

to a determination made by the Secretary of Health, Education, and Welfare in September 1965. (The annual amount of this determination for the old-age and survivors insurance trust fund was \$87.4 million, and for the disability insurance trust fund, \$18.4 million.) Periodically, the estimated amounts of annual payments will be refigured to reflect actual costs already incurred and revision in the estimates of future costs.

The first annual reimbursement, for fiscal year 1966 and amounting to \$78 million for the old-age and survivors insurance trust fund and \$16 million for the disability insurance trust fund, was received in July 1966. Like amounts have been appropriated by Congress for fiscal year 1967 and will be received by the trust funds in the early part of calendar year 1967. Moreover, the Budget Document of the United States for the fiscal year 1968 makes similar provision for the third such annual reimbursement. The estimates shown in the various tables in this section reflect the effect of past and future reimbursements.

#### ACTUARIAL STATUS OF THE TRUST FUNDS

Old-age, survivors, and disability insurance benefit payments will increase for many years—not only in dollars but also as a percentage of taxable payroll. Long-range estimates are needed, therefore, to show how much the cost is likely to increase and to indicate whether the scheduled tax rates are adequate.

The cost of benefits to aged persons, which constitute more than 80 percent of the total cost, will rise for several reasons. The U.S. population will, in the long run, almost certainly become relatively much older on the average. A relatively older population will tend to result from the fact that the present aged population is made up of the survivors from past periods when death rates were much higher than they are now. Another such factor is that, after the turn of the century, the larger birth cohorts of the 1940's, 1950's, and 1960's will be attaining retirement age. Thus, in the future, relatively more persons, both in total and in each cohort, will attain age 65 and older ages.

The cost of the program is closely related to the ratio of the population aged 65 and over (potential beneficiaries) to the population aged 20 to 64 (potential contributors). On June 30, 1966, this ratio was 18.3 percent. In a stationary population that would result if the death rates of the U.S. Life Tables for 1959-61 were applied to a constant annual number of births the ratio would be 25.4 percent, but such a situation is not likely to occur within the next century. Ultimately this ratio may become even greater than 25 percent because decreases in mortality below present rates would, in a stationary population, have the effect of increasing the proportion at the oldest ages.

Another reason for the increasing cost is that the proportion of the aged population eligible for and receiving benefits will increase. Some of the present persons aged 65 and over were not in covered employment long enough to obtain benefits, or, in the case of widows, their husbands were not sufficiently long in covered employment. Although the system began in 1937, many jobs were not covered until 1951 or 1955. It is estimated that the proportion of the aged popula-

tion eligible for some type of cash benefit under the system will increase from the level of about 89 percent on January 1, 1967, to between 94 and 95 percent in 1980 and between 96 and 98 percent by the end of the century.

Since the long-term future cost of the old-age, survivors, and disability insurance program will be affected by many factors that are difficult to determine, the assumptions used in the actuarial cost estimates may differ widely and yet be reasonable. The long-term cost estimates for the program (shown for 1980 and thereafter) are presented here on a range basis to indicate the plausible variation in future costs depending on the actual trends that develop for the various cost factors. Both the low- and high-cost estimates are based on assumptions that represent moderately full employment, with the average annual earnings remaining at about the level that prevailed in 1966; thus, changes slightly above and slightly below this level tend to offset each other over the long-range future period considered. Each estimate provides data on taxable payroll and contributions and on beneficiaries and benefit payments for every future year. The data are presented here for selected future years.

It is considered likely, although by no means certain, that actual costs as a percentage of taxable payroll will lie between the low- and high-cost figures. Also, a single estimate of costs is needed as a guide in considering proposed legislation and developing tax schedules intended to make the system self-supporting. For these reasons, an intermediate-cost estimate is prepared, in which numbers of beneficiaries, amount of benefit payments, and taxable payrolls are taken halfway between the low- and high-cost figures. The intermediate percentage-of-payroll figures are obtained by dividing total benefit payments by taxable payroll, each on the intermediate basis, and are therefore not exactly equal to the average of low- and high-cost percentage-of-payroll figures.

Table 19 shows benefit-payment costs for selected years and the corresponding level-costs over the next 75 years, expressed as percentages of taxable payroll, under each of the three estimates. The level cost of the program on this basis is the constant combined employer-employee tax rate that, together with a tax on the self-employed of about 75 percent of such combined rate (in the 1965 act a maximum self-employed tax rate of 7.0 percent was established), would exactly pay for future benefits and administrative expenses, after making allowance for the effect of the future interest earnings of the existing trust fund and for all other future interest earnings. All percentage-of-payroll figures are adjusted so that they represent the tax rate that employees and employers combined, and the self-employed at three-quarters of the combined rate, would have to pay in any given year to meet exactly the disbursements in that year.

TABLE 19.—*Estimated costs of old-age, survivors, and disability insurance benefit payments as percent of payroll,<sup>1</sup> 1966 level-earnings assumptions, 1980-2045*

(In percent)

Calendar year	Low-cost estimate	High-cost estimate	Intermediate-cost estimate <sup>2</sup>
Old-age and survivors insurance benefits <sup>3</sup>			
1980.....	7.24	7.63	7.43
1985.....	7.66	8.14	7.89
1990.....	7.94	8.55	8.24
2000.....	7.44	8.37	7.89
2025.....	8.66	11.09	9.76
2045.....	8.56	11.76	9.96
Level-cost <sup>4</sup> .....	7.42	8.52	7.91
Disability insurance benefits <sup>3</sup>			
1980.....	0.74	0.86	0.80
1985.....	.75	.88	.81
1990.....	.73	.88	.80
2000.....	.74	.93	.84
2025.....	.80	1.09	.93
2045.....	.82	1.11	.95
Level-cost <sup>4</sup> .....	.76	.96	.85

<sup>1</sup> Taking into account the lower contribution rate on self-employment income, on tips, and on multiple-employer "excess wages," as compared with the combined employer-employee rate.

<sup>2</sup> Based on the averages of the dollar contributions and dollar costs under the low- and high-cost estimates.

<sup>3</sup> Includes payments for vocational rehabilitation services.

<sup>4</sup> Level contribution rate, at an interest rate of 3.25 percent for high cost, 3.75 percent for intermediate-cost, and 4.25 percent for low-cost, for benefits after 1966, taking into account interest on the trust fund on Dec. 31, 1966, future administrative expenses, the railroad retirement financial interchange provisions, and reimbursement for additional cost of noncontributory credit for military service.

Tables 20 and 21 show, for each set of estimates, the contributions, benefit payments, administrative expenses, amount paid to or received from the railroad retirement system, and the balance in the trust funds for selected years.

It should be emphasized that dollar figures projected for so many years into the future have only limited significance because of changes that are likely to occur in the general economy, as well as in the system itself. What is really the most significant are relative figures such as those in table 19, showing the benefit costs as a percentage of taxable payroll.

For old-age and survivors insurance, annual benefit payments as a percentage of payroll are less than or close to the scheduled tax rates in the early future years, but they eventually rise above the ultimate combined employer-employee rate of 9.0 percent for the high- and intermediate-cost assumptions. For disability insurance, the benefit payments are higher than the present combined employer-employee tax rate of 0.7 percent in all but the early years.

To measure the extent to which the financing arrangements of the system result in a surplus or deficiency, a level rate equivalent to the actual increasing contribution rates has been computed, taking into account future interest. The level-equivalent rate of contributions minus the level-cost of benefit payments and administrative costs expressed as a percentage of taxable payroll (after making allowance for the interest-earning effect of the existing trust fund), gives the amount by which the contribution rate in all years would have to

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be changed to put the system in exact long-range balance according to the estimate. A negative figure would indicate that an increase in the tax rate is needed to make the system self-supporting, while a positive figure would indicate that the system is overfinanced.

TABLE 20.—Estimated progress of old-age and survivors insurance trust fund, 1966 level-earning assumption <sup>1</sup>

[In millions]

Calendar year	Contributions	Benefit payments	Administrative expenses	Financial inter-change <sup>2</sup>	Interest on fund	Fund at end of year
Actual data						
1956.....	\$6,172	\$5,715	\$132	\$5	\$526	<sup>3</sup> \$22,519
1957.....	6,825	7,347	162	2	556	22,393
1958.....	7,566	8,327	194	-124	552	21,864
1959.....	8,052	9,842	184	-282	532	20,141
1960.....	10,866	10,677	203	-318	516	20,324
1961.....	11,285	11,862	239	-332	548	19,725
1962.....	12,059	13,356	256	-361	521	18,337
1963.....	14,541	14,217	281	-423	569	19,125
1964.....	15,689	14,914	296	-403	593	18,235
1965.....	16,017	16,737	328	-436	644	20,570
1966.....	20,658	18,267	256	-444		
Low-cost estimate						
1980.....	\$34,373	\$27,567	\$449	-\$105	\$4,849	\$124,853
1985.....	36,689	31,139	486	4	7,270	183,967
1990.....	39,232	34,514	523	52	10,016	251,272
2000.....	46,318	38,237	577	112	17,946	447,853
2025.....	63,533	61,097	865	147	65,411	1,611,481
High-cost estimate						
1980.....	\$33,682	\$28,497	\$514	-\$155	\$3,009	\$100,561
1985.....	35,769	32,265	556	-46	4,159	136,815
1990.....	37,888	35,927	610	-7	5,239	170,718
2000.....	43,619	40,471	663	42	7,792	232,861
2025.....	53,140	65,479	963	67	16,425	521,752
Intermediate-cost estimate						
1980.....	\$34,028	\$28,031	\$482	-\$130	\$3,867	\$112,430
1985.....	36,229	31,702	521	-21	5,582	159,609
1990.....	38,560	35,220	566	23	7,385	209,245
2000.....	44,969	39,355	620	77	12,205	344,138
2025.....	58,336	63,288	914	107	36,172	1,004,202

<sup>1</sup> Interest rates of 3.25 percent for high-cost, 3.75 percent for intermediate-cost, and 4.25 percent for low-cost, were used in determining the level cost, but in developing the progress of the trust fund, varying rates in the early years were used, which, when averaged over a long period of time, are equivalent to such fixed rates.

<sup>2</sup> A positive figure indicates payment to the trust fund from the railroad retirement account; a negative figure indicates the reverse.

<sup>3</sup> Not including \$60,000,000 in the railroad retirement account to the credit of the old-age and survivors insurance trust fund.

<sup>4</sup> These figures are artificially high because of the method of reimbursements between this trust fund and the disability insurance trust fund (and, likewise, the figure for 1959 is too low).

NOTE.—Contributions include reimbursement for additional cost of noncontributory credit for military service.

TABLE 21.—Estimated progress of disability insurance trust fund, 1966 level-earnings assumption <sup>1</sup>

[In millions]

Calendar year	Contributions	Benefit payments	Administrative expenses	Financial inter-change <sup>2</sup>	Interest on fund	Fund at end of year
Actual data						
1957.....	\$702	\$57	<sup>3</sup> \$3	-----	\$7	\$649
1958.....	966	249	<sup>3</sup> 12	-----	25	1,379
1959.....	891	457	50	22	40	1,825
1960.....	1,010	568	36	5	53	2,289
1961.....	1,038	887	64	-5	66	2,437
1962.....	1,046	1,105	66	-11	68	2,368
1963.....	1,099	1,210	68	-20	66	2,235
1964.....	1,154	1,309	79	-19	64	2,047
1965.....	1,188	1,573	90	-24	59	1,606
1966.....	2,022	1,784	137	-----	58	1,739
Low-cost estimate						
1980.....	\$2,691	\$2,837	\$115	\$15	\$22	\$701
1985.....	2,871	3,041	114	18	-33	638
1990.....	3,070	3,183	112	18	( <sup>4</sup> )	( <sup>5</sup> )
2000.....	3,622	3,834	126	18	( <sup>4</sup> )	( <sup>5</sup> )
2025.....	4,953	5,642	185	18	( <sup>4</sup> )	( <sup>5</sup> )
High-cost estimate						
1980.....	\$2,637	\$3,228	\$144	\$7	( <sup>6</sup> )	( <sup>6</sup> )
1985.....	2,800	3,501	155	8	( <sup>6</sup> )	( <sup>6</sup> )
1990.....	2,985	3,691	157	8	( <sup>6</sup> )	( <sup>6</sup> )
2000.....	3,412	4,521	190	8	( <sup>6</sup> )	( <sup>6</sup> )
2025.....	4,143	6,435	271	8	( <sup>6</sup> )	( <sup>6</sup> )
Intermediate-cost estimate						
1980.....	\$2,664	\$3,032	\$130	\$11	( <sup>6</sup> )	( <sup>6</sup> )
1985.....	2,835	3,271	132	13	( <sup>6</sup> )	( <sup>6</sup> )
1990.....	3,017	3,438	134	13	( <sup>6</sup> )	( <sup>6</sup> )
2000.....	3,517	4,176	158	13	( <sup>6</sup> )	( <sup>6</sup> )
2025.....	4,548	6,039	228	13	( <sup>6</sup> )	( <sup>6</sup> )

<sup>1</sup> Interest rates of 3.25 percent for high-cost, 3.75 percent for intermediate-cost, and 4.25 percent for low cost were used in determining the level cost, but in developing the progress of the trust fund, varying rates in the early years were used, which, when averaged over a long period of time, are equivalent to such fixed rates.

<sup>2</sup> A positive figure indicates payment to the trust fund from the railroad retirement account; a negative figure indicates the reverse.

<sup>3</sup> These figures are artificially low because of the method of reimbursements between the trust fund and the old-age and survivors insurance trust fund (and, likewise, the figure for 1959 is too high).

<sup>4</sup> Fund exhausted in 1983.

<sup>5</sup> Fund exhausted in 1975.

<sup>6</sup> Fund exhausted in 1977.

NOTE.—Contributions include reimbursement for additional cost of noncontributory credit for military service and benefits include payments for vocational rehabilitation services.

The long-range balance of the system is shown by the following level-equivalent costs and contributions, expressed in percentages of taxable payroll, which are computed as of the beginning of calendar year 1967, at interest rates of 3.25 percent for high-cost, 3.75 percent for intermediate-cost, and 4.25 percent for low-cost:

[In percent of taxable payroll <sup>1</sup>]

Item	OASI	DI	Total
Low-cost estimate			
Contributions.....	8.79	.70	9.49
Benefits <sup>2</sup> .....	7.42	.76	8.18
Actuarial balance.....	1.37	-.06	1.31
High-cost estimate			
Contributions.....	8.82	.70	9.52
Benefits <sup>2</sup> .....	8.52	.96	9.48
Actuarial balance.....	.30	-.26	.04
Intermediate-cost estimate			
Contributions.....	8.80	.70	9.50
Benefits <sup>2</sup> .....	7.91	.85	8.76
Actuarial balance.....	.89	-.15	.74

<sup>1</sup> Based on adjusted payroll that reflects the lower contribution rate on self-employment income, tips, and multiple-employer "excess wages", as compared with the combined employer-employee rate.

<sup>2</sup> Including adjustments (1) for interest on the existing trust fund, (2) for administrative expenses, (3) for the railroad retirement financial interchange provisions, and (4) for reimbursement of military-wage-credits cost. For DI, includes payments for vocational rehabilitation services.

The old-age, survivors, and disability insurance system as a whole is overfinanced by a substantial amount (0.74 percent of payroll on the intermediate-cost basis). The old-age and survivors insurance portion of the system is overfinanced by a substantial amount (0.89 percent of payroll on the intermediate-cost basis). However, the disability insurance portion has a lack of actuarial balance (0.15 percent of payroll on the intermediate-cost basis) that is well above the margin of variation inherent in these cost estimates.

If the intermediate-cost estimate had been based on a higher interest rate than 3.75 percent (which is somewhat above the current average being earned by the total investments of the trust funds, although considerably below the prevailing market rate of interest on long-term Government obligations, which was 5 percent in December 1966 and 4½ percent in January 1967), the actuarial balance of the total program would have been considerably improved. Thus, for example, the use of a 4-percent interest rate would increase the actuarial balance of the program by about 0.05 percent of taxable payroll.

If the experience exactly follows the assumptions, future computations would show a gradual increase in the actuarial balance (or lack of balance) under the intermediate-cost estimate for both the old-age and survivors insurance system and the disability insurance system. The reason for this is that interest accumulations increase any surplus in the system, but the failure to accumulate all interest income that

would have been earned in an exactly balanced system increases any deficit. In the case of a surplus, the excess contributions actually earn interest, while a deficit grows because of the absence of the annual interest that would have been earned if the contributions required for balance had been paid.

Continuing study of the emerging experience under the program provides a basis for prompt changes in the tax rate or other changes that may be necessary to keep the system from growing excessively out of actuarial balance in either direction.

It is important to note that these estimates are made on the assumption that earnings will remain at about the level prevailing in 1966. If earnings levels rise, as they have in the past, the benefits and the taxable earnings base under the program will undoubtedly be modified. In fact, if all other assumed cost factors are closely followed by the experience, then increasing wage levels will automatically generate positive actuarial balances that can be used to increase benefit levels without changing the financing provisions. If such changes are made concurrently and proportionately with changes in general earnings levels, and if the experience follows all the other assumptions, the future year-by-year costs of the system as a percentage of taxable payroll would be the same as those shown. However, the existing trust fund accumulated in the past, and its interest earnings, will represent a smaller proportion of the future taxable payrolls than if earnings were not to increase in future years. As a result, since interest earnings of the trust fund will play a relatively smaller role in the financing of the system, the "net" level-cost—taking into account benefit payments, administrative expenses, and interest on the existing trust fund—would be somewhat higher. However, the level-cost might not rise this much, or might even decline, if benefit adjustments do not fully reflect rising earnings. Again, the effect of such events can be observed in ample time to make any needed changes in the contribution schedule or any other appropriate changes in the system.

This analysis includes the benefits and contributions in respect to all persons anticipated to be covered in the future under present statutory provisions and not merely (a) the benefits to be paid to workers who have been covered by the system in the past and to their dependents and survivors, (b) the future taxes to be paid by, and with respect to, such workers and (c) the existing trust funds. An insurance company must set up reserves equal to all currently accrued liabilities, since it cannot compel individuals to become new policyholders and must be in a position at any time so that in the future it can pay all benefits that will become due with respect to its present and past policyholders, using only its present assets and the future premiums to be paid by present policyholders. In analyzing the actuarial condition of a compulsory social insurance system that will continue indefinitely, the income and outgo with respect to new entrants should properly be included, thus obviating the need to set up reserves for all currently accrued liabilities.

A discussion of the assumptions under which these estimates have been made is presented in appendix I.

## MEDIUM-RANGE COST ESTIMATES

The preceding sections have presented both short-range cost estimates (for the next 5 years) and long-range cost estimates (for many decades into the future) for the old-age, survivors, and disability insurance system. This section presents medium-range cost estimates covering a period of 15 to 20 years that take into account possible variations in economic factors, such as level of earnings and level of employment, as well as variations in demographic factors.

Tables 22 and 23 present two medium-range projections based on different assumptions. For both projections, it is assumed that economic activity will have normal expansion throughout the period, with employment increasing steadily and with the average total earnings of covered workers increasing at an annual rate of 3 percent (somewhat higher increases are assumed in the first 5 years). Under present circumstances, it would appear that this 3-percent rate of increase is on the low side.

In the first projection (table 22), the maximum taxable earnings base is assumed to remain at \$6,600 per year, while for the second one (table 23), the base is assumed to be kept up to date; i.e., changed periodically so as to cover about the same proportion of total earnings that was covered in 1967 by the \$6,600 base. These assumptions imply that, for the first projection, only about three-eighths of the 73-percent increase in average earnings that is estimated to occur in 1967-85 will be taxable under the program, due to the dampening effect of the fixed maximum taxable earnings base. For the second projection, the entire 73-percent increase will be taxable because of the assumed constant updating of the taxable earnings base.

TABLE 22.—Estimated progress of trust funds, increasing earnings assumption, fixed earnings base, and equivalent 3.75 percent interest rate basis<sup>1</sup>

[In millions]

Calendar year	Contributions <sup>2</sup>	Benefit payments <sup>3</sup>	Administrative expenses	Financial inter-change <sup>4</sup>	Interest on fund	Fund at year end
Old-age and survivors insurance trust fund						
1975	\$37,591	\$25,716	\$491	-\$263	\$3,348	\$100,589
1980	43,110	29,544	590	-43	6,430	187,281
1985	48,105	33,550	692	96	10,429	298,874
Disability insurance trust fund						
1975	\$2,939	\$2,760	\$152	-\$7	\$122	\$3,653
1980	3,370	3,171	161	15	153	4,548
1985	3,760	3,481	175	23	200	5,932

<sup>1</sup> On the same basis as used to develop the trust funds for the long-range intermediate cost estimates in tables 20 and 21.

<sup>2</sup> Includes reimbursement for additional cost of noncontributory credits for military service.

<sup>3</sup> For the old-age and survivors insurance trust fund, does not include the special payments to persons aged 72 and over that are reimbursable from the General Treasury. For the disability insurance trust fund, includes payments for vocational rehabilitation services.

<sup>4</sup> A positive figure indicates payment to the trust funds from the railroad retirement account; a negative figure indicates the reverse.



TABLE 23.—*Estimated progress of trust funds, increasing earnings and benefits assumptions, variable earnings base, and equivalent 3.75 percent interest rate basis*<sup>1</sup>

[In millions]

Calendar year	Contributions <sup>2</sup>	Benefit payments <sup>3</sup>	Administrative expenses	Financial inter-change <sup>4</sup>	Interest on fund	Fund at year end
Old-age and survivors insurance trust fund						
1975	\$42,886	\$33,536	\$601	\$-403	\$2,590	\$79,011
1980	53,976	44,514	765	-194	4,775	140,754
1985	66,615	58,366	959	-36	7,292	211,221
Disability insurance trust fund						
1975	\$3,353	\$3,692	\$184	\$4	\$7	\$297
1980	4,218	4,815	206	16	( <sup>5</sup> )	( <sup>5</sup> )
1985	5,202	6,022	243	22	( <sup>5</sup> )	( <sup>5</sup> )

<sup>1</sup> On the same basis as used to develop the trust funds for the long-range intermediate cost estimates in tables 20 and 21.

<sup>2</sup> Includes reimbursement for additional cost of noncontributory credits for military service.

<sup>3</sup> For the old-age and survivors insurance trust fund, does not include the special payments to persons aged 72 and over that are reimbursable from the General Treasury. For the disability insurance trust fund, includes payments for vocational rehabilitation services.

<sup>4</sup> A positive figure indicates payment to the trust funds from the railroad retirement account; a negative figure indicates the reverse.

<sup>5</sup> Fund exhausted in 1976.

It is assumed for the first projection that all provisions of the law would remain as they were after the 1965 amendments. This projection is based on dynamic earnings-level assumptions and static benefit-provision assumptions. However, over the 19-year period covered by the estimates, changes will undoubtedly be made. The purpose of this estimate is to indicate the size of the financial commitments of present law, even though it is recognized that the law itself will undoubtedly be changed during the period. The extent and timing of these changes are of course, unpredictable.

It is assumed for the second projection that the maximum taxable earnings base and the benefit provisions of the law are amended periodically so that the relationships among total earnings, taxable earnings and benefit expenditures during each of the years 1967-85 are the same as those shown in the long-range intermediate-cost estimates prepared on level-earnings assumptions. The cost estimate shown in table 23 is, therefore, very similar to the long-range cost estimate if costs are considered in terms of percentages of taxable payroll, but it has the advantage of presenting dollar figures of a more realistic magnitude. This projection, accordingly, is based on dynamic earnings-level assumptions, combined with an assumption that the law is frequently amended to keep the system fully up to date.

As shown in tables 22 and 23, according to the medium-range estimates, the old-age and survivors insurance trust fund grows steadily through the 19-year period—reaching about \$187 billion in 1980 in the first projection and about \$141 billion in the second one. For 1985, the corresponding figures for the balance in the trust fund are \$299 billion and \$211 billion, respectively. In 1985, estimated contribution income exceeds benefit outgo by about 43 percent under the assumptions of dynamic earnings-level conditions and static benefit provisions, but by only 14 percent under the “double dynamic” assumptions basis.

The disability insurance trust fund, according to the first projection, increases slowly—reaching about \$4.5 billion in 1980 and about \$5.9 billion in 1985. According to the second projection, with the “double dynamic” assumptions, the fund is exhausted in the year 1976.

#### CONCLUSION

The current long-range actuarial cost estimates for the old-age, survivors, and disability insurance program as a whole indicate that the program is overfinanced by a substantial amount. The actuarial balance of each of the two parts of the program—old-age and survivors insurance and disability insurance—is, however, differently effected.

According to the intermediate-cost estimate, the old-age and survivors insurance program has a substantial favorable actuarial balance of 0.89 percent of taxable payroll on a level-cost basis computed over the next 75 years. On the other hand, the disability insurance program shows a lack of actuarial balance of 0.15 percent of taxable payroll.

The Board of Trustees recommends that there be an increase in the allocation of future income to the disability insurance trust fund. Specifically, the portion of the combined employer-employee contribution rate that would go to the disability insurance trust fund should be 0.85 percent of taxable payroll, while for the self-employed rate the corresponding figure should be 0.6375 percent. The increased allocation to the disability insurance trust fund would not affect the actuarial balance of the old-age, survivors, and disability insurance system as a whole, but it would make for a more reasonable and equitable subdivision of the income between the two parts of the system.

For the present program, following this increased allocation to the disability insurance trust fund, the actuarial balance of the old-age and survivors insurance portion of the system would, according to the intermediate-cost estimate, be 0.74 percent of taxable payroll, while the disability insurance portion of the system would be in exact actuarial balance. Thus, after the increase in allocation, on the basis of the present long-range cost estimates, not only would the present program as a whole have a substantial actuarial balance, but also each of the two parts of the system would have a satisfactory actuarial balance. It may be noted that, under conditions of actuarial balance, the system will have sufficient income from contributions (based on the tax schedule now in the law) and from interest earnings on investments to meet the cost of the benefit payments and administrative expenses over the 75-year period covered by the cost estimates.

The Board of Trustees had repeatedly recommended, in prior reports, that appropriations authorized under section 217(g) of the Social Security Act be made from general revenues to reimburse the trust funds for the additional costs incurred with respect to benefits based on noncontributory credit for military service. The Board is pleased to state that, during the period since the release of its last annual report, Congress has enacted the first two such appropriations.

# APPENDIXES

## APPENDIX I. ASSUMPTIONS, METHODOLOGY, AND DETAILS OF LONG-RANGE COST ESTIMATES

The basic assumptions used in the long-range estimates for the old-age, survivors, and disability insurance system are described in this appendix.<sup>1</sup> Also given are more detailed data in connection with the results of these estimates.

### *Population*

Projections were made of the U.S. population (including overseas areas covered by the old-age, survivors, and disability insurance program) for future quinquennial years, by 5-year age groups and by sex. The starting point was the population on July 1, 1965, as estimated by the Bureau of the Census from the 1960 census and from births, deaths, and migration in 1960-65. This population estimate was increased to allow for probable underenumeration in the 1960 census and adjusted for differences in the geographical areas covered by the estimate of the Bureau of the Census and those covered by the old-age, survivors, and disability insurance system.

In the projections for both cost estimates it is assumed that mortality rates will decline until the year 2000. In the high-cost estimates, mortality rates for the year 2000 are, on the average, about 73 percent of the 1959-61 level. The mortality is projected to decrease by about 40-55 percent at the younger ages, but with the rates at the older ages showing somewhat smaller improvements. The low-cost estimate assumes exactly half of the improvement in mortality used in the high-cost estimate.

In the low-cost estimate, fertility rates are assumed to decrease slowly until reaching a level in 1985 roughly equivalent to about 83 percent of the average rates prevailing in the period 1960-65. The high-cost fertility rates decrease more rapidly and reach an ultimate rate in 2010 equivalent to about 68 percent of the 1960-65 experience. Both estimates assume a small amount of net immigration.

The low-cost estimate is based on high fertility and high mortality, while the high-cost estimate assumes low fertility and low mortality. This makes the high-cost population relatively much older than the low-cost population, which is reasonable in view of the fact that benefits to aged persons account for more than 80 percent of the cost of the system. Complete details about the population projections are given in Actuarial Study No. 62, Social Security Administration.

### *Employment*

Assumptions as to the percentage of the population who have covered employment during a year were made for each age group by sex for each quinquennial year. The estimated percentages for 1965 for males were projected to increase slightly (so as to reflect some decrease in the unemployment rate over that prevailing in 1965), except for the older ages where they were assumed to decrease for both the low-cost and high-cost assumptions (thus recognizing the possibility of higher retirement rates). An increase was assumed for females, except for the very old ages; these increases are higher in the middle ages and are a continuation of trends in the past.

All the foregoing assumptions may be characterized as representing moderately full employment. A depression could substantially increase the cost, but it is believed that any periods of low employment would be of short duration and would not have a significant long-range effect.

### *Earnings*

Level average earnings at about the 1966 level were assumed for each sex. This assumption implies that within each sex group the earnings level would not

<sup>1</sup> A more detailed discussion of the procedures followed in making the long-range cost estimates will be published in Actuarial Study No. 64, Social Security Administration. A detailed discussion of the cost estimates for the 1965 act can be found in Actuarial Study No. 63.

rise on account of changes in the distribution of covered workers by occupation or industry.

In the past, average earnings have increased greatly, partly because of inflation, partly because of increased productivity, and partly because of the changed occupational composition of the labor force and related factors. If this trend continues and if the benefit formula is not changed, the cost relative to payroll would be less than the estimates show because the formula provides a benefit that is a decreasing percentage of average wage as the average wage increases.

It is likely, however, that if average earnings increase, the benefit formula and the earnings base used for contributions will be modified.

If benefit payments are increased in exactly the same ratio as the increase in average earnings, the year-by-year cost estimates of benefit payments expressed as a percentage of payroll would be unchanged. There would, however, be some increase in the level-premium cost because of the diminished relative value of interest earnings on the trust funds.

#### *Insured population*

The term 'insured' is used as meaning fully insured, since the number of persons who are currently insured only is relatively small and can be disregarded for long-range cost analysis purposes. The percentages of insured persons by age and sex in various future years are estimated from the percentages of persons covered. It is evident that eventually almost all males in the country will be insured for old-age and survivor benefits; the ultimate percentage for aged males is estimated at 96 percent in the low-cost estimate and 98 percent in the high-cost estimate. For females there is much greater uncertainty; it is estimated that the corresponding proportions for aged females will eventually be 70 percent in the low-cost estimate and 75 percent in the high-cost estimate (the differential reflecting the range possible because of women moving in and out of the labor market and whether thereby they do or do not obtain insured status).

The estimated numbers of persons insured for disability benefits are lower than those insured for old-age and survivor benefits because of the more restrictive insured status provisions for disability benefits.

#### *Aged beneficiaries*

Old-age beneficiaries are estimated from the aged insured population. The proportions, by age and sex, of the insured population that were receiving benefits at the beginning of 1965 were projected to increase slightly in the high-cost estimate, following the trends in the past—thus, reflecting the assumed gradual increase in the retirement rates. In the low-cost estimate, the rates were assumed to remain at the 1965 level, which reflects the most recent tendency for a leveling-off in this factor.

Wives aged 62 and over of male old-age beneficiaries were estimated by using census data and mortality projections. These potential wife beneficiaries, after adjustment for eligibility to benefits on their own account, were assumed to claim benefits as soon as they are eligible, even if this occurred at ages 62–64, when they would have to take reduced benefits. The experience to date indicates that in the vast majority of the cases such immediate claiming of wife's benefits does occur.

To estimate widow beneficiaries the proportions of widows in the female aged population were projected according to mortality assumptions and adjusted for both eligibility to benefits on their own account and for the insured status of their deceased husbands. These uninsured eligible widows were assumed to claim benefits as soon as available even if this occurred at ages 60 and 61, when they would have to take reduced benefits.

It can be observed that the assumed wife and widow beneficiaries consist of the uninsured potential beneficiaries. In actual practice, some of the insured potential beneficiaries also receive a residual benefit consisting of the excess of the potential wife's or widow's benefit over their own old-age benefit. These residual benefits, although not giving rise to additional aged beneficiaries, were considered in the cost of the particular type of dependent or survivor benefit concerned.

The minor category of parent beneficiaries is estimated as a constant proportion of aged persons not eligible for any other benefit. The insignificant effect of the retirement test as it applies to wife's, widow's, and parent's benefits was ignored. No estimates were made for benefits to dependent husbands and widowers since their cost is relatively negligible.

Appendix table 1 shows the estimated numbers of aged beneficiaries.

*Beneficiaries under retirement age*

Young wives and children of retired workers were estimated by reference to their ratios to male old-age beneficiaries, as derived from recent actual data and projected according to the population fertility and mortality assumptions.

Child-survivor beneficiaries were obtained from estimates of total paternal orphans in the country in future years. The projected child population by age groups was multiplied by the probability of being a paternal orphan. These probabilities were derived by using distributions of age of fathers at birth of child and death rates consistent with the population projections. The number of paternal orphans was then adjusted to eliminate orphans of uninsured men, to add the small numbers of orphans of insured women and to include the eligible disabled orphans aged 18 and over. For the nondisabled children aged 18-21, a further reduction was made to exclude those not attending school. Mother survivor beneficiaries are estimated by assuming a constant ratio of mothers to children, after excluding those aged 18-21 who are attending school. The numbers of lump-sum death payments were estimated by multiplying the insured population by death rates used in the population projections.

*Disabled beneficiaries and their dependents*

Future numbers of persons receiving monthly disability benefits based on their own earnings records are estimated by applying disability prevalence rates (by age and sex) to the population insured for disability benefits. Prevalence rates may be defined as the proportion of the relevant population (population insured for disability in this case) that has a specific characteristic (receiving disability benefits in this case).

 APPENDIX TABLE 1.—*Monthly retirement beneficiaries in current-payment status,<sup>1</sup> 1955-2025*

[In thousands]

Calendar year	Old-age beneficiaries		Wives of old-age beneficiaries <sup>2</sup>	Aged widows <sup>3</sup>	Dependent parents	Total
	Male	Female				
Actual data						
1955.....	3,252	1,222	1,144	701	25	6,344
1956.....	3,572	1,540	1,376	913	27	7,428
1957.....	4,198	1,999	1,779	1,095	29	9,101
1958.....	4,617	2,303	1,979	1,233	30	10,162
1959.....	4,937	2,589	2,123	1,394	35	11,077
1960.....	5,217	2,845	2,236	1,544	36	11,877
1961.....	5,765	3,160	2,368	1,697	37	13,027
1962.....	6,244	3,494	2,510	1,859	37	14,145
1963.....	6,497	3,766	2,561	2,011	37	14,872
1964.....	6,657	4,011	2,587	2,159	36	15,451
1965.....	6,872	4,276	2,614	2,371	35	16,168
Low-cost estimate						
1980.....	9,013	7,567	2,912	3,473	32	22,967
1985.....	9,833	8,840	2,970	3,632	31	25,306
1990.....	10,578	10,075	3,041	3,557	30	27,281
2000.....	11,125	11,514	2,838	3,501	28	29,006
2025.....	18,204	18,989	3,646	5,356	28	46,223
High-cost estimate						
1980.....	9,619	7,931	3,103	3,441	33	24,127
1985.....	10,643	9,323	3,209	3,583	32	26,790
1990.....	11,639	10,697	3,280	3,547	31	29,194
2000.....	12,616	12,607	3,050	3,623	29	31,925
2025.....	21,280	22,039	3,782	4,838	23	51,962

<sup>1</sup> Persons qualifying both for old-age benefits and for wife's, widow's, husband's, widower's, and parent's benefits are shown only as old-age beneficiaries. Minimum retirement age was 65 until November 1956, when it was lowered to 62 for women, and until August 1961, when it was also reduced to 62 for men, except that for widows it was further lowered to 60 in September 1965. Actual data as of the end of the year (except for 1958—November); estimated data as of the middle of the year. Excluding effect of railroad financial interchange provisions.

<sup>2</sup> Including dependent husbands and including wives of any age with child beneficiaries in their care (both relatively small categories).

<sup>3</sup> Including dependent widowers.

The prevalence rates were developed from assumed disability incidence and termination rates. The incidence rates were based on the so-called 165 percent modification of class 3 rates (which includes increasingly higher percentages for ages above 45). This 165 percent modification corresponds roughly to life insurance company experience during the early 1930's. These rates were reduced by 10 percent to account for the fact that unlike the general definition in insurance company policies, disability is not presumed to be total and of expected long-continued duration after 6 months' duration. Rather, the likelihood of the disability being of a long-continued and indefinite-nature condition must be proved at the time. To take into consideration the fact that according to the 1965 amendments the disability should be expected to last at least 12 months instead of being of a long-continued duration, the final prevalence rates were increased by 1.5 percent relatively.

The original estimates of the cost of the disability insurance system (prepared at the time of the 1956 amendments) assumed, for high cost, incidence rates based on the 165 percent modification of class 3 rates. For low cost, the rates were assumed to be 25 percent of those used in the high cost estimate. These incidence rates are basically those in current use except for a narrowing of the range between low and high to reflect the operating experience analyzed up to now. This experience has shown the actual incidence rates to fall roughly mid-range between the high incidence and low incidence originally assumed.

Benefit termination rates because of death and recovery in current use are those used in the original disability insurance cost estimate—i.e., class 3 rates for high cost and 1924-27 German social insurance experience for low cost estimate.

The prevalence rates resulting from the above incidence and termination rates were adjusted to reflect current operating experience and the new definition in the 1965 amendments and then used to calculate the numbers of beneficiaries in the future. These future prevalence rates are thus based on the incidence and termination rates originally assumed, but they are adjusted to reflect the latest available experience. The modified methodology that has been followed allows for a prompt reflection, in the estimated cost, of any changes in the experience of the program.

In accordance with current experience the prevalence rates for females were assumed to be about 80 percent of those for male workers.

Appendix table 2 shows the estimates of number of beneficiaries under the minimum retirement age (including disability insurance beneficiaries and their dependents).

#### *Average benefits and total benefit payments*

Average benefits in the various benefit categories were interpolated between the sizes of current benefit awards, estimated from recent claims data, and the sizes of the ultimate benefits computed. The latter were determined as though the 1966 earnings level were in effect throughout the entire working life of all workers with respect to whom benefits are being paid. Total benefit payments are shown in dollar amounts, in tables 20 and 21, and as a percentage of payroll, in table 19.

The combined cost of old-age, survivors, and disability benefits (expressed as a percentage of taxable payroll) in 1966 as shown in tables 15 and 18 is projected to increase by about 40 percent in the low-cost estimate and by about 95 percent in the high-cost estimate, according to table 19. The significant upward cost trend is temporarily reversed around the year 2000, at which time a significant part of the age population consists of survivors of persons born in the 1930's, when birth rates were low.

APPENDIX TABLE 2.—*Monthly beneficiaries under minimum retirement age in current-payment status<sup>1</sup> and number of deaths resulting in lump-sum death payments, 1955-2025*

[In thousands]

Calendar year	Children <sup>2</sup>	Widowed mothers	Disability beneficiaries			Total monthly beneficiaries	Lump-sum death cases
			Workers	Wives <sup>3</sup>	Children <sup>4</sup>		
Actual data							
1955.....	1,276	292	-----	-----	-----	1,568	567
1956.....	1,341	301	-----	-----	-----	1,642	547
1957.....	1,502	328	150	-----	-----	1,980	680
1958.....	1,606	354	238	12	18	2,228	<sup>5</sup> 657
1959.....	1,754	376	334	48	78	2,590	<sup>6</sup> 822
1960.....	1,845	401	455	77	155	2,934	779
1961.....	1,989	428	618	118	291	3,444	813
1962.....	2,160	452	741	147	387	3,887	865
1963.....	2,230	462	827	168	457	4,144	969
1964.....	2,298	471	894	179	490	4,332	1,011
1965.....	2,535	472	988	193	558	4,746	990
Low-cost estimate							
1980.....	3,217	508	1,438	252	813	6,228	1,446
1985.....	3,291	523	1,521	254	820	6,409	1,579
1990.....	3,538	567	1,576	263	823	6,767	1,698
2000.....	3,817	611	1,898	318	935	7,579	1,944
2025.....	5,333	801	2,799	491	1,328	10,752	2,895
High-cost estimate							
1980.....	3,106	475	1,652	290	936	6,459	1,491
1985.....	3,065	465	1,770	295	953	6,548	1,630
1990.....	3,168	481	1,839	306	987	6,781	1,747
2000.....	3,025	482	2,242	370	1,192	7,311	1,981
2025.....	4,001	529	3,198	524	1,691	9,943	3,009

<sup>1</sup> See footnote 1 of appendix table 1 for definition of minimum retirement age. Does not include wives under age 62 of old-age beneficiaries; includes disability beneficiaries aged 62-64, and spouses aged 62 and over of disability beneficiaries. For actual data, as of December (except for 1958—November); for estimated future data, as of middle of year. Excluding effect of railroad financial interchange provisions.

<sup>2</sup> Children of retired and deceased workers.

<sup>3</sup> Spouses of disabled workers, including some such spouses aged 62 and over.

<sup>4</sup> Children of disabled workers.

<sup>5</sup> January through November 1958.

<sup>6</sup> December 1958 through December 1959.

*Administrative expenses*

Assumed administrative expenses for old-age, survivors, and disability insurance are based on two factors—the number of persons having any covered employment in the given year and the number of monthly beneficiaries.

*Railroad retirement financial interchange*

A financial interchange between the old-age, survivors, and disability insurance system and the railroad retirement system is provided, as explained in appendix II. The purpose of this interchange is to place the old-age and survivors insurance and the disability insurance trust funds in the same position they would have been in if railroad employment were, and always had been, covered employment.

Because of the relatively older age distribution of railroad workers, the transfer is currently in favor of the railroad retirement system. But it is estimated that eventually the low-cost factors in respect to railroad employment—higher average wage, lower percentage of females, and more wives and widows of railroad workers receiving old-age, survivors, and disability insurance benefits on their own earnings records, rather than on the record of the railroad worker—will shift the transfer the other way. The long-range effect is relatively insignificant insofar as old-age, survivors, and disability insurance costs are concerned, but the current estimates indicate a small net gain to the railroad retirement system over the entire period of these estimates.

*Interest rate*

The 1960 amendments revised the basis for determining the interest rate on public-debt obligations issued for purchase by the trust funds (special issues), which constitute a major portion of the investments of the trust funds. Under previous law, the interest rate on special obligations was related to the average coupon rate on all outstanding marketable obligations of the United States not due or callable for at least 5 years from the original issue date. Under present law, this interest rate is based on the average market yield of all such marketable obligations not due or callable for 4 or more years from the time of the issuance of the special obligations.

This change will have the immediate effect of gradually increasing the interest income of the trust funds as compared with the previous basis. The ultimate effect is expected to be only a slight increase in the interest income of the system since, over the long run, coupon rates on new long-term Government obligations tend to follow (both up and down) the average market yield on all outstanding long-term issues.

For the intermediate-cost estimate a level interest rate of 3.75 percent was assumed. This is somewhat above the average yield of the total investments of both trust funds as of January 1, 1967 (3.66 percent), but is below the rate applicable for new investments in January 1967 (4% percent). The interest rate for the low-cost and high-cost estimates was assumed at 4.25 percent and 3.25 percent, respectively.

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 APPENDIX II. LEGISLATIVE HISTORY AFFECTING THE TRUST FUNDS <sup>1</sup>

*Board of Trustees.*—From January 1, 1940, when the Federal old-age and survivors insurance trust fund was established, through July 15, 1946, the three members of the Board of Trustees, who served in an ex officio capacity, were the Secretary of the Treasury, the Secretary of Labor, and the Chairman of the Social Security Board. On July 16, 1946, under Reorganization Plan No. 2 of 1946, the Federal Security Administrator became ex officio member of the Board of Trustees in place of the Chairman of the Social Security Board, which agency was abolished. On April 11, 1953, Reorganization Plan No. 1 of 1953, creating the Department of Health, Education, and Welfare, went into effect, and the office of Federal Security Administrator was abolished. The functions of the Administrator as ex officio member of the Board of Trustees were taken over by the Secretary of Health, Education, and Welfare. The remaining membership of the Board has not changed since it was first established. Since the establishment of the fund, the Secretary of the Treasury has been managing trustee. The Social Security Act Amendments of 1950 designated the Commissioner for Social Security—since April 11, 1953, the Commissioner of Social Security—as Secretary of the Board of Trustees.

Under the Social Security Amendments of 1956, the functions of the Board of Trustees have related to both the Federal old-age and survivors insurance trust fund and the Federal disability insurance trust fund. The Social Security Amendments of 1960 eliminated the so-called three-times rule (requiring the Board of Trustees to report to the Congress whenever it expects that in the course of the next 5 fiscal years either of the trust funds will exceed three times the highest annual expenditures from such fund anticipated during that 5-year period). The Social Security Amendments of 1965 provide that the Board of Trustees shall meet not less frequently than once each calendar year.

*Contribution rates.*—The Social Security Act of 1935 fixed the contribution rates for employees and their employers at 1 percent each on taxable wages for the calendar years 1937–39, and provided for higher rates thereafter. However, subsequent acts of Congress extended the 1-percent rates through calendar year 1949. On January 1, 1950, the rates rose to 1½ percent each for employees and employers, as provided by the Social Security Act Amendments of 1947. In accordance with the Social Security Act Amendments of 1950, the 1½-percent rates remained in effect through calendar year 1953, and, on January 1, 1954, rose to 2 percent each for employees and employers. These rates remained in

<sup>1</sup> Amendments to the Social Security Act and to related sections of the Internal Revenue Code were made during the period 1939–66. The more important changes made in 1950–58 that are significant from an actuarial standpoint are described in appendix II of the 21st Annual Report of the Board of Trustees. The more important changes contained in the 1960 and 1961 amendments are described in the main body of the 23d Annual Report, and the changes made in 1964 are described in the 25th Annual Report. The more important changes contained in the amendments made in 1965 and in 1966 are described in the main body of the present report.