NEW COST ESTIMATES FOR THE OLD-AGE AND SURVIVORS INSURANCE SYSTEM, WITH THE ASSUMPTION OF A STATIC FUTURE WAGE LEVEL

by

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FOREWORD

These new "1942" cost estimates for the old-age and survivors insurance system adopted in 1939 represent the first opportunity to make consistent low and high illustrative studies using the available Baltimore records as to coverage, certain preliminary claims records for benefits under the new program, and the so far available 1940 census data. Due to the radical changes introduced by the war, any study using no data since 1940 is already "dated" to a considerable degree.

In these studies there may be reviewed the possible range of beneficiaries in Charts 1 and 2, while in Charts 3 and 4 we indicate the distribution of benefits between the various categories of beneficiaries. Between the low estimates of Charts 1 and 3 and the high estimates of Charts 2 and 4 there is a wide difference. We look forward to a series of benefit payments which will depend upon a tremendous number of separate but interrelated factors. The unpredictability of the future argues for caution in the adoption of benefits the future magnitude of which is so difficult to predict.

As in certain other reports from this office, we wish to call attention to the supplementation by the programs of Titles I and IV, old-age assistance and aid to dependent children. Only the existence of those programs can validate the fragmentary coverage of the population shown under Table 1. Because the two are supplementary, the rest of the population beyond those insured continues to have certain protection. The actuarial evaluation of the probability (and the direction) of permissive future changes, whether in tax rates or in benefit amounts, has not been attempted. The "freezing" of the tax rate for 1943 indicates that the Congress had not accepted the permanence of the 1939 schedule of rates as seriously as this study has done.

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A. Introduction

The purpose of this report is to present a new set of long-range cost estimates for the old-age and survivors insurance program. When the 1939 amendments were enacted, long-range cost estimates were prepared on the basis of two sets of assumptions--those developed by the Committee on Economic Security in 1935 and the so-called probable maximum cost assumptions which were devised in 1938 to indicate the upper ranges of possible cost. Results of these cost estimates made in 1939 have been set forth in a number of places, including Actuarial Study No. 14, the first two annual reports of the Board of Trustees, and various interoffice memorandums.

Since these early estimates were made, there has developed a considerable amount of additional data upon which cost estimates may be prepared. Especially important is the current availability of 1940 census figures (which show an unexpectedly large number of persons age 65 and over), the data in the so-called 1939 Actuarial Sample which investigated insured status conditions, the more complete analysis of the Family Composition Study to furnish data in respect to familial relationships, and the 1940 substantive claims statistics. With the availability of all these new data, crude and limited in long-range significance as they may be, it has been felt desirable to proceed from the ground up to develop new sets of cost estimates. As well as having a greater amount of pertinent data available, it has been possible to make less crude the methods of estimation in a number of ways.

As before, it has been decided to prepare two different cost estimates, although their significance is not quite the same as before. The two new estimates are still intended to represent a low and a high cost possibility; we continue to point out that the one is not the maximum, nor the other the minimum. It should be emphasized that these two estimates are coordinate, and neither is claimed to be superior to the other. In developing the low estimate the choice of assumptions in all instances was made in the direction of producing low over-all costs, whereas for the high estimate the opposite procedure was followed. For some types of benefits the low estimate might indicate higher costs than the high estimate so that the concept of a wide range in costs is not present for each benefit category separately but only for aggregate benefits. For instance, assumed lower mortality rates would result in lower costs for orphan's benefits but higher for old-age retirements and thus for total benefits.

In many instances it is possible to set forth the specific different assumptions made (and this is done in Table A), but in others they may not be listed so definitely. More details as to the methodology will be presented in the section dealing with that subject; however, it may be said here that it is most unlikely that future experience will correspond to all the assumptions of one estimate or the other. It is possible that, with respect to some factors, future experience will be lower in effect than in the assumptions of the low estimate, while in other instances it may be higher than in the high estimate. The results set forth are thus, to some extent, academic, especially as to absolute amounts in dollars, but considerably more validity is present in regard to comparisons relative to payroll and in regard to the relative secular trends shown.

The cost estimates for the original Social Security Act covered the period up to 1980. Some commentators have assumed that thereafter the annual benefit disbursements and tax income would remain constant. There is no sound reason to believe that the system will ever become completely mature (as determined by a level income and a level outgo). A consideration of several factors makes it clear that such a condition could not exist after a bare period of only 40 years of operation. First, the population itself could not become stable within 40 years. Second, individuals now young would just be retiring 40 years hence and would receive benefits for a considerable time thereafter. Third, in 1980 many aged individuals would be receiving benefits based on less than a lifetime's exposure to covered wages (because of the system beginning in 1937). The then adopted methodology was designed to produce figures for 1980 somewhat higher than "true estimates" for that year as a token recognition of the gradually increasing trend beyond that date which could be expected for at least 10 or 20 years.

In the present estimates the procedure is somewhat different in that the computations are carried out to the end of the 20th century, some 60 years hence. By that time the population, according to certain assumptions made by the National Resources Committee (not completely accepted by the Office of the Actuary) would, in effect, have reached a stable condition (cf., memorandum from Robert J. Myers to W. R. Williamson, "Projection of N.R.C. Estimates Beyond 1980," March 27, 1942). Correspondingly, it is assumed, although perhaps too arbitrarily, that all other conditions relating to maturity of the old-age and survivors insurance program would have been satisfied by that time; however, because of certain conditions, such as individuals retiring in the early and middle years of operation and surviving for long durations, theoretical maturity might not be possible of complete attainment until at least 70 or 80 years hence. The figures presented for the most distant years shown in the following analysis accordingly were determined so as to be slight relative overstatements in order to allow for the effect of the slow upward trend anticipated in the succeeding years.

Table A

SUMMARY OF ASSUMPTIONS MADE IN COST ESTIMATES, LEVEL WAGE ASSUMPTION

Factor	Low Estimate	High Estimate
Mortality Rates	Constant at current levels	Declining according to NRC "medium" assumption
Interest Rate	2¼%	2½%
Initial Coverage	35,000,000	35,000,000
Initial Average Annual Covered Wage	$940	$940
Future Average Annual Covered Wage	Level at $940	Level at $940
Average Retirement Age		
a. Men	69	66½
b. Women	66⅓	65
c. Total	68¼	66¼

Although figures for benefit payments have been developed for each single year from 1940 to 2000, the tabular presentation will be limited to decennial years beginning with 1950. The trend after 1950 was extrapolated backward to fit in with the actual experience of 1940-41. No figures for the individual years in the 1940's are given because of the extremely atypical conditions now prevailing on account of the war and those which are likely to prevail in the years immediately following its cessation. However, figures dealing with the overall 60-year period, such as those showing level costs and progress of the fund, of necessity, take account of the extrapolated trend values for the current decade, rather than the probably lower amounts to be expected during the war years. In addition to the violent fluctuations from the secular trend which may result from the war, there is also the indeterminate element of lag which is mostly of importance in the early years of operation of a social insurance program. The possibility of greatly expanded retirement benefits immediately following the war is recognized, but not recorded here.

The figures presented in this report are, in most instances, rounded to the nearest thousand when dealing with persons and to the nearest million when dealing with dollars. In many cases the inherent crudity of the method of estimation and the expected random fluctuations do not warrant as many significant figures as are actually shown. However, in respect to those types of benefits which are relatively minor in nature (such as lump-sum death payments or parent's benefits) it is desirable to carry out the figures to this extent in order to show the trend movement.

Under the actual administration of the program it is possible for individuals to receive benefits under more than one category. For instance, if an aged woman is eligible for a primary benefit of $12 in her own right and her husband has a primary benefit of $30, she would receive a wife's benefit of $3 ($\frac{1}{2}$ x $30 - $12) in addition to her primary benefit. In order to simplify the calculations and the presentation thereof, the procedure has been adopted of considering that when an individual is eligible for more than one type of benefit, he will receive his entire payment under that category which results in the highest amount rather than under separate categories.

These estimates are <u>illustrations</u> based on certain arbitrary assumptions rather than <u>predictions</u>. Neither the low estimate nor the high estimate can be said to be the better, and the same applies to any derived average or synthesis of the two series of figures. Moreover, these illustrative estimates are intended to present only the secular trend of the operations of the program and so take no account of any cyclical fluctuations which are likely to occur because of business conditions or other disturbing factors. Thus, if by chance one of the estimates should exactly duplicate the long-range trend of costs, it is also quite likely that such agreement would not be present for most individual years because of the cyclical element.

The estimates have not taken into account the tremendous spurt in business activity resulting from the war nor any possibilities of a sharp decline following its cessation; rather the basic coverage and payroll for both estimates have been taken to be those of 1940 (when there were 35 million individuals with wage credits and a total taxable payroll of $33 billion) projected into the future on the basis of population trends and the particular wage assumptions. These projections show ultimate levels of 38-40 million persons covered 60 years hence, with corresponding payrolls of $36-38 billion for the level wage assumption and $77-80 billion for the increasing wage assumption. This is in sharp contrast to the situation in 1941, when there were 41 million persons with wage credits and a total taxable payroll of $42 billion; the corresponding figures for 1942 are even higher. If full employment continues after the war, these estimates will be decidedly on the low side insofar as the absolute figures are concerned, but relative comparisons of benefits to taxes or to payroll may still possess some degree of validity; thus, it might be said that the foundation of the estimates is a normal trend based on 1940, with the current business upsurge being assumed to be merely a "mountain" on the secular trend line. Since 1940 was apparently a not "normal" year, but rather a turning point, this study necessarily gives too great credence to a single year.

The report is divided into three sections. Section B is a summary of the results of the two cost estimates using a level wage assumption. Section C makes a comparison of the results of the new cost estimates with those prepared in 1939. Section D goes into detail as to the assumptions made and the methodology adopted.

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B. Summary of Results for Level Wage Assumption

In Table 1 there are presented figures on the estimated insured population in various future years, subdivided by sex and according to whether under or over 65. For the low estimate the total insured population increases from about 31 million persons in 1950 to almost 43 million persons fifty years hence, whereas for the high estimate the range is from 36 to 59 million. The number of aged persons who possess insured status shows a far more rapid increase than the total insured population. Thus, for the low estimate the range is from 1½ million in 1950 to almost 7 million ultimately, whereas for the high estimate the corresponding figures are 2 and 15 million respectively. With the passage of time a relatively larger proportion of the total are women, this being the result of the fact that it will be many years before the current younger women who represent the bulk of the female employment reach age 65.

Table 1

ESTIMATED INSURED POPULATION[a] IN FUTURE YEARS, LEVEL WAGE ASSUMPTION

(Figures in millions of persons)

Calendar Year	Under Age 65			Age 65 and Over			Grand Total
	Men	Women	Total	Men	Women	Total	
Low Estimate							
1950	21.4	8.3	29.7	1.3	.2	1.5	31.2
1960	23.4	9.9	33.3	2.3	.5	2.8	36.1
1970	24.7	10.9	35.6	3.0	.9	3.9	39.5
1980	24.8	11.0	35.8	4.0	1.7	5.7	41.5
1990	24.8	11.1	35.9	4.5	2.2	6.7	42.6
2000	24.8	11.1	35.9	4.6	2.3	6.9	42.8
High Estimate							
1950	24.0	9.5	33.5	1.8	.3	2.1	35.6
1960	27.1	11.8	38.9	3.4	1.0	4.4	43.3
1970	29.3	13.7	43.0	5.0	1.7	6.7	49.7
1980	30.4	14.2	44.6	7.3	3.3	10.6	55.2
1990	30.4	14.2	44.6	8.8	4.7	13.5	58.1
2000	30.4	14.2	44.6	9.6	5.2	14.8	59.4

a/ Average number of persons with either currently or fully insured status during year.

The estimated insured population for the high estimate is larger than for the low estimate, chiefly because of the assumption of a greater "in and out" movement with corresponding accessions of insured status; however, another factor is that the high estimate is based on a somewhat larger total U.S. population (because of lower assumed future mortality). This latter factor is chiefly of importance for the aged group, since the eventual total aged population according to the high estimate is almost $\frac{1}{3}$ greater than according to the low estimate. The remainder of the twofold difference between the aged insured population under the high estimate as compared to the low one arises from the above-mentioned assumptions as to increased securing of insured status. There may still be an inadequate recognition of perfunctory qualification for benefits.

The effect of the different population bases may partly be eliminated by considering the insured population relative to the total population. From Table 2 it may be seen that somewhat more than half of the men under age 65 will possess insured status, with only a gradual increase with the passage of time. For women the corresponding figures are only about half as large, although there is a somewhat more rapid increase. Although in the early years only about $\frac{1}{4}$ of the aged male population will be insured according to the low estimate, this figure will increase to more than $\frac{1}{2}$ ultimately, whereas for the high estimate the proportion is $\frac{1}{2}$ for 1950 and over $\frac{3}{4}$ ultimately. For aged women the corresponding proportions are at first much lower, but there is a rapid rise during the period considered. The total insured population represents in the early years about $\frac{1}{3}$ of the total population over age 20, while ultimately almost $\frac{1}{2}$ for the high estimate and somewhat less for the low estimate.

Table 3 and Charts 1 and 2 present estimates of the number of primary beneficiaries of both sexes and their dependents who are receiving benefits. The number of primary beneficiaries in current payment status, of course, has as its upper limit the number of aged insured persons as shown in Table 1. As a reducing factor there are those insured individuals who are in covered employment, either having never filed claim for primary benefits, or else having done so but having returned to work. The figures presented for the number of beneficiaries in this and subsequent tables represent the number of persons actually receiving payments rather than the total number entitled, including those for whom benefits are suspended because of work, etc. According to the low estimate the number of primary beneficiaries increases from slightly less than 1 million in 1950 to more than 5 million in 2000, while for the high estimate the range is from about 2 to $13\frac{1}{2}$ million. In both estimates the female primary beneficiaries make up an increasing proportion of the total. Thus for the low estimate in 1950 they are only 17%, while by 2000 they are 40%.

The spread between the low and high estimates of beneficiaries is increased further over that for the aged insured population because of the element of retirement. Thus, in 2000 for the low estimate only 74% of those eligible for primary benefits as a result of possessing insured status are estimated to be actually receiving them, whereas for the high

Table 2

ESTIMATED INSURED POPULATION[a] IN FUTURE YEARS AS PERCENTAGE OF CORRESPONDING TOTAL POPULATION, LEVEL WAGE ASSUMPTION

Calendar Year	Under Age 65[b]			Age 65 and Over			Grand Total[c]
	Men	Women	Total	Men	Women	Total	
			Low Estimate				
1950	50%	19%	34%	24%	4%	14%	32%
1960	52	22	37	35	7	21	35
1970	54	24	39	42	11	26	37
1980	54	24	40	51	19	34	39
1990	54	25	40	53	23	37	39
2000	54	25	40	55	24	38	39
			High Estimate				
1950	55%	22%	38%	33%	5%	19%	36%
1960	59	27	43	48	13	30	41
1970	61	29	45	59	18	37	44
1980	63	30	47	70	28	48	47
1990	63	30	47	75	36	55	48
2000	63	30	47	77	38	57	49

a/ Average number of persons with either currently or fully insured status during year.
b/ Insured population under 65 is compared with total population 20-64.
c/ Total insured population is compared with total population 20 and over.

Table 3

ESTIMATED AVERAGE NUMBER OF PRIMARY BENEFICIARIES[a] AND SUPPLEMENTARY BENEFICIARIES[b] IN FUTURE YEARS, LEVEL WAGE ASSUMPTION

(Figures in thousands of persons)

Calendar Year	Primary Beneficiaries[a]			Supplementary Beneficiaries[b]	
	Men	Women	Total	Wives[c]	Children
			Low Estimate		
1950	776	156	932	242	50
1960	1,442	452	1,894	436	82
1970	1,972	775	2,747	582	101
1980	2,590	1,405	3,995	644	136
1990	3,001	1,894	4,895	666	150
2000	3,088	2,018	5,106	690	150
			High Estimate		
1950	1,568	314	1,882	480	100
1960	2,969	896	3,865	907	162
1970	4,379	1,647	6,026	1,354	194
1980	6,405	3,173	9,578	1,683	251
1990	7,847	4,449	12,296	1,948	289
2000	8,502	4,959	13,461	2,131	290

a/ Excludes all individuals entitled to primary benefits smaller than other types of benefits for which they may be eligible (i.e., wife's, widow's, or parent's).

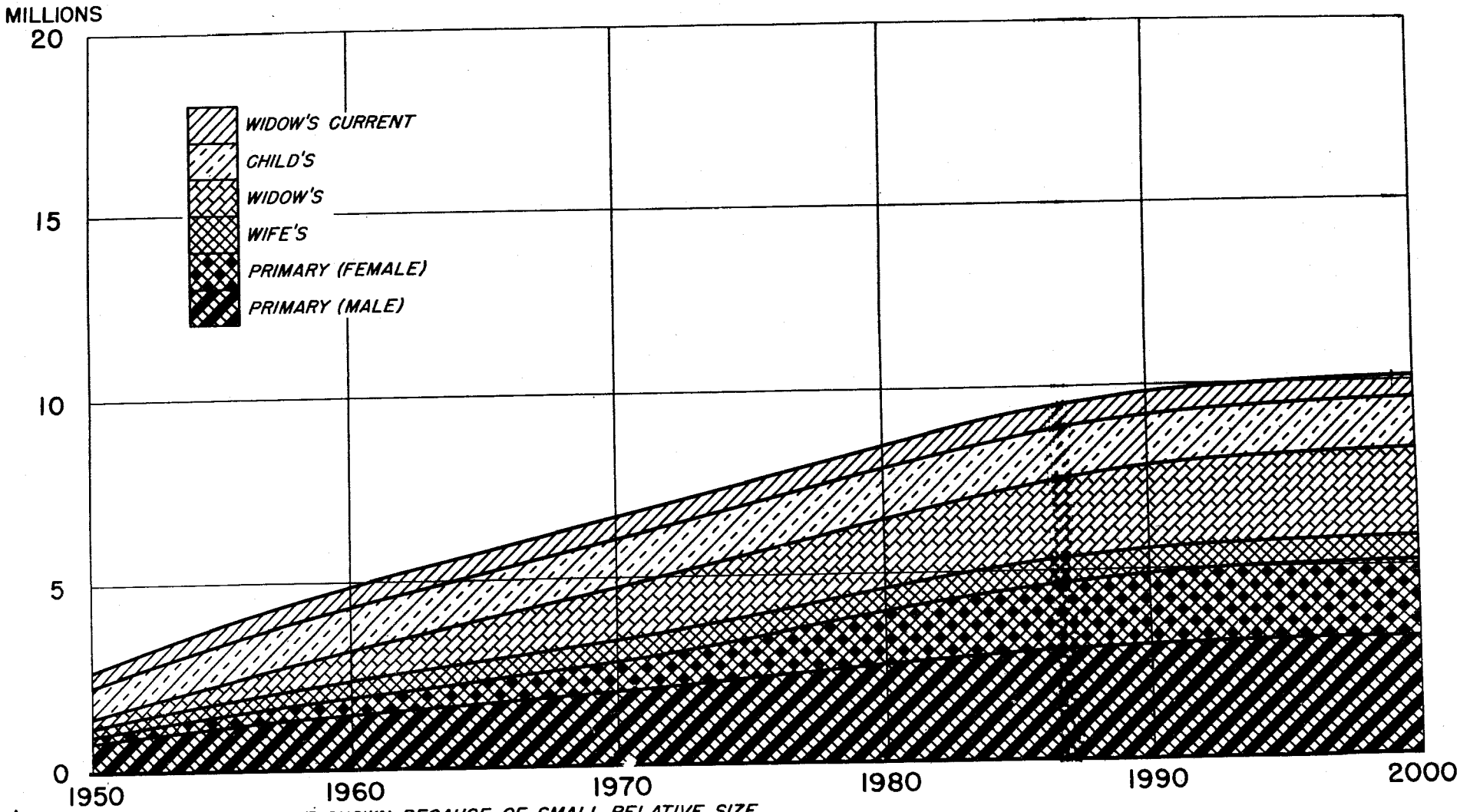
b/ Includes aged wives and children of primary beneficiaries in respect to whom wife's and child's benefits are being paid.

c/ Includes wives eligible for primary benefits smaller than wife's benefit.

Note: Figures relate to average number of persons in current-payment status during the calendar year.

CHART I

ESTIMATED NUMBER OF MONTHLY BENEFICIARIES BY TYPE* LOW ESTIMATE



*PARENT'S BENEFICIARIES NOT SHOWN BECAUSE OF SMALL RELATIVE SIZE

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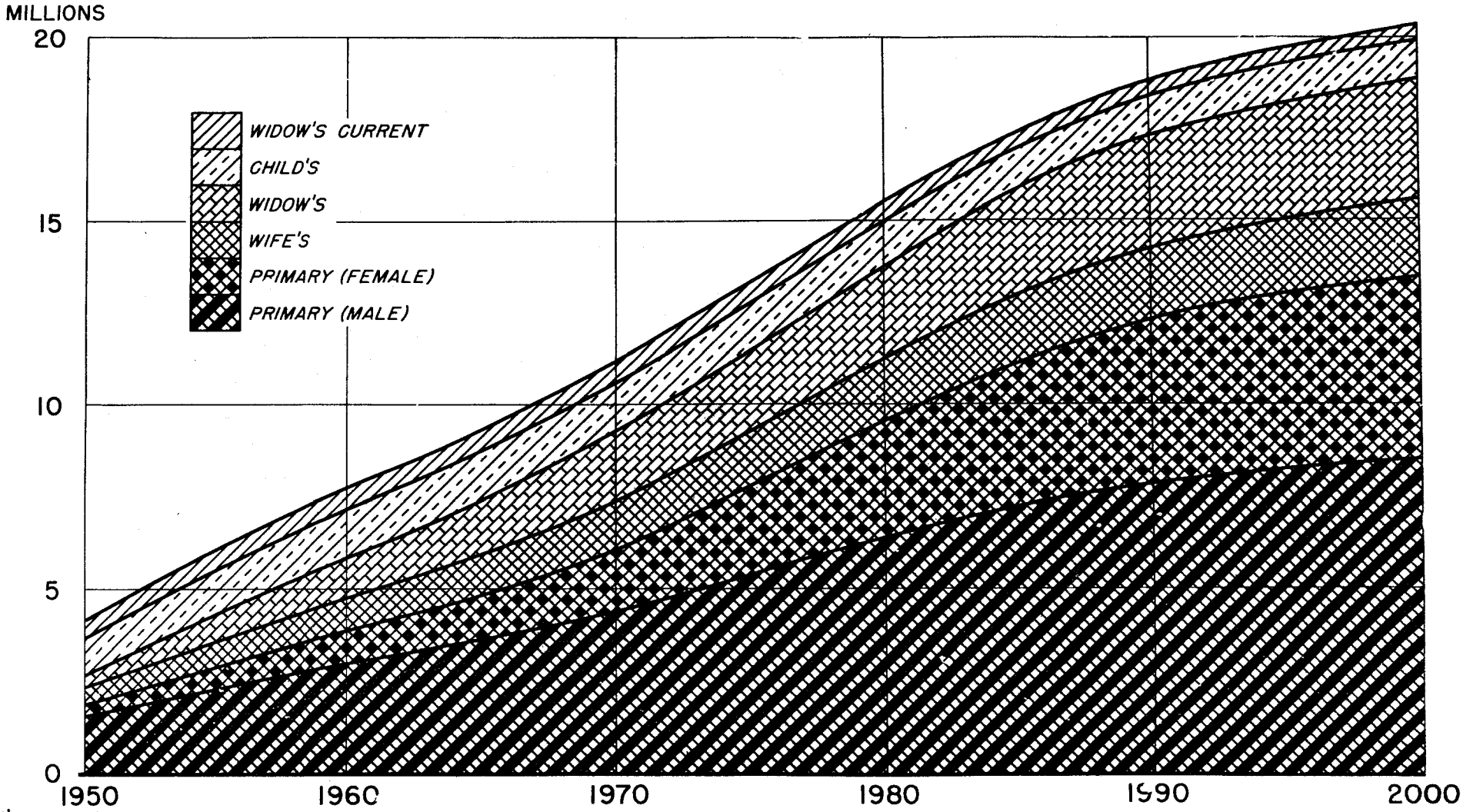
CHART 2

ESTIMATED NUMBER OF MONTHLY BENEFICIARIES BY TYPE*
HIGH ESTIMATE



*PARENT'S BENEFICIARIES NOT SHOWN BECAUSE OF SMALL RELATIVE SIZE

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estimate the corresponding proportion is 91%. Conversely, in the low estimate despite the smaller size of the total aged population, there are more insured aged persons working ultimately than in the high estimate--namely, 1.8 million vs. 1.3 million.

The number of aged wives receiving supplementary benefits increases to ultimate levels of about ¾ million for the low estimate and 2 million for the high estimate. In the early years there is roughly 1 eligible wife for every 3 male primary beneficiaries, but this proportion gradually declines to about 1 to 4 chiefly because of the increasing number of wives who are primary beneficiaries in their own right. The number of dependent children of primary beneficiaries, although relatively small in relation to the other categories of beneficiaries, nevertheless reaches rather sizeable absolute numbers--namely, about 150,000 for the low estimate and 300,000 for the high one.

Table 4 and Charts 1 and 2 present figures in regard to survivors of insured individuals. For all categories there tends to be much less of a range between the low estimate and the high one than there was in the case of primary beneficiaries and their dependents because of a number of counterbalancing factors; in fact, in some cases the high estimate shows a lower number of beneficiaries. The number of aged widow recipients increases steadily, reaching a level in 2000 of 2.4 million for the low estimate and 3.3 million for the high estimate. The number of recipients of parent's benefits tends to reach a maximum in about 1980, with a decline thereafter; this is caused by the increasing number of such aged parents who are entitled to benefits in their own right, or else (for the women) as widows. In the early actual experience, the women receiving parent's benefits far outnumber the men, not only because of greater female survival rates, but also because of higher dependency rates.

The number of orphaned children receiving benefits according to the low estimate reaches an ultimate level after a few decades at about 1¼ million. On the other hand, for the high estimate approximately the same level is reached, but there is a steady decline thereafter until in 2000 there are only about ¾ million such children. This relative trend arises from the assumed lower birth rates and from the assumed future mortality rates under the high estimate which predict drastic reductions at the young and middle adult ages, so that far fewer orphans are created, whereas in the low estimate current mortality rates are assumed to apply in the future. The factor of lower death rates and thus a lesser amount of orphanhood far more than offsets the larger size of the insured population exposed to risk of death under the high estimate.

The trend of the number of women receiving widow's current benefits, as would be expected, closely follows that for children because of the inter-connection between these two categories. The number of child beneficiaries is about twice as large as the number of widow's current beneficiaries, although for the high estimate in long-distant future years this ratio is somewhat diminished. It should be pointed out that

Table 4

ESTIMATED AVERAGE NUMBER OF SURVIVORS BENEFICIARIES[a] AND NUMBER OF LUMP-SUM DEATH PAYMENTS[b], LEVEL WAGE ASSUMPTION

(Figures in thousands of persons)

Calendar Year	Aged Widows	Parents		Children[c]	Widow's Current[c]	Lump-Sum Payments[b]
		Men	Women			
			Low Estimate			
1950	262	12	36	808	383	238
1960	815	22	83	1,112	550	349
1970	1,423	23	101	1,217	602	472
1980	1,852	22	103	1,232	610	580
1990	2,255	18	93	1,228	608	658
2000	2,371	18	86	1,228	608	687
			High Estimate			
1950	324	15	46	895	438	273
1960	1,068	32	122	1,142	590	393
1970	1,915	37	162	1,107	582	537
1980	2,526	37	179	953	511	677
1990	3,068	35	180	802	440	825
2000	3,284	35	166	750	416	884

a/ Includes all individuals entitled to primary benefits smaller than given type of benefit.

b/ Number of deceased individuals on whose wages lump-sum death payments were based.

c/ Excludes individuals in family for whom no additional benefit is payable, such as children in excess of 3 where mother is receiving widow's current benefits.

Note: Figures relate to average number of persons in current-payment status during the calendar year.

this analysis does not indicate that there are an average of two children for each mother; the actual rate will be somewhat less than this (about $1\frac{1}{2}$). Two factors enter in here--namely, the presence of some total orphans and the tendency for many of such mothers to seek covered employment and forego the benefits for themselves, while their children, nonetheless, receive payments (this would especially be true where there are a large number of children in the family so that because of the maximum provisions there is no reduction in total benefits when the mother does not file a claim for herself).

The number of lump-sum death payments follows a somewhat similar trend for both estimates, with the figures for the high estimate being somewhat larger. The annual number of such payments increases from about $\frac{1}{4}$ million in the early years to $\frac{3}{4}$ million eventually. The number of lump-sum payments would be expected to increase, not only with the increase in size of the insured population, but also relatively because of the advancing age of the population; with many more deaths at the older ages there would tend to be less probability of survivors being present, although when they are, there would be a greater chance that immediate benefits would be payable since the widow would be more likely to be over 65.

Table 5 relates the aged beneficiaries of all categories to the total aged population by sex. Ultimately, almost $\frac{1}{2}$ of the aged population according to the low estimate and almost $\frac{3}{4}$ for the high estimate will be in receipt of some form of benefit under the old-age and survivors insurance program. The proportions for women are somewhat lower than those for men in the early years but larger in the later years, as the cumulative effect of widows and female primary beneficiaries becomes more important. The ultimate proportion for men tends to be lower in both estimates, especially for the low one because of the factor of greater continued employment beyond age 65 than has been assumed for women. This table indicated the large extent to which the OASI program will ultimately cover the aged population for benefits despite the fact that at any one moment there may actually be a much smaller proportion engaged in covered employment. The wide range in the estimated number of beneficiaries arises not only from uncertainties as to future demographic conditions, but also as to the amount of "in and out" movement and the extent to which the size of the insured population will be affected thereby.

In Table 6 there are shown the average sizes of the various types of benefits, both according to the actual 1940 experience and the estimated future experience. It will be noted that for all categories the estimated future trend is remarkably level, with the figures for the low estimate being somewhat larger than those for the high estimate. Likewise, the low estimate in most cases shows a slightly upward trend over the actual 1940 experience, whereas the high estimate shows a slightly downward movement.

Table 5

ESTIMATED AVERAGE NUMBERS OF BENEFICIARIES AGED 65 AND OVER[a] AS PERCENTAGES OF TOTAL AGED POPULATION BY SEX, LEVEL WAGE ASSUMPTION

Calendar Year	Primary Beneficiaries[b]		Wives[c]	Widows[c]	Total Beneficiaries[a]		
	Men	Women			Men	Women	Total
			Low Estimate				
1950	14%	3%	4%	5%	14%	13%	14%
1960	22	6	6	12	22	26	24
1970	28	10	7	18	28	36	32
1980	33	15	7	20	33	44	39
1990	36	20	7	23	36	51	44
2000	37	21	7	25	37	54	46
			High Estimate				
1950	29%	5%	8%	6%	29%	20%	25%
1960	42	12	12	14	42	39	40
1970	52	17	14	20	52	53	53
1980	62	27	14	21	62	64	63
1990	68	34	15	23	68	74	71
2000	69	36	16	24	69	77	73

a/ Figures are not shown separately for parents because of the relatively small number of persons receiving such benefits. Such individuals are, however, included in the total beneficiaries columns.

b/ Excludes all individuals entitled to primary benefits smaller than other types of benefits for which they may be eligible (i.e., wife's, widow's or parent's)

c/ Includes all individuals entitled to primary benefits smaller than given type of benefit.

Table 6

ESTIMATED AVERAGE SIZE OF BENEFIT PAYMENTS, BY TYPE OF BENEFIT, LEVEL WAGE ASSUMPTION

Calendar Year	Monthly Old-Age Benefits					Monthly Survivors Benefits		Other Benefits	
	Primary		Supplementary		Survivors				
	Male	Female	Wife's	Child's	Widow's	Child's	Widow's Current	Dependent Parent's	Lump-Sum Death
Actual Experience (1940 Awards)									
1940	$23	$18	$12	$11	$20	$12	$20	$13	$140
Low Estimate									
1950	$25	$18	$13	$12	$19	$13	$20	$13	$150
1960	26	19	13	12	19	13	20	13	150
1970	27	18	14	13	19	13	21	13	149
1980	29	17	14	13	20	13	21	13	148
1990	30	16	15	14	21	13	21	14	147
2000	30	16	15	14	21	13	21	14	146
High Estimate									
1950	$24	$16	$12	$11	$19	$12	$19	$12	$137
1960	23	16	12	11	18	12	19	12	133
1970	23	15	12	11	17	12	19	12	128
1980	24	14	12	11	18	12	19	12	125
1990	25	14	12	11	18	12	19	12	121
2000	25	14	12	11	18	12	19	12	120

Note: Where an individual is eligible for benefits under more than one category, it is assumed that his entire benefit will be under that category which is highest.

At first thought, it might be expected that the average benefit would have an increasing secular trend because of the existence of the 1% increments in the benefit formula; however, there are several counterbalancing factors--namely, the effect of the "in and out" movement which, combined with the calculation of the average wage on a lifetime basis, would tend to produce a greater number of benefits at the lower ranges. It is for this reason that the figures for the high estimate are less than those for the low one, although by a relatively small amount--about 10% in general. In addition, for primary benefits the trend is influenced in a downward direction by the fact that there is an increase in the relative proportion of women who, in general, have lower benefits, both because of lower wage rates and because of more periods of non-employment (due to separation from the labor market at marriage, etc.).

Even though there is estimated to be little relative change in the sizes of the average benefit payments, the frequency distribution thereof will differ quite noticeably in future years as contrasted with the present. Many years hence it may be expected that the range of individual benefits will be broadened. None now receive primary benefits in excess of $42.40, whereas 40 years hence there will be a considerable number in excess of $50. Likewise, in future years it may be anticipated that there will be relatively more benefits at the $10 minimum, or slightly in excess thereof, than at the present time. As in many other series of data, a blind consideration of averages is apt to be very deceiving.

Table 7 presents estimates of the amount of total benefit payments in various future years. The same data are protrayed graphically in Charts 3 and 4. The total disbursements range in the low estimate from $.6 billion in 1950 to $2.7 billion in 2000--more than a fourfold increase. On the other hand, for the high estimate, the range is from $.9 billion to $4.7 billion--a fivefold growth. Primary benefits constitute the vast bulk of the total payments, ultimately representing somewhat more than 50% of the total for the low estimate and 70% for the high estimate. In the early years the residue of the benefit payments is fairly well divided among the other categories, but ultimately widow's benefits amount to about $\frac{1}{3}$ of the remainder. This relationship arises from the fact that the disbursements for widow's benefits increase steadily throughout the period from an initial low level, whereas most of the other types of benefits tend to have a rapid increase but an ultimate levelling off.

The total estimated benefit payments under the high estimate are about 50% larger than under the low estimate in the early years and about 75% in the later years. This relationship differs appreciably for the various categories of benefits. For both primary and wife's benefits, the figures for the high estimate are more than twice as great, whereas for the other categories the high estimate does not show such large excesses; in fact, for child's and widow's current benefits the ultimate amounts of payments under the low estimate are about 50% in excess of those according to the high estimate (in respect to this apparent paradox as to the nomenclature of low and high estimates, see the discussion on page 1 of the Introduction).

Table 7

ESTIMATED BENEFIT PAYMENTS, BY TYPE OF BENEFIT, LEVEL WAGE ASSUMPTION

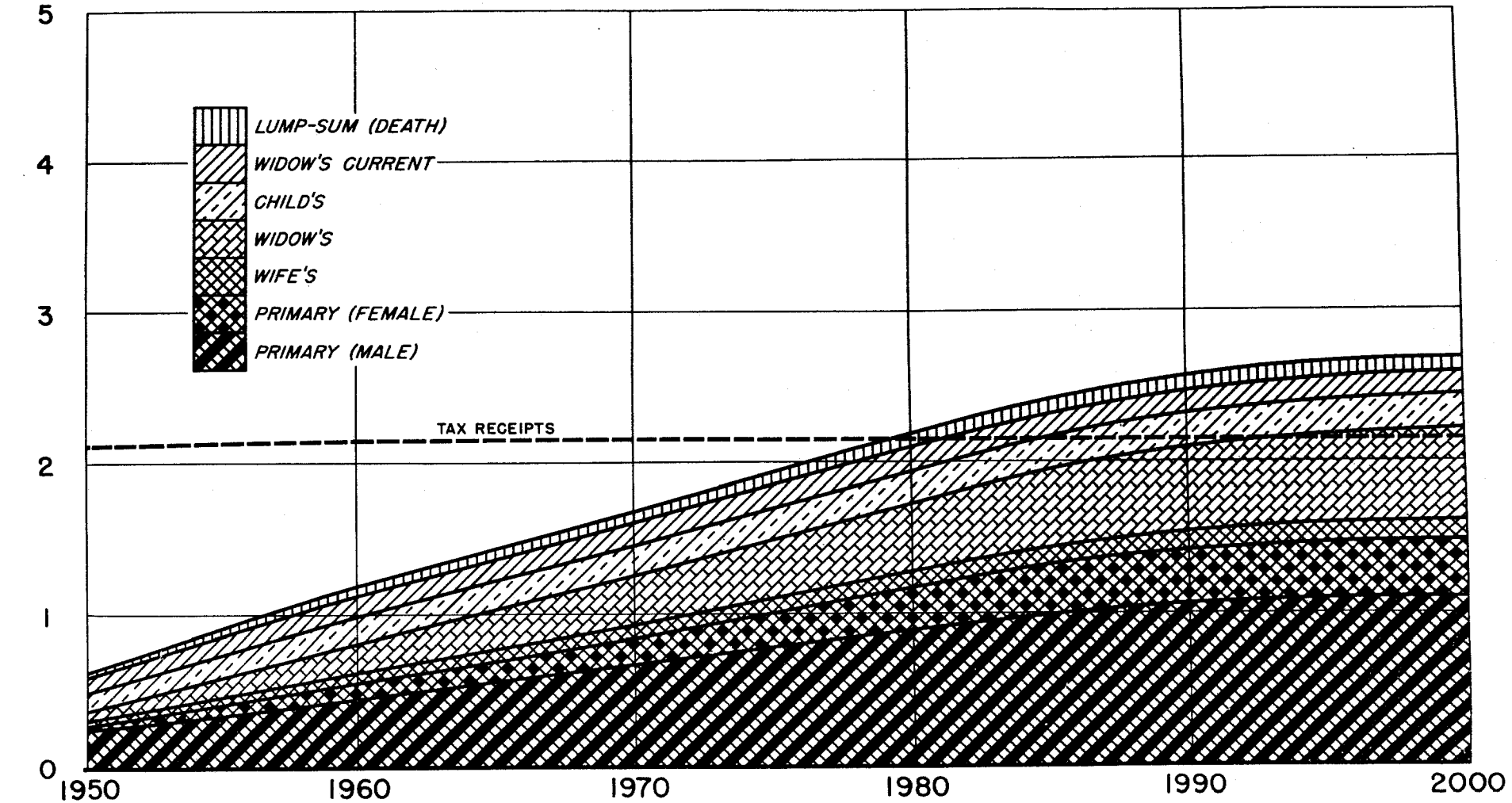
(Figures in millions of dollars)

Calendar Year	Monthly Old-Age Benefits						Monthly Survivors Benefits			Other Benefits		Total Benefits
	Primary		Supplementary		Survivors			Widow's		Dependent	Lump-Sum	
	Male	Female	Wife's	Child's	Widow's	Total	Child's	Current	Total	Parent's	Death	
						Low Estimate						
1950	234	33	36	8	59	370	122	92	214	7	36	627
1960	451	101	68	13	184	817	172	134	306	16	53	1,192
1970	646	168	95	17	330	1,256	191	150	341	19	70	1,686
1980	887	277	110	23	444	1,741	195	153	348	20	86	2,195
1990	1,058	359	125	26	552	2,120	195	153	348	19	96	2,583
2000	1,101	375	131	26	605	2,238	195	153	348	18	100	2,704
						High Estimate						
1950	446	61	68	14	71	660	131	103	234	9	38	941
1960	820	169	125	22	227	1,363	166	136	302	22	52	1,739
1970	1,232	299	190	27	398	2,146	162	134	296	27	69	2,538
1980	1,852	534	243	36	530	3,195	141	118	259	30	84	3,568
1990	2,314	727	287	42	657	4,027	119	102	221	30	100	4,378
2000	2,522	801	316	43	716	4,398	112	96	208	29	106	4,741

Note: Where an individual is eligible for benefits under more than one category, it is assumed that his entire benefit will be under that category which is highest.

CHART 3

ESTIMATED AMOUNT OF BENEFIT PAYMENTS BY TYPE*
LOW ESTIMATE



*PARENT'S BENEFIT PAYMENTS NOT SHOWN BECAUSE OF SMALL RELATIVE SIZE

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JULY 1942

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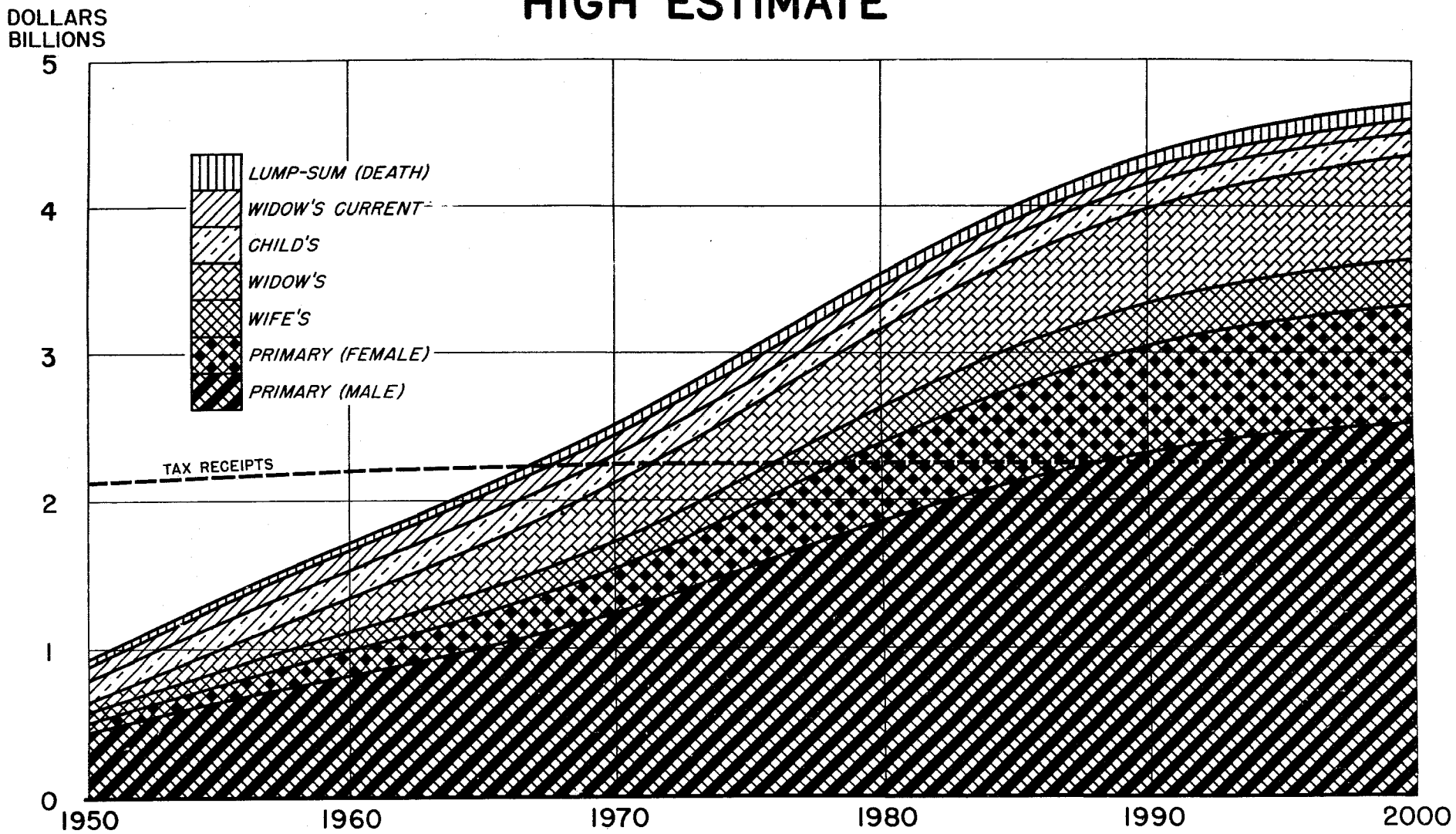
C-24.1

CHART 4

ESTIMATED AMOUNT OF BENEFIT PAYMENTS BY TYPE*
HIGH ESTIMATE



*PARENT'S BENEFIT PAYMENTS NOT SHOWN BECAUSE OF SMALL RELATIVE SIZE

SOCIAL SECURITY BOARD
JULY 1[illegible]

OFFICE OF THE ACTUARY
C-25.1

From Charts 3 and 4 there may be determined the year in which the estimated benefit payments first exceed the estimated tax receipts. For the low estimate this occurs in 1980, whereas for the high estimate the corresponding point is 1966. By the year 2000 benefit payments exceed tax receipts by about $\$\frac{1}{2}$ billion in the low estimate and by about $\$2\frac{1}{2}$ billion in the high estimate.

Table 8 gives a comparison of benefit payments to payroll for various future years and also for the entire 60-year period following 1940. The "average cost" represents the average annual benefits disbursements over the period 1940-2000 taken as a percentage of the average payroll for that period, with no account being taken of interest rate. In the use of this concept of "average cost" it will, of course, be recognized that benefit costs after the year 2000 will exceed the 1940-2000 average (see Charts 3 and 4 which show the rising trend throughout the period). The "average cost" for all benefits combined is $4\frac{1}{2}\%$ in the low estimate and slightly more than 7% for the high estimate--a differential of over 50%.

In the low estimate the "average cost" for primary benefits represents 52% of the total, with wife's benefits being 5%, widow's being 19%, widow's current and child's benefits combined also being 19%, and the remaining 5% being for parent's and lump-sum death payments. On the other hand, for the high estimate, primary and wife's benefits represent a larger proportion--namely, 65% and 7% respectively, while widow's benefits are reduced to 14% and child's and widow's current benefits combined, to 10%. The "average cost" for payments to primary beneficiaries and their dependents constitutes almost 60% of the total in the low estimate and almost 75% for the high estimate, with the residue being accounted for by survivors benefits. Of the monthly benefit payments the "average cost" for those payable to aged persons is 80% of the total for the low estimate and 90% for the high estimate.

Table 9 shows the aggregate balance sheet for the 60-year period under consideration without regard to interest. According to the low estimate the total income to the Fund, including the initial amount on hand, is about $125 billion, whereas the total outgo is about $100 billion, leaving a residual balance of almost $25 billion. The tax receipts are at an equivalent average rate of 5.66% of payroll, whereas the benefit payments, as pointed out previously in Table 8, are 4.55%. The residual balance represents somewhat more than an average of 1% of payroll which, in effect, means that the tax rate in every year of the period could be 1% less than the schedule calls for, and the Fund would still have enough on hand to meet all current obligations until the end of the period (even disregarding completely any interest income). However, thereafter, income would have to be raised to the level of $7\frac{1}{2}\%$ of payroll (see Table 8) in order to meet the subsequent disbursements.

According to the high estimate the income to the Fund would be only slightly larger than under the low estimate (because of a somewhat larger covered population resulting from the larger total population

Table 8

ESTIMATED BENEFIT PAYMENTS AS PERCENT OF PAYROLL, BY TYPE OF BENEFIT, LEVEL WAGE ASSUMPTION

Calendar Year	Monthly Old-Age Benefits						Monthly Survivors Benefits			Other Benefits		Total Benefits
	Primary		Supplementary		Survivors			Widow's		Dependent	Lump-Sum	
	Male	Female	Wife's	Child's	Widow's	Total	Child's	Current	Total	Parent's	Death	
Low Estimate												
1950	.67%	.09%	.10%	.02%	.17%	1.05%	.35%	.26%	.61%	.02%	.10%	1.78%
1960	1.26	.29	.19	.04	.52	2.30	.48	.38	.86	.04	.15	3.35
1970	1.80	.47	.27	.05	.92	3.51	.53	.42	.95	.05	.20	4.71
1980	2.48	.77	.31	.06	1.24	4.86	.54	.43	.97	.06	.24	6.13
1990	2.96	1.00	.35	.07	1.54	5.92	.54	.43	.97	.05	.27	7.21
2000	3.07	1.05	.37	.07	1.69	6.25	.54	.43	.97	.05	.28	7.55
Average Cost[a]	1.81	.53	.24	.05	.87	3.51	.46	.36	.82	.04	.19	4.55
High Estimate												
1950	1.26%	.17%	.19%	.04%	.20%	1.86%	.37%	.29%	.66%	.03%	.11%	2.66%
1960	2.25	.46	.34	.06	.62	3.73	.45	.37	.82	.06	.14	4.75
1970	3.29	.80	.51	.07	1.06	5.73	.43	.36	.79	.07	.18	6.77
1980	4.95	1.43	.65	.10	1.42	8.55	.38	.32	.70	.08	.22	9.55
1990	6.19	1.94	.77	.11	1.76	10.77	.32	.27	.59	.08	.27	11.71
2000	6.74	2.14	.84	.11	1.91	11.74	.30	.26	.56	.08	.28	12.66
Average Cost[a]	3.63	1.00	.49	.08	1.02	6.22	.35	.29	.64	.06	.18	7.10

a/ Average cost of benefits over the period 1940-2000 as percentage of average payroll for that period.

Note: Where an individual is eligible for benefits under more than one category, it is assumed that his entire benefit will be under that category which is highest.

Table 9

AGGREGATE BALANCE SHEET FOR PERIOD 1940-2000, WITHOUT REGARD TO INTEREST, LEVEL WAGE ASSUMPTION

(Figures in billions of dollars)

Item	Low Estimate		High Estimate	
	Amount	As % of Payroll[a]	Amount	As % of Payroll[a]
Total Benefit Payments	98.4	4.55%	158.2	7.10%
Administrative Expenses	2.6	.12	3.3	.15
Tax Receipts	122.3	5.66	126.3	5.67
Initial Fund	2.0	.09	2.0	.09
Residual Balance[b]	+23.3	+1.08	-33.2	-1.49

a/ Average annual amount of item over the period 1940-2000 as percentage of average payroll for that period.

b/ A positive figure indicates an excess of income items over outgo ones and vice versa.

Table 9-a

AGGREGATE BALANCE SHEET FOR PERIOD AFTER 1940, WITH 2½% INTEREST RATE, LEVEL WAGE ASSUMPTION

(Figures in billions of dollars)

Item	Low Estimate		High Estimate	
	Present Value	As % of Payroll[a]	Present Value	As % of Payroll[a]
Total Benefit Payments	63.8	4.46%	104.7	7.11%
Administrative Expenses	1.7	.12	2.1	.15
Tax Receipts	79.0	5.52	81.5	5.54
Initial Fund	2.0	.14	2.0	.14
Residual Balance[b]	+15.5	+1.08	-23.3	-1.58

a/ Present value of item, expressed as percentage of present value of total payroll.

A positive figure indicates an excess of income items over outgo ones and vice versa.

assumed), while outgo would be drastically increased. As a result, the residual balance, still disregarding interest, would be a deficit of $33 billion, which is equivalent to a level charge of 1½% of payroll. This would indicate that in order to have tax income balance disbursements in this period, it would be necessary for income to be higher each year by an amount equivalent to 1½% of payroll. Even so, following the end of the period, income would have to be raised to a level of 12½% of payroll (see Table 8) in order to maintain a balance thereafter.

Table 9a presents a comparison similar to that of Table 9, except that a compound interest rate of 2½% is used, and the period considered is 1940 into perpetuity, assuming that the trends of benefit payments and tax receipts level off after the year 2000 at the amounts current at that time. By sheer coincidence, the figures for the residual balances relative to payroll are almost identical for the two methods of interest analysis. On the basis of the artificial assumptions as to perpetuity made above, the low estimate indicates that the program is more than self-supporting by an amount of 1% of payroll, or $15 billion of "present value" so that were the present program to be continued unchanged indefinitely, the tax rate could be reduced by 1%. On the other hand, the high estimate would indicate that the system is not self-supporting by an amount of 1½% of payroll, or in other words, that it is deficient by some $23 billion in "present value" so that there would be the necessity for increasing the present schedule of tax rates by 1½% of taxable payroll in each year, or for the setting-up of the $23 billion deficit and maintenance of the present tax rates.

In the above discussion of possible financing changes it should be kept in mind that an "actuarial reserve" method is assumed. This is not necessarily to be taken as advocated, but rather the calculations have been performed for such analytic value as they may possess. Because of the wide range of possible results of reserve financing as shown by Table 9a, there is clearly indicated the difficulty of making exact actuarial calculation of either the actuarial surplus or deficit of the Fund. Under one set of assumptions the system is over-financed, while under another set of assumptions it is under-financed. There would be no more reason to be over-conservative by immediately setting up a large fund to meet the apparent "accrued liability" than to be so foolhardy as to use the apparent discounted "profit".

Table 10 presents the results of accumulating the Fund at an interest rate of 2½%; the rate on presently held investments is at about the same level as this (2.44% as of December 31, 1942) despite the fact that the rate on new investments in recent months has been as low as 2%. For both estimates it is assumed that the benefit provisions and tax schedules are left unchanged (Congress has twice changed the rates in the 1935 Act, so that precedents are against this assumption). Under the low estimate the balance in the Fund grows steadily until by the year 2000 its amount is $91½ billion, and at that time it is continuing to increase at a rate of more than $1⅓ billion per year. It is interest-

Table 10

ESTIMATED PROGRESS OF TRUST FUND, LEVEL WAGE ASSUMPTION

(Figures in millions of dollars)

Calendar Year	Tax Receipts	Benefit Payments	Administrative Expenses	Net Income	Interest on Fund[a]	Balance in Fund[b]
			Low Estimate			
1950	2,106	627	33	1,446	329	14,380
1960	2,142	1,192	39	911	755	31,532
1970	2,148	1,686	44	418	1,156	47,644
1980	2,148	2,195	49	-96	1,530	62,678
1990	2,148	2,582	53	-487	1,875	76,576
2000	2,148	2,704	54	-610	2,241	91,504
			High Estimate			
1950	2,124	941	36	1,147	289	12,570
1960	2,190	1,739	45	406	596	24,691
1970	2,244	2,538	53	-347	780	31,781
1980	2,244	3,568	54	-1,388	773	30,844
1990	2,244	4,378	72	-2,206	492	18,376
2000	2,244	4,741	75	-2,572	[c]	[c]

[a] At a rate of 2½%.
[b] As of end of year.
[c] Trust fund is fully depleted in 1999.

ing to note that the Fund reaches a size of $47 billion in 1970, or 10 years before that "debated" figure was "to be attained" under the 1935 Act. According to the high estimate, the picture is entirely changed. The Fund increases steadily to a maximum of $32¾ billion in 1975, and decreases rapidly thereafter (assuming that no other source of income is introduced) until by 1999 it would be completely exhausted, and there would be an annual excess of outgo over income of more than $2½ billion each year thereafter.

If it were known that the low estimate would accurately portrary the actual experience and the tax rates were reduced accordingly, the resulting size of the Fund would be appreciably smaller than the colossal figures shown in Table 10. Conversely, if the actual experience were to follow the high estimate and the income were increased by a total of 1½% of payroll in each future year from now on, the balance in the Fund would be considerably larger than the figures shown in Table 10. In either case, it will be observed that a very sizeable accumulation of funds will result for the next few decades under either estimate so long as the present tax schedule is maintained or, at least not drastically modified.

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C. Comparison of Results of 1942 Cost Estimates and Those of 1939

As pointed out previously, there have become available in the last few years much additional data which can be used in the preparation of cost estimates. Especially important is the material dealing with the age distribution of the insured population. This section will analyze briefly the cost estimates made in 1939 in comparison with those of this study. It is believed that these 1942 estimates would possess a considerably higher degree of accuracy and reliability than the earlier estimates, especially in regard to secular trends in the early decades of the operation of the system, were it not for the cumulative effects of the war. They do not attempt any recognition of the results of the conflict now in progress. It is too early for any sound estimate of that important influence.

Table 11 and Chart 5 compare for certain selected years the estimated benefit disbursements according to the two different estimates. For this comparison there have been used the benefits related to payroll so as to eliminate the major effect of the differing population and payroll bases. Table 11 gives only the ratios of the relative cost under the one estimate to that under the other; Chart 5 gives the absolute cost as a percentage of payroll for all benefits combined but does not deal separately with the various individual categories of benefits.

Table 11

COMPARISON OF 1939 AND 1942 ESTIMATES OF BENEFITS BY TYPE AS PERCENT OF PAYROLL, LEVEL WAGE ASSUMPTION

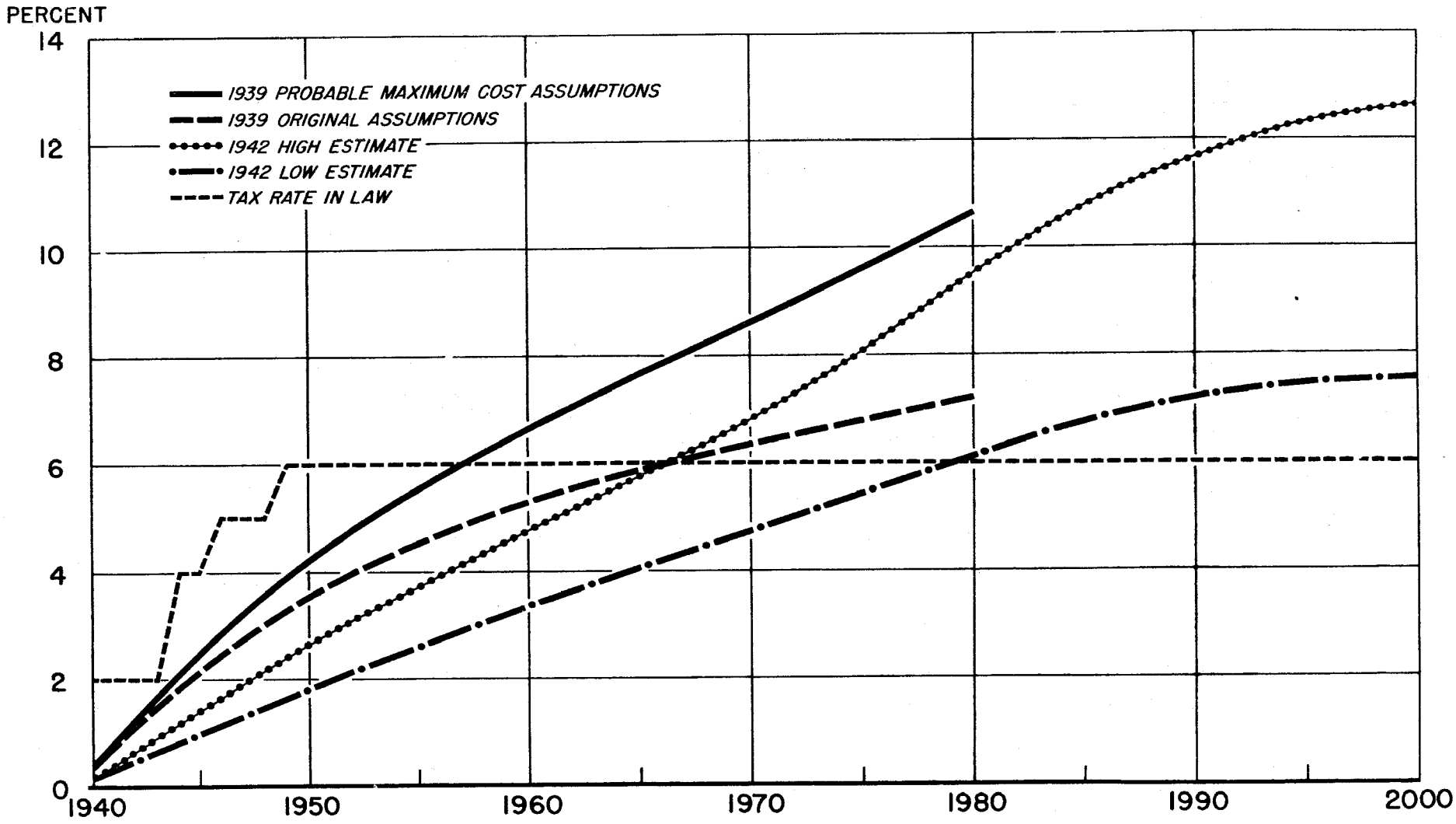
Calendar Year	1942 Estimate as % of 1939 Estimate						
	Primary	Wife's	Child's	Widow's	Widow's Current	Lump-Sum Death	Total
			Low Estimate				
1950	36%	42%	82%	61%	79%	59%	50%
1960	49	85	104	78	103	58	62
1980	65	154	139	145	139	63	85
2000[a]	83	185	143	200	139	74	105
			High Estimate				
1950	52%	60%	105%	89%	139%	69%	63%
1960	67	85	137	94	137	67	71
1980	74	204	185	172	139	79	90
2000[a]	102	263	159	233	137	100	119

a/ For 1939 estimates the figure for 1980 is taken as that for 2000.

Note: Figures not shown for parent's benefits because of their small relative size.

CHART 5

COMPARISON OF 1939 AND 1942 ESTIMATES OF BENEFITS AS PERCENT OF PAYROLL†



†LEVEL WAGE BASIS

SOCIAL SECURITY BOARD
DECEY 1942

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C-26.1

From these two displays it may be seen that the earlier estimates, both low and high, when compared with the later ones, overstated costs appreciably in the first few decades of operation and were still slightly higher even in 1980. Considering total benefit payments the range between the low and high estimates is much greater in the early years for the 1942 estimates than for the 1939 ones; it is desirable to indicate a wider range of predictability for a period when elements of lag and business conditions have such an important relative effect. In 1950 the later low estimate was only 50% as large as the early one, whereas the corresponding ratio for the high estimates was about 60%. Incidentally, it may be pointed out that the 1939 low estimate was actually somewhat higher than the 1942 high estimate during the first 25 years of operation although thereafter the latter rises to a much greater height. The year 2000 figures for the 1942 estimates are higher in both cases than for the 1939 estimates--namely, by 5% for the low estimate and almost 20% for the high estimate.

Next considering the several different categories of benefits, it may be noted that the 1942 low estimate of primary benefits is appreciably lower than the 1939 estimate, especially in the early years, but even in comparing the ultimate figures there is still a 17% differential. On the other hand, for the high estimates the eventual costs are almost identical. This lower range for primary benefits in the early years arises from the current availability of reliable data on the age distribution of the insured population (ignoring the unavailability of recent changes due to the emergency), so that a somewhat more realistic picture was obtained of the potential load of insured aged persons in the immediate future, the cumulative effect of which would influence the number of primary beneficiaries for a number of decades to come. The primary benefits under the 1942 low estimate are also smaller in amount than under the earlier cost estimate because of the assumption of lower retirement rates or, in other words, as to more individuals continuing in employment rather than drawing benefits. Such an assumption is particularly social in nature; the need of the work of every capable person already exists and may possibly persist for many years.

The 1942 estimates of wife's benefits are lower than the early estimates in the first few years of operation but appreciably higher thereafter. The differences are somewhat more pronounced than in the case of primary benefits, the trend of which, of course, influences the trend for wife's benefits. Entering in also is the factor that in the 1942 estimates somewhat less allowance was made for the wife being a primary beneficiary in her own right (this may be a questionable change, with more wives working). In addition, modifications (believed to be improvements) in the estimating techniques had an effect.

For each of the categories of survivors monthly benefits the 1942 estimates tend to be somewhat lower in the early years, but in a relatively short period this is reversed; in fact, in the most distant years the 1942 estimates are in some instances 50-100% greater. These tendencies result chiefly from a greater allowance for an accumulating, growing in-

sured population relative to the persons with wage credits in any one year than in the earlier estimates which were based on the latter group rather than the former as should have been done.

The 1942 estimates of lump-sum death payments are lower in all instances than the 1939 estimates. The availability of additional data on family composition seemed to indicate that too great allowance had been made in the earlier estimates for individuals dying without leaving survivors eligible for immediate monthly benefits. Conversely, this past overestimation tended to understate the survivors monthly benefits; this has now been corrected in the 1942 estimates as indicated above.

The effect of the low estimates of benefit disbursements in the early years for the 1942 estimates as contrasted with the 1939 ones and as indicated by Chart 5 is of paramount importance in the accumulation of the Fund. With a given amount of contribution income a lower amount of benefits, of course, results in a larger accumulated Fund. In Table 12 there are shown cumulative payments and net taxes (total tax receipts minus all administrative expenses) for the two sets of estimates. Contrasting the cumulative net taxes for each of the estimates indicates little difference; however, there is an appreciably difference in the cumulative benefits. Thus, for the low estimates the 1942 one shows $24 billion less disbursements for the period up to 1980, whereas for the high estimates the corresponding figure is $30 billion. Since the tax receipts are about the same, this will indicate a much larger accumulation of funds according to the 1942 estimates (as exemplified by the large balances portrayed in Table 10 discussed previously). Whereas the 1939 low estimate indicated an almost exact balance between cumulative benefits and cumulative net taxes up to 1980, the 1942 low estimate indicates a surplus of more than $30 billion. Even for the high estimate the 1942 estimate excess reaches $8 billion in 1980, although for the 1939 estimate there was a deficit of more than $20 billion.

A comparison of the 1942 estimates with the 1939 ones indicates that the benefit disbursements in the first few decades of operation will probably be appreciably lower than had been previously estimated, since (ignoring the effect of the war) the later estimates are believed to be more accurate, having been based on both more adequate data and more refined techniques of estimation. The experience in the next few years might, perchance, be very much lower than even the 1942 low estimate because of the war employment conditions. Conversely, following the cessation of the war, disbursements (especially primary benefits) might well show a sharp increase and exceed the 1942 high estimate because of the large number of aged individuals who might be drawn into employment during the war and thus attain eligibility, which situation would not have seemed likely on the basis of the 1937-40 experience alone. However, any such peak developing could also wear off gradually so that the long-term trend would again fall within the range of the 1942 estimates rather than the higher range of the 1939 estimates.

Table 12

COMPARISON OF CUMULATIVE BENEFIT PAYMENTS AND NET TAX RECEIPTS[a] SINCE 1940 UNDER 1939 AND 1942 ESTIMATES, LEVEL WAGE ASSUMPTION

(Figures in billions of dollars)

Calendar Year	1942 Estimate			1939 Estimate		
	Cumulative Benefits	Cumulative Net Taxes	Excess of Taxes	Cumulative Benefits	Cumulative Net Taxes	Excess of Taxes
			Low Estimate			
1950	3.6	14.8	11.2	7.1	13.0	5.9
1960	13.0	35.7	22.7	22.6	32.1	9.5
1970	27.7	56.7	29.0	44.4	53.0	8.6
1980	47.3	77.7	30.4	71.1	75.4	4.3
			High Estimate			
1950	5.3	14.9	9.6	8.7	13.6	4.9
1960	19.0	36.1	17.1	28.9	34.0	5.1
1970	40.7	57.8	17.1	60.0	56.7	-3.3
1980	71.5	79.7	8.2	101.5	81.3	-20.2

a/ Net tax receipts are total receipts minus all administrative expenses.

From an actuarial standpoint, it is usually considered rather hazardous to revise long-range cost estimates downward, but the renewed emphasis upon work and other evidence collected to date seem to indicate that the earlier cost estimates were somewhat of an overstatement for the early years of operation. However, the long-range figures indicating costs of as high as 12% of payroll or as low as 7 or 8% of payroll still seem to possess validity; in fact, it is indicated that ultimate costs might even be somewhat higher than had previously been estimated. These revised estimates also show a sharper upturn of future costs—not a wholly desirable situation.

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D. Assumptions and Methodology

The first step in preparing the cost estimates was to determine the size and age-sex composition of the insured population in various future years. As basic data, there were available the population estimates of the Committee on Economic Security, which were used for the low estimate, and those termed "medium" of the National Resources Committee, which were used for the high estimates. Both these population estimates were sub-divided into quinquennial age groups by sex for various future quinquennial years. From results of the "actuarial sample", the age and sex composition of the insured population in 1940 was obtained and expressed in relation to the 1940 population. From this about 55% of the men aged 25-29 were indicated as possessing insured status, whereas for women the corresponding figure was 23%.

In obtaining the estimated insured population in future years, there was first estimated for each age-sex group the percent of the total population who would be insured. For age groups under 30 the percentages were assumed to remain constant, but for older age groups they were assumed to increase from the 1940 levels because of the accumulative nature of insured status, especially taking into account the possible future obtaining of permanently insured status by many individuals.

In the low estimate the method adopted was to assume that for any given future year the percent of the population in the given age-sex group who were insured was the same as the corresponding percent for that same group of persons in 1940; for instance, 40% of the men aged 45-49 in 1940 were insured, and it was assumed that this same percentage applied to men aged 50-54 in 1945, to men aged 55-59 in 1950, etc. Thus eventually 55% of all men over the age of 25 were assumed to possess insured status since this is the maximum percentage reached in 1940. It should be noted that this method does not assume that all men with insured status in 1940 maintain it perpetually, but rather that the

relative accessions are counterbalanced by those who lose their insured status. This seems to be about the lowest reasonable assumption to make.

For the high estimate, the percentage of the population who were insured was obtained in the same way as the low estimate except that after 1950 arbitrary percentage increases were applied to the proportions obtained in the low estimate for ages 30 and over. These increased with age so as to allow for the accumulative nature of insured status. For men aged 30-34 the relative increase was 5%; for 35-39, 10%, etc., until for those 65 and over a figure of 40% was used. For women the same procedure was adopted, except that the relative increases mentioned above were taken as 1½ times as large. For the first decade of operation, these relative percentages were graduated in uniformly. As an example of how this modification is applied, consider again the male age group 45-49 in 1940, at which time 40% were insured. In 1950 rather than 40% of the survivors of this age group being assumed to be insured, there are now 52% (namely, 40% x 1.30), while for this group in 1960 when they were 65-69, the corresponding figures is 56% (40% x 1.40).

Having developed these percentages for the insured population relative to the total population, it was then a simple matter to obtain the estimated insured population by multiplying then by the estimated total population discussed previously.

The next step was to estimate the payroll for various future years. As discussed in the introduction, the average wage is assumed to have no secular trend so that the 1940 payroll was merely increased in proportion to the estimated size of the covered population (i.e. the number of individuals working in covered employment). This was done by applying the percentages of the population in covered employment in 1940 by sex and quinquennial age groups to the future population estimates. The increase in this covered population as contrasted with the 1940 figure of 35.0 million persons was applied to the 1940 payroll of $32.9 billion to obtain the future estimated payrolls.

The next step was to estimate the number of primary beneficiaries from the previously resulting insured aged populations. This was done by assuming that certain proportions of each of the various quinquennial age groups over 65 would be in receipt of benefits. These proportions were as follows:

Age Group	Low Estimate		High Estimate	
	Men	Women	Men	Women
65-69	40%	75%	75%	90%
70-74	75	90	95	98
75-79	95	99	99	100
80 & over	100	100	100	100

The equivalent average ages corresponding to the above schedules are 69 for men and 66½ for women in the low estimate, and 66½ for men and 65½ for women in the high estimate. Applying these proportions there is then readily obtained the estimated primary beneficiaries.

From the male primary beneficiaries using data from the Family Composition Study, it was possible to estimate the number who have aged wives, with an allowance being made in the high estimate for improved mortality which would result in a somewhat larger proportion of men being in this category. However, not all of these aged wives would be recipients of wife's benefits because some of them would be getting primary benefits in their own right. Therefore, the number of female primary beneficiaries who are married was estimated, and varying proportions of these were assumed to be wives of primary beneficiaries (this proportion ranged from 90% in the earlier years down to 75% ultimately, since it could be expected that in the first few years most of the married female annuitants would be wives of covered men although ultimately this tendency would probably diminish, partially because of migration). By deducting this group of married female primary beneficiaries from the total aged wives of male primary beneficiaries there was obtained the number of women in receipt of wife's benefits.

The above method makes no allowances for cases where the woman is in receipt of both types of benefits but, as stated previously, the subdivision of the various categories of benefits is based on the assumption that the individual will take whichever benefit is larger rather than the smaller benefit plus a partial benefit from the other category. It is believed that there will be considerable counterbalancing present so as to make the method used above be reasonably accurate.

The small number of dependent children of male primary beneficiaries was obtained by applying proportions from the 1940 claims data from which it appeared that there were about 11 such children per 100 men of all marital statuses in the age group 65-69 with the corresponding figures for the next two quinquennial age groups being 5 and 2 respectively.

Next, there were determined the average primary benefits for those attaining age 65 in various future years. For each category there were estimated the average number of years of covered employment by utilizing the data on proportion of population insured by age-sex groups. This was then expressed as a percentage of the maximum possible years. The assumed average wage while working, based on the earnings in 1940 of the insured population considered separately by sex and age groups, was then reduced by this percentage to obtain the average wage for benefit purposes. The average primary benefit was then calculated on the basis of this wage and increment years based on the average years of employment as mentioned above. The resulting figure was then reduced by a 5% factor to allow for the fact that the benefit based on the average wage will, on the average, be greater than the average benefit based on a wage distribution (this is the result of the weighted nature of the benefit formula).

Having gotten the average primary benefit for those attaining age 65 in various future years it was then possible to match these up against the primary beneficiaries with appropriate subdivision by age and sex groups. The total primary benefits could thence be obtained by multiplying each category of primary beneficiary by the appropriate average benefit. Since there was no rapid secular trend in the primary benefit, the average wife's benefit was assumed to be one-half of the average male primary benefit (at present the relationship is somewhat greater than one-half, but it seems likely that this relationship will diminish toward that point). Correspondingly, the average child's benefit for male primary beneficiaries was taken to be one-half of the average male primary benefit (the insignificant number of eligible children of female primary beneficiaries was ignored). It was thus possible to get wife's and supplementary child's benefits by multiplying the number of such individuals by the average benefit.

In order to estimate survivors benefits, it was first necessary to obtain the deaths among the insured population in each future period differentiated by age and sex. This was done by applying the appropriate death rates (those upon which the population estimates were based) to the estimated insured populations. The male deaths were subsequently subdivided into married male deaths and then into married male deaths with children through the use of Family Composition Study data.

From the latter developed data there was then obtained the number of surviving children and their mothers for deceased insured males (no account was taken of dependent children of widowers or of insured women since it had been previously determined that these categories would be negligible). These were then projected, based on data obtained from the Family Composition Study, so as to obtain for various future years the number of surviving orphans and their mothers. Factors were also developed to allow for the elimination of children in excess of the maximum number entitled to benefits, taking into consideration the maximum benefit provisions. Also a reduction was made for employment and non-school attendance of children (namely, 5% for the low estimate and 3% for the high estimate) and for employment of the mother (namely, 10% for the low estimate and 5% for the high estimate), these adjustments being determined partially empirically and partially from the 1940 claims data.

From the married male deaths of each future year it was possible to estimate the age distribution of widows created each year and then, by the use of proper mortality and remarriage factors (from the American Remarriage Table), the number of widows surviving to age 65 and not remarried was obtained. These figures were then projected to obtain the total number of non-remarried aged widows of deceased insured individuals.

As in the case of wife's benefits, it was necessary to reduce the number of such individuals so as to take into account those of this category who had earned larger primary benefits in their own right. The

latter group was determined by subdividing the female primary beneficiaries into those who were widows and then assuming that certain arbitrary percentages of these would otherwise have been eligible for widow's benefits. In the early years these arbitrary percentages were very small, increasing to about 90% ultimately, since widowed primary beneficiaries in the early years would be quite apt to be widows of men who had died before the system began, while in the later years there would probably be included almost all such widows. After these widowed primary beneficiaries had been deducted, a further reduction was made for ineligibility for benefits because of work, etc., (namely, 5% for the low estimate and 2% for the high estimate).

From the deaths among unmarried men and among women, there were determined the number and age distribution of surviving parents, using mortality factors for estimating the proportion with parents and birth data for estimating their age distributions. These parents by age were then projected to and beyond age 65 in order to obtain the total number of surviving aged parents in various future years.

However, because of the dependency requirements, not all of these survivors are eligible for benefits. For the low estimate it was assumed that in all future years 9% of the male parents and 20% of the female ones would fall in this category and thus be eligible for benefits, these factors being determined from the 1940 claims data. For the high estimate it was assumed that there would be an upward trend in the dependency ratio to ultimate levels of 15% for fathers and 45% for mothers (this is not a prophecy of increasing dependency). By applying the above mentioned dependency ratios, there were then obtained the estimated dependent fathers and mothers. However, a further deduction was necessary to allow for those parents who, either before or after their child's death, had earned a primary benefit in their own right. The reduction factors adopted were very small in the early years (since most of the then eligible parents would have had little opportunity for covered employment of their own), but increasing ultimately to about 50% for men and 40% for women (based crudely on the proportions of the total population eligible for primary benefits, although slightly smaller).

The number of deaths for which lump-sum payments are available was determined from the total female deaths obtained as described previously and from the male deaths excluding those cases where children are present or where the widow is over 65 at the time of the death of her husband.

Now, having available the number of survivors who receive benefits and the number of individuals in respect to whom lump-sum payments are made, it was necessary to obtain estimated average benefits in order to get the total benefit payments. This was done by a process somewhat similar to that used in obtaining the average primary benefit for primary beneficiaries, with separate calculations being made for each age-sex group for various future years. Since the trend of the average primary benefit is quite level in the future (on the assumptions of a level

over-all wage), the approximate methods used are probably sufficiently reliable. It should be pointed out that the method used does take into account the fact that workers at the middle ages have higher primary benefits, on the average, than those reaching age 65 (as evidenced in the 1940 claims data).

From the above computations, there could then readily be obtained the total benefit payments by categories for various future periods. No allowance was made in the lump-sum death payments for amounts less than 6 times the primary benefit in those cases where only the actual cost of burial is payable and is less than such amount.

From the above results, which were obtained for various future years, there were then interpolated figures for each single year. This was also done for the estimated payroll, from which tax receipts were obtained by applying the approximated tax rate, taking into account the three month lag between collection and the period in which the wages were earned. Administrative expenses were estimated by the formula used in the two Trustees' Reports; namely, 3/40% of total payroll plus 1% of benefit payments. The balance in the trust fund was then calculated, using an interest rate of $2\frac{1}{2}\%$ applied to the sum of the previous year's fund and 3/8 of the net income to the fund during the given year, the method used in the two Trustees' Reports.