OLD-AGE AND SURVIVORS INSURANCE
1943-44 COST STUDIES

By

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Actuarial Study No. 19   (Level Wage)
(September 1943)

Actuarial Study No. 19 (a)   (Increasing Wage)
(May 1944)

Actuarial Study No. 19 (b)   (Disability)
(January 1944)

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FOREWORD

Actuarial Study No. 19 and its coordinate studies 19(a) and 19(b) have been prepared by Mr. D. C. Bronson, Assistant Actuary, and represent the fifth step in a series concerned with potential costs under Title II of the Social Security Act of 1935, the amendments of 1939, and the possible extension of OASI to invalidity benefits. The preceding four steps have been:

> (1) Cost Studies prepared for the Committee on Economic Security, in 1934–5 preceding the initial legislation.
>
> (2) Cost Studies prepared for the Advisory Council of 1937–8 preceding the amendments of 1939.
>
> (3) Cost Studies prepared in connection with the Congressional Committee hearings of 1939.
>
> (4) Actuarial Study No. 17 dealing with the amended act and using OASI wage records through 1940.

For Actuarial Studies Nos. 18, 19, 19(a) and 19(b), there have become available:

> (1) Further OASI wage records.
>
> (2) 1940 census data.
>
> (3) Vital statistics up to date.
>
> (4) Many other reports.

"Low" and "high" values are assigned to various cost factors, both "low" and "high" being well within a much wider range between a "lowest" and a "highest" which values are not determined. "Lag" in getting under way is recognized to a greater extent than in previous studies by working from the actual experience of the early years.

Actuarial Study No. 19 uses the illustrative assumptions of uniform wage levels; No. 19(a) has adopted a yearly rate of increase in wages of 1%—a geometrical progression factor of 1.01; No. 19(b) explores the potential costs of "invalidity" or serious long-term disability benefits incorporated into the structure of OASI.

The long-range nature of the studies leaves out any indication as to when booms or depressions, wars or epidemics might develop or their specific effect on the experience. The emphasis is instead on long-time trends to the end of the century.

Attention is particularly called to (1) the continued increase in costs during the whole period of the study, with particular recognition of the lag in the development of old-age cost; (2) the relatively small outlays under survivors benefits costs; (3) the fact that the changes in wage level are representative of similar changes in many other factors; (4) the extremely wide potential range in disability costs.

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ACTUARIAL STUDY No. 19

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A. INTRODUCTION

Actuarial Study No. 18 developed an investigation of costs for an expanded program. Such expansion included both extension to all excluded categories and new benefit features such as prolonged disability, lump-sum to all deaths, and female retirement at 60; it also postulated an employee-employer contribution rate of 2% each. In the development of Actuarial Study No. 18, it was necessary to use assumptions somewhat different in nature from those required for the more restricted program cost studies. The present study parallels, for the present Act, Study No. 18, adopting wherever practicable the assumptions and methods which went into that study. While this adoption of new assumptions breaks somewhat with past procedure (which held largely to the same basic assumptions so that comparability (with the past) for proposed changes could be measured), it provides costs internally consistent between two programs—the present one and the expanded system of Study No. 18—and it furnishes a new basis by which a measure can be made of other changes intermediate between (or beyond) these two programs.

In relation to Actuarial Study No. 17, it can be said that the present study results in somewhat higher dollar costs, but somewhat lower percent of payroll costs. Actuarial Study No. 17 was exploratory of breaking away from the earlier basic assumptions but did not inject a differential average wage bitween the "low" cost level and that of the "high." The use of the differential in the present study is one of the main reasons for the results of the present study varying from those of Actuarial Study No. 17.

As in earlier studies a range in cost is presented: one to bring out low (not lowest) cost illustrations, the other for high (not highest) cost illustrations. In some of the component parts the "low" cost is actually higher than the "high" cost, as, for example, benefits to widows with children where for the "high" cost, both the assumption of relatively fewer births and that of lighter mortality overcome the assump-

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tion of greater average benefits. Also it will be seen that while the dollar outlay under the high assumptions is substantially above that of the low, the costs as percentages of payroll do not consistently bear a similar relationship.

The 1945 figures in the tables set forth for the low basis are the most recent estimates of the Bureau of Old-Age and Survivors Insurance. For the 1945 high no adjustment has been made and the result is about equivalent to the cost under the second Alternative offered by the Third Trustees' Report. Thus, the figures, however, are not out of line with the possibilities as discussed in the text of theTrustees' Report and in other recent correspondence.

Many of the tables presented in Study No. 18 were not duplicated here because of the more restricted nature of the present Act, also, data which was given in two tables in the former study, are worked into a one-table presentation here. As before, the results are presented in tabular form with a prefatory brief discussion for each of the tables.

B. BASIC ASSUMPTIONS

Table A which follows sets forth some indication of the basis of 9 major assumptions underlying this study. Numerous other assumptions and adjustment factors have been necessary in the development; these are more minor and are not susceptible to tabular display. The lettered sections of this table which perhaps need further explanation are C, D, E, and F.

In Actuarial Study No. 18 the same wage assumptions as shown under C of this table were adopted. Inasmuch as under the extended coverage of that study there was no uncovered employment and status was assumed to "freeze" upon compensable sickness or unemployment, average wages for benefit purposes were developed without much "in-and-out" movement; thus reduction in average wage was assumed to occur only as a result of complete noncompensable withdrawal from the labor force. In the present study, on the other hand, the labor force assumptions under E are made up of both covered and uncovered employment, and no freezing of status for sickness or unemployment is assumed. In E., "L. F." means labor force according to 1940 Census; thus, for the census week (March 24–30, 1940), "L. F." comprised those employed in the week, including public emergency work, and those seeking work ("S. W.") during the week, including new workers.

The 4-quarter covered workers are taken to represent on the average the full-time wage of section C. From the OASI experience by quarters of wages in 1940 and 1941, in D an average effective annual wage was approximated according to the categories of 1-quarter, 2-quarter, and 3-quarter workers. In section F the total labor force was broken down according to quarters with 0 covered wages, with

1-quarter, 2-quarter, 3-quarter, and 4-quarter wages. From this distribution assumptions of the percentage who might be considered *insured* according to age were determined. For the low cost, 0 and 1-quarter percentages in the distribution were taken as those not obtaining insured status; the other percentages were taken as obtaining insured status on the basis of the covered wages of section C and D. This same division was used for the high cost except that ½ of the 1-quarter percentages were assumed to work into an insured status of a 2-quarter character. It is readily appreciated that this procedure is unrealistic in stabilizing the flow which takes place over time between 0-quarter, 1-quarter, 2-quarter, etc., persons of a given year; however, as a basis for averages, and because of the impossibility at present of tracing the flow by quarter patterns over any appreciable time, it is felt that these assumptions are as good as any that can be be practicably utilized.

Section H indicates the considerable aging that will take place in our population, both under a level set of mortality rates (COES) and under sets of mortality rates which provide for improvement over time (NRC).

In section I are given the percentages insured. These should not be taken as the number working for taxable wages in any year. As a rule, the proportion of the population insured at the younger ages would be less than the percentage who obtained some covered wages during a year, and the reverse would gradually (both by age and calendar time) become true at older ages. This portion of the table develops that ultimately, even under the restricted coverage of the present program, 60–70% of male lives would have fully insured status and some 20–30% of the female population; also, 50–65% of males 65 and over would be primary beneficiaries, but only about 14% of the women since so many of the latter are drawing wives' and widows' benefits.

C. NUMBER OF BENEFICIARIES

In Table I are given estimates of the number of beneficiaries in force at the end of the years shown according to beneficiary category. The 1945 figures for the "low" correspond to the most recent estimates of the Bureau of Old-Age and Survivors Insurance; these may be used for the low side of the range since they have been developed on an assumption of the continuation of war conditions throughout 1945.

It is interesting to note that the number of beneficiaries for old-age benefits does not appear to have leveled off within the length of time shown in this table, while the survivors beneficiaries level off by about 1960. True, at some time prior to the year 2000 the rate of growth in number of old-age beneficiaries has dampened, but even on the "low" the actual number continues up a little. This indicates that the year 1980 may have too often in the past been taken as roughly the year of

stabilization; however, in the Trustees Report we have spoken of as long as a century for stabilization which is right theoretically since that imaginary entity, "a stationary population," requires a period of time to elapse equal to the oldest age in the mortality table. By the year 2000, however, even in a non-stationary population there will have been a complete cycle of "period of employed lifetime" elapsed for all practical purposes, so that any growth thereafter in the number of beneficiaries should no longer be influenced by the date of the program's commencement (1937), but mainly by population changes.

As is stated at various points in this study, the female primary beneficiaries exclude women who can obtain a wife's or widow's benefit even though they are insured in their own right. Actually they would take the larger amount so that some would in practice fall in as primaries and some (the majority probably) as wives and widows. As an indication of the total women who could be primary beneficiaries if they chose that benefit (that is assuming no other benefit available to them), the female primary beneficiaries of column (3) would be increased roughly for the low 4% in 1950, 10% in 1960, 32% in 1980, and after; and for the high, 5% in 1950, 11% in 1960, and 46% in 1980 and after.

The number of persons shown as recipients of children's benefits columns (5) and (9) assumes that all eligible children would file and thus in the larger families would take properly pro-rated benefits. Actually experience has been more the other way, that only the number of children file claim sufficient to obtain the maximum. The method of showing the total number indicates the scope of children really benefited by the program rather than those who merely serve as the medium for the actual beneficiary list. About 6% of the number of children shown are of the "non-claim" type; this percentage comes from OASI experience to date.

In comparing the low and the high figures of columns (9) and (10) respectively, the different birth and mortality results are clear. The high figures actually run substantially lower than the low because of lower birth rates and, in addition, relatively fewer widows and paternal orphans created by death of father. In comparing columns (9) and (10), one to the other, it should be borne in mind that while remarriage dissolves the widow's benefit, the child's payments continue; thus there is not a beneficiary widow in column (10) for every child (not a full orphan) of column (9).

It may be noted that the number of child beneficiaries' and widows' current beneficiaries vary considerably, from those given in Table IV of Actuarial Study No. 17. The differences lie in a number of reasons concerning which there is no need for discussion here, but explanations and reconciliation have been outlined in a rather detailed memorandum of methodology prepared in connection with work sheets of the present study.

The figures for parents are always most unreliable since, in addition to the other assumptions of the study, the element of dependency at time of insured's death complicates the situation. Many parents will, of course, be insured in their own right or have a larger benefit as a widow of a deceased, insured husband. In any event, this benefit type will not become of important cost significance; according to actual current experience, the number shown in the table is large.

The three to four-fold increase over time in the number of deaths qualifying for the lump-sum benefit should be noted. This results from several causes: the aging insured population, the higher mortality (before retirement) among those whose children have reached age 18, and the increasing proportion of insured women who reach the ages of high mortality rates—these factors are responsible for the secular increase and for the irregular variations between the low and the high.

D. AVERAGE BENEFITS

In Table II average benefits are shown on an annual basis because the small changes show up better than if given monthly in dollars only. These amounts are those "in force" and hence do not check as the result of dividing the total benefit disbursements of Table III by the number of beneficiaries of Table I since the Table III disbursements both (1) exclude amounts in suspension and (2) for new entrants and terminations include only one-half year's transactions on the average.

The average benefits slowly but steadily increased to 1980 for male primary beneficiaries because the 1% increment overcomes both (1) the natural decrease in average wage of the insured group by age which occurs as persons of the group drop out of covered employment and (2) the "drag" in over-all average benefit because earlier retirements at smaller average benefits are still on the benefit rolls. For female primaries the lower average wage and smaller proportion staying in covered employment causes the "low" benefits to reach a peak around 1955 with some decrease thereafter; the "high" figures continue up, however, to the "employed lifetime limit" of 1980.

In column (4) the trend of wife benefits naturally closely parallels that of male primaries.

Widows' benefits of column (5) increase to 1980 under both "low" and "high," though the relative increase under the latter is a little greater, largely because under the "high" (lighter) mortality, husbands die later and hence there has been more opportunity for the 1% increment to operate, even though by the same token greater opportunity is present for leaving covered employment at the older active ages, thereby reducing average wages more than is the case in the "low"; that is, the increment more than makes up for the relative reduction in average wage.

Both child's benefits and widows' current figures increase to 1980 because the deceased husband (whose death must have occurred within 18 years) had, on the average, a primary benefit (potential) which increased with age on account of the 1% increment. Included in the average for children are benefits of children of primary beneficiaries; these are relatively few in number and, of course, their average amount increases in rough correspondence with the increase for male primary average amounts. The average benefit for children has not been adjusted here for any maximum benefit.

For the lump-sum amounts of column (9) it might at first be expected that their trend would rather parallel that of child's or widows' current; however, there are a substantial number of lump-sum on insured female lives and on aged lives of both sexes so that we do not find the expected analogy to hold.

In the determination of average benefits from average wage, various adjustment factors were used to recognize the principle that average benefits derived from a frequency distribution of average wages varies from that of using a single average wage.

It will be noted throughout that the benefit percentage relationships, 50%, 75%, 100% (of primary benefits), do not hold one with another. This is because they are functions of different primary benefits both by age and by calendar time.

E. BENEFIT COSTS

In Table III are shown the costs in dollars and as percentages of payroll, in each case by beneficiary type.

These results, particularly in respect to male primaries, take account of employment in covered work for some persons after benefits have commenced, thus suspending payments for part of a year. If this factor were ignored, the amounts for male primaries (column (2)) and for wives (column (4)) would be increased roughly 10%.

The proportion of monthly benefits payable to survivors under 65 is impressive by its small size; while in the early period it runs nearly half for the "low" and about 30% for the "high", later on these proportions reduce tremendously so that by the year 2000 they are 12% and 6% respectively. But benefits to aged widows and parents may be considered "survivors" as well as "old-age," so that these may be added in when the full effect of the survivors feature of the Act is desired. Properly, though, an adjustment must first be made for women who would have been entitled in their own right to primary benefits if there had been no survivors' provision. Until the quite late years this adjustment is negligible. The resulting proportions for the survivors' feature thus modified are: In the year 2000, 39% of monthly benefit costs are on account of the insured's death in case of the low, and 28% for the high.

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The payments designated as "Young Survivors Benefits" reach a relatively stabilized position in 15 or 20 years while the "Old-Age Benefits" (except for parents) continue to increase both in dollars and percentages of payroll throughout the period of observation. By the year 2000 a tendency to level off is occurring, though not clearly obvious from the table because of the 20-year interval 1980 to 2000 (but see chart). It is interesting to test the category with greatest relative increase over this final 20-year period; the following figures show how premature from a year of stabilization 1980 may be:

Percent increase in cost from 1980 to 2000

	Low	High
Male primaries	23	52
Female primaries	18	70
Wives	23	62
Widows	43	70
Total Old-Age Benefits	28	62

The substantially greater "life expectancy" in the high assumptions reveals itself in a general comparison between low and high figures above. Considering specific categories, we observe that male primaries and wives increase the same under the low, as would be expected, but that under the high, wives go up 62% against 52% for male primaries because of the increasing number of aged married couples still unbroken by wife's death. The larger rate of increase for female primaries under the high, in comparison with the low, is the result of the increased percentage of females taken to be in the labor force, in addition to the lighter mortality. Under both the low and the high, the category of aged widows shows the greatest increase for these distant years. This is because these widows are the result of insured husbands dying at all ages of married life; large numbers were once widows' current beneficiaries who again come in for benefit at age 65, others are widows already 65 or over at time of husbands' death. Thus, the greatest relative backlog of future recipients lies in the married women of today and tomorrow.

F. SUMMARY AND RESERVE FUND

Table IV summarizes the income and outgo for future years and develops the progress of the reserve on the assumption of 2% compound interest.

The figures in column (4) show that the proportionate increase in dollar cost between the high and the low runs from 31% in 1955 to 88% in the year 2000. However, the proportionate increases in percentage-of-payroll costs are quite different and for all the years shown except 2000, when the relationship is 118%, the high figures are less than the low, 85% thereof in 1955 to 93% in 1980.

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The obvious reason for these opposite relationships lies in the substantially greater average wages assumed in the high example. As a general rule under the "bent" formula the higher the wage, the smaller the benefit as a percent thereof. This is directly reflected in expressing costs as a percentage of payroll and not until after 1980 do other high cost factors of the high assumptions "catch-up" to bring out percentage of payroll costs above those of the low assumptions.

This result is very pertinent in showing the greater inherent variation in percentage of payroll costs than in dollar costs. Quite feasible assumptions could be chosen which would bring out dollar costs in between those given in this study but not percentage costs—for example, the use of a greater "in-and-out" movement under the high assumptions would result in dollar costs further down the range given, but the percentage of payroll costs would be up and could easily fall quite outside the range of percentages given. Or, again, the average cost to the year 2000, column (6), shows 5.6% for each set of assumptions, thus apparently presenting no range whatsoever, and yet we know that there is a range and that 5.6%, regardless of future conditions, is not the single answer.

The progress of the reserve fund of column (9) indicates that taxes plus interest are more than adequate, for the low assumptions, to support benefits indefinitely. Similar sufficiency for the high assumptions would hold considerably beyond the year 2000, although by adding taxes (column (3)) plus interest (column (8)) for that year and comparing the sum with that year's benefits (column (4)), it is seen that the reserve fund is slowly shrinking, and because, the interest part of the income depends on the size of the fund, the shrinking will accelerate with time.

This study is the first one on a level wage assumption which we have presented, dealing with the present formula and coverage where the reserve fund under the high assumptions has not become negative prior to the year 2000. The reserve holds up because of the high level of average wages adopted. These were adopted for bringing out illustrations which would have homogeneous assumptions with those for the expanded program of Actuarial Study No. 18. This forced homogeneity itself, however, carries danger. In Study No. 18, the complete coverage and the freezing of status at compensable unemployment and sickness eliminated largely the possibility of much "in-and-out" movement; but, in this study in the restricted coverage basis and without other integrated benefit programs, there remains considerable latitude for that sort of intermittent coverage beyond that assumed herein. Hence, from the results of column (9) of table IV, too great reliance should not be placed on the ability of the fund to remain positive over the next 60 years. Conditions could reasonably evolve so as to exhaust the fund within that time.

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This warrants a repetition of the warning that the "low" costs are not meant to represent the *lowest*, nor the "high," the *highest*.

G. BENEFITS AND TAXES IN DOLLARS

The "No. 19" curves on the accompanying chart portray, from 1945 on, the benefits and taxes summarized in table IV. The curves up to the middle of 1943 on the chart represent actual experience to date (without attempting to show the irregularities within the year). From the middle of 1943 until the end of the war, the tax line is more apt to follow the high example than the low and probably vice-versa for the benefit situation, but the area is given a question mark.

The curves so labeled represent those which have appeared up to now in the OASI Trustees' Reports. The trustees' benefit lines are substantially higher up to 1990, where they stopped, than the benefit lines of the present study. The single tax line of the Trustees' Report has often been questioned as to appropriateness. Under the assumptions used in the cost studies upon which the trustees' curves were based, a single tax line was justified. Now, however, with a differential in the number of covered *jobs* and with an average wage differential between the low and the high, a double tax line is necessary and in general more logical.

Actuarial Study No. 17 produced benefit curves higher in the earlier years and lower in the later than the "No. 19" curves on the attached graph. The assumptions of No. 17 were felt to produce dollar benefit costs which were not conservative for the long run. With 7 curves already in the chart, the addition of 3 more would confuse the picture further. However, in order to furnish an indication of how study No. 17 benefit results compare with the others, horizontal dashes have been indicated in the decennial ordinates 1950, 1960, etc., with the letter H indicating "high" benefits and the letter L indicating "low" benefits for No. 17 results.

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PRESENT OASI PROGRAM: BENEFITS AND TAXES

BILLIONS OF DOLLARS

END OF YEAR

NOTE: POINTS H AND L INDICATE BENEFIT VALUES FROM ACTUARIAL STUDY NO. 17

JULY 1944

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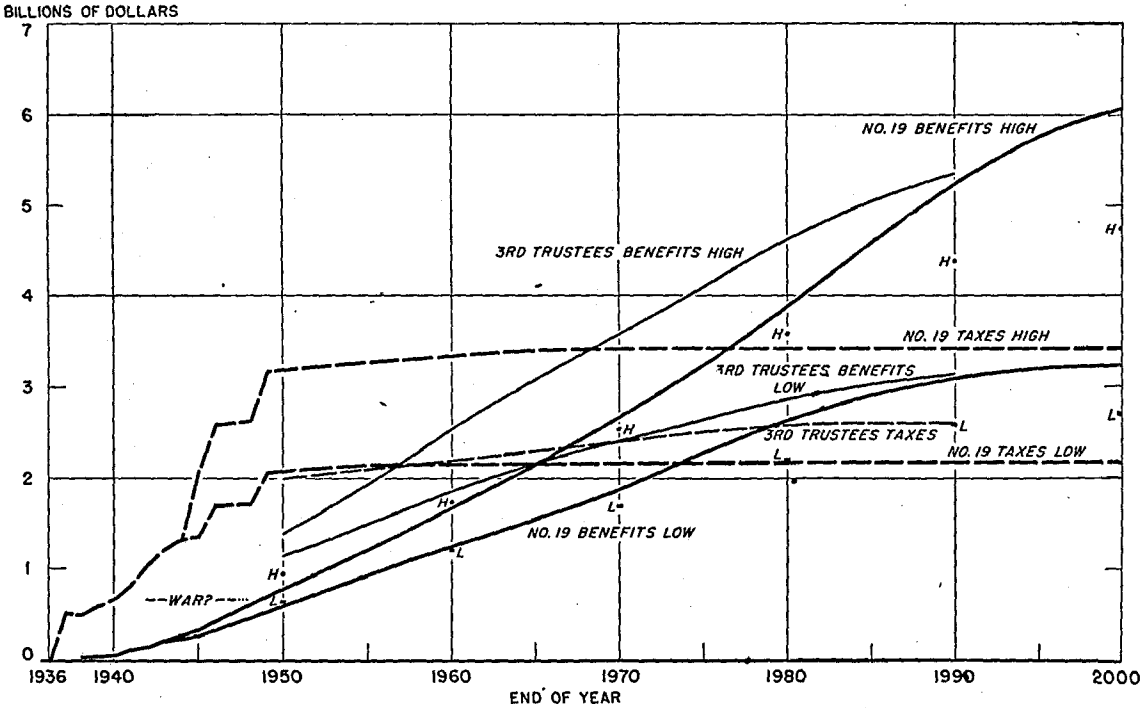
A. *Mortality.*
  Low: Constant rates at current (ex-war) levels.
  High: Declining rates (NRC medium).

B. *Marital and parental status.*
  Derived by consideration of 1940 Census data, Richmond Family Composition Studies and OASI claim statistics. Remarriage rates by Workmen's Compensation select experience.

C. *Wages (assumed wages for a work-year).*

	Men	Women
Low	$1,500	$900
High	2,000	1,200

D. *Wages (assumed per number of work-quarters per year).*

	Men			Women		
	1 quarter	2 quarters	3 quarters	1 quarter	2 quarters	3 quarters
Low	$150	$300	$750	$90	$180	$450
High	200	400	1,000	120	240	600

E. *Employment assumptions to age 65 (covered and excluded combined).*

	Men (by age)	Women (by age)
Low	1940 L. F. percent minus S. W.	1940 L. F. percent minus S. W.
High	1930 gainful workers	1940 total L. F. percent plus assumed future increases.

F. *Covered employment assumptions.*
  Same relation to all employment (above) as borne by 1940 covered employment (by age, quarters, and percentage number of employees).

G. *Covered pay rolls (in billions).*

Low				High		
Men	Women	Total	Calendar year	Men	Women	Total
$27.8	$5.8	$33.6	1945	$42.6	$8.9	$51.5
28.7	5.9	34.6	1950	44.1	8.9	53.0
29.7	5.9	35.6	1955	45.4	9.2	54.6
29.9	5.9	35.8	1960	46.1	9.4	55.5
30.1	5.9	36.0	1970	47.1	9.9	57.0
30.2	5.8	36.0	1980+	47.0	10.0	57.0

H. *Total population age 20+ (in thousands).*

Age	Low (COES)		Calendar year	High (NRC medium)	
	Men	Women		Men	Women
20–64	40,967	41,303	[1] 1945	40,967	41,303
65+	4,851	5,207		4,851	5,207
20–64	42,574	42,812	[1] 1950	42,422	42,796
65+	5,376	5,962		5,531	5,910
20–64	44,608	44,788	1960	44,639	44,896
65+	6,591	6,999		7,101	7,717
20–64	45,604	45,023	1980	46,302	45,322
65+	7,876	9,113		10,356	11,695
20–64	44,065	43,285	2000	46,340	44,507
65+	8,592	9,641		12,830	13,640

[1] 1945 figures are projected 1940 Census; 1950 are graded from 1945.

TABLE A.—*Basic assumptions*—Continued

I. *Insured and retired* [1] *proportion of population (derived percentages).*

Age	Low		Calendar year	High	
	Men	Women		Men	Women [2]
	Percent	*Percent*		*Percent*	*Percent*
Insured 20-64	49	16	1945	57	18
Insured 65+	18	2		20	2
Primary beneficiaries	10	1		11	1
Insured 20-64	52	17	1950	61	20
Insured 65+	25	4		27	4
Primary beneficiaries	17	3		22	3
Insured 20-64	54	18	1955	64	22
Insured 65+	30	5		34	5
Primary beneficiaries	22	3.5		29	4
Insured 20-64	56	19	1960	66	24
Insured 65+	34	7		40	7
Primary beneficiaries	26	5		35	6
Insured 20-64	58	21	1970	69	27
Insured 65+	44	12		49	12
Primary beneficiaries	36	9		45	10
Insured 20-64	59	21	1980	71	30
Insured 65+	54	18		60	19
Primary beneficiaries	46	13		55	13
Insured 20-64	60	21	2000	71	32
Insured 65+	60	21		71	32
Primary beneficiaries	52	14		66	14

[1] The percent insured at 65 and over includes the percent of primary beneficiaries shown.
[2] Only the women without right to any other benefit are listed as primary beneficiaries.

TABLE I.—*Beneficiaries in force*

[Figures in thousands of persons]

Calendar year	Monthly old-age beneficiaries [1]							Monthly survivor beneficiaries			Total OASI monthly beneficiaries	Lump-sum deaths
	Male [1]	Female [2]	Wives [3]	Children of primary beneficiaries	Widow's [3]	Parent's	Total old-age	Child's	Widow's current	Total survivors		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
						Low						
1945	436	59	143	22	97	7	764	383	148	531	1,295	170
1950	896	147	264	46	246	50	1,649	912	221	1,133	2,782	218
1955	1,319	213	401	61	449	84	2,527	1,204	295	1,499	4,026	270
1960	1,722	352	533	77	753	111	3,548	1,372	350	1,722	5,270	323
1970	2,555	752	795	110	1,425	125	5,762	1,552	398	1,950	7,712	430
1980	3,662	1,144	1,139	159	2,310	127	8,541	1,563	397	1,960	10,501	542
2000	4,468	1,350	1,390	165	3,253	127	10,753	1,564	397	1,961	12,714	623
						High						
1945	544	68	170	28	84	25	919	454	78	532	1,451	179
1950	1,201	164	387	60	319	82	2,213	876	171	1,047	3,260	227
1955	1,781	271	589	86	473	145	3,345	1,102	236	1,338	4,683	268
1960	2,466	472	843	112	818	208	4,919	1,192	279	1,471	6,390	314
1970	3,769	908	1,369	158	1,621	269	8,094	1,200	298	1,498	9,592	428
1980	5,706	1,475	2,118	239	2,629	292	12,459	1,155	262	1,417	13,876	569
2000	8,438	2,513	3,355	291	4,450	271	19,318	1,154	262	1,416	20,734	773

[1] End of year; includes those whose claims arise in the year, and those who may be in noncurrent-payment status some part of the year (e. g., nearly 20 percent of the male primaries of column (2) are of this nature).
[2] Those eligible to primary benefits only; in addition to single and divorced women, this column includes a few wives whose husbands have not yet retired and insured wives and widows of noninsured husbands.
[3] Includes women who are also insured in their own right.

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TABLE II.—*Estimated average annual benefits (in force), per beneficiary by type*

Year	Primary		Wives'	Widow's	Parent's	Child's [1]	Widow's current	Lump sum
	Male	Female						
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Low								
1940 [2]	$279	$221	$146	$244	$157	$146	$235	$140
1945	291	226	152	235	154	150	240	143
1950	303	232	158	236	157	153	245	146
1955	315	236	164	248	160	156	249	150
1960	324	231	169	253	164	159	254	151
1970	333	224	174	261	167	163	260	151
1980	340	215	177	265	169	165	263	151
2000	340	215	177	265	169	165	263	150
High								
1940 [2]	$279	$221	$146	$244	$157	$146	$235	$140
1945	314	230	162	263	171	167	267	159
1950	334	241	173	267	176	172	275	164
1955	350	247	181	278	180	176	280	167
1960	364	248	189	287	182	179	285	170
1970	380	256	197	300	185	181	290	174
1980	387	263	200	303	189	185	296	170
2000	387	263	200	303	189	185	296	166

[1] Includes the relatively few children of primary beneficiaries.
[2] Actual.

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TABLE III.—*OASI benefit payments and percent of pay roll for year indicated*

[Millions of dollars]

Year (1)	Monthly old-age benefits												Monthly young survivors benefits						Other		Total	
	Primary				Wives' [2] (4)		Widow's [2] (5)		Parent's (6)		Total old-age (7)		Child's [3] (8)		Widow's current (9)		Total young survivors (10)		Lump sum (11)		Total benefits (12)	
	Male (2)		Female [1] (3)																			
	Amount	Per-cent	Amount	Per-cent	Amount	Per-cent	Amount	Per-cent	Amount	Per-cent	Amount	Per-cent	Amount	Per-cent	Amount	Per-cent	Amount	Per-cent	Amount	Per-cent	Amount	Per-cent
Low																						
1945	$88	0.26	$11	0.03	$16	0.05	$20	0.06	$1	-----	$136	0.41	$50	0.15	$21	0.06	$71	0.21	$26	0.08	$233	0.70
1950	232	.67	34	.10	36	.10	52	.15	8	0.02	362	1.04	140	.40	54	.16	194	.56	31	.09	587	1.70
1955	362	1.02	50	.14	58	.16	104	.29	13	.04	587	1.65	193	.54	73	.21	266	.75	40	.11	893	2.51
1960	509	1.42	81	.23	79	.22	182	.51	18	.05	869	2.43	228	.64	89	.25	317	.89	49	.14	1,235	3.45
1970	753	2.10	168	.47	122	.34	362	1.01	21	.06	1,426	3.98	270	.75	103	.29	373	1.04	64	.18	1,863	5.19
1980	1,107	3.08	246	.68	180	.50	602	1.67	21	.06	2,156	5.99	284	.79	104	.29	388	1.08	81	.22	2,625	7.29
2000	1,363	3.79	290	.81	221	.61	859	2.39	17	.05	2,750	7.65	285	.79	104	.29	389	1.08	93	.26	3,232	8.98
High																						
1945	$140	0.27	$16	0.03	$23	0.04	$21	0.04	$4	0.01	$204	0.39	$72	0.14	$21	0.04	$93	0.18	$28	0.05	$325	0.63
1950	345	.65	40	.08	58	.11	78	.15	14	.03	535	1.02	155	.29	47	.09	202	.38	37	.07	774	1.46
1955	543	.90	67	.12	93	.17	126	.23	26	.05	855	1.56	206	.38	66	.12	272	.50	44	.08	1,171	2.14
1960	786	1.42	117	.21	139	.25	220	.40	38	.07	1,300	2.35	233	.42	80	.14	313	.56	53	.10	1,666	3.00
1970	1,268	2.22	232	.41	238	.42	475	.83	50	.09	2,263	3.97	246	.43	86	.15	332	.58	75	.13	2,670	4.68
1980	1,937	3.40	388	.68	370	.65	775	1.36	55	.10	3,525	6.18	258	.45	78	.14	336	.59	97	.17	3,958	6.94
2000	2,935	5.15	661	1.16	598	1.05	1,348	2.37	51	.09	5,593	9.82	267	.47	78	.14	345	.61	128	.23	6,066	10.64

[1] Those eligible to primary benefits only; in addition to single and divorced women this column includes a few wives whose husbands have not yet retired and insured wives and widows of noninsured husbands.

[2] Includes women who are also insured in their own right.

[3] Includes the relatively few children of primary beneficiaries.

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TABLE IV.—*Summary—Benefit, taxes and progress of reserve* [1]

Calendar year	Covered pay roll (billions)	Tax income for year shown (millions)	OASI benefit payments for year shown (millions)	Benefit cost for year shown, as percent of pay roll	Level cost, 1945 to year shown, as percent of pay roll		Income from interest (2 percent) on the fund (millions)	Amount of trust fund (end of year) (billions)
					No interest	2 percent interest		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Low								
1945	$33.4	$1,336	$233	0.70	0.7	0.7	$152	$8.2
1950	34.6	2,076	587	1.70	1.2	1.2	310	16.5
1955	35.6	2,136	893	2.51	1.7	1.6	486	25.2
1960	35.8	2,148	1,235	[2] 3.45	2.1	2.0	650	33.3
1970	35.9	2,154	1,863	5.19	3.0	2.8	932	47.2
1980	36.0	2,160	2,625	7.29	4.0	3.6	1,116	56.2
2000	36.0	2,160	3,232	8.98	5.6	4.7	1,242	[3] 62.2
High								
1945	$51.5	$2,060	$325	0.63	0.6	0.6	$160	$8.9
1950	53.0	3,180	774	1.46	1.1	1.1	402	21.5
1955	54.6	3,276	1,171	2.14	1.4	1.4	682	35.5
1960	55.5	3,330	1,666	[4] 3.00	1.8	1.8	950	48.8
1970	57.0	3,420	2,670	4.68	2.7	2.5	1,436	72.9
1980	57.0	3,420	3,958	6.94	3.6	3.2	1,596	90.4
2000	57.0	3,420	6,066	10.64	5.6	4.6	1,854	[5] 92.3

[1] Exclusive of administrative expenses.
[2] Benefits reach 4 percent of pay roll in 1964.
[3] On basis of tax and benefit conditions of year 2000 continuing, fund would keep increasing.
[4] Benefits reach 4 percent of pay roll in 1967.
[5] Reaches a peak of $97 billion in year 1990; on basis of tax and benefit conditions of year 2000 continuing, fund would decrease thereafter at an accelerating rate reaching zero in 60 years.

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ACTUARIAL STUDY No. 19(a)

Changes in the Results of Actuarial Study No. 19 If an Increasing Wage Assumption Is Introduced

A. INTRODUCTORY

The Fourth Annual Report of the Board of Trustees in the section on Actuarial Status of the Trust Fund carries the following paragraphs concerning an increasing wage assumption of the type introduced in the present Study:

Another factor mentioned earlier but not used in the actuarial projections is the trend, exhibited in the past, of an irregular but upward movement in earnings, both on a dollar basis and in the form of real wages. If this secular trend continues, then—other things being equal—the curves of benefits and taxes would both be more steeply ascending than shown. The upward change in the tax curves, however, would be far more accentuated than would be such change in the benefits curves. There are several reasons for this, the important one being that the benefit increase would be dampened because: (i) the basis for benefits is the average monthly wage up to the maximum of $250; 40 percent is taken on the first $50 thereof and 10 percent operates on that part above $50; as average wages increase, and as more persons reach the $250 maximum, a larger portion of such wages falls in that part of the benefit formula to which the 10 percent rather than the 40 percent rate applies, thus reducing benefits in relation to wage, and consequently in relation to taxes; and (ii) any year's taxes are substantially based on the covered wages of that year, while any year's benefits in force are based on weighted composite wages of all previous years in which the insured persons on whose account the benefits are paid worked in covered employment, thus including in future years, wages of as much as 60, 70, or more years previously. In view of these facts, continuation of the past upward trend in wages would postpone for a longer period or possibly even permanently, the time at which benefits computed under the present formula would rise above taxes at the rates now scheduled.

In addition to excluding the assumption of increasing wages, the cost examples given have avoided dealing with various other important secular trends with diverse effects on costs which cannot now be adequately extrapolated into the future such as: (i) lengthening of the period of childhood or preparation for work; (ii) an earlier age of retirement, conceivably reversible under circumstances of improved health and good employment conditions; (iii) the long-time trend of migration out of agriculture and domestic service into occupations now covered by the program; (iv) the downward trend in hours of work; and (v) the upward trends in the employment of women outside the home. Recognition of these trends is another factor, in addition to those discussed in more detail above, which prompts the board of trustees to present the long-range cost figures with reservations.

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The injection of factors of increasing wages into the benefit formula and tax base, naturally extend influences throughout the program, affecting for any given time in the future, the inter-relationships of benefits and the relationships of benefits with the then current taxable wages. This Study attempts to carry through these changes in respect to the resulting average benefits, total benefit disbursements, comparison thereof to the then current (higher) taxable wages and to develop the resulting reserves on the assumption of the present schedule of tax rates and the benefit formula of the present Act, either or both of which might reasonably be subject to change under a future wage experience of the nature assumed herein. In view of this and with the further elaboration quoted above from the Fourth Trustees' Report any conclusions drawn from this Study should be adequately understood and carefully stated.

B. BASIC ASSUMPTIONS

The present Study holds to the assumptions of Actuarial Study No. 19 except for substituting, for the level wage basis, an increasing wage element whereby a compound rate of increase of 1% per year in covered wages is used. Starting with the year 1945, the following table indicates the increases which this assumption produces. In the first column are the straight mathematical figures for the geometrical progression involved. The other columns result in the operation of this progression but are held down according to the weighting of those wages which reach the $3,000 ceiling of the present law. For example, if there were no ceiling, each level of wages would have increased 72.9% (col. (2)) by the year 2000. Considering, however, the assumed frequency distribution of four-quarter workers for example, and the $3,000 ceiling, there would only be a composite percentage increase, taking males low for illustration, of 48.6% (col. (3)); females have room to increase more, however, since the ceiling is not met as soon for those workers as a group:

Year	Increase factors, no ceiling (geometrical progression)	4-quarter workers, wage increase factors, $3,000 ceiling			
		Male lives		Female lives	
		Low	High	Low	High
(1)	(2)	(3)	(4)	(5)	(6)
1945	1.000	1.000	1.000	1.000	1.000
1950	1.051	1.042	1.034	1.050	1.049
1955	1.105	1.087	1.068	1.102	1.099
1960	1.161	1.131	1.100	1.157	1.152
1965	1.220	1.176	1.132	1.214	1.206
1970	1.282	1.221	1.162	1.273	1.261
1975	1.348	1.267	1.190	1.336	1.319
1980	1.417	1.313	1.218	1.401	1.378
1985	1.489	1.358	1.243	1.469	1.438
1990	1.565	1.402	1.267	1.539	1.498
1995	1.645	1.445	1.288	1.611	1.558
2000	1.729	1.486	1.309	1.684	1.618

A summary of the way in which the new assumptions change items C, D and G of table A, in Actuarial Study No. 19, is given in table A(a) below. Here the effect of the $3,000 ceiling, mentioned above, is illustrated under C, where the ratios of wage increase for four-quarter workers from 1945 to the year 2000 are the same as the appropriate figures in columns (3) to (6) of the factor table above. In item D, dealing with the less than four-quarter assumptions, the ratios of increase are greater since the $3,000 has no, or little, effect.

C. AVERAGE BENEFITS

In table B, there are set forth ratios of increase for benefit categories over the corresponding amounts under the level wage assumptions of Actuarial Study No. 19. In table C, the average annual benefits are given which are reflected by the ratios of table B.

Table B illustrates several interesting points: first, it shows quantitatively the relatively small effect which the increasing wage assumption has on benefits, due to (i) the fact that benefits are a function of wages spread over a long period of time, (ii) that the bent formula dampens the increase in benefits with the increase in wage, and (iii) that the $3,000 ceiling also holds down the increase in benefits. The largest increase in benefits, shown in table B, is only a little over 17%, applying as to lump sums for females under the low (lump sums reflect recent earnings more than does a beneficiary roll for monthly benefits), and the smallest increase for the year 2000 occurs under male primary benefits for the high, amounting to only 8%.

Secondly, table B indicates the diversity in the increase ratios for benefits between categories thereof, ranging from a 5% increase in the year 2000 for widow's benefits (where death of husband in many cases occurred years earlier when lower wages prevailed), to the previously mentioned 17% for female lump sums. Male primary benefits do not increase as much as 10% under either assumption.

Thirdly, the table indicates the far greater effective increase in taxable payrolls than in benefits, as shown in column (2). This is more specifically measured in a later table of this Study.

The figures in table B are carried to three decimal places but this connotes more exactness than is by any means the case, even under a given set of assumptions, because adjustments based on judgment have to be made throughout, so that the table is meant to emphasize interrelationships but only approximations to the degree thereof.

Table C, as mentioned earlier, sets forth the dollar amounts of average annual benefits in force. The relationship of each to those of Study No. 19 has just been described through table B. Because of the restricted nature of the coverage, these benefits are derived from a composite distribution of the wage levels of covered employ-

ment and also of the time spent in covered employment. Secondly, these average benefits do not offer any good comparison against wages for persons who have reasonably steady work in covered employment until death or retirement. In order to get some measurement of what the benefits mean in terms of the increased wage prevailing just prior to death or retirement, the following table is carried through, wherein 5 illustrative cases are taken. These show, in the upper section, the resulting primary benefits and their relation to wage under a level wage assumption; in the middle section, the similar situation under the increasing wage assumption after it has operated 40 years (1985); and in the bottom section, a similar comparison for the year 2000, assuming 40 increment years.

Primary benefits—Employee obtaining 40 increment years

	Case I	Case II	Case III	Case IV	Case V
	Level wage assumption				
1. Average monthly wage	$50.00	$100.00	$150.00	$250.00	$500.00
2. Monthly wage at retirement	50.00	100.00	150.00	250.00	500.00
3. Monthly primary benefit	28.00	35.00	42.00	56.00	56.00
4. Percent of wage at retirement	*Percent* 56	*Percent* 35	*Percent* 28	*Percent* 22.4	*Percent* 11.2
	1 percent increasing wage—Retirement in 1985				
1. Average monthly wage (1945–85)	$61.00	$122.00	$183.00	[1] $305.00	[1] $610.00
2. Monthly wage at retirement	74.00	149.00	223.00	372.00	745.00
3. Monthly primary benefit	29.54	38.08	46.62	56.00	56.00
4. Percent of wage at retirement	*Percent* 40	*Percent* 26	*Percent* 21	*Percent* 15	*Percent* 7.5
	1 percent increasing wage—Retirement in 2000				
1. Average monthly wage (1960–2000)	$71.00	$142.00	$213.00	[1] $355.00	[1] $710.00
2. Monthly wage at retirement	86.00	173.00	259.00	432.00	865.00
3. Monthly primary benefit	30.94	40.88	50.82	56.00	56.00
4. Percent of wage at retirement	*Percent* 36	*Percent* 24	*Percent* 20	*Percent* 13	*Percent* 6.5

[1] Maximum for benefit purposes is $250.

From this table, it is seen that for the lowest wage category shown (those who would have a $50 wage under the level wage assumption), the increasing wage assumption pulls their primary benefit down 20 percentage points in relation to wage at retirement (from 56% to 36%). As we go up the scale in wage categories, the reduction in benefits percentage lessens until we reach cases IV and V. Then, the drop increases again due to benefits being held down by the ceiling while actual wages at retirement are above the ceiling. This comparison over time illustrates one of the objections to the increasing wage assumption, namely, that under it the benefit formula (assumed to be static) is likely to be forced upward in some way to provide

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more liberal dollar amounts as a compensation for the drop in percentage relationship.

D. BENEFIT COSTS AND COMPARISON WITH NO. 19 (LEVEL WAGE)

In tables D, E, and the three charts, the cost illustrations of the increasing wage study are presented, including some comparisons with the results of Study No. 19 (level wages).

Table D gives the No. 19(a) costs broken down by category of beneficiaries and corresponds with table III of Study No. 19. The relative positions and interrelations of benefit category remain as before so that no particular new comment need be made.

Table E gives a summary comparison between the level wage figure of No. 19 and the increasing wage figures of the present study. In the left-hand section of the table, the figures for benefits payable to those above age 65 are given side by side with those for the level wage assumption. In the middle section, the figures cover the beneficiaries under 65 together with the lump-sum payments. In the right-hand section, total benefits are shown. In all cases, except the percentages in the earlier years, the previously discussed differences show up to a larger dollar benefit outlay (though the increase is surprisingly little) but a smaller percentage of pay-roll cost.

In supplementation to tables D and E, three charts are appended which show graphically the relationships of tax income and total benefit outgo. Chart A makes a comparison for the low and high results under the increasing wage assumptions. Chart B takes the low illustrations from both the level wage assumptions and the increasing wage assumption and gives the comparative curves thereof. Chart C does the same thing in respect to the high illustrations.

E. SUMMARY AND RESERVE FUND

In table F, a summary of the illustrative values is given. Certain items of interest are revealed by this table. Columns 6 and 7 show that if the plan were financed from 1945 on a level percent basis, less than 5% of pay roll would carry the scheme at least until the year 2000. Another item to note is the extent of the reserve fund and the interest-income thereon in column 8. In respect to the reserve fund and its interest yield, plus the 6% tax rate, there is no indication by the year 2000, under either the high or the low, that the fund will stop growing in size. In fact, in the low example, the tax income alone is almost equal to the benefit outgo, so that little of the interest income is even needed.

Table F shows some considerable differences from its counterpart, table IV of Actuarial Study No. 19. For convenient comparison the following table is set down giving figures for the year 2000.

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No. 19 (level wage) vs. No. 19(a) (increasing wage)

From table F, year 2000		Low assumptions		High assumptions	
Col. No.	Item	No. 19	No. 19(a)	No. 19	No. 19(a)
(2)	Covered pay roll_____(billions of dollars)__	36.0	55.6	57.0	80.4
(3)	Year's tax income_____(millions of dollars)__	2,160	3,336	3,420	4,821
(4)	Benefit payments_____(millions of dollars)__	3,232	3,539	6,066	6,550
(5)	Benefit payments_____(percent of pay roll)__	8.98	6.37	10.64	8.15
(6)	Level cost (no interest) since '45 (percent of pay roll)__	5.6	4.6	5.6	4.8
(7)	Level cost (2 percent interest) since '45 (per cent of pay roll)__	4.7	4.1	4.6	4.1
(8)	Interest income (2 percent) on fund (millions of dollars)__	1,242	2,036	1,854	2,832
(9)	Amount in trust fund_____(billions of dollars)__	62	103	92	142

F. ADDENDUM

Wage and Benefit Relationships under Increasing Wage Assumption

This Study has used the 1% increase per year in wages as applying uniformly to all wage levels. This method of application is obviously theoretical for two reasons: first, if the secular trend of wages is to continue upward in the future such trend will not follow a smooth mathematical curve but will have plateaus, valleys, and various angles of inclination; secondly, the trend, as reflected by an overall average wage, may carry considerably different indexes of increase for different levels of wages making up the average. The present Study has not attempted to deal with the infinite number of permutations and combinations possible in these two variables of irregularity, but for illustrative purposes has adopted the simpler assumptions mentioned which are much more susceptible to handling.

One of the objections often put forward to the use of an increasing wage assumption for cost purposes, is that the resulting picture is one-sided. This is because benefits, formulated with a view to their relationship to present wages, come to be measured against a new set of wages (increased amounts) which are alien to the wages used in the formulation of such benefits. The argument goes on to say that under an increasing wage trend it seems patent that the benefit formula will be adjusted, too, to keep pace (subject to lag) with wages.

The static benefit objection, just mentioned, is sometimes countered by pointing out (an opinion) that the increases of the future are not likely to be of a uniform nature by wage level, but that greater increases will occur at the lower levels of the frequency distribution, with the higher levels moving up slower, if at all. This claim is tantamount to saying that if the present benefit formula produces a reasonable amount for the $3,000 man and individuals in the future merely move up the wage scale within the $3,000 limitation, that the consequent benefits, being reasonable today, will be reasonable without change in the
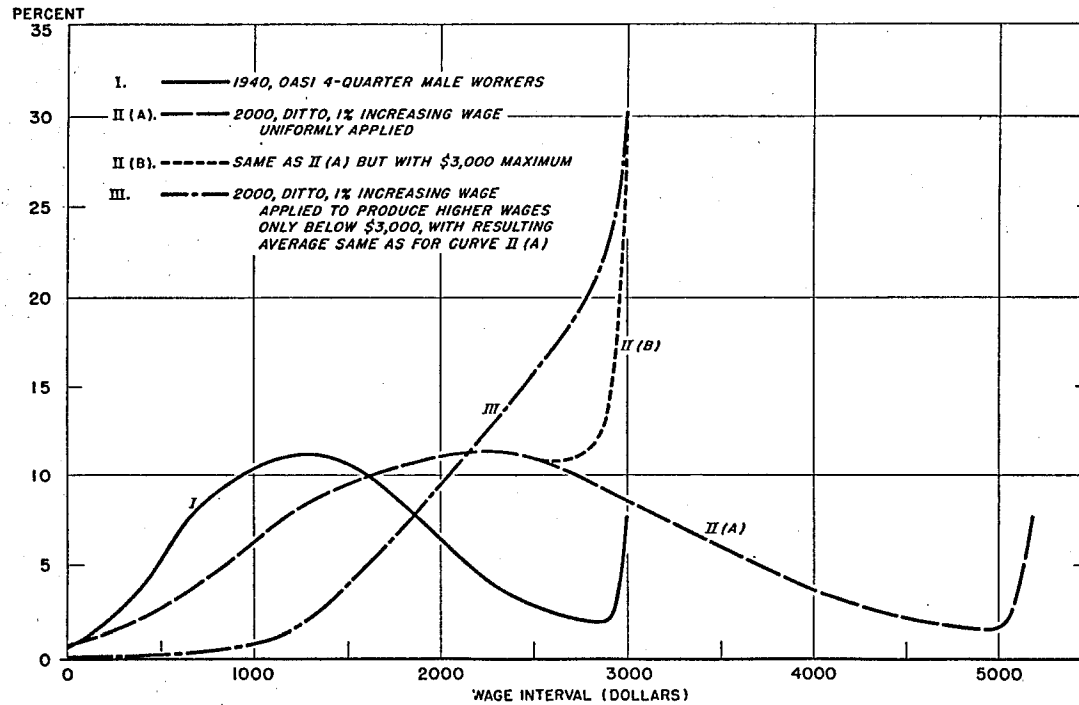
future. The rejoinder to this is usually that a wage, say of $3,0C0, will not be an immovable pivot with the greatest upward movement at the lowest end of the frequency curve, but that the $3,000 level, as well, will rise, more in the manner postulated by this Study so that more and more individuals will become affected by the $3,000 ceiling and so that benefits will drop continuously wren expressed as a percentage of actual pay.[1]

Frequency Distributions

In order to bring into this Study some mathematical feeling, of the above mentioned debate, the following table is presented together with chart D. The first column below gives the mid-points of the $200 wage intervals used in presenting the 1940 OASI wage statistics for four-quarter male workers. The second column gives the corresponding mid-points (for a $346 interval) which would result in the year 2000 from the 1% per year increase uniformly applied. Column (3) shows a percentage distribution of the same sized sample of four-quarter covered male workers according to these two sets of wage intervals and representing for each an identical frequency distribution per interval. This distribution for the 1940 intervals, of column (1) is represented by curve number I on chart D. and the same distribution at the intervals for the year 2000 is represented by curve number II(A), where the 1940 ceiling of $3,000 has become the top figure shown of $5,187. If, in column (3), we stop with class 9, assigning the present statutory $3,000 to class 10 and over, we will produce curve II(B), as a substitute for the right-hand part of curve II(A). In the fourth column of the table there are given figures for quite a different frequency distribution, namely, one which assumes that $3,000 would, in effect be a pivot, and that all the rise would occur at wage levels below that figure. These increases were fixed by the adoption of a mathematical series slightly adjusted such that the resulting overall average wage would be the same as the average wage for the distribution in column (3). The result is given by curve number III in the chart, which is the one yielding the same average wage overall as does the complete curve number II(A).

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[1] Then, of course, there is the matter of *"price"* and result in real wages, matters which are still further beyond the scope of this Study.

CHART D.- FREQUENCY DISTRIBUTIONS OF PERSONS BY WAGE INTERVALS*

PERCENT

I. ————— 1940, OASI 4-QUARTER MALE WORKERS

II (A). ——— 2000, DITTO, 1% INCREASING WAGE
UNIFORMLY APPLIED

II (B). ------- SAME AS II (A) BUT WITH $3,000 MAXIMUM

III. —·—·— 2000, DITTO, 1% INCREASING WAGE
APPLIED TO PRODUCE HIGHER WAGES
ONLY BELOW $3,000, WITH RESULTING
AVERAGE SAME AS FOR CURVE II (A)

II (B)

III

I

II (A)

WAGE INTERVAL (DOLLARS)

*ANY POINT ON A CURVE IS NOT THE PERCENT (ORDINATE) FOR THAT EXACT WAGE (ABSCISSA), BUT FOR THE SURROUNDING $200 OR $300 WAGE INTERVAL.

Class	Wage interval mid-points of 1940 statistics	Wage interval mid-points for the year 2000 for same class	Frequency distribution of 1940 4-quarter workers for mid-points of cols. (1) and (2)	Frequency distribution for year 2000 if all increase is below $3,000
	(1)	(2)	(3)	(4)
	Dollars	*Dollars*	*Percent*	*Percent*
1	100	173	1.20	0.1
2	300	519	2.84	.3
3	500	865	4.99	.6
4	700	1,210	8.24	1.5
5	900	1,556	9.76	4.7
6	1,100	1,902	10.83	8.5
7	1,300	2,248	11.43	12.5
8	1,500	2,594	10.64	17.0
9	1,700	2,939	8.87	23.6
10	1,900	3,285	7.68	
11	2,100	3,631	5.55	
12	2,300	3,977	3.79	
13	2,500	4,323	2.82	31.2
14	2,700	4,668	2.19	
15	2,900	5,014	1.49	
16	3,000	5,187	7.68	

	For 1940 distribution of cols. (1) and (3) above	For year 2000 distribution (1940 type, max. $3,000) of cols. (2) and (3) above	For year 2000 distribution (new type, max. $3,000) of cols. (2) and (4) above
	(5)	(6)	(7)
	Dollars	*Dollars*	*Dollars*
(a) Average wage for benefits	1,511	2,247	2,613
(b) Taxable pay roll (billions)	21.6	32.1	37.4
(c) Average basic primary benefit:			
(i) On overall average wage	331.10	404.70	441.30
(ii) On frequency distribution	326.22	403.11	441.02
	Percent	*Percent*	*Percent*
(d) Percent average benefit (c) (ii) to average wage of (a)	21.6	17.9	16.9

In the lettered lines, at the bottom of the table, there are some points of interest. In line (a), column (6), the average wage is held down by the $3,000 ceiling, whereas, in column (7), this is not true since by hypothesis no one's increased wages have moved above $3,000. The effect of the ceiling also shows up in line (b), where the tax pay roll of column (6) is held down to $32.1 billion, whereas under the "new type" frequency distribution of column (7) the tax pay roll mounts to $37.4 billion.

In line (c) (i) and (ii), it is interesting to note that even for these four-quarter workers there is some differential in benefits caused by computation on average wage rather than on frequency distribution, although this differential has about disappeared by the year 2000 through "building up" the wages which determine them. (The benefits shown here are the base benefits without any increment, so they should not be taken as illustrative of actual amounts.) Line (d) shows a drop in the percentage relationship of benefits to average wage over the period but that the drop is not much greater for the "new type" frequency distribution of column (7) than it is for the 1940 type of distribution of column (6). (Here, again line (d) is not good for

measuring this drop over time for individuals; for this purpose see table on page 21).

As previously mentioned the attached Chart D furnishes a graphical display of the distributions given in the table on page 24.

Obsolescence of Benefit Formulae

In an economic milieu of increasing dollar wages and values, all "fixed benefit" programs are almost bound to respond with liberalizations of formula. Historically, we find this (either through adjustment or automatic) in practically all early retirement plans, in other types of benefit programs, and in insurance provision. For example in 1920 the Civil Service Retirement plan had a top benefit of $720 per year, now it is over $5,000 per year. Again, provision for death and disability benefits to veterans has seen increases occur over the years. Most private plans are based on a fixed percentage of wage, often times "final" wage, so that the increase in benefits is implicit in moving to higher wage levels; even so, over time, the maximum and minimum benefits have been raised. The purchase of voluntary insurance and annuities has been for average amounts of an increasing trend, exemplifying again that in the public's concept the amount of appropriate protection has been of an increasing character.

The OASI benefit formula, while geared to wages, places 4 times the weight on the 1st $600 of average annual wages that it does on the excess above that amount; it also recognizes no wages above $3,000 a year. Consequently, unlike many of the retirement plan formulae, benefits do not keep pace with wages. A recent study in the Office of the Actuary investigated what sort of benefit formula might have been established 50 years ago to produce about the same benefit relative to the then prevailing wage as now obtains. ·,

The average nonagricultural wage in 1894 appears to have been about $450 per annum. Taking a figure of $1,500 as representing 50 years later, we have the 1st $600 at a 40% benefit rate and $900 at 10%. The result is a base benefit of 22%. For a 22% benefit on the 1894 wage there would have been 40% on the 1st $180 and 10% on $270. By similar analogy the ceiling wage then would have been $900 rather than the present $3,000. The table below summarizes this comparison:

Benefit formulated on average wages of year 1894 compared with $1,500 taken as current average

	Average wage	Base benefit (equals 22 percent [1] of wage)	Portion of wage		Consistent maximums	
			At 40 percent rate	At 10 percent rate	Covered wage	Base benefit
1894 wage base	$450	$99	$180	$270	$900	$144
1944 wage base	1,500	330	600	900	3,000	480

[1] Present formula produces $330 or 22 percent of $1,500.

Thus, if the above 1894 formula had remained unchanged, most of the base benefits, payable today would have been at the maximum of $12 a month (or, with a full 40 percent increment, $16.80 a month). It is not reasonable to contend that under the wage history which has eventualized the benefit formula would have stood unadjusted. By the same token, the present study on increasing wages as far ahead as 2000 warns the reader that its use of a static benefit formula is not an assumption consistent with the past.

TABLE A (a).—*Basic Assumptions*

In table A, Actuarial Study No. 19, the basic assumptions thereof were given. In the present Study all the earlier items are the same as before except those in which the factor of wage enters. Thus the following assumptions of Actuarial Study No. 19 are unchanged and reference to table A of that Study may be made in regard to them: A. Mortality, B, Marital and Parental Status, E. Employment Assumptions, F. Covered Employment Assumptions, H. Total Population by Sex and Age, and I. Proportions of Population Insured and Retired.

The changes necessitated in assumptions C, D, and G of Actuarial Study No. 19, table A are given below:

C. Wages (assumed covered wages for a work-year):

	Men		Women	
Year	1945	2000	1945	2000
Low	$1,500	$2,229	$900	$1,516
High	2,000	2,618	1,200	1,942

D. Wages (assumed covered wages per number of work-quarters per year):

	Men						Women					
	1 quarter		2 quarters		3 quarters		1 quarter		2 quarters		3 quarters	
Year	1945	2000	1945	2000	1945	2000	1945	2000	1945	2000	1945	2000
Low	$150	$259	$300	$514	$750	$1,254	$90	$156	$180	$311	$450	$774
High	200	346	400	679	1,000	1,579	120	207	240	415	600	1,028

G. Covered pay rolls (in billions):

Calendar year	Low			High		
	Men	Women	Total	Men	Women	Total
1945	$27.8	$5.8	$33.6	$42.6	$8.9	$51.5
1950	29.9	6.2	36.1	45.7	9.3	55.0
1955	32.4	6.5	38.9	48.8	10.1	58.9
1960	34.0	6.8	40.8	51.0	10.9	61.9
1970	37.1	7.5	44.6	55.5	12.5	68.0
1980	40.0	8.2	48.2	58.5	13.9	72.4
2000	45.8	9.8	55.6	64.0	16.4	80.4

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TABLE B.—*Increase ratios, derived factors expressing the indexes of increase of Study No. 19(a) (increasing wage) over Study No. 19 (level wage)*

Year	Taxable pay roll	Primary Male	Primary Female	Wives'	Widow's	Parent's	Child's	Widow's current	Lump sums Male	Lump sums Female	Lump sums Total	All benefits
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Low												
1950	1.043	1.006	1.001	1.006	1.005	1.007	1.007	1.007	1.009	1.003	1.008	1.003
1955	1.092	1.008	1.002	1.008	1.006	1.012	1.012	1.012	1.014	1.006	1.012	1.008
1960	1.139	1.013	1.014	1.013	1.008	1.017	1.017	1.017	1.019	1.020	1.019	1.014
1970	1.241	1.023	1.028	1.023	1.013	1.043	1.043	1.043	1.032	1.039	1.034	1.027
1980	1.340	1.036	1.058	1.036	1.021	1.074	1.074	1.074	1.050	1.104	1.063	1.042
2000	1.545	1.090	1.168	1.090	1.054	1.143	1.143	1.143	1.100	1.172	1.118	1.095
High												
1950	1.038	1.006	1.001	1.006	1.005	1.007	1.007	1.007	1.007	1.005	1.007	1.004
1955	1.078	1.009	1.005	1.009	1.006	1.012	1.012	1.012	1.011	1.010	1.011	1.009
1960	1.116	1.013	1.010	1.013	1.007	1.019	1.019	1.019	1.016	1.015	1.016	1.014
1970	1.194	1.023	1.020	1.023	1.012	1.037	1.037	1.037	1.027	1.033	1.028	1.023
1980	1.269	1.036	1.038	1.036	1.020	1.061	1.061	1.061	1.040	1.060	1.045	1.036
2000	1.410	1.080	1.115	1.080	1.050	1.115	1.115	1.115	1.081	1.126	1.096	1.080

TABLE C.—*Estimated average annual benefits (in force), per beneficiary, by type (increasing wage assumptions)*

Year	Primary Male	Primary Female	Wives'	Widow's	Parent's	Child's [1]	Widow's current	Lump sum
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Low								
1940 [2]	$279	$221	$146	$244	$157	$146	$235	$140
1945	291	226	152	235	154	150	240	143
1950	305	233	159	237	158	154	245	147
1955	318	237	166	250	162	158	252	152
1960	32S	234	171	255	167	163	260	153
1970	341	230	178	264	174	170	271	155
1980	353	228	184	271	182	177	282	160
2000	371	251	193	279	193	188	300	168
High								
1940 [2]	$279	$221	$146	$244	$157	$146	$235	$140
1945	314	230	162	263	171	167	267	159
1950	336	241	174	269	177	173	277	165
1955	353	249	183	279	182	178	284	168
1960	369	251	191	289	185	182	290	172
1970	388	261	201	304	192	188	300	179
1980	401	273	208	309	201	196	314	178
2000	418	293	217	318	211	206	329	182

[1] Includes the relatively few children of primary beneficiaries.
[2] Actual.

TABLE D.—*OASI benefit payments and percent of pay roll for year indicated*

[Increasing wage assumptions]

[Millions of dollars]

Year (1)	Monthly old-age benefits													Monthly young survivors benefits						Other		Total	
	Primary				Wives' [2] (4)		Widow's [2] (5)		Parent's (6)		Total old-age (7)		Child's [3] (8)		Widow's current (9)		Total young survivors (10)		Lump sum (11)		Total benefits (12)	
	Male (2)		Female [1] (3)																					
	Amount	Percent	Amount	Percent	Amount	Percent	Amount	Percent	Amount	Percent	Amount	Percent	Amount	Percent	Amount	Percent	Amount	Percent	Amount	Percent	Amount	Percent
Low																						
1945	$88	0.26	$11	0.03	$16	0.05	$20	0.06	$1	----	$136	0.41	$50	0.15	$21	0.06	$71	0.21	$26	0.08	$233	0.70
1950	233	.65	34	.09	36	.10	52	.14	8	0.02	363	1.01	141	.39	54	.15	195	.54	31	.09	589	1.63
1955	365	.94	50	.13	58	.15	105	.27	13	.03	591	1.52	195	.50	74	.19	269	.69	40	.10	900	2.31
1960	516	1.26	82	.20	80	.20	183	.45	18	.04	879	2.15	232	.57	91	.22	323	.79	50	.12	1,252	3.07
1970	773	1.73	172	.30	125	.28	367	.82	22	.05	1,457	3.27	282	.63	107	.24	389	.87	67	.15	1,913	4.29
1980	1,147	2.38	260	.54	186	.39	615	1.28	23	.05	2,231	4.63	305	.63	112	.23	417	.87	80	.16	2,734	5.67
2000	1,486	2.67	339	.61	241	.43	905	1.63	19	.03	2,990	5.38	326	.59	119	.21	445	.80	104	.19	3,539	6.37
High																						
1945	$140	0.27	$16	0.03	$23	0.04	$21	0.04	$4	0.01	$204	0.40	$72	0.14	$21	0.04	$93	0.18	$28	0.05	$325	0.63
1950	347	.63	40	.07	58	.11	78	.14	14	.03	537	.98	156	.28	47	.09	203	.37	37	.07	777	1.41
1955	548	.93	67	.11	94	.16	127	.22	26	.04	862	1.46	208	.35	67	.11	275	.47	44	.07	1,181	2.01
1960	796	1.29	118	.19	141	.23	222	.36	39	.06	1,316	2.13	237	.38	82	.13	319	.52	54	.09	1,689	2.73
1970	1,297	1.91	237	.35	243	.36	481	.71	52	.08	2,310	3.40	255	.38	89	.13	344	.51	78	.11	2,732	4.02
1980	2,007	2.77	403	.56	383	.53	791	1.09	58	.08	3,642	5.03	274	.38	83	.11	357	.49	102	.14	4,101	5.66
2000	3,170	3.94	737	.92	646	.80	1,415	1.76	57	.07	6,025	7.49	298	.37	87	.11	385	.48	140	.17	6,550	8.15

[1] Those eligible to primary benefits only; in addition to single and divorced women this column includes a few wives whose husbands have not yet retired and insured wives and widows of noninsured husbands.

[2] Includes women who are also insured in their own right.

[3] Includes the relatively few children of primary beneficiaries.

TABLE E.—*Comparison of costs under No. 19 and No. 19(a), both in dollars (millions) and as percent of pay roll*

Year	Old-age benefits [1]				Young survivors [2] and lump sum				Total benefits			
	Dollars		% Pay roll		Dollars		% Pay roll		Dollars		% Pay roll	
	#19	#19(a)	#19	#19(a)	#19	#19(a)	#19	#19(a)	#19	#19(a)	#19	#19(a)
Low												
1945	$136	$136	0.4	0.4	$97	$97	0.3	0.3	$233	$233	0.7	0.7
1950	362	363	1.0	1.0	225	226	.6	.6	587	589	1.7	1.6
1955	587	591	1.6	1.5	306	309	.9	.8	893	900	2.5	2.3
1960	869	879	2.4	2.2	366	373	1.0	.9	1,235	1,252	3.4	3.1
1970	1,426	1,457	4.0	3.3	437	456	1.2	1.0	1,863	1,913	5.2	4.3
1980	2,156	2,231	6.0	4.6	469	503	1.3	1.1	2,625	2,734	7.3	5.7
2000	2,750	2,990	7.7	5.4	482	549	1.3	1.0	3,232	3,539	9.0	6.4
High												
1945	$204	$204	0.4	0.4	$121	$121	0.2	0.2	$325	$325	0.6	0.6
1950	535	537	1.0	1.0	239	240	.5	.4	774	777	1.5	1.4
1955	855	862	1.6	1.5	316	319	.6	.5	1,171	1,181	2.1	2.0
1960	1,300	1,316	2.3	2.1	366	373	.7	.6	1,666	1,689	3.0	2.7
1970	2,263	2,310	4.0	3.4	407	422	.7	.6	2,670	2,732	4.7	4.0
1980	3,525	3,642	6.2	5.0	433	459	.8	.6	3,958	4,101	6.9	5.7
2000	5,593	6,025	9.8	7.5	473	525	.8	.7	6,066	6,550	10.6	8.2

[1] Male and female primary, wives', widow's and parent's benefits.
[2] Widow's current and all child's benefits.

TABLE F.—*Summary of benefits, taxes and progress of reserves,[1] (increasing wage assumptions)*

Calendar year	Covered pay roll (billions)	Tax income for year shown (millions)	OASI benefit payments for year shown (millions)	Benefit cost for year shown, as percent of pay roll	Level cost, 1945 to year shown, as percent of pay roll		Income from interest (2 percent) on the fund (millions)	Amount of trust fund (end of year) (billions)
					No interest	2 percent interest		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Low								
1945	$33.4	$1,336	$233	0.70	0.7	0.7	$152	$8.2
1950	36.1	2,166	589	1.63	1.2	1.2	316	16.7
1955	38.9	2,334	900	2.31	1.6	1.6	506	26.3
1960	40.8	2,448	1,252	[2] 3.07	2.0	1.9	696	35.8
1970	44.6	2,676	1,913	4.29	2.7	2.6	1,070	54.4
1980	48.2	2,892	2,734	5.67	3.5	3.2	1,406	71.1
2000	55.6	3,336	3,539	6.37	4.6	4.1	2,036	[3] 102.7
High								
1945	$51.5	$2,060	$325	0.63	0.6	0.6	$160	$8.9
1950	55.0	3,300	777	1.41	1.0	1.0	408	21.9
1955	58.9	3,534	1,181	2.01	1.4	1.4	808	36.9
1960	61.9	3,714	1,689	2.73	1.7	1.7	1,010	52.0
1970	68.0	4,080	2,732	[4] 4.02	2.4	2.3	1,616	82.3
1980	72.4	4,344	4,021	5.66	3.2	2.9	2,168	109.6
2000	80.4	4,824	6,550	8.15	4.8	4.1	2,832	[3] 142.2

[1] Exclusive of administrative expenses.
[2] Benefits reach 4 percent of pay roll in 1968.
[3] On basis of tax and benefit conditions of year 2000 continuing, fund would keep increasing.
[4] Benefits reach 4 percent of pay roll in 1970.

CHART A.- PRESENT OASI PROGRAM: BENEFITS AND TAXES
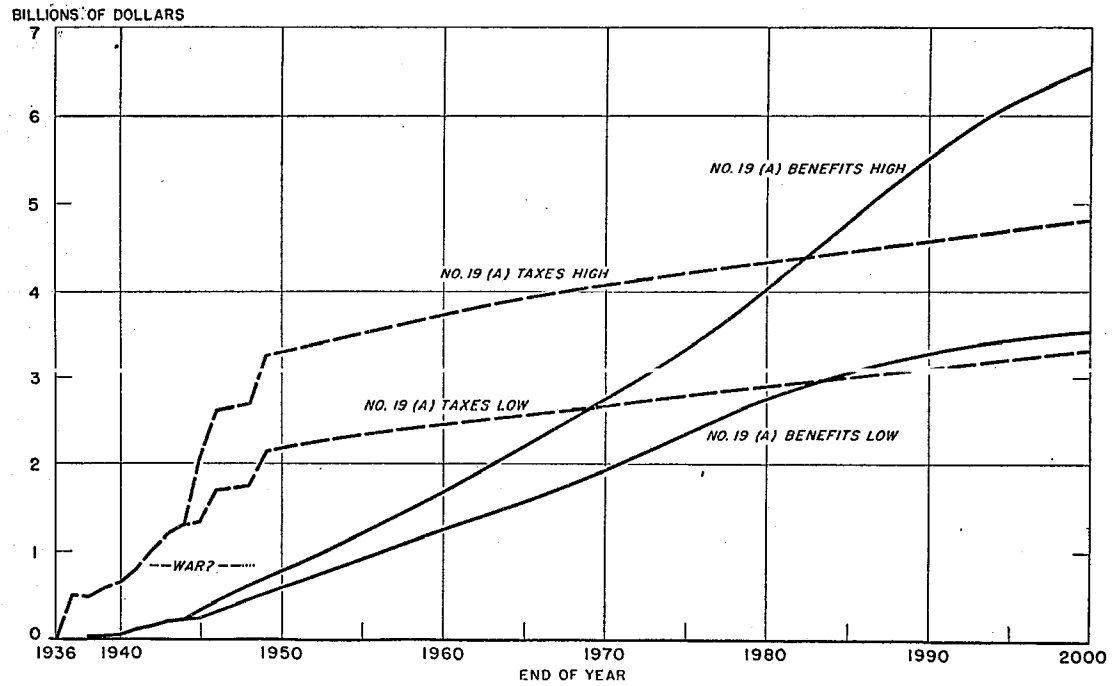### COMPARISON OF LOW AND HIGH RESULTS FOR INCREASING WAGE ASSUMPTIONS

BILLIONS OF DOLLARS

END OF YEAR

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CHART B.– PRESENT OASI PROGRAM: BENEFITS AND TAXES
COMPARISON (FOR THE LOW) OF LEVEL AND INCREASING WAGE ASSUMPTIONS

BILLIONS OF DOLLARS

NO. 19 (A) BENEFITS LOW

NO. 19 (A) TAXES LOW

NO. 19 BENEFITS LOW

NO. 19 TAXES LOW

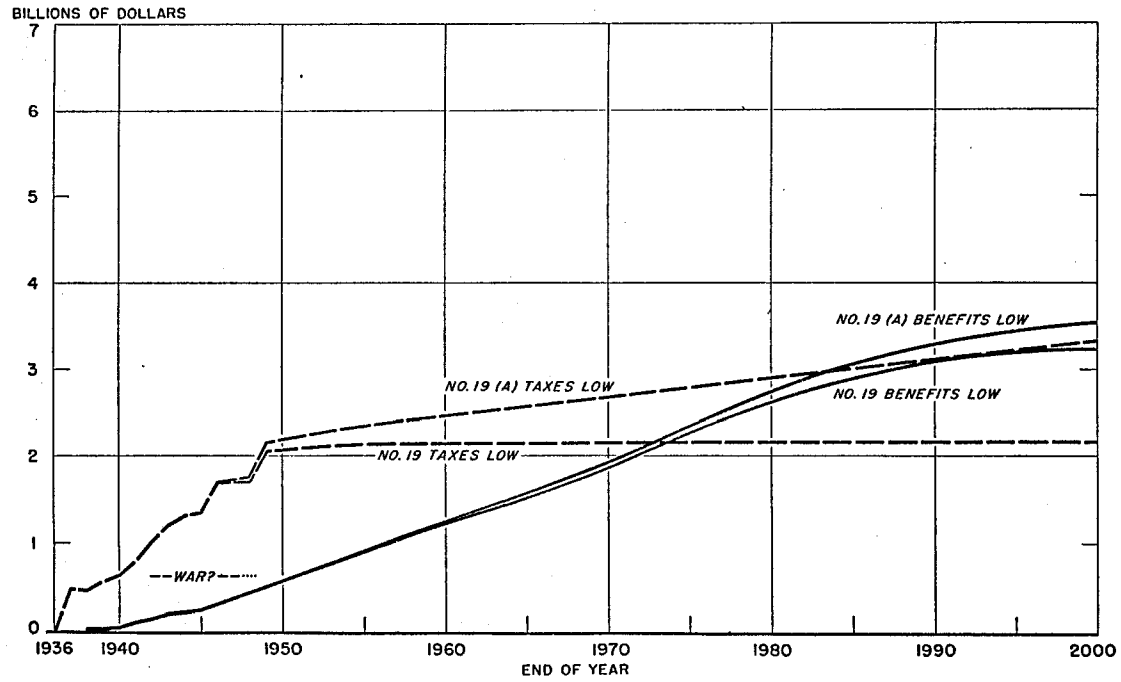—WAR?—

END OF YEAR

SOCIAL SECURITY BOARD
OFFICE OF THE ACTUARY

JULY 1944
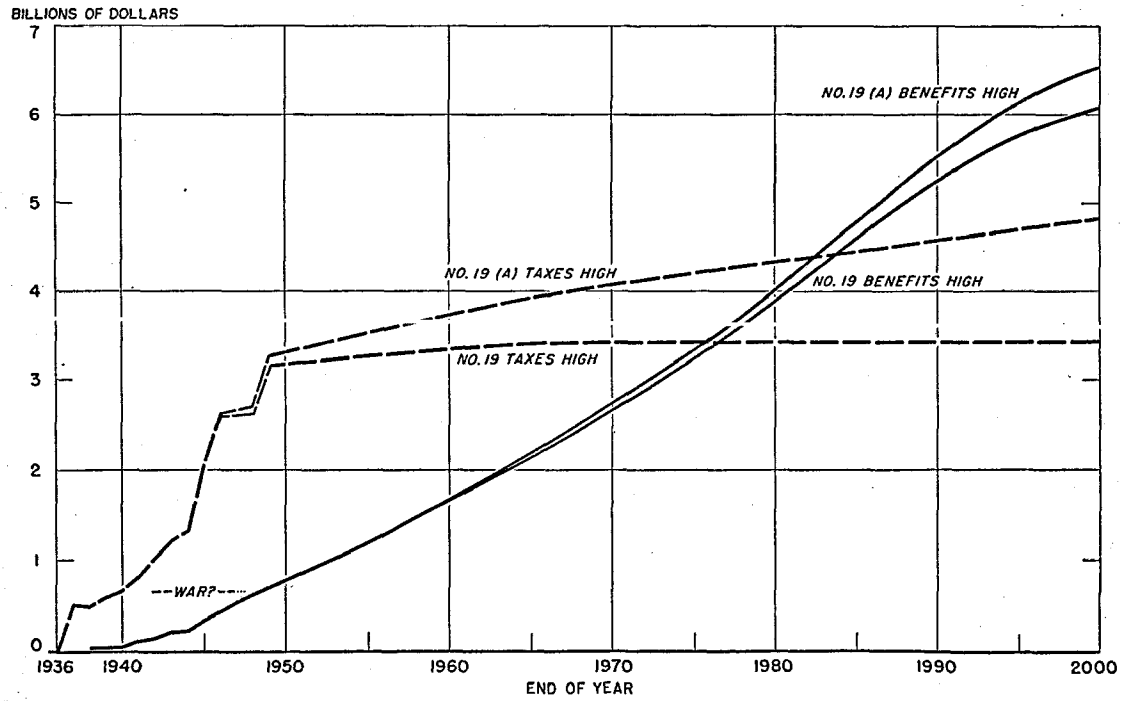
CHART C. – PRESENT OASI PROGRAM: BENEFITS AND TAXES
COMPARISON (FOR THE HIGH) OF LEVEL AND INCREASING WAGE ASSUMPTIONS

BILLIONS OF DOLLARS

END OF YEAR

ACTUARIAL STUDY No. 19 (b)

Disability Benefits Incorporated Into the Present Act

A. SPECIFICATIONS

The specifications for the present study are as follows:

(1) Coverage and benefit formula same as 1939 Amendments.

(2) Fully *and* currently insured status required.

(3) Benefits commence after 6 months of disability.

(4) Wife with child 50% primary disability benefit; each child 50%.

(5) Insured status and average wage "freeze" at disability, in respect to subsequent old-age or survivors benefits.

(6) No retroactive disability cases included.

Other changes not exclusively pertinent to disability and whose relative effects on long-range costs are very small are:

(7) Removal of 200% of primary benefit as a maximum.

(8) Removal of age 65 in respect to wife's benefits for a wife with child.

B. ASSUMPTIONS

The general assumptions underlying the study are the same as those in Actuarial Study No. 19, most of which were set forth there under the Table of Basic Assumptions. These will not be repeated except to mention two of them for convenience: (i) Male workers in four covered quarters earn $1,500 for the "low" and $2,000 for the "high"; females $900 and $1,200 respectively; (ii) Employment conditions for males under the "high", taken as the 1930 percentage of "gainful workers" in the population, which leaves little leeway for disability cases particularly at lower and middle ages.

The added assumptions particular to the addition of disability are:

(1) Beneficiaries and costs are given the disability label only while the individual is under age 65; thereafter he becomes a primary *old-age* beneficiary.

(2) The cost of other forms of benefit (Specification (5)) which, except for the fact of disability compensable under the program, would have lapsed or been reduced, has been considered a part of the cost of disability.

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(3) The "low disability" assumptions use double, quadruple for females, Hunter's incidence rates and 100% of Hunter's Select termination rates.

(4) The "high disability" assumptions use "medium" insurance company incidence experience, viz. 150% class 3 (6 mos. clause), double for females, and German social insurance 1925-30 termination rates.

(5) The "high disability" results for males under the "high" general assumptions were forced downward to be made consistent with those assumptions wherein the number employed is so near the maximum.

(6) The fact that malingerers could at the same time while drawing benefits, work in uncovered employment (not true in the complete coverage of Actuarial Study No. 18), was recognized for No. (5) above by adding 10% to the already reduced costs.

(7) No assumptions were directly included in respect to Specifications (7) and (8).

(8) No assumptions for cost of administration were adopted.

(9) No special adjustments have been attempted to recognize disabilities which might not benefit under the program because of provision elsewhere, such as Workmen's Compensation or Veterans' disability benefits.

C. TABLE A—BENEFITS, BENEFICIARIES AND COST

Table A presents the four sets of illustrative estimates, "low" and "high" disability applying to each set of general assumptions. Figures are given quinquennially from 1945 to the year 2000. The 1945 figures take no recognition of special conditions such as the war, nor do they take into account the exact timing of an effective date for the disability program; neither do the early figures contain any retroactive disability cases such as would be possible if the legislation provided for picking up, as to current payment, persons who actually became disabled at an earlier date in the OASI program. Thus the 1945 results should not be taken as representing carefully developed short-range estimates, but are included to indicate the trend in magnitudes and for use in determining the level cost illustrations of Table B.

Table A, for any set of assumptions, gives only one column of dollar costs, that of the total. An expanded table of costs by sex or for dependents was felt to be unnecessary at present in view of the required extra clerical and typing time involved. Such more detailed breakdowns are quite susceptible to being obtained from the number of beneficiaries and the average benefits furnished by the table. Roughly, disability costs, except for the high disability under the

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high general assumptions, divide up as 25% female primaries, 55% male primaries and 20% dependents benefits. The high-high results divide up as 45:40:15 respectively.

Disability costs at first rise sharply and then more slowly for 25 or 30 years; later on under the population assumptions taken, the costs tend to drop off slightly. Under the low general assumptions the "swing" from "low disability" costs to "high disability" costs is roughly in the degree of 1 to 3, and about 1 to 2 under the high general assumptions.

The rate of becoming disabled increased progressively with age so that even under a plan which observes the disabled cases as such only until age 65 (when they become old-age cases), both the number of new cases and the disability claims in force preponderate at the higher age groups. Suggestions have been made that the first step in a disability program might recognize for benefit, only those cases above a given age, such as age 55. The following table is intended to give an indication of the distribution by age of both new cases in a typical year and the "in force" at the end of such year. It is based upon male lives under the "low" general assumptions. The same character of distribution would appear for the "high" general assumptions though the exact relationship would be a bit different.

Examples of number of disability cases by age

[Typical year 1960]

Attained age	Low assumptions—Male lives							
	Low disability				High disability			
	New claims of year		Claims in force end of year		New claims of year		Claims in force end of year	
	Thousands	Percent	Thousands	Percent	Thousands	Percent	Thousands	Percent
0-24	2.3	4	7	2	8.8	6	29	3
25-29	3.4	6	14	4	13.8	9	57	5
30-34	3.8	7	21	7	14.7	10	83	8
35-39	4.7	8	28	9	16.1	11	110	11
40-44	5.3	9	34	11	15.6	10	126	12
45-49	6.1	11	39	12	·16.5	11	133	13
50-54	7.2	13	45	14	18.4	12	143	14
55-59	9.4	17	55	17	21.2	14	166	16
60-64	14.3	25	75	24	23.5	17	198	18
Total	56.5	100	318	100	148.6	100	1,045	100

D. TABLE B—COST OF DERIVED BENEFITS AND LEVEL COSTS

Specification No. (5) provides for maintaining, during disability, the same insured status and average wage as existed at commencement of disability. This means that at termination of disability benefits through death or attaining age 65, survivors benefits or old-age benefits would be due in undiminished amounts. In the present program without disability benefits, many such survivors or old-age

benefits would not be payable because during the non-compensable period of disability insured status would have expired; or, if payable, because the event of death or attaining 65 occurs during the extended insured status period, the amount of monthly benefit would be progressively smaller because of the progressively reducing average wage.

Table B shows the benefit cost, brought over from table A, of what can be called "disability proper", and in the next column gives the additional OASI costs for the frozen conditions discussed in the preceding paragraph; these are presented under the heading "Derived Benefits". While no split of this cost is made by type, i. e., (i) survivors benefits before 65 not otherwise payable, (ii) old-age benefits not otherwise payable and (iii) full benefits in lieu of reduced benefits— it is reasonably certain that the bulk of this extra cost lies with (ii) above, and the old-age portion of (iii). It will be noted that this extra cost for derived benefits is slow to accumulate but eventually reaches a magnitude in the neighborhood of 10% of disability cost proper.

Table B shows percentage of payroll costs with the derived benefits included, and goes on to present the respective approximations to level costs for disability including the derived benefits, both with and without interest. While the assumption that these level rates were in effect would of course result in certain amounts of disability reserves (on an accumulative basis), no such development has been carried out at present. For one thing the specifications do not set forth any suggestion of an earmarked tax for disability. It would be possible to consider the disability part as looking to the regular OASI Trust Fund for its support, in which event the disability costs would be an additional charge on the reserves as developed and presented in table IV of Actuarial Study No. 19. Such an assumption would of course necessitate alterations in the reserve values of that Study.

Specifications (7) and (8) affect Study No. 19 itself, but from tests that have been made the overall influence on long-range illustrations is small and of a type which can be assumed to be absorbed by the amplitude of the range of costs. The removal of the 200% maximum might increase total costs to a degree of 1% (of costs, not payrolls) and the age 65 change might run some ½% increase in total costs.

The disability rates and termination frequencies which were used in developing results producing these illustrative ranges in costs are of course synthetic and, to an extent, arbitrary. Except as a technical term, the results are not "expected costs". Even with the exact terms of a disability insurance program known (including a specific definition of compensable disability), and with some actual administrative experience gained thereunder, cost projections are unreliable. With neither of these advantages present, cost figures are obviously

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even more uncertain. Disability costs develop under an equation of "definition", "administration" and "current economy", besides under the more tangible factors of benefit formula, average wage, insured status, number of dependents, etc. Hence the ranges in costs are meant to be illustrative of reasonable "swings" involving the uncertainty of all these elements, but they are not limiting boundaries as to possible costs. Some persons will feel that costs of less than ½% of payroll are absurdly small, others that results of nearly 2½% are unduly high; perhaps they would both be right.

TABLE A.—(f65) Disability benefits, beneficiaries, and cost

Year	Low disability							High disability						
	Number of beneficiaries (thousands)			Average Annual benefit		Total disability cost		Number of beneficiaries (thousands)			Average Annual benefit		Total disability cost	
	Female primary disability benefit	Male primary disability benefit	Wife and child dependent benefit	Female primary	Male primary	Dollars (millions)	As percent of payroll	Female primary disability benefit	Male primary disability benefit	Wife and child dependent benefit	Female primary	Male primary	Dollars (millions)	As percent of payroll
	Low assumptions							Low assumptions						
1945	27	50	35	$248	$322	$29	0.09	83	133	98	$246	$321	$79	0.24
1950	105	193	135	252	329	113	.33	363	606	446	251	327	362	1.05
1955	153	264	184	258	336	160	.45	528	865	636	255	333	529	1.49
1960	189	318	222	263	343	197	.55	643	1,045	769	259	340	653	1.82
1965	215	353	247	266	351	224	.62	733	1,201	883	262	346	761	2.12
1970	231	369	257	270	360	241	.67	799	1,271	936	265	352	825	2.29
1975	244	382	267	273	365	255	.71	833	1,306	962	267	357	860	2.39
1980	244	391	273	275	368	261	.72	840	1,314	968	269	360	874	2.43
1985	238	388	271	277	372	260	.72	833	1,303	960	270	363	873	2.42
1990	236	385	269	278	373	259	.72	816	1,298	956	271	363	867	2.41
1995	230	377	263	280	374	254	.71	802	1,275	938	272	364	854	2.37
2000	228	367	255	280	375	250	.69	790	1,258	926	272	365	842	2.34
	High assumptions							High assumptions						
1945	27	55	38	$275	$370	$35	0.07	83	146	108	$273	$369	$96	0.19
1950	105	152	107	280	378	107	.20	366	255	188	279	376	233	.44
1955	155	199	139	286	386	148	.27	359	359	265	283	383	339	.62
1960	193	214	170	292	394	186	.34	655	434	319	287	391	420	.76
1965	221	208	208	295	404	228	.40	754	504	371	291	393	494	.87
1970	239	327	228	300	414	254	.45	823	536	395	294	405	546	.95
1975	256	345	241	303	420	273	.48	860	552	407	296	411	568	1.00
1980	256	353	247	305	423	280	.49	881	556	409	299	414	578	1.01
1985	249	359	251	307	428	284	.50	870	572	421	300	417	587	1.03
1990	216	365	256	309	429	288	.51	848	591	435	301	417	592	1.04
1995	240	354	247	311	430	280	.49	833	574	422	302	419	580	1.02
2000	239	341	238	311	431	273	.48	820	561	412	302	420	570	1.00

TABLE B.—(f65) *Disability cost proper of table A and cost of other OASI benefits derived because of disability* [1]—*level cost of both as percent of pay roll*

Calendar year	Cost	Cost, other	Total cost	Total cost	Cost	Cost, other	Total cost	Total cost
	Disability proper (millions)	Derived benefits (millions)	a/c Disability (millions)	As percent of pay roll	Disability proper (millions)	Derived benefits (millions)	a/c Disability (millions)	As percent of pay roll
	Low assumptions with low disability				Low assumptions with high disability			
1945	$29		$29	0.09	$79		$79	0.24
1950	113	$1	114	.33	362	$3	365	1.05
1955	160	5	165	.46	529	12	541	1.52
1960	197	12	209	.58	653	24	677	1.89
1970	241	25	266	.74	825	47	872	2.42
1980	261	34	295	.82	874	67	941	2.61
2000	250	29	279	.78	842	84	926	2.57
Level, no interest				.66				2.14
Level, 2% interest				.60				1.96
	High assumptions with low disability				High assumptions with high disability			
1945	$35		$35	0.07	$96		$96	0.19
1950	107	$1	108	.20	233	$4	237	.45
1955	148	6	154	.28	339	14	353	.65
1960	186	12	198	.36	420	16	436	.79
1970	254	24	278	.49	540	29	569	1.00
1980	280	36	316	.55	578	43	621	1.09
2000	273	32	305	.54	570	59	629	1.10
Level, no interest				.44				.91
Level, 2% interest				.40				.83

[1] These "derived" benefits are regular OASI claims which (1) would not have been payable due to expiring of insured status, except that the disability claim maintained the insured status until death or age 65 so that subsequent benefits ensued; or (2) would have been payable in smaller amounts except that the disability claim maintained the full average wage for purposes of determination of subsequent OASI claims.

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