

This PDF is a selection from an out-of-print volume from the National Bureau of Economic Research

Volume Title: Private Pension Funds: Projected Growth

Volume Author/Editor: Daniel M. Holland

Volume Publisher: UMI

Volume ISBN: 0-87014-411-1

Volume URL: <http://www.nber.org/books/holl66-1>

Publication Date: 1966

Chapter Title: Projections of Covered Workers and Beneficiaries

Chapter Author: Daniel M. Holland

Chapter URL: <http://www.nber.org/chapters/c1581>

Chapter pages in book: (p. 16 - 52)

## 2. Projections of Covered Workers and Beneficiaries

Ideally, one would like to estimate the future dimensions of pension funds by treating the processes affecting pension plan fiscal flows—e.g., labor force participation rate, employment, coverage, contributions per employee, employees' earnings, employer contributions, benefit payments, and fund earnings—as variables whose values are determined within a model of the economy, and hence must be mutually consistent with one another and with the economy in which they operate.

Since a model of this kind would require an impracticable commitment of resources, it was decided to adopt the compromise of estimates that would “project” each of the fiscal operations associated with pension plans separately, keeping an eye, however, on reasonable relations among the component parts.

The projection procedure will distinguish between “real” variables—the number of beneficiaries and covered workers—and monetary variables—benefits per beneficiary and contributions per capita. The product of “real” and money variables will give the monetary amounts of benefit payments and contributions.

### *Basic Framework*

What happens over a period, say, a year, to the level of assets in the fund accumulated for a pension plan depends on the net difference between inflows to the fund and outflows from it. Two sets of flows build up reserves—contributions made under the provisions of the plans by employers and employees, and the earnings of the assets in the fund at the start of the year and in addition, of course, earnings on the increment to assets over the year. On the other hand, two types of flows tend to diminish the fund, benefit payments and costs

of administration. Benefit payments are estimated explicitly; costs of administration are, in effect, subsumed in the net earnings rate assumed in projecting fund earnings.

If the level of assets at the beginning of a year, contributions and benefit payments during the year, and the rate of return on the fund's assets are known, the earnings of the fund can be estimated and the level of fund assets at the beginning of the next year can be obtained by iteration. If the aggregate of private pension plans is thought of as one "giant" plan, what has just been said applies to the private industrial pension structure as a whole.

Let  $E_t$  be earnings during period  $t$ ;  $C_t$  be contributions during period  $t$ ;  $P_t$  be benefits paid during period  $t$ ;  $r$  be rate of return during period  $t$ ;  $H_t$  be reserves at the end of period  $t$ .

Then:

$$H_t = rH_{t-1} + (C_t - P_t) + E_t. \quad (1)$$

Or, very simply, the reserves on hand at the end of a period are equal to the reserves at the start of the period plus contributions minus benefits plus fund earnings over the period.

This relation enables us to obtain the level of reserves for any period,  $t + 1$ , if we have projected  $C$ ,  $P$ , and  $r$ ; for we can project  $C$  and  $P$  and estimate  $E$  as

$$E_t = rH_{t-1} + \frac{r(C_t - P_t)}{2}. \quad (2)$$

That is to say, earnings over period  $t$  are equal to the earnings on the stock of assets at the start of  $t$  (i.e.,  $r[H_{t-1}]$ ) plus earnings on the net excess of contributions over benefits (i.e.,  $\frac{r[C_t - P_t]}{2}$ ). As a

convenient approximation, we assume that  $r$  times half the total excess of contributions over benefits over the year accurately measures the earnings on this score (which would be the case if the rates of flow of  $C_t$  and  $P_t$  were even over the year).

In addition to estimating  $C_t$  and  $E_t$  separately, we also developed a set of projections in which  $(C_t + E_t)$  were estimated as a combined total. This was done on the assumption that for a given  $P_t$ , a total inflow—call it  $K$  (which equals  $C_t + E_t$ )—of a specified size is required; within limits, its precise allocation between  $C_t$  and  $E_t$  is unimportant.

Indeed, it has been suggested, should  $E_t$  be smaller or larger than expected, then compensating variations would be made in  $C_t$ .

The procedure for these estimates is straightforward. Rewriting (1), we have  $H_t = H_{t-1} + (C_t + E_t) - P_t$ . We estimated two items,  $P_t$  and  $(C_t + E_t)$ , and obtained  $H_t$  by adding these values to  $H_{t-1}$ .

In attempting a judgment on the size of contributions (or benefit payments) in the future—more specifically, up through 1981—two steps were utilized: estimation of (1) covered workers (or the number of beneficiaries)—the “real” variable noted in the discussion earlier—and (2) contributions per covered worker (or benefit payments per beneficiary). Estimated contributions (or benefit payments), then, would be the product of the two steps.

### *Projecting Coverage*

Coverage—i.e., the number of workers “on whose behalf” contributions are being made at any given time—grows not only because more people enter the labor force than leave it but also because each year pension plans are extended to more firms and more classes of workers. Therefore, it was not possible to project coverage on the basis of a simple straightforward relationship to some underlying demographic variable. Rather a number of alternative assumptions were used.

#### THE HISTORY OF PRIVATE INDUSTRIAL PENSION PLAN COVERAGE

Table 10 presents the growth of coverage under private industrial pension and deferred profit-sharing plans (i.e., profit-sharing plans with retirement features) and relates this coverage to several measures of the larger universe within which it falls (see columns 3 and 5). Since these data summarize a basic feature of the pension structure—the number of people covered by this set of arrangements—they are interesting in and of themselves. Furthermore, they bear directly on the immediate problem of projecting the amount of contributions over the next twenty years.

Currently, well over 23 million workers are participating in these pension plans, and this number has apparently shown continual growth since 1935. Table 10 shows that coverage over the thirty-one years from 1930 to 1961 rose by 20 million, from 6 to 32 per cent

TABLE 10

*Growth of Private Industrial Pension Coverage Compared with  
Civilian Labor Force and Nonagricultural Payrolls  
(excluding government), End of Year, 1930-61*  
(thousands)

Year	Covered Workers (1)	Civilian Labor Force		Employees on Nonagricultural Payrolls (Excluding Government) <sup>a</sup>	
		Number (2)	Per Cent Covered (3)	Number (4)	Per Cent Covered (5)
1930	2,700	48,523	5.6	26,276	10.3
1935	2,700	52,283	5.2	23,572	11.5
1940	4,100	55,640	7.4	28,174	14.6
1945	6,400	53,680	11.9	34,450	18.6
1950	9,800	63,099	15.5	39,196	25.0
1951	11,000	62,884	17.5	41,460	26.5
1952	11,700	62,966	18.6	42,216	27.7
1953	13,200	63,860	20.7	43,587	30.3
1954	14,200	64,468	22.0	42,271	33.6
1955	15,400	65,848	23.4	43,761	35.2
1956	16,900	67,530	25.0	45,131	37.2
1957	18,200	67,946	26.8	45,278	40.2
1958	19,000	68,647	27.7	43,529	43.6
1959	20,200	69,394	29.1	45,214	44.7
1960	21,600	70,612	30.6	45,850	47.1
1961	22,600	71,603	31.6	45,395	49.8

Source: Column 1: Alfred M. Skolnik, "Growth of Employee-Benefit Plans, 1954-1961," *Social Security Bulletin*, April 1963, and earlier issues. Column 2, 1930-35: Stanley Lebergott, *Manpower in Economic Growth*, New York, 1964; 1940-58: Bureau of the Census, *Current Population Reports*, Series P. 50, *Annual Report on the Labor Force*; 1959-61: Department of Labor, *Special Labor Force Report*. Column 4: *Employment and Earnings Statistics for the United States*, 1909-1964, Bureau of Labor Statistics Bulletin 1312-2.

<sup>a</sup>Called ENPEG in later tables.

of the civilian labor force. But this relation involves using the grossest measure of the nation's manpower, a base which, in particular, is not very finely attuned to considerations important for pension coverage and its growth. The civilian labor force is not the most relevant base for assessing the degree of coverage, how far coverage has come over some specified period, and how far it is likely to go over some span of years in the future, because, for one thing, it includes some workers covered by other pension arrangements, namely, government employees. For another, it also encompasses groups clearly not suited for pension arrangements that are the responsibility of an employer, i.e., the unemployed, agricultural workers, domestic servants, the self-employed (who until 1962 were not permitted to have their business set up pension trusts on their behalf), and unpaid family workers.

Adjusting for these inappropriate inclusions provides the base designated as "employees on nonagricultural payrolls (excluding government)," hereafter called ENPEG. When pension coverage is related to this base, it appears (as in column 5 of Table 10) that about half the relevant number of workers are currently covered. But even this is not the most appropriate base, for it includes two additional groups of workers who are really not "suitable" for pensions. This time it is not the industries they work in that determines employees' eligibility, but their conditions of employment. It is clear that people who typically work part time are not appropriate grist for the pension mill. A similar conclusion is valid for young workers who are still finding their employment or occupational niche and can be expected to have high mobility. For an adjustment on this latter score, "young" could be defined as under 25. Incorporating both these adjustments would provide the most relevant base against which to assess the adequacy of coverage—a base that might be called "employees potentially eligible for industrial pensions," or EPEIP.

Table 11 contains estimates of EPEIP.<sup>1</sup> Industrial pension coverage is currently quite high, extending as it does to more than two-thirds of those it might realistically be expected to encompass.<sup>2</sup>

<sup>1</sup> The estimating procedure is somewhat involved. Since precision is not a requisite for the use to which these data are put, the details may be omitted.

<sup>2</sup> Of necessity there are larger errors of estimate in EPEIP than in ENPEG. However, as can be seen from column 4 of Table 11, the relationship between the two measures has remained quite constant over time. Therefore, operations per-

TABLE 11

*Growth of Private Industrial Pension Coverage Compared with  
Employees Potentially Eligible for Industrial Pensions and  
Employees on Nonagricultural Payrolls  
(excluding government), End of Year, 1950-59*  
(thousands)

Year	Covered Workers (1)	Employees Potentially Eligible for Industrial Pensions <sup>a</sup> (2)	Covered Workers as Percentage of EPEIP (3)	EPEIP as Percentage of ENPEG (4)
1950	9,800	26,907	36.4	68.6
1951	11,000	28,752	38.3	69.3
1952	11,700	29,822	39.2	70.6
1953	13,200	31,229	42.3	71.6
1954	14,200	30,531	46.5	72.2
1955	15,400	31,484	48.9	71.9
1956	16,900	32,256	52.4	71.5
1957	18,200	32,400	56.2	71.6
1958	19,000	31,021	61.2	71.3
1959	20,200	31,600	63.9	69.9

Source: Columns 1 and 4: Table 10; column 2: NBER estimates.

<sup>a</sup>Called EPEIP in column 3 and later tables.

Of either base, EPEIP or ENPEG, workers covered by pension plans have comprised a steadily growing percentage. Thus, between 1950 and 1961, the coverage percentage increased from 25 to 50 for ENPEG, and over the period 1950-59 from 36 to 64 for EPEIP. A cessation of plans, a sufficient modification of the distribution of employment between less strongly and more strongly covered industries, or a rate of exit out of the labor force higher than entrance into it—all of which could contribute to an absolute decline in this

formed with one of them as a base is equivalent, except for a scale factor, to using the other as the base. When we speak below about using EPEIP for our projections, it is equivalent to using ENPEG.

However, to assess how well the industrial pension "structure" is doing its job in terms of coverage, EPEIP is the more meaningful base.

percentage—appear to be extremely unlikely. The strong likelihood, rather, is for rising coverage as a percentage of EPEIP or ENPEG in the future.

#### COVERAGE PROJECTIONS $C_1$ THROUGH $C_4$

The coverage percentage has a theoretical maximum of 100, but of course there is no real probability of achieving it. There is no basis for a firm choice of some specific percentage at some particular date, except of course the obvious hunch that in ten years, say, it would be surprising if it did not exceed the present level or was as high as 98, for example. This does not seem like much to go on, but tying it in with one additional feature of the behavior of coverage over time that seemed likely provided a basis for projections. Suppose that at some date (it is not necessary to specify here precisely when) covered workers as a percentage of EPEIP (or ENPEG) will reach some feasible maximum—call it  $k$ —which will persist permanently. In other words, assume that after that date actual coverage in relation to “potential” coverage will remain constant because the only additions to coverage will be a constant fraction of additions to EPEIP (or ENPEG), and both the coverage series and the relevant bases will be growing at the same rate. The assumption, then, is that coverage should grow more rapidly than EPEIP (or ENPEG), but with the differential in the rates of growth continually narrowing until, with their equality, coverage will remain the same fraction,  $k$ , of EPEIP (or ENPEG).

It seems improbable that the coverage percentage would rise linearly and then suddenly level off when it reached  $k$ . More likely would be an increase in the percentage of potentially eligible workers covered, but by smaller and smaller increments each year, thus slowly approaching some specified ceiling. Particular to the process under observation is the consideration that the more likely situations for the introduction or extension of coverage have naturally been tapped first; the harder cases now remain. Some supporting evidence for the view that the heavily covered areas are currently approaching a practicable ceiling, while in the other areas pension coverage is making slower headway, appears in the Occupational Wage Survey data of the Bureau of Labor Statistics, summarized in Table 12. It seems reasonable to expect that it will become increasingly difficult

TABLE 12

Percentage of Workers in Establishments Providing Pensions, Selected Areas, Industries,  
Occupational Groups, and Dates, 1951-60

City	Year	All Industries <sup>a</sup>		Manufacturing		Public Utilities <sup>a</sup>		Wholesale Trade		Retail Trade		Finance, Services	
		Office	Plant	Office	Plant	Office	Plant	Office	Plant	Office	Plant	Office	Plant
Dallas													
Nov.	1960	75	62	82	67	75	73	-	-	71	55	74	-
Oct.	1956	69	54	80	56	87	88	-	-	58	44	59	-
Aug.	1952	58	36	54	35	73	65	-	-	63	31	-	-
Boston													
Oct.	1960	81	72	83	78	79	78	59	49	83	76	89	59
Sept.	1957	77	59	73	59	95	88	65	55	54	61	89	58
Mar.	1951	63	38	50	41	90	73	43	33	33	28	80	49
Seattle													
Aug.	1960	82	68	93	73	63	82	-	-	76	54	-	-
Aug.	1956	72	63	83	69	79	94	-	-	64	53	-	-
Sept.	1951	37	18	12	5	60	61	48	36	41	18	48	25
Baltimore													
Dec.	1960	87	74	88	80	91	97	86	45	83	64	89	-
Aug.	1957	87	80	91	86	93	99	79	44	79	70	92	-
June	1951	61	63	66	71	94	64	63	41	52	56	44	21
Cleveland													
Sept.	1960	76	76	84	83	61	77	49	46	-	-	79	-
Oct.	1956	74	67	78	72	91	100	58	57	-	-	83	-
Oct.	1951	52	49	58	56	89	53	38	27	-	-	26	32

Source: Bureau of Labor Statistics, Occupational Wage Surveys (Bulletins 1033, 1045, 1056, 1057, 1116-1; 1202-1, 1202-3, 1202-5; 1224-2, 1224-3; 1285-7, 1285-11, 1285-15, 1285-21, 1285-34).

Note: The percentages represent workers in establishments with pension programs as a percentage of all workers. Not all workers in an establishment with a pension plan are covered by that plan.

<sup>a</sup> Because railroads have been included under public utilities in all areas except Baltimore in 1960-61, data for these years are not comparable with surveys made in earlier years.

to increase the rate of growth of the coverage percentage as time goes on.

Consequently, the behavior of the coverage percentage can be anticipated to exhibit the characteristics of asymptotic growth. As already noted, it is most likely that coverage will grow faster than EPEIP (or ENPEG), but at a declining rate of differentially higher growth which at some future date will be about equal to and remain approximately the same as the rate of growth of the potentially eligible. It is the declining rate of growth of coverage that will induce the asymptotic behavior that seemed reasonable for the coverage percentage.

Three alternative possibilities were used as the year by the end of which the feasible ceiling in the coverage percentage would be reached—1971, 1976, or 1981. Thus there are three different coverage projections, designated  $C_2$ ,  $C_3$ , and  $C_4$ .<sup>3</sup> Each rests on the same general procedure but sets different dates for the convergence of the growth rates of coverage and of the broader working population from which covered workers come. In projection  $C_2$ , the year of convergence is taken to be 1971. For  $C_3$  and  $C_4$  it is five and ten years later. The transient-state rate of growth of coverage was taken to follow a geometric progression, with the first term set at 5.6 per cent and the last term at 2.1 per cent at the specified date in the future at which the “steady state” will be reached.<sup>4</sup>

In contrast with projections  $C_2$ ,  $C_3$ , and  $C_4$ , for which sole reliance was placed on the aggregate coverage percentage and total ENPEG (or EPEIP), the projection designated  $C_1$  makes some conjectures about coverage by industrial sectors and therefore has the advantage

<sup>3</sup>  $C_1$  is reserved for a coverage projection on a different basis.

<sup>4</sup> The rate of growth of coverage averaged 5.6 per cent for the last several years. The 2.1 per cent is a more complicated story. EPEIP, which over the last decade constituted a rather stable percentage of “employees on nonagricultural payrolls (excluding government)” (see Table 11), is assumed to grow at the same rate as the latter. In the *Manpower Report of the President*, 1964, a close approximation to ENPEG is projected to grow at an annual rate of 2.1 per cent over the period 1960–75. Niceties of definition and periods of projection are not crucial here. Thus in an earlier draft EPEIP was assumed to grow at the same rate as total nonagricultural employment (not the same as ENPEG) and a projected growth rate for the latter of 2.1 per cent was derived from forecasts in United States Senate, Special Committee on Unemployment Problems, 86th Congress, 1st Session, *Readings in Unemployment*, p. 511 (farm workers), and Table 7, p. 505 (total civilian unemployment). The “crude” procedure and the more elaborate procedure provided precisely the same steady-state growth rate.

that it permits incorporating a well-known fact of private pension life in the projections, viz., unequal degrees of coverage by industrial sectors, and thereby taking account in the projection of the differential growth of employment in these sectors over time. In this sense the  $C_1$  projection can be called a "judgment" projection, since it required estimating an initial set of sector coverage percentages and additional sets of such estimates for three benchmark dates in the future.

$C_1$  derives from the industry division of employment delineated in Table 13 for 1960, i.e., ENPEG for 1960 by industrial groupings.<sup>5</sup> To these employment figures coverage percentages were applied that embodied the extent of pension coverage for each sector (see column 3). While there are, of course, some clues to go on concerning the degree of industrial pension coverage (Table 12, for example, contains data generally pertinent to this point), it is nonetheless true that the percentages of column 3 are matters of judgment. In arriving at them, a ranking among industries was established that seemed consistent with what is known about sectoral coverage and these coverage percentages were adjusted to make the over-all result consistent also with the one known number for which there is a good estimate, total private industrial pension plan coverage as of the end of 1960.<sup>6</sup>

From the same source used for column 2 of Table 13, estimates of employment by sector for 1970 and 1975 are available. For these years, once again, judgment on sectoral coverage was used, the general guide being that coverage will grow most rapidly in the sectors of lowest coverage and least rapidly, if at all (as a percentage), in the sectors judged to be very high as of 1960. Projections of sectoral employment, judgment coverage percentages, and estimated coverage for 1970 and 1975 appear in Table 14.

For coverage beyond 1975, an additional set of estimates was required. To obtain sectoral employment as of 1980, the same percentage increase between 1975 and 1980 was assumed as was estimated for the period 1970-75. And sector coverage percentages for 1980

<sup>5</sup> *Manpower Report of the President*, 1963, p. 95.

<sup>6</sup> The conformity is good. Coverage from aggregating the sector estimates is set by this method as 21.6 million for 1960, virtually the same as the actual estimate available when the  $C_1$  projection was developed. Since that time, the actual estimate has been revised to 21.2 million, not enough to throw the sectoral estimates off perceptibly. For the original coverage estimate, see the article on employee benefit plans in the April 1963 *Social Security Bulletin*; the revised estimate is in the article on the same topic in the April 1964 issue.

TABLE 13

*Employment, Coverage Percentages, and Number of Covered Workers,  
by Industry Division, 1960*

(millions)

Industry Division	Employment, 1960 <sup>a</sup>	Coverage Percentage <sup>b</sup>	Covered Employees
Wholesale and retail trade	11.4	30	3.4
Service and miscellaneous	7.4	15	1.1
Transportation and public utilities	4.0	80	3.2
Finance, insurance, and real estate	2.7	80	2.2
Manufacturing	16.8	60	10.1
Contract construction	2.9	30	0.9
Mining	0.7	80	0.6
Total	45.9		21.5

<sup>a</sup>Annual averages, from *Manpower Report of the President*, 1963, p. 95.

<sup>b</sup>NBER estimates.

were obtained as before, i.e., by judgment (see Table 15). The pattern of these percentages looks reasonable—coverage ratios in sectors of low coverage are assumed to grow more rapidly than those in sectors of high coverage—but the ranking of sectors by degree of coverage is invariant with respect to 1975 (which is also invariant with respect to 1970, which, in turn, is the same ranking as we assumed for 1960).

Coverage estimates for years other than these benchmark dates were obtained by linear interpolation except that for 1981, which was arrived at by assuming that the same increase in coverage as between 1979 and 1980 would take place between 1980 and 1981.

All four coverage projections appear in Table 16 and Chart 1. The differences among them are, of course, determined by the procedures used in their derivation. A sense of these differences can be obtained by looking at the numbers of covered workers that each assumption implies.

The numbers emphasize a property shared by many other series in the estimates. If, starting with a common value, one postulates different rates of growth, then, given a long enough time span, wide

TABLE 14  
*Projected Employment, Coverage Percentages, and Number of Covered Workers,  
 by Industry Division, 1970 and 1975*  
 (millions)

Industry Division	1970		1975			
	Employment <sup>a</sup>	Coverage Percentage <sup>b</sup>	Covered Employees	Employment <sup>a</sup>	Coverage <sup>b</sup> Percentage	Covered Employees
Wholesale and retail trade	14.0	40	5.6	15.6	47.5	7.4
Service and miscellaneous	10.2	25	2.6	11.9	32.5	3.9
Transportation and public utilities	4.4	85	3.7	4.5	85	3.8
Finance, insurance, and real estate	3.5	85	3.0	3.9	85	3.3
Manufacturing	19.2	65	12.5	20.3	67.5	13.7
Contract construction	4.0	35	1.4	4.4	37.5	1.7
Mining	0.7	85	0.6	0.7	85	0.6
Total	56.0		29.4 <sup>c</sup>	61.3		34.4 <sup>c</sup>

<sup>a</sup> Annual averages, from *Manpower Report of the President*, 1963, p. 95.

<sup>b</sup> NBER estimates.

<sup>c</sup> Differs from value in Table 16 due to rounding.

TABLE 15

*Projected Employment, Coverage Percentages,  
and Number of Covered Workers,  
by Industry Division, 1980  
(millions)*

Industry Division	Employment	Coverage Percentage	Covered Employees
Wholesale and retail trade	17.4	55	9.6
Service and miscellaneous	13.9	40	5.6
Transportation and public utilities	4.6	85	3.9
Finance, insurance, and real estate	4.3	85	3.7
Manufacturing	21.5	70	15.0
Contract construction	4.8	40	1.9
Mining	0.7	85	0.6
Total	67.2		40.3 <sup>a</sup>

Source: NBER estimates (annual averages).

<sup>a</sup>Differs from value in Table 16 due to rounding.

differences in projected values will show up as a consequence.  $C_2$  and  $C_4$  differ by a matter of 6.0 million by the end of 1981, but the other side of the coin shows a much smaller 2.7 million difference for a date some ten years earlier. After ten years of projecting, by 1971 the estimates are not very different. Rather extreme differences in assumptions do not have important consequences for the results over the first ten years. Although there may be uncertainty about the future, expressed by many different assumptions, fairly firm expectations may well be held about the more immediate future—say, to 1970.

Another observation suggested by these data relates to the growth of coverage. Although a feasible maximum for the coverage percentage has been assumed, this does not mean that the growth in coverage will not be substantial. Even under the most restrained of the set of three coverage assumptions,  $C_2$ , the number of covered workers would come close to doubling over the course of the next twenty years, averaging an increase of 800,000 per year.

TABLE 16

*Annual Private Industrial Pension Plan Coverage**Under Four Coverage Projections, 1961-81*

(thousands, as of end of year)

Year	$C_1$	$C_2$	$C_3$	$C_4$
1961	22,600	22,600	22,600	22,600
1962	23,366	23,757	23,790	23,807
1963	24,132	24,869	24,968	25,021
1964	24,898	25,934	26,130	26,238
1965	25,664	26,949	27,273	27,456
1966	26,430	27,914	28,395	28,673
1967	27,196	28,828	29,494	29,885
1968	27,962	29,691	30,567	31,091
1969	28,728	30,504	31,613	32,288
1970	29,500	31,268	32,630	33,474
1971	30,396	31,984	33,617	34,648
1972	31,292	32,655	34,573	35,808
1973	32,188	33,340	35,497	36,952
1974	33,084	34,040	36,389	38,078
1975	33,980	34,754	37,249	39,185
1976	35,322	35,483	38,077	40,272
1977	36,664	36,228	38,876	41,338
1978	38,006	36,988	39,692	42,383
1979	39,348	37,764	40,525	43,406
1980	40,689	38,557	41,376	44,405
1981	42,031	39,446	42,244	45,380

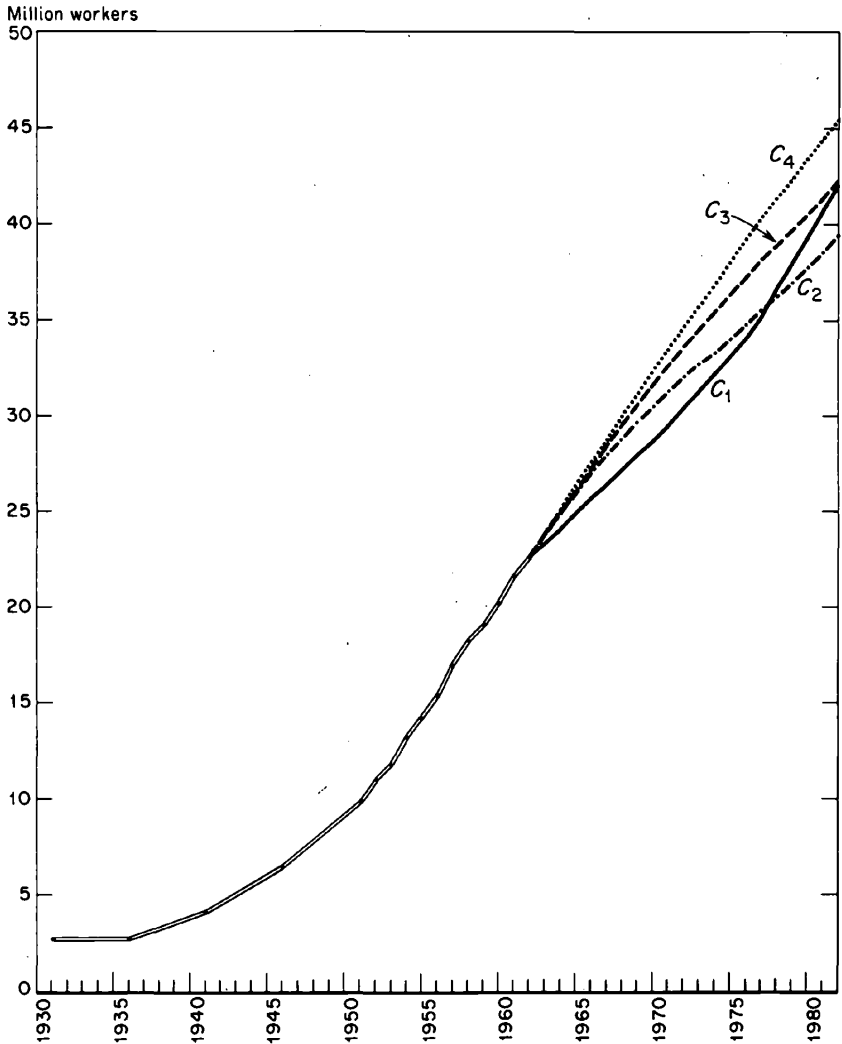
Source: NBER projections.

In Chart 1, the conclusion appears justified that all three projections ( $C_2$ ,  $C_3$ , and  $C_4$ ) are reasonable in that they seem to agree with the experience of the years 1930-60, also plotted on the chart, and all suggest a "toning down" of the rate of increase in coverage over time. There is a purely subjective basis for preferring  $C_3$ :  $C_2$  seems to tail off too soon, and  $C_4$  continues to climb too rapidly over the whole period. This subjective judgment is the least convincing of the grounds for preferring  $C_3$  to the others in this group of three. Two further and weightier arguments are presented below.

It has been stated that projections  $C_2$ ,  $C_3$ , and  $C_4$  involve an initially

## CHART 1

*Growth of Private Industrial Pension Plan Coverage,  
1930-61, and Projections Through 1981*



Source: Tables 10 and 16.

more rapid rate of growth of coverage which converges to that of ENPEG or EPEIP by a specified date. A consequence of these assumptions necessarily is the constancy of the fraction of, say, EPEIP covered by industrial plans from that date on. Thus, additional insight and basis for evaluation of  $C_2$ ,  $C_3$ , and  $C_4$  comes from the data of Table 17,

TABLE 17  
*Projected Private Industrial Pension Coverage*  
*Under Four Assumptions as Percentage of*  
*Estimated Potentially Eligible,*  
*Selected Years, 1966-81*  
 (millions)

End of Year	EPEIP (1)	Coverage Under Projections				Projected Coverage as Percentage of EPEIP			
		$C_1$ (2)	$C_2$ (3)	$C_3$ (4)	$C_4$ (5)	$C_1$ (6)	$C_2$ (7)	$C_3$ (8)	$C_4$ (9)
1966	36.4	26.4	27.9	28.4	28.7	72.5	76.6	78.0	78.8
1971	40.4	30.4	32.0	33.6	34.6	75.2	79.2 <sup>a</sup>	83.2	85.6
1976	44.7	35.3	35.5	38.1	40.3	79.0	79.4	85.2	90.2
1981	49.6	42.0	39.4	42.2	45.4	84.7	79.4	85.1 <sup>b</sup>	91.5

Source: Column 1, NBER projections; columns 2-5, Table 16.

<sup>a</sup>Differs from 79.4 due to rounding.

<sup>b</sup>Differs from 85.2 due to rounding.

which indicates the estimated percentage of EPEIP covered by industrial pensions at selected dates in the future and the implicit coverage percentage asymptotes for each of the projections.  $C_2$ 's percentage seems "too low"; for will not an institution that had covered 64 per cent of EPEIP in 1959 (and over 67 per cent, as indicated by a preliminary estimate, in 1961) be likely to cover a higher percentage than 79.4 at the height of its power? On the other hand,  $C_4$ 's ultimate coverage percentage, 91.5, seems too high, for an achievement that comes within less than 10 percentage points of the

absolutely perfect achievement seems beyond realistic expectation. Given these evaluations, then,  $C_3$  is to be favored, not because it can be demonstrated to be precisely correct, but simply because it falls between an estimate that seems too low and another that appears too high.

There are two points about  $C_1$  that require particular notice. For one thing, this projection, in sharp contrast to  $C_2$ ,  $C_3$ , and  $C_4$  does not "graft" smoothly onto the historical record of pension coverage.

One would expect coverage to take a smooth path because of the large set of forces determining it and because of its smooth pattern over a large number of years up to 1961. On this score,  $C_1$  does not seem to provide as credible a growth pattern as the other three assumptions. Secondly, the pattern of the annual increments under  $C_1$  is unbelievably explosive (about 750,000 in the early 1960's contrasted with 1,350,000 in the late 1970's). But the  $C_1$  estimates for the benchmark dates have something to recommend them; derived from industry coverage, they constitute a different and independent basis of projection. Therefore, the fact that the  $C_1$  magnitudes sprawl across  $C_2$  and  $C_3$  make the latter two projections more credible than  $C_4$ .

In summary, there are numerous grounds on which coverage might be projected. Two bases were used that seemed appropriate for sets of alternative projections. Each set and component of the set had something to recommend it and other features or characteristics that militated against it. All things considered, of the four available projections,  $C_3$  is preferred on the grounds explained above. Thus, in discussing findings, reliance will be primarily on projections of pension fund assets that incorporate  $C_3$ . However, the significance of alternative coverage assumptions will also be assessed and projected pension fund holdings based on them will be examined.

### *Projecting Beneficiaries*

Three methods were available for projecting the number of annuitants (beneficiaries): looking for a time trend; estimating a functional relation between beneficiaries of the private industrial pension structure and some other relevant variable or variables (say, beneficiaries

under OASDI, or number of people over 65); or undertaking a necessarily somewhat crude actuarial analysis. The first two, which involved regression analysis, were rejected as inappropriate. Among the reasons for this decision are:

1. The "structure" of industrial pensions changed drastically with the start of the Second World War for reasons stated earlier and not necessary to delineate here. In addition, a change in structure occurred in 1948 and 1949, when collective bargaining for pension plans started to take hold. This means that for regressions with data drawn from the structure that might be expected to prevail in the future, a good starting date would be 1950. But since 1950 the number of beneficiaries has grown at an increasing rate, and surely by a later date some leveling off of this rise is likely. This expectation arises simply from the dynamics of a pension plan, which after a period of growth tends to approach something like "stability." An extrapolation of the trend of beneficiaries on the basis of the data from 1950 to 1961 (the last year for which data were available when these calculations were undertaken) might incur the risk of a large error.

2. Given the decision to restrict the regression to data no earlier than the 1950's, there would be in all only twelve observations. With one degree of freedom lost for each constant and coefficient, even for a one-variable linear or exponential model there would be only ten degrees of freedom. This could severely limit the usefulness of any such model.

3. It could not be expected that the relationship between industrial pension annuitants and some other series over the last twelve years would continue for the next generation. Recipients of primary OASDI benefits might seem to provide a likely series; their number is carefully projected by the actuary of the Social Security Administration, and they are drawn from the same underlying "population" that provides the base for industrial pensioners. But the growth of industrial coverage has been rapid compared with the stability of OASDI's degree of coverage. Also OASDI's dynamics are basically different from those of industrial pension plans; moreover, these two sets of arrangements, having been introduced at different times, would be at different stages of their development at any particular point in time. Therefore, it would not be sensible to regress industrial annuitants on OASDI beneficiaries. Even if a regression analysis showed a close

fit in the past, there would be no warrant to expect the observed relationship to continue over time. All these considerations militated against estimating a functional relation with time or some other variable as a way of projecting industrial pension beneficiaries.

The third method seems to give good results. It is called here the "actuarial" method because it involves applying some (albeit primitive) actuarial techniques to the population of present beneficiaries and of those who will become beneficiaries during the period of the projection. Assuming the retirement age to be 65, beneficiaries at the end of year  $t + n$  are those persons covered by industrial pensions who are at least  $65 - n$  years old at the end of year  $t$  and who survive through year  $t + n$ , plus those of the beneficiaries at the end of year  $t$  who survive to the end of  $t + n$ . Thus, for example, the forecasted number of annuitants as of the end of 1975 would consist of those who survived to that date from among beneficiaries and covered employees at least 50 years old by the end of 1960.

This, of course, is an incomplete statement of the case. Over the course of the  $n$  years, (1) some workers covered at the end of  $t$  will leave covered employment without a pension right and go to positions in which they will not earn pension rights or will become unemployed, and (2) some other workers older than  $65 - n$  but not covered at the end of  $t$  will become covered over the  $n$  years as pension plans are extended to them, and will become beneficiaries at 65. Five different (alternative) adjustment factors will be used to allow for various relations between (1) and (2).

It is assumed that the retirement age is 65, which indeed is what it has been and still is in most plans. It may be argued that the introduction of the "early" retirement option under OASDI—appropriately adjusted payments to start at age 62—will tend to become characteristic of industrial plans as well. But if this comes about, it will do so gradually. More important, the early retirement option will generally involve actuarially reduced benefits, so the projection for *amount* of benefits need not be thrown off as severely. An additional assumption is that, for any year, all covered people of at least 65 are annuitants. Less rigidly and more realistically, it may alternatively be assumed that the number of late retirees, those over 65, is about the same as the number of early retirees, those under 65.

To estimate the number of survivors among covered workers at any

given time in the future, mortality tables were used. Ray M. Peterson of the Equitable Life Assurance Society of the United States generously made available a table which in his opinion would be considered generally appropriate by most actuaries. This is the 1951 Group Annuity Table of Mortality (Males) Projection C, projected from 1959 through 1979, ages set forward one year for males and back five years for females.<sup>7</sup>

Actuarial tables give mortality as a function of age and sex. Ideally, then, there should be a breakdown of the covered pension population (including annuitants) annually by age and sex. The basic series fell far short of this, however; only an admittedly rough and not quite current breakdown by sex was available, and ages could be estimated only by classes. A beginning was made with annual (end-of-the-year) figures for total covered employees and total beneficiaries 1950-61.<sup>8</sup> To get a breakdown by sex, use was made of Weltha Van Eenam's unpublished estimate for covered employees in 1956-74.2 per cent male and 25.8 per cent female. Mrs. Van Eenam, at that time Associate Actuary of the Social Security Administration, furnished this estimate

<sup>7</sup> It is worth noting at this point that the choice of a mortality table does not seem to be critical. In an earlier draft of this study, a table was used that involved lower mortality rates than the one used here. That table, for which we thank W. J. McDonnell of the John Hancock Mutual Life Insurance Company, was the 1951 Group Annuity Table of Mortality (Males) projected eight years to 1959 and rated on age one year younger for males and six years younger for females. In addition, Mr. McDonnell advised that quite commonly an improvement factor is assumed—1¼ per cent per year for all ages up to and including 70 and tapering to zero for people over 89 years of age. This improvement factor was used in developing a mortality table for the twenty years after 1959. The result was a table that involved consistently lower mortality rates than used in the present study. Some illustrative comparisons for males appear in the following tabulation on mortality rate per 1,000 lives:

<i>Age</i>	<i>Year</i>	<i>Earlier Draft</i>	<i>Present Study</i>
60	1964	12.209	14.323
60	1971	11.179	13.281
60	1979	10.108	11.359
65	1964	18.758	23.091
65	1971	17.177	21.145
65	1979	15.532	19.120

The projection of beneficiaries under these different mortality rates varied only slightly. The earlier draft projected 6,589,000 for the end of 1980, and the comparable present value is 6,388,000, clearly not a difference to cause any concern. (Anticipating the terminology elaborated later, the comparable present projection is that involving an *A* factor of zero, i.e., the first section of Table 19.)

<sup>8</sup> Alfred M. Skolnik, "Growth of Employee Benefit Plans, 1954-1961," *Social Security Bulletin*, April 1964.

to the author in 1958; it is the only known estimate of coverage by sex. These percentages were assumed to hold for 1961 for both covered employees and beneficiaries.

An age distribution of the pension population was obtained in the following way. First, those covered by pensions (excluding annuitants, of course) were considered to be between ages 25 and 65. The upper limit is set by the usual retirement date; the lower limit, by a general presumption that people do not become covered by a pension plan until they are regular, full-time employees and have spent some time with a particular company, and that 25 or so is a likely age for this to happen. Second, the pension population was distributed among age groups—the data permitted nothing more refined than five-year groupings, 25 and under 30, 30 and under 35, and so on—in the same proportions as the age distribution (between 25 and 65) of “employees in industries suitable for industrial pensions,”<sup>9</sup> a category derived by subtracting domestic servants, unpaid family workers, self-employed workers, government employees, and employees who usually work part time from total civilian nonagricultural employment.<sup>10</sup> The basic data, for which 1961 was the most recent year at the time the estimates were prepared, came from the Bureau of the Census and the Bureau of Labor Statistics.

As already noted, the most refined breakdowns for nonagricultural employees is by five-year age groups. For some of the subtracted categories, e.g., domestic servants, an age breakdown is given. For others, it was estimated simply by assuming the same age distribution as for total nonagricultural employees. The age distribution so obtained was then applied to the covered pension population of 1961. Implicit

<sup>9</sup> With our interest limited to projections over the next twenty years, we did not, of course, require age breakdowns for employed persons under 45.

<sup>10</sup> The purpose here was to arrive at a total that represented the number of employees currently in industries in which industrial pension coverage could “reasonably” be expected. (The category was developed initially for an analysis of the growth of pension coverage, but it turned out to be appropriate for use in the current connection also.) Thus we excluded government employees and railroad workers, who are covered by other pension programs; agricultural workers, domestic servants, and unpaid family workers whose employers generally are not economically strong enough to undertake a pension commitment; the self-employed whose firms were not permitted (until 1962) to set up pension trusts on their behalf; and finally, typically part-time workers, who are usually considered to be beyond the pension pale.

in this step is the assumption that the age distribution of the covered population is the same as that for all employees in each industry. Since beneficiaries are being projected over the next twenty years, only covered employees age 45 and over are considered (see Table 18).

Starting in 1961 (as of the end of the year, which may also be con-

TABLE 18

*Estimated Age and Sex Breakdown of Private Industrial  
Pension Coverage, End of 1961*

	Covered Workers, by Age					Benefi- ciaries
	Total <sup>a</sup>	45-49	50-54	55-59	60-64	
Male						
Percentage in						
class	100.00	13.74	11.94	9.50	6.90	
Number (thousands)	16,770	2,304	2,002	1,593	1,157	1,410
Female						
Percentage in						
class	100.00	15.72	13.46	10.16	5.67	
Number (thousands)	5,830	916	785	592	331	490
Total (thousands)	22,600	3,220	2,787	2,185	1,488	1,900

Source: NBER estimates.

<sup>a</sup>All ages 25-64, but excluding beneficiaries.

sidered the beginning of 1962) and operating with five-year age groups, new pension plan beneficiaries were projected for each year of the period 1962-81; they consisted of those survivors in the age groups (as of the end of 1961) 60 and over, 55 and over, 50 and over, and 45 and over, respectively, who reach at least the retirement age of 65. To be specific, new pension plan beneficiaries in 1962 consisted of one-fifth of the 60-64 covered group as of the end of 1961 who survived to the end of 1962.<sup>11</sup> In other words, for simplicity it was assumed that the distribution of ages within each age group was rec-

<sup>11</sup> Plus a small addition on the score of the adjustment factor alluded to above, which we are, for convenience, still neglecting.

tangular. This, while crude, is convenient and about as correct as a more "realistic" and complex weighting of ages.<sup>12</sup>

There is another group to account for—those who were receiving benefits in year  $t$  and survived to  $t+1$ . Here the procedure is a straightforward application of mortality rates. The process was started in 1961 (end of the year or beginning of 1962) by apportioning the pension population among age classes 65 and over in the same proportions as these ages were distributed in the total population.

Finally, the adjustment factor must be explained. In essence the adjustment constitutes a running annual addition to the covered workers from whom the annual increment to the ranks of annuitants is picked up. Since it seemed likely that more workers would join the ranks of potential beneficiaries because of increased coverage each year than would leave it because of moving to noncovered employment, the appropriate adjustment is an addition that somehow should be linked with coverage. The indicated adjustment then would be to take a fraction of the increase in coverage in the groups 45 and over as of the end of 1961. The important question is, what fraction? Two polar cases can be noted and dismissed (although estimates based on them appear below for those who are interested in comparing these results with those considered more reasonable)—zero and one. Zero means that additions and attritions were equally strong (an unlikely event), and one implies that mobility out of pension-covered employment to noncovered employment was zero and new additions to coverage had the same age distribution as the existing covered population. This latter is doubtful because it violates two well-known facts of pension and industrial life—newly hired workers are usually below

<sup>12</sup> In an earlier version of this study, weighted average mortality rates were developed for each year within an age class. For this purpose, the clue came from the behavior of the numbers of nonagricultural employees in the different age groups, which rose steadily to some modal age—35–39 for males, 45–49 for females—and then fell off without exception with each succeeding age group. A similar relation was assumed to hold *within* age groups—particularly that, in groups older than the modal group, the number at each age varies directly with age. Therefore, in each age group above the modal one, the annual age distribution of employees was estimated as an arithmetic progression which summed to the total number of employees in that five-year age span. (Numerous details involved in the estimates are not discussed here.) But the number of beneficiaries obtained from this age distribution differed imperceptibly from that obtained by the much simpler even distribution within the class assumption. Hence this present version uses the simpler, equally accurate method.

the average age of the working force and there is an obvious reluctance to hire persons over 40 for numerous reasons.

Therefore, it can be argued that the likely adjustment fraction (call it  $A_i$ ) is neither  $A_0$  nor  $A_1$ . To cover the range between  $A_0$  and  $A_1$ , beneficiaries were estimated, using  $A_{.25}$ ,  $A_{.50}$ , and  $A_{.75}$ , preference being given to  $A_{.25}$  and  $A_{.50}$ . (For the reasons for this preference, see the next section; for a detailed explanation of the adjustment factor with numerical illustrations see Chapter 4.) With five  $A$  fractions and four alternative coverage assumptions,<sup>13</sup> there are twenty different projections of beneficiaries. Two out of the twenty— $A_{.25}C_3$  and  $A_{.50}C_3$ —will be drawn on extensively in this study's estimates (see Chart 2).

#### OBSERVATIONS ON THE ESTIMATED NUMBER OF BENEFICIARIES

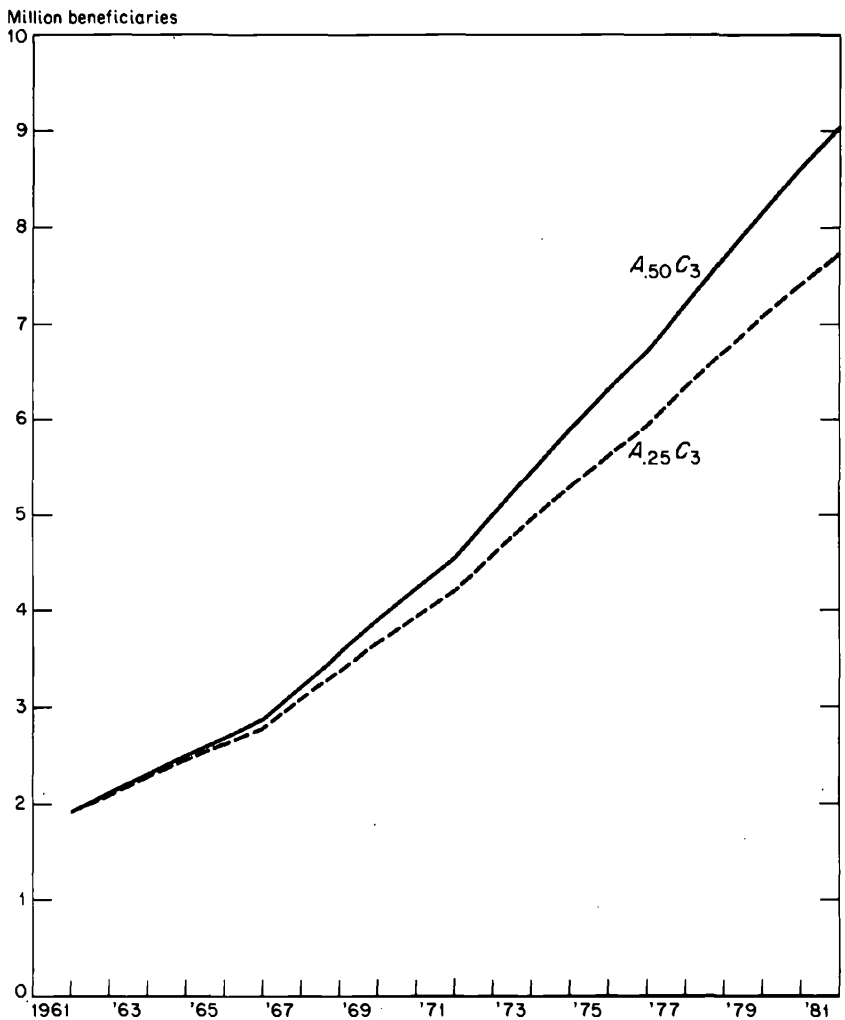
This study's main interests lie in the fiscal operations of private pension plans; the plans' fund accumulations, which are the net result of these operations; and the pattern over time of net changes in pension fund asset accumulations, which measure the importance of the role of pension funds in the capital markets. Viewed against these interests, projecting beneficiaries is simply a necessary step in arriving at one of the fiscal flows—benefit payments. However, our projections of the number of beneficiaries suggest, of course, how extensive the scope of industrial pension income support will be over the next twenty years; on this score they deserve closer examination than a concern with fiscal flows alone would warrant.

All twenty beneficiary projections for the years 1962 through 1981 are tabulated in Table 19. Table 20, for selected benchmark dates, fixes the adjustment factor and explores the effects of variation in the coverage assumption. Table 21 fixes the coverage assumption and leaves the adjustment factor free to vary. From Table 20 it is immediately apparent that varying the coverage assumption has no perceptible effect on the number of projected beneficiaries. Therefore, only one of them is needed and the choice is  $C_3$ , which is preferred. On the other hand, the entries in Table 21 indicate that the choice of a particular  $A_i$  is crucial, for the projected differences are large, particularly, of course, in the later years of the period covered by the projections.

<sup>13</sup> The basis for the coverage assumptions is developed above.

CHART 2

*Projected Number of Beneficiaries of Private  
Industrial Pension Plans, 1961-81*



Source: Table 19.

TABLE 19

Projected Number of Beneficiaries of Private Industrial Pension Plans  
Under Twenty Combinations of  $A_iC_j$  Assumptions, 1961-81

(thousands, as of end of year)

Year	$A_0C_1$			$A_{.25}C_1$			$A_{.25}C_2$		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
1961	1,410	490	1,900	1,410	490	1,900	1,410	490	1,900
1962	1,548	535	2,083	1,550	535	2,085	1,551	536	2,087
1963	1,678	577	2,255	1,686	580	2,265	1,689	581	2,270
1964	1,800	618	2,417	1,816	622	2,438	1,823	624	2,448
1965	1,911	656	2,566	1,939	664	2,603	1,951	667	2,618
1966	2,012	691	2,702	2,054	703	2,757	2,070	708	2,777
1967	2,191	775	2,966	2,255	795	3,049	2,275	801	3,077
1968	2,360	855	3,215	2,447	884	3,331	2,472	893	3,365
1969	2,516	932	3,449	2,629	971	3,601	2,659	982	3,641
1970	2,659	1,006	3,665	2,801	1,056	3,857	2,833	1,067	3,901
1971	2,789	1,076	3,864	2,962	1,139	4,101	2,994	1,150	4,144
1972	2,995	1,181	4,176	3,210	1,261	4,472	3,240	1,273	4,513
1973	3,188	1,283	4,470	3,447	1,382	4,829	3,474	1,393	4,867
1974	3,366	1,380	4,746	3,670	1,500	5,170	3,695	1,509	5,204
1975	3,528	1,473	5,001	3,880	1,613	5,493	3,900	1,622	5,522
1976	3,673	1,560	5,233	4,084	1,728	5,813	4,088	1,730	5,818
1977	3,881	1,674	5,555	4,363	1,874	6,237	4,349	1,869	6,218
1978	4,074	1,783	5,857	4,627	2,017	6,645	4,596	2,004	6,599
1979	4,250	1,886	6,135	4,876	2,156	7,031	4,824	2,134	6,958
1980	4,405	1,983	6,388	5,104	2,289	7,392	5,033	2,258	7,291
1981	4,540	2,074	6,614	5,309	2,415	7,724	5,222	2,377	7,599

(continued)

## Private Pension Funds: Projected Growth

TABLE 19 (continued)

Year	A.25C3			A.25C4			A.50C1			A.50C2		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
	1961	1,410	490	1,900	1,410	490	1,900	1,410	490	1,900	1,410	490
1962	1,551	536	2,087	1,551	536	2,087	1,552	536	2,088	1,554	536	2,090
1963	1,690	581	2,271	1,690	581	2,271	1,693	582	2,275	1,700	584	2,284
1964	1,825	625	2,449	1,825	625	2,450	1,833	627	2,460	1,848	631	2,479
1965	1,953	668	2,621	1,955	668	2,623	1,968	672	2,640	1,991	679	2,671
1966	2,074	709	2,784	2,077	710	2,787	2,098	716	2,814	2,130	726	2,856
1967	2,284	804	3,088	2,288	806	3,094	2,320	816	3,136	2,364	829	3,193
1968	2,485	897	3,382	2,493	899	3,392	2,538	914	3,452	2,592	932	3,525
1969	2,677	988	3,665	2,688	991	3,680	2,749	1,012	3,761	2,812	1,034	3,846
1970	2,858	1,076	3,934	2,873	1,081	3,954	2,951	1,109	4,060	3,021	1,134	4,155
1971	3,025	1,162	4,187	3,045	1,169	4,213	3,149	1,206	4,355	3,216	1,231	4,448
1972	3,281	1,288	4,569	3,306	1,298	4,604	3,443	1,349	4,792	3,507	1,373	4,881
1973	3,524	1,412	4,936	3,556	1,424	4,980	3,729	1,490	5,220	3,788	1,513	5,302
1974	3,753	1,532	5,285	3,793	1,548	5,340	4,004	1,631	5,637	4,057	1,652	5,709
1975	3,965	1,648	5,613	4,013	1,667	5,681	4,268	1,769	6,036	4,313	1,787	6,100
1976	4,159	1,759	5,917	4,216	1,782	5,998	4,542	1,915	6,458	4,551	1,919	6,470
1977	4,425	1,900	6,326	4,493	1,929	6,422	4,905	2,099	7,004	4,874	2,087	6,961
1978	4,677	2,038	6,715	4,754	2,071	6,825	5,256	2,283	7,539	5,183	2,252	7,435
1979	4,910	2,171	7,081	4,996	2,208	7,204	5,592	2,463	8,056	5,475	2,414	7,890
1980	5,123	2,298	7,421	5,216	2,338	7,554	5,909	2,641	8,551	5,747	2,571	8,318
1981	5,313	2,418	7,731	5,411	2,462	7,873	6,203	2,813	9,016	6,002	2,724	8,727

(continued)

## Covered Workers and Beneficiaries

43

TABLE 19 (continued)

Year	A. 50 C3			A. 50 C4			A. 75 C1			A. 75 C2		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
1961	1,410	490	1,900	1,410	490	1,900	1,410	490	1,900	1,410	490	1,900
1962	1,554	537	2,091	1,554	537	2,091	1,554	536	2,090	1,557	537	2,094
1963	1,701	584	2,286	1,702	584	2,286	1,701	584	2,285	1,712	587	2,299
1964	1,850	632	2,483	1,852	633	2,485	1,850	632	2,482	1,872	639	2,511
1965	1,997	681	2,678	2,001	682	2,683	1,998	681	2,679	2,034	691	2,725
1966	2,141	729	2,869	2,146	731	2,877	2,143	730	2,873	2,193	745	2,938
1967	2,381	835	3,216	2,392	838	3,230	2,389	837	3,226	2,457	859	3,316
1968	2,619	941	3,560	2,635	947	3,582	2,633	946	3,579	2,719	974	3,693
1969	2,851	1,048	3,899	2,874	1,056	3,930	2,875	1,056	3,930	2,975	1,090	4,066
1970	3,073	1,153	4,226	3,106	1,164	4,270	3,111	1,166	4,277	3,222	1,205	4,428
1971	3,285	1,256	4,541	3,328	1,271	4,599	3,348	1,279	4,627	3,457	1,319	4,776
1972	3,597	1,407	5,004	3,653	1,427	5,081	3,694	1,443	5,136	3,798	1,482	5,280
1973	3,898	1,555	5,454	3,970	1,583	5,553	4,035	1,608	5,643	4,132	1,645	5,777
1974	4,186	1,702	5,888	4,276	1,737	6,013	4,370	1,774	6,144	4,456	1,808	6,264
1975	4,457	1,845	6,302	4,567	1,889	6,456	4,695	1,939	6,634	4,769	1,969	6,738
1976	4,709	1,984	6,693	4,839	2,037	6,876	5,052	2,123	7,175	5,065	2,129	7,194
1977	5,045	2,158	7,204	5,201	2,223	7,424	5,513	2,352	7,864	5,460	2,331	7,791
1978	5,367	2,330	7,698	5,546	2,406	7,952	5,968	2,583	8,551	5,843	2,532	8,375
1979	5,672	2,499	8,170	5,871	2,584	8,455	6,412	2,815	9,227	6,211	2,730	8,941
1980	5,955	2,662	8,617	6,172	2,756	8,928	6,838	3,046	9,885	6,559	2,926	9,485
1981	6,213	2,819	9,032	6,444	2,921	9,365	7,243	3,274	10,517	6,894	3,121	10,015

(continued)

## Private Pension Funds: Projected Growth

TABLE 19 (continued)

Year	A. 75 C3			A. 75 C4			A1 C1			A1 C2		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
	1961	1,410	490	1,900	1,410	490	1,900	1,410	490	1,900	1,410	490
1962	1,557	537	2,094	1,557	538	2,095	1,556	537	2,093	1,560	538	2,098
1963	1,713	588	2,301	1,714	587	2,302	1,709	586	2,295	1,724	590	2,314
1964	1,877	640	2,516	1,879	640	2,519	1,867	637	2,504	1,898	646	2,544
1965	2,043	694	2,737	2,048	696	2,743	2,028	690	2,718	2,077	704	2,782
1966	2,210	749	2,959	2,219	752	2,971	2,190	744	2,934	2,260	764	3,024
1967	2,485	868	3,352	2,501	873	3,374	2,460	860	3,320	2,555	890	3,445
1968	2,762	989	3,751	2,788	997	3,785	2,733	979	3,712	2,853	1,019	3,872
1969	3,038	1,112	4,150	3,076	1,125	4,200	3,007	1,101	4,109	3,150	1,151	4,300
1970	3,308	1,236	4,544	3,361	1,254	4,615	3,280	1,226	4,506	3,439	1,282	4,721
1971	3,570	1,359	4,929	3,640	1,385	5,025	3,561	1,356	4,917	3,718	1,413	5,131
1972	3,945	1,537	5,482	4,040	1,572	5,611	3,964	1,544	5,507	4,115	1,600	5,715
1973	4,314	1,715	6,028	4,435	1,761	6,196	4,368	1,735	6,103	4,508	1,789	6,297
1974	4,670	1,892	6,562	4,822	1,951	6,773	4,769	1,930	6,699	4,895	1,980	6,875
1975	5,011	2,066	7,077	5,197	2,141	7,338	5,165	2,127	7,292	5,273	2,171	7,444
1976	5,332	2,238	7,569	5,554	2,329	7,883	5,618	2,354	7,972	5,637	2,362	8,000
1977	5,751	2,452	8,202	6,018	2,562	8,580	6,195	2,635	8,830	6,115	2,603	8,718
1978	6,157	2,664	8,821	6,466	2,795	9,261	6,774	2,923	9,697	6,585	2,845	9,430
1979	6,547	2,875	9,422	6,894	3,024	9,918	7,347	3,217	10,564	7,042	3,088	10,130
1980	6,916	3,082	9,998	7,295	3,248	10,543	7,908	3,513	11,421	7,481	3,329	10,810
1981	7,260	3,284	10,543	7,665	3,464	11,129	8,450	3,809	12,259	7,913	3,574	11,487

(continued)

TABLE 19 (concluded)

Year	$A_1C_3$			$A_1C_4$		
	Male	Female	Total	Male	Female	Total
1961	1,410	490	1,900	1,410	490	1,900
1962	1,560	538	2,098	1,560	538	2,098
1963	1,726	591	2,317	1,727	591	2,318
1964	1,904	648	2,551	1,907	649	2,554
1965	2,090	708	2,798	2,097	710	2,807
1966	2,282	771	3,053	2,295	774	3,069
1967	2,594	902	3,496	2,617	910	3,527
1968	2,915	1,037	3,954	2,951	1,052	4,003
1969	3,239	1,181	4,420	3,294	1,200	4,493
1970	3,562	1,326	4,888	3,639	1,353	4,992
1971	3,881	1,472	5,353	3,984	1,509	5,493
1972	4,330	1,680	6,010	4,469	1,732	6,201
1973	4,775	1,891	6,666	4,955	1,960	6,916
1974	5,211	2,104	7,315	5,439	2,193	7,632
1975	5,633	2,315	7,949	5,914	2,427	8,341
1976	6,035	2,525	8,560	6,374	2,662	9,036
1977	6,552	2,785	9,337	6,960	2,954	9,914
1978	7,059	3,045	10,105	7,534	3,246	10,780
1979	7,553	3,307	10,860	8,089	3,537	11,626
1980	8,026	3,567	11,593	8,616	3,824	12,440
1981	8,474	3,823	12,298	9,108	4,104	13,213

Source: NBER projections.

Note:  $A_0C_2$ ,  $A_0C_3$ , and  $A_0C_4$  are the same as  $A_0C_1$ , since with an adjustment factor of zero the difference among the  $C_j$ 's is irrelevant in estimating the number of beneficiaries.

## Private Pension Funds: Projected Growth

TABLE 20

*Projected Number of Beneficiaries of Private Industrial Pension Plans, Adjustment Factor  $A_{.25}$  and Four Coverage Assumptions, End of Year, 1961-81*  
(millions)

Year	Coverage Assumption			
	$C_1$	$C_2$	$C_3$	$C_4$
1961	1.9	1.9	1.9	1.9
1966	2.8	2.8	2.8	2.8
1971	4.1	4.1	4.2	4.2
1976	5.8	5.8	5.9	6.0
1981	7.7	7.6	7.7	7.9

Source: Table 19.

TABLE 21

*Projected Number of Beneficiaries of Private Industrial Pension Plans, Coverage Assumption  $C_3$  and Five Adjustment Factors, End of Year, 1961-81*  
(millions)

Year	Adjustment Factor				
	$A_0$	$A_{.25}$	$A_{.50}$	$A_{.75}$	$A_1$
1961	1.9	1.9	1.9	1.9	1.9
1966	2.7	2.8	2.9	3.0	3.1
1971	3.9	4.2	4.5	4.9	5.4
1976	5.2	5.9	6.7	7.6	8.6
1981	6.6	7.7	9.0	10.5	12.3

Source: Table 19.

The most obvious and important thing to note about these projections is the great increase in beneficiaries that can be expected. By the end of 1981, beneficiaries will be 4.1 times as numerous as in 1961 under  $A_{.25}C_3$ , and 4.8 times as big under  $A_{.50}C_3$ . (Even the ultraconservative projection,  $A_0C_3$ , shows a 1981 number that is 3.5 times the 1961 figure.) As to annual rates of growth in different subperiods of the twenty-year span covered by the projections, they

TABLE 22

*Absolute and Percentage Increase in Number of Beneficiaries  
of Private Industrial Pension Plans  
Under Projections  $A_{.25}C_3$  and  $A_{.50}C_3$ , 1961 - 81*

Year	$A_{.25}C_3$		$A_{.50}C_3$	
	Thousands	Per Cent	Thousands	Per Cent
1961	120	6.7	120	6.7
1966	163	6.2	191	7.1
1971	253	6.4	315	7.5
1976	304	5.4	391	6.2
1981	310	4.2	415	4.8

Source: Table 19 and A. M. Skolnik, "Growth of Employee-Benefit Plans," *Social Security Bulletin*, April 1963, Table 5, p. 12.

show some toning down of the volatility of the system. (See Table 22, which gives the annual percentage change over specified years.) This, of course, is to be expected: annuitants are expected to grow in number, and the values in Table 19 show this. But it is anticipated that they will sooner or later grow at a decreasing rate, for otherwise the projections would imply a growth so great and over so protracted a period of time as to be at odds with the simple dynamics of a pension plan sketched out earlier.

Another interesting feature of the projections is the indication that most beneficiaries will be males. This, of course, simply reflects the higher rate of male participation in the labor force. However, the percentage that males comprise of total beneficiaries will tend to decline primarily as a result of the lower mortality experience of

women. Thus under  $A_{.25}C_3$ , for example, the male-female split as of 1961 is 74-26 per cent, and as of the end of 1981 it is projected at 69-31 per cent. The change is not startling; a really pronounced shift in the male-female percentages over time could not come from differential mortality alone but would require a significant change in the underlying determinant, viz., male and female labor force participation rates.

This breakdown by sex is highly conjectural and should be taken as illustrative. Total annuitants is a more accurate figure than male and female annuitants. Moreover, we have assumed in this discussion either that no survivorship options are available (a generally valid assumption for the "typical" plan, but tending to become less generally descriptive) or, where the plan provides for them, they are not made use of. Clearly this is a source of error in the estimates.

#### COMPARISON WITH OASDI

It is hard to attach significance to absolute numbers of annuitants per se. It is probably more meaningful to compare numbers such as these with some relevant bases. Two have been chosen for this purpose—the number of old-age beneficiaries under OASDI, which is to all intents and purposes a system that covers the whole working population, and the total population aged 65 and over. These comparisons appear in Table 23. Before discussing them, however, some caveats are in order. First, the comparisons relate the number of beneficiaries to persons aged 65 and over; yet all of the former do not fall into this age category,<sup>14</sup> and not all of the latter are retired. In other words, the fraction of persons 65 or over that industrial pension beneficiaries comprise and the proportion of persons 65 and over who are receiving industrial pensions are not the same category. The comparison here is not clear-cut; but since interest is primarily in the broad sweep of the data, it is nonetheless useful. The same thing can be said about the male-female breakdowns, which are rough but sufficient for the purpose.

Table 23 consists of four panels because use is made of both  $A_{.25}C_3$  and  $A_{.50}C_3$  and also the two population projections for the low-cost and high-cost estimates prepared in the Division of the

<sup>14</sup> Most obviously so in the case of OASDI, which permits retirement at 62.

Actuary of the Social Security Administration.<sup>15</sup> Among the more interesting conclusions that may be drawn from the table are the following:

1. Currently (see the data for 1965) only 13–14 per cent of persons aged 65 and over receive income support from industrial pensions, but this support averages higher than OASDI payments. At the same time, it is less crucial to the average recipient than OASDI old-age benefits are to the person receiving no other retirement income, since industrial pension recipients are from a higher economic stratum. For males the industrial pension plan percentage is larger—22–24 per cent as against 6 per cent for females—but even for males the present fraction is not high. Women are in the labor force less than men; also women workers are more frequently in industries with low pension coverage or are not covered because they work part time or have returned to the labor force after a long absence.

2. Industrial pension recipients will represent a growing fraction of the population 65 and over, but even by 1980 not a very impressive one; the estimates put it somewhere between one-fourth and one-third. Again the difference between males and females should be noted—about 50 per cent for males and 15–18 per cent for females.

3. The industrial beneficiary percentages contrast sharply with those of the public pension scheme. OASDI is older<sup>16</sup> and broader in its coverage; and in the last five years or so it has lowered the retirement age to 62. (While industrial plans may move in this direction, they will do so with a lag.) Thus it is not difficult to understand the greater number of current and projected OASDI old-age beneficiaries—over 52 per cent of the population 65 and over<sup>17</sup> in 1965 and between 62 and 69 per cent by 1980. Under these averages lies an already familiar sharp diversity between males and

<sup>15</sup> For source, see the notes to Table 23. The low-cost and high-cost estimates derive from two sets of alternative assumptions which lead to low and high costs in relation to payroll. The actuary describes his estimates this way: "The figures developed do not represent the widest possible range that could reasonably be anticipated, but rather our studied opinions as to a plausible range" (Actuarial Study No. 58, p. 4). This sentence, by the way, is a pithy description of this study's projections.

<sup>16</sup> The industrial pension structure, of course, consists of many thousands of plans, some started well before OASDI. Nonetheless, most industrial pension coverage is in plans that began late in World War II or in the following years.

<sup>17</sup> This is different and less meaningful than the statement that over 52 per cent of all persons 65 and over receive old-age benefits under OASDI.

TABLE 23

*Comparison of Population 65 and over with Recipients of Old-Age and Industrial Pensions*

*(A.25C<sub>3</sub> and A.50C<sub>3</sub>), 1960-80*

(absolute numbers in millions)

	A.25C <sub>3</sub>					
	Low-Cost Assumption			High-Cost Assumption		
	1960	1965	1970	1975	1980	1980
1. Persons 65 and over						
Male	7.6	8.0	9.0	9.5	10.0	11.0
Female	9.1	10.1	11.0	12.5	14.0	15.0
Total	16.7	18.1	20.0	22.0	24.0	26.0
2. Industrial pension beneficiaries						
Male	1.2	1.8	2.7	3.8	4.9	4.9
Female	0.4	0.6	1.0	1.5	2.2	2.2
Total	1.6	2.4	3.7	5.3	7.1	7.1
3. (2) as per cent of (1)						
Male	15.8	22.5	30.0	40.0	49.0	44.5
Female	4.4	5.9	9.1	12.0	15.7	14.7
Total	9.6	13.3	18.5	24.1	29.6	27.3
4. OASDI beneficiaries (65 and over)						
Male	5.0	6.1	6.8	7.6	8.3	9.6
Female	2.3	3.4	4.4	5.5	6.6	8.3
Total	7.3	9.5	11.2	13.1	14.9	17.9
5. (4) as per cent of (1)						
Male	65.8	76.2	75.6	80.0	83.0	87.3
Female	25.3	33.7	40.0	44.0	47.1	55.3
Total	43.7	52.5	56.0	59.5	62.1	68.8

	Low-Cost Assumption				High-Cost Assumption					
	1960	1965	1970	1975	1980	1960	1965	1970	1975	1980
<b>1. Persons 65 and over</b>										
Male	7.6	8.0	9.0	9.5	10.0	7.6	8.1	9.0	10.0	11.0
Female	9.1	10.1	11.0	12.5	14.0	9.1	10.3	12.0	13.5	15.0
Total	16.7	18.1	20.0	22.0	24.0	16.7	18.4	21.0	23.5	26.0
<b>2. Industrial pension beneficiaries</b>										
Male	1.2	1.9	2.9	4.2	5.7	1.2	1.9	2.9	4.2	5.7
Female	0.4	0.6	1.0	1.7	2.5	0.4	0.6	1.0	1.7	2.5
Total	1.6	2.5	3.9	5.9	8.2	1.6	2.5	3.9	5.9	8.2
<b>3. (2) as per cent of (1)</b>										
Male	15.8	23.8	32.2	44.2	57.0	15.8	23.5	32.2	42.0	51.8
Female	4.4	5.9	9.1	13.6	17.9	4.4	5.8	8.3	12.6	16.7
Total	9.6	13.8	19.5	26.8	34.2	9.6	13.6	18.6	25.1	31.5
<b>4. OASDI beneficiaries (65 and over)</b>										
Male	5.0	6.1	6.8	7.6	8.3	5.0	6.3	7.4	8.5	9.6
Female	2.3	3.4	4.4	5.5	6.6	2.3	3.7	5.2	6.8	8.3
Total	7.3	9.5	11.2	13.1	14.9	7.3	10.0	12.6	15.3	17.9
<b>5. (4) as per cent of (1)</b>										
Male	65.8	76.2	75.6	80.0	83.0	65.8	77.8	82.2	85.0	87.3
Female	25.3	33.7	40.0	44.0	47.1	25.3	35.9	43.3	50.4	55.3
Total	43.7	52.5	56.0	59.5	62.1	43.7	54.3	60.0	65.1	68.8

Line 1 is from *Long-Range Cost Estimates for Old-Age, Survivors, and Disability Insurance System, 1963*, by Robert J. Myers and Francisco Bayo, U.S. Department of Health, Education, and Welfare, Social Security Administration, Division of the Actuary, Actuarial Study No. 58, 1963, p. 20. The actual 1960 data are as of April 1 of that year, and the estimates for the other years as of July 1. The values for 1975 are obtained by linear interpolation between the 1970 and 1980 estimates.

Line 2 contains this study's beneficiary projections based on coverage assumption 3 and the indicated adjustment factor.

These estimates are taken as of January 1 of the stated year for comparability with the OASDI estimates. (Technically the estimates are as of December 31 of the preceding year.) The 1960 entry is the actual 1959 estimate from the article in *Social Security Bulletin*, April 1964, split up among males and females in the proportions .742 and .258 as explained earlier in the text.

Line 4 is estimated from the data on pp. 25 and 26 of the source cited for line 1 as of January 1. Only workers retired because of age are included, not their wives or survivors. The values for 1970 and 1975 are obtained by linear interpolation between the 1965 and 1980 estimates.

females—in 1965 percentages about 76 per cent for males and 34 per cent for females. By 1980 the percentage will be somewhere between 83 and 87 for men and around 50 for women. Thus, by way of summary, it can be inferred that, of all people 65 and over in 1980, most of the men and about half of the women will be receiving OASDI old-age payments<sup>18</sup> and about half of the men and less than one-fifth of the women will be receiving industrial pension benefits.

4. Almost all of the recipients of industrial pensions also receive OASDI old-age benefits; and this double-pension (or even multiple-pension) group will, of course, receive considerably higher income support in retirement than those who are the recipients of OASDI benefits alone.<sup>19</sup> The projections indicate that this double-pension group will remain a minority through the end of 1980, for even by that date, as has been noted, it will reach a figure that represents somewhere between one-fourth and one-third of the aged population (persons 65 and over).<sup>20</sup>

5. While it is true that more men than women are in paid employment, the differential observed and projected under industrial plans is not simply a reflection of this fact. OASDI's beneficiary mix is less heavily weighted in the direction of men as against women, and the projections suggest that this will continue to be the case. Between 1960 and 1980, the number of women beneficiaries under industrial plans will rise from one-third to about 45 per cent of the men's total. For OASDI the increase will be from 46 per cent to something like 80 or 85 per cent.<sup>21</sup>

<sup>18</sup> It should be noted that the OASDI beneficiary figures used in our discussion relate only to old-age payments to retired workers. They do not include payments to wives of retired workers or to survivors.

<sup>19</sup> Except for some of those who receive in addition old-age assistance payments, veterans' pensions, or early-retirement pensions from previous jobs (e.g., police and firemen).

<sup>20</sup> For an interesting discussion of the role of employment status in social welfare, see Richard M. Titmuss, *The Social Division of Welfare*, Liverpool, 1956, reprinted in Richard M. Titmuss, *Essays on 'The Welfare State'*, London, 1958.

<sup>21</sup> What has been said so far about industrial pensions involves an understatement of the double-pension group, i.e., of the role, measured simply in terms of beneficiaries, of private pension arrangements. For the pensioners of plans for government employees are a sizable group and will continue to grow. Projections for state and local government employees are examined in Chapter 7, and Chapter 8's summary data include them.