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## ACTUARIAL ANALYSIS OF THE RELATIVE VALUE OF REFUNDS VERSUS DEFERRED ANNUITIES UNDER THE CIVIL SERVICE RETIREMENT SYSTEM

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Pension plans that have contributions from the covered members almost invariably provide that, upon withdrawal from service before being eligible for retirement, the member may obtain a refund of his accumulated contributions. Under some plans, such refund represents merely the total contributions, while under other plans, accumulated compound interest is also included. When the plan provides for vesting (payment of a deferred pension, which is usually based, in part, on the employer contributions to the plan), this is almost always predicated on the employee not withdrawing his lump-sum refund. As a result -- depending upon the vesting provisions of the plan -- the employee generally forfeits some benefits arising from the employer contributions if he foregoes vesting and, instead, chooses the lump-sum refund.

This note will examine the relative effects of taking the lump-sum refund as against selecting a deferred pension for various illustrative cases under the U.S. Civil Service Retirement system. Full vesting is available after completion of 5 years of service, and the deferred pension payable at age 62 is based on the years of service and on the "high-5-year" average salary. Instead of this deferred annuity, the withdrawing member may elect a lump-sum refund of his total contributions without interest (except for certain past periods). Similarly, if an individual who has chosen the deferred annuity dies before age 62, the death benefit is merely the return of the contributions without any crediting of interest for the period following separation from service. Similarly, for death after retirement, there is, in essence, a guarantee that the total annuity payments will at least equal the death benefit that would have been payable if death had occurred just before retiring (i.e., with no allowance for interest following date of separation from service).

The illustrative cases studied in this note will be for individuals entering at the present time under two hypothetical salary scales and for various assumed ages at entry and years of service at time of withdrawal. The basic calculations valuing the deferred annuity (including the death benefit applicable) are at an interest rate of 3%, using mortality rates from the a-1949 Table, which has been widely used by insurance companies for annuity valuation and premium purposes. The salary rates used are those which were in effect in the middle of 1962.

Salary Scale A is based on an individual entering government service at Grade 3, being promoted to Grade 4 in 2 years, to Grade 5 after 3 more years, to Grade 6 after 5 more years, and to Grade 7 after 5 more years (remaining in that grade for the remainder of his career). Salary Scale B is based on an individual entering government service at Grade 5, being promoted to Grade 7 in 2 years, to Grade 9 after 2 more years, to Grade 11 after 3 more years, and to Grade 12 after 8 more years (remaining in that grade for the remainder of his career).

Tables 1 and 2 compare the amount of the lump-sum refund with the present value of the deferred annuity (separately for men and women), as well as showing the annual amount of the deferred annuity that is available under the vesting provisions -- for Salary Scales A and B, respectively. In general, the present value of the deferred annuity is in excess of the lump-sum refund, indicating that the more financially advantageous choice is the deferred annuity. This would normally be expected, since some of the employer contributions enter into the provision of the deferred annuity -- although there is by no means any direct "1 for 1" or similar relationship.

There are, however, certain significant exceptions to the general conclusion. For individuals entering at the youngest ages and having only 5 years of service, the lump-sum refund may exceed the present value of the deferred annuity. The reasons for this are the relatively long period of deferment of the pension so that it has a relatively low present value (e.g., at 3% interest a payment of \$100 due in 35 years has a present value of only \$36), and the loss of interest when death occurs after withdrawal from service and before age 62.

For persons withdrawing after long periods of service, who are generally near age 62, and also for persons withdrawing near age 62 even though they may have short service, the financial advantage of choosing the deferred annuity is relatively greater. In many instances, the present

value of the deferred annuity is as much as 3 or 4 times as large as the lump-sum refund. For example, for a woman with Salary Scale A entering at age 30 and withdrawing at age 55, the present value of the deferred annuity is \$33,900, or 3.9 times as large as the lump-sum refund of \$8,710. For a man with Salary Scale B entering at age 30 and withdrawing at age 55, the present value of the deferred annuity is \$45,108, or 3.4 times as large as the lump-sum refund of \$13,082.

Now, some might rightly say that the assumed interest rate of 3% is too low and that with a higher interest rate the comparison would not be so favorable to the election of the deferred annuity. Calculations have also been made for several selected examples for men entering at age 20, using a 4% interest rate. The resulting figures are as follows:

Years of Service	Salary Scale A		Salary Scale B	
	Lump-Sum Refund	Present Value of Deferred Annuity	Lump-Sum Refund	Present Value of Deferred Annuity
5	\$1,304	\$828	\$1,701	\$1,005
10	2,823	2,348	4,069	3,598
15	4,650	5,411	6,796	8,059

Under these circumstances, the refund is financially more favorable up to somewhat more than 10 years of service. A higher interest rate than 4% would, of course, advance the "breaking point" to a longer period of service.

It could be argued that the withdrawing employee might be able to make a large fortune with his cash refund, such as by going into business for himself or by making a fortunate investment in stocks or oil wells. Against this argument, the only rebuttal is that, in a similar manner, the individual might lose his money and thus destroy part or all of his deferred old-age protection.

Although the foregoing analysis has indicated that for many employees -- particularly those with long periods of service or near retirement age -- it is financially advantageous to take the deferred annuity rather than the immediate lump-sum cash refund, there are instances where

the deferred annuity has little advantage from a financial standpoint over the refund and, in fact, in some cases is actually disadvantageous. The actual experience shows that although some individuals may be financially knowledgeable, many others prefer to take the cash now and let the future worry about itself. Thus, in a recent study of the Civil Service Retirement system, the proportion of those eligible to elect either a cash refund or a deferred annuity who actually took the refund varied from 88% at ages 20-29, to 84% at ages 30-39, 71% at ages 40-49, and 56% at ages 50-59 (relatively little variation in these proportions as between men and women). From a purely financial standpoint, it would seem likely that a higher proportion of those aged 20-29 (possibly close to 100%) should have selected the refund, whereas for those at the older ages, the proportion choosing the refund should have been much lower (and, in fact, close to zero).

Table 1

COMPARISON OF LUMP-SUM REFUNDS AND PRESENT VALUES OF DEFERRED ANNUITIES  
UNDER CSR SYSTEM FOR PERSONS WITHDRAWING FROM SERVICE, SALARY SCALE A

Years of Service	Lump-Sum Refund	Deferred Annuity (per year)	Present Value <u>a/</u> of Deferred Annuity	
			Man	Woman
Age at Entry 20				
5	\$1,304	\$326	\$1,266	\$1,520
10	2,823	768	3,432	4,139
15	4,650	1,476	7,561	9,185
20	6,648	2,228	13,234	16,097
25	8,710	2,935	20,322	24,689
30	10,848	3,699	30,104	36,360
Age at Entry 30				
5	\$1,304	\$326	\$1,701	\$2,045
10	2,823	768	4,625	5,581
15	4,650	1,476	10,253	12,433
20	6,648	2,228	18,146	21,906
25	8,710	2,935	28,465	33,900
Age at Entry 40				
5	\$1,304	\$326	\$2,299	\$2,763
10	2,823	768	6,319	7,582
15	4,650	1,476	14,342	17,062
20	6,648	2,228	26,218	30,493
Age at Entry 50				
5	\$1,304	\$326	\$3,196	\$3,782
10	2,823	768	9,067	10,526

a/ Based on a-1949 Table at 3% interest.

Table 2

COMPARISON OF LUMP-SUM REFUNDS AND PRESENT VALUES OF DEFERRED ANNUITIES  
UNDER CSR SYSTEM FOR PERSONS WITHDRAWING FROM SERVICE, SALARY SCALE B

Years of Service	Lump-Sum Refund	Deferred Annuity (per year)	Present Value <u>a/</u> of Deferred Annuity	
			Man	Woman
Age at Entry 20				
5	\$1,701	\$392	\$1,534	\$1,834
10	4,069	1,184	5,262	6,365
15	6,796	2,202	11,265	13,695
20	9,808	3,359	19,926	24,255
25	13,082	4,659	32,166	39,146
30	16,533	5,973	48,072	58,653
Age at Entry 30				
5	\$1,701	\$392	\$2,059	\$2,467
10	4,069	1,184	7,096	8,587
15	6,796	2,202	15,279	18,539
20	9,808	3,359	27,331	33,014
25	13,082	4,659	45,108	53,775
Age at Entry 40				
5	\$1,701	\$392	\$2,780	\$3,330
10	4,069	1,184	9,708	11,674
15	6,796	2,202	21,383	25,446
20	9,808	3,359	39,514	45,965
Age at Entry 50				
5	\$1,701	\$392	\$3,856	\$4,554
10	4,069	1,184	13,962	16,219

a/ Based on a-1949 Table at 3% interest.