

**TRANSACTIONS OF SOCIETY OF ACTUARIES
1993-94 REPORTS**

REPORT OF THE ANNUITY EXPERIENCE COMMITTEE

GROUP ANNUITY MORTALITY

ABSTRACT

This report presents the 1989 and 1990 calendar-year experience of retired individuals in the U.S. who are covered under group pension contracts issued in the U.S. and Canada. Data for calendar-years 1985 through 1988 are also included to provide a comparison with 1989 and 1990 experience and to provide information on mortality improvement over time.

A partial list of previous Society of Actuaries reports on group annuity mortality is shown below.

1969-71 calendar years: *TSA 1975 Reports*

1981-82 calendar years: *TSA 1983 Reports*

1983-84 calendar years: *TSA 1984 Reports*

1985-86 calendar years: *TSA 1985-86-87 Reports*

1987-88 calendar years: *TSA 1988-89-90 Reports*.

The report includes the experience of contracts providing insurer-guaranteed annuity benefits to ongoing pension plans and the experience of contracts covering closed groups of lives for which purchases are made by a single payment at issue (single-premium closeout business). Effective with the 1985 experience, it also includes contracts that do not contain insurer guarantees of future payments (immediate participation guarantee contracts, direct disbursed benefit payment arrangements).

The total data reported in this study include all annuities in payment status that are to continue for the future lifetime of the annuitant. With respect to joint and survivor annuities, only the primary annuitant is counted in the exposure and death statistics.

1. CAVEATS

The data may not be homogeneous by experience year. Of the 14 contributors listed at the end of this report, six submitted data for all years in the 1985-90 period. Furthermore, the aggregate study data include data that some companies submitted in a new format beginning in 1989.

Data collection is generally done during the six months in the year following the experience year. It is possible that deaths will be reported subsequent to the gathering of data. If an insurance carrier submits data early

in the year, that carrier will be expected to have a relatively high level of late reported deaths and vice versa. Although the level of late reporting might range from 1 percent to 3 percent for data submitted six months after the end of the experience year, no adjustment is made to the study results for the lag in the reporting of deaths. However, results for years prior to 1989 reflect some level of late reported deaths. Results for years 1989 and 1990 will reflect late reported deaths in the next report.

The data submitted were in sufficient detail to allow the committee to break the total experience into subsets based on a single parameter or a combination of parameters. The committee believes that the tables in this report produce data cells generally large enough to be credible (at least 50 deaths, for example) and in a format that facilitates data analysis.

2. FORMAT OF STUDY

The format is essentially the same as that of the Group Annuity Mortality Report of 1985 and 1986 calendar-year experience. The following index describes the tables and charts.

Table	Description
1-2	Summary of Exposures and Actual Deaths, by Lives and Annual Income, by Attained Age Group, for Males and Females, in Calendar Years (1) 1989 and (2) 1990
3-8	Experience by Retirement Class: Prior to Normal Retirement Date (NRD), on or after NRD, No Stated NRD, and Past NRD with No Payment, by Lives and Annual Income, by Attained Age Group, in Calendar Years 1989 for (3) Males and (4) Females; 1990 for (5) Males and (6) Females; and 1989-90 for (7) Males and (8) Females
9-10	Experience by Benefit Class: Life Annuity, Life Annuity with Period Certain, and Modified Cash Refund Annuity, by Lives and Annual Income, by Attained Age Group, in Calendar Years 1989-90 for (9) Males and (10) Females
11-12	Experience by Survivor Status: Single Life and Joint Life Annuity, by Lives and Annual Income, by Attained Age Group, in Calendar Years 1989-90 for (11) Males and (12) Females
13-14	Experience by Years Since Retirement: 0-1, 2-5, 6-10, and 11 or More Years, by Lives and Annual Income, by Attained Age Group, in Calendar Years 1989-90 for (13) Males and (14) Females
15	Comparison of Experience for Males and Females, by Lives and Annual Income, by Attained Age Group, in Calendar Years 1989-90

- 16–21 Experience by Guaranteed Versus Nonguaranteed Status, by Lives and Annual Income, by Attained Age Group, in Calendar Years 1989 for (16) Males and (17) Females; 1990 for (18) Males and (19) Females; and 1989–90 for (20) Males and (21) Females
- 22–25 Summary of Experience by Classification Group, in Calendar Years 1989 and 1990 for Males, by (22) Lives and (23) Annual Income; and for Females, by (24) Lives and (25) Annual Income
- 26–29 Comparison of Experience by Classification Group, for 1989–90 Versus 1987–88 for Males, by (26) Lives and (27) Annual Income; and for Females, by (28) Lives and (29) Annual Income
- 30–33 Summary of Mortality Improvement in Calendar Years 1985 to 1990, by Attained Age Group, for Males, by (30) Lives and (31) Annual Income; and for Females, by (32) Lives and (33) Annual Income.

Chart

- I–IV Histograms of A/E ratios from 1985 to 1990

The mortality table used for expected deaths is the 1983 Group Annuity Mortality (GAM) Table without projection. Expected deaths for females are based on the female mortality tables (as opposed to the male mortality tables with the standard six-year setback), except for Table 15, which is based on male mortality with no age setback. Attained age is defined as age nearest birthday as of January 1 of the calendar year of exposure.

Each of the tables displays exposure and A/E ratio. The amount of exposure provides a key to the credibility of the data in each classification age cell and for the classification group in total. Caution is advised in drawing any conclusions for experience at the very low or very high ages, because exposures are rather limited.

3. PRINCIPAL OBSERVATIONS

1989–90 Experience

Overall A/E ratios for males are lower based on income than on number of lives (1.10 versus 1.02, respectively). This is true for all five-year age groups. There is no significant difference in the corresponding female A/E ratios (1.17 versus 1.16 overall). As concluded in the prior 1987–88 report, the data support the notion that higher-income individuals exhibit lower mortality.

A/E ratios for individuals who retire prior to NRD are generally higher than those who retire on or after NRD. This is true overall for males and females, based on lives and income.

A/E ratios are higher for males who elect life versus life and certain, or modified cash refund annuities. Single-life A/E ratios also appear to be higher than joint life annuities.

It is difficult to reach any conclusions about mortality experience based on numbers of years since retirement. A/E ratios show a decreasing pattern with increasing duration since retirement. Possible explanations may be the presence of disabled lives in the data at the younger ages and early durations, and the fact that some contributors may have coded the year of retirement to be the year of purchase for single-premium closeout business, thus causing an understatement in the years since retirement.

A/E ratios for contracts in which future benefit payments are guaranteed by an insurer, which constitutes the majority of the study data, are lower than non-insurer-guaranteed contracts. The former includes single-premium closeout business, which is usually nonparticipating, whereas the latter includes contracts with immediate participation guarantee feature.

As expected, females are living longer than males. The ratio of female to male mortality averages 0.60, based on lives, and 0.62, based on income. The ratio of female to male mortality tends to increase as age increases.

Comparison with 1987-88 Experience

Comparing 1987-88 calendar-year data against 1989-90 calendar-year data did not reveal any distortions or unreasonable results for experience in aggregate, or by class. The only major trend exhibited is, as expected, continuing mortality improvement for both males and females over the last two years.

Exposure has increased from the 1987-88 exposure period to the 1989-90 exposure period: the increase was 16.9 percent for male lives, 33.8 percent for male income, 28.3 percent for female lives, and 51.3 percent for female income. The increase in exposure largely occurred for the 1990 exposure year and is due to the number of insurers submitting data as well as to additional contracts. The trends of the increase in exposure indicate that the additional contracts have a higher level of income (relative to existing contracts) as well as a higher proportion of females.

The overall male mortality dropped 8 percent from the 1987–88 exposure period to the 1989–90 exposure period (A/E ratios of 1.18 versus 1.10, respectively) based on lives. The improvement based on income was 5 percent (A/E ratios of 1.07 versus 1.02, respectively). It appears that most of the improvement occurred from 1988 to 1989.

The overall female mortality improved 9 percent from the 1987–88 exposure period to the 1989–90 exposure period (A/E ratios of 1.26 versus 1.17, respectively) based on lives. The improvement based on income was 8 percent (A/E ratios of 1.24 versus 1.16, respectively). As with male lives, most of the improvement for female lives occurred from 1988 to 1989.

Results for ratios of female to male mortality are similar for both periods.

1985–90 Experience Trends

Mortality had improved in each of the last five years for males based on lives and on income. The average improvement has been 2.8 percent based on lives and 2.7 percent based on income from 1985 to 1990. The largest improvement occurred from 1985 to 1986 (9.6 percent improvement based on income).

Female mortality had also generally improved over the last five years based on lives and income. Mortality improvement has averaged 2.6 percent based on lives and 2.7 percent based on income. Female mortality has improved considerably from 1985 to 1986 (8.6 percent based on income).

The high rate of mortality improvement experienced by all companies between 1985 and 1986, for both males and females, is noteworthy. While this trend is reversed in the subsequent period, there is a somewhat permanent decrease in subsequent, overall mortality A/E levels. A possible explanation may be that the 1985–86 period was characterized by a large volume of single-premium closeout business, in part due to high interest rates and the prevailing business climate. This may have in turn caused an increase in the proportion of exposure associated with white-collar occupations. Moreover, changes to existing defined-benefit pension plans, for example, retirement incentives and lump-sum options, may have increased the degree of annuitant selection during that period.

4. CONTRIBUTING COMPANIES

The following companies have contributed experience for the investigation covered by this report.

Aetna Life Insurance Company
Canada Life
Connecticut General
Equitable Life Assurance Society
John Hancock Mutual Life Insurance Co.
Lincoln National Life Insurance Company
Metropolitan Life Insurance Company
Nationwide Life Insurance Company
Pacific Mutual Life Insurance Company
Penn Mutual Life Insurance Company
Principal Financial Group
Prudential Insurance Co. of America
Sun Life Assurance Co. of Canada
Travelers Insurance Company

GROUP ANNUITY MORTALITY

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TABLE 1

SUMMARY OF EXPOSURES AND ACTUAL DEATHS FOR CALENDAR-YEAR 1989

Attained Age	Males		Females		Total	
	Exposure	Deaths	Exposure	Deaths	Exposure	Deaths
Lives						
Under 55 ..	5,557.05	72.00	5,775.45	21.00	11,332.50	93.00
55-59	45,167.60	580.00	19,788.90	138.00	64,956.50	718.00
60-64	120,348.84	2,008.00	53,312.98	488.00	173,661.82	2,497.00
65-69	201,223.57	4,827.00	94,345.49	1,235.00	295,569.06	6,061.00
70-74	180,723.00	6,748.00	88,016.87	1,829.00	268,739.87	8,577.00
75-79	134,297.88	7,852.00	70,107.48	2,357.00	204,405.36	10,209.00
80-84	72,524.22	6,606.00	41,921.07	2,353.00	114,445.29	8,959.00
85-89	29,672.14	3,992.00	18,031.93	1,628.00	47,704.07	5,620.00
90-94	8,245.34	1,704.00	5,114.09	820.00	13,359.43	2,524.00
95 and over	1,558.31	433.00	1,137.92	258.00	2,696.23	691.00
Total	799,317.95	34,822.00	397,552.18	11,127.00	1,196,870.13	45,949.00
Income						
Under 55 ..	\$ 41,034,037	\$ 452,447	\$ 18,413,844	\$ 76,053	\$ 59,447,881	\$ 528,500
55-59	225,004,945	2,268,706	58,486,064	416,682	283,491,009	2,685,388
60-64	674,699,389	9,427,027	153,246,391	1,249,620	827,945,781	10,676,647
65-69	945,998,492	19,231,897	232,586,901	2,718,817	1,178,585,393	21,950,714
70-74	657,258,801	21,449,682	166,193,869	3,184,625	823,452,670	24,634,307
75-79	384,545,580	20,092,079	106,399,237	3,419,743	490,944,817	23,511,823
80-84	174,997,851	15,110,532	53,045,457	2,968,993	228,043,308	18,079,525
85-89	60,577,450	8,330,881	19,630,647	1,736,458	80,208,097	10,067,338
90-94	14,683,594	3,192,188	5,213,212	870,194	19,896,807	4,062,383
95 and over	2,487,905	633,610	1,156,742	236,312	3,644,647	869,922
Total	\$3,181,288,045	\$100,189,049	\$814,372,364	\$16,877,497	\$3,995,660,409	\$117,066,546

TABLE 2
SUMMARY OF EXPOSURES AND ACTUAL DEATHS FOR CALENDAR-YEAR 1990

Attained Age	Males		Females		Total	
	Exposure	Deaths	Exposure	Deaths	Exposure	Deaths
Lives						
Under 55	7,397.00	105.00	7,557.43	38.00	14,954.43	143.00
55-59	53,375.95	686.00	24,851.00	174.00	78,226.95	860.00
60-64	146,190.29	2,333.00	67,235.53	596.00	213,425.82	2,928.00
65-69	258,735.98	5,949.00	122,669.86	1,562.00	381,405.84	7,511.00
70-74	238,694.07	8,911.00	116,031.28	2,327.00	354,725.35	11,238.00
75-79	189,088.76	11,105.00	95,064.28	3,186.00	284,153.04	14,291.00
80-84	109,583.14	9,912.00	62,967.19	3,520.00	172,550.33	13,432.00
85-89	48,022.47	6,572.00	30,700.37	2,778.00	78,722.84	9,350.00
90-94	14,672.14	2,842.00	10,005.89	1,445.00	24,678.03	4,287.00
95 and over	3,033.28	783.00	2,251.76	507.00	5,285.04	1,290.00
Total	1,068,793.08	49,198.00	539,334.59	16,133.00	1,608,127.67	65,331.00
Income						
Under 55	\$ 48,541,994	\$ 417,375	\$ 20,497,281	\$ 196,081	\$ 69,039,275	\$ 613,456
55-59	267,724,664	2,621,180	66,868,277	389,245	334,592,942	3,010,424
60-64	806,605,532	10,720,636	181,548,377	1,405,028	988,153,909	12,125,664
65-69	1,169,034,659	23,608,765	290,696,761	3,503,259	1,459,731,420	27,112,024
70-74	851,933,336	27,884,428	220,169,118	4,062,211	1,072,102,454	31,946,638
75-79	514,473,566	27,002,615	139,917,537	4,399,394	654,391,103	31,402,010
80-84	248,397,964	21,230,990	77,688,039	4,145,100	326,086,003	25,376,090
85-89	91,382,666	11,914,850	33,241,176	2,895,149	124,623,843	14,809,999
90-94	25,275,978	4,554,767	9,637,938	1,410,987	34,913,916	5,965,755
95 and over	4,295,539	1,044,020	2,060,382	475,109	6,355,921	1,519,129
Total	\$4,027,665,897	\$130,999,626	\$1,042,324,887	\$22,881,564	\$5,069,990,784	\$153,881,190

TABLE 3

EXPERIENCE BY RETIREMENT CLASS FOR CALENDAR-YEAR 1989
 EXPECTED MORTALITY BASIS—1983 GROUP ANNUITY MORTALITY

Attained Age	Prior to NRD		On/After NRD		No Stated NRD		Past NRD With No Payment		Total	
	Exposure	A/E Ratio	Exposure	A/E Ratio	Exposure	A/E Ratio	Exposure	A/E Ratio	Exposure	A/E Ratio
Male Lives										
Under 55	3,090.01	3.13	526.65	1.93	1,930.73	2.93	9.66	0.00	5,557.05	2.96
55-59	22,651.19	1.90	1,785.39	1.69	20,717.50	1.54	13.52	0.00	45,167.60	1.73
60-64	62,600.30	1.54	9,748.15	1.33	47,918.81	1.29	81.58	0.00	120,348.84	1.42
65-69	77,986.65	1.31	51,627.01	1.07	70,705.69	1.18	904.22	0.79	201,223.57	1.20
70-74	54,678.89	1.28	61,941.59	1.02	62,425.11	1.07	1,677.41	1.03	180,723.00	1.11
75-79	31,334.58	1.42	52,672.62	0.93	49,138.41	1.03	1,152.27	1.06	134,297.88	1.08
80-84	10,197.99	1.68	29,885.71	0.91	31,857.68	0.97	582.84	1.20	72,524.22	1.04
85-89	3,194.80	1.71	13,503.72	0.92	12,744.62	0.98	229.00	0.92	29,672.14	1.03
90-94	626.00	2.20	3,986.65	1.05	3,549.69	1.01	83.00	1.44	8,245.34	1.12
95 and over	68.66	2.66	758.05	1.01	721.60	0.92	10.00	1.22	1,558.31	1.05
Total	266,429.07	1.45	226,435.54	0.97	301,709.84	1.05	4,743.50	1.06	799,317.95	1.11
Male Income										
Under 55	\$ 22,650,484	2.71	\$ 5,295,784	0.20	\$ 13,057,752	3.12	\$ 30,017	0.00	\$ 41,034,037	2.55
55-59	103,349,150	1.53	12,168,626	1.46	109,437,826	1.16	49,343	0.00	225,004,945	1.35
60-64	304,228,726	1.32	56,523,423	0.96	313,639,319	1.11	307,922	0.00	674,699,389	1.19
65-69	310,459,561	1.18	234,272,924	0.86	397,884,379	1.00	3,381,627	1.22	945,998,492	1.02
70-74	161,184,427	1.11	210,617,190	0.95	279,407,323	0.94	6,049,861	0.79	657,258,801	0.98
75-79	73,881,975	1.27	142,353,605	0.85	165,107,161	0.95	3,202,840	0.86	384,545,580	0.97
80-84	19,890,126	1.56	68,367,306	0.87	85,322,299	0.96	1,418,120	1.36	174,997,851	1.00
85-89	4,960,956	1.58	27,516,279	0.98	27,696,119	1.05	404,096	0.65	60,577,450	1.05
90-94	734,234	2.42	7,388,932	1.14	6,126,222	1.15	434,206	0.32	14,683,594	1.19
95 and over	90,074	2.44	1,214,614	0.83	1,176,685	0.88	6,532	1.37	2,487,905	0.92
Total	\$1,001,429,714	1.27	\$765,718,683	0.91	\$1,398,855,085	0.99	\$15,284,564	0.88	\$3,181,288,045	1.03

TABLE 4
 EXPERIENCE BY RETIREMENT CLASS FOR CALENDAR-YEAR 1989
 EXPECTED MORTALITY BASIS - 1983 GROUP ANNUITY MORTALITY

Attained Age	Prior to NRD		On/After NRD		No Stated NRD		Past NRD With No Payment		Total	
	Exposure	A/E Ratio	Exposure	A/E Ratio	Exposure	A/E Ratio	Exposure	A/E Ratio	Exposure	A/E Ratio
Female Lives										
Under 55	3,231.87	2.38	647.45	0.96	1,860.95	2.34	35.18	0.00	5,775.45	2.20
55-59	11,566.12	2.06	1,573.08	1.90	6,585.94	2.31	63.76	0.00	19,788.90	2.13
60-64	28,268.69	1.67	7,236.20	1.39	17,558.45	1.83	249.64	0.72	53,312.98	1.68
65-69	32,522.14	1.59	29,298.27	1.35	31,540.67	1.51	984.41	0.44	94,345.49	1.47
70-74	21,701.29	1.52	33,842.44	1.19	30,998.37	1.19	1,474.77	1.04	88,016.87	1.27
75-79	12,580.25	1.59	29,924.87	0.96	26,802.31	1.04	800.05	1.07	70,107.48	1.10
80-84	4,694.09	1.79	18,390.47	0.94	18,417.59	1.06	418.92	1.03	41,921.07	1.09
85-89	1,652.40	1.98	8,216.69	0.99	7,965.93	1.05	196.91	0.94	18,031.93	1.11
90-94	389.99	2.21	2,538.53	1.18	2,127.57	1.12	58.00	1.32	5,114.09	1.23
95 and over	67.25	2.09	605.75	0.89	454.92	0.88	10.00	2.24	1,137.92	0.98
Total	116,674.09	1.68	132,273.75	1.04	144,312.70	1.13	4,291.64	1.02	397,552.18	1.19
Female Income										
Under 55	\$ 9,995,935	3.30	\$ 1,794,293	0.41	\$ 6,547,953	1.71	\$ 75,663	0.00	\$ 18,413,844	2.45
55-59	31,099,699	1.98	4,185,915	2.65	23,071,542	2.34	128,908	0.00	58,486,064	2.17
60-64	77,537,411	1.62	17,604,583	0.66	57,372,476	1.62	731,922	0.23	153,246,391	1.50
65-69	74,041,638	1.43	64,825,449	1.28	91,339,800	1.31	2,380,014	0.18	232,586,901	1.33
70-74	33,110,113	1.55	59,723,241	1.11	70,447,686	1.12	2,912,829	0.57	166,193,869	1.19
75-79	14,751,779	1.65	41,493,150	0.95	48,782,227	1.00	1,372,081	0.69	106,399,237	1.06
80-84	3,999,796	2.06	22,189,754	0.91	26,118,020	1.12	737,887	0.60	53,045,457	1.09
85-89	1,199,099	2.15	8,923,875	0.97	9,244,905	1.07	262,768	1.02	19,630,647	1.09
90-94	254,013	1.87	2,740,035	1.33	2,141,795	1.18	77,369	1.18	5,213,212	1.29
95 and over	95,952	0.84	587,640	0.63	462,466	0.75	10,683	2.99	1,156,742	0.72
Total	\$246,085,435	1.64	\$224,067,935	1.02	\$335,528,870	1.15	\$8,690,124	0.67	\$814,372,364	1.18

TABLE 5

EXPERIENCE BY RETIREMENT CLASS FOR CALENDAR-YEAR 1990
 EXPECTED MORTALITY BASIS—1983 GROUP ANNUITY MORTALITY

Attained Age	Prior to NRD		On/After NRD		No Stated NRD		Past NRD With No Payment		Total	
	Exposure	A/E Ratio	Exposure	A/E Ratio	Exposure	A/E Ratio	Exposure	A/E Ratio	Exposure	A/E Ratio
Male Lives										
Under 55	5,711.05	3.21	449.67	1.61	1,180.45	4.08	55.83	4.39	7,397.00	3.26
55-59	44,967.93	1.75	1,197.68	2.12	7,026.85	1.49	183.49	3.58	53,375.95	1.73
60-64	118,831.73	1.35	6,834.52	1.18	19,650.87	1.48	873.17	0.86	146,190.29	1.36
65-69	163,905.48	1.18	52,214.08	1.03	37,393.19	1.20	5,223.23	0.91	258,735.98	1.15
70-74	133,966.51	1.15	53,203.89	1.05	37,827.77	1.12	13,695.90	1.04	238,694.07	1.12
75-79	98,555.08	1.10	48,831.46	1.04	31,119.63	1.07	10,582.59	1.09	189,088.76	1.08
80-84	47,268.18	1.06	31,983.33	1.00	23,845.16	1.04	6,486.47	0.97	109,583.14	1.03
85-89	18,060.42	1.11	15,863.59	1.03	10,581.22	0.98	3,517.24	1.05	48,022.47	1.05
90-94	5,062.64	1.05	5,180.39	1.07	3,021.94	1.01	1,407.17	1.11	14,672.14	1.05
95 and over	860.32	0.91	1,149.67	1.11	636.96	0.89	386.33	0.87	3,033.28	0.97
Total	637,189.34	1.14	216,908.28	1.04	172,284.04	1.08	42,411.42	1.03	1,068,793.08	1.09
Male Income										
Under 55	\$ 37,215,856	1.98	\$ 4,321,950	0.35	\$ 6,593,992	3.00	\$ 410,195	0.26	\$ 48,541,994	1.97
55-59	209,580,787	1.37	6,219,236	1.71	50,418,632	1.02	1,506,009	1.15	267,724,664	1.31
60-64	637,060,899	1.13	29,606,561	1.10	132,763,029	1.19	7,175,043	0.67	806,605,532	1.14
65-69	736,925,770	1.05	185,997,354	1.03	217,242,396	0.94	28,869,138	0.64	1,169,034,659	1.02
70-74	445,728,607	0.99	169,374,574	1.00	178,289,348	1.04	58,540,806	0.82	851,933,336	0.99
75-79	253,398,016	1.01	123,354,393	0.97	104,782,762	0.93	32,938,394	0.87	514,473,566	0.97
80-84	99,334,249	1.02	70,881,795	0.99	61,754,931	0.95	16,426,989	0.88	248,397,964	0.98
85-89	31,799,292	1.04	28,947,519	0.99	22,981,728	0.94	7,654,127	1.05	91,382,666	1.00
90-94	8,505,313	0.89	8,253,154	1.01	5,457,218	1.05	3,060,293	1.05	25,275,978	0.99
95 and over	1,321,953	0.73	1,442,558	1.04	849,678	0.91	681,350	0.96	4,295,539	0.90
Total	\$2,460,870,743	1.04	\$628,399,095	1.00	\$781,133,714	0.98	\$157,262,345	0.88	\$4,027,665,897	1.01

TABLE 6
EXPERIENCE BY RETIREMENT CLASS FOR CALENDAR-YEAR 1990
EXPECTED MORTALITY BASIS--1983 GROUP ANNUITY MORTALITY

Attained Age	Prior to NRD		On/After NRD		No Stated NRD		Past NRD With No Payment		Total	
	Exposure	A/E Ratio	Exposure	A/E Ratio	Exposure	A/E Ratio	Exposure	A/E Ratio	Exposure	A/E Ratio
Female Lives										
Under 55	5,593.84	2.98	512.40	2.44	1,380.36	3.65	70.83	0.00	7,557.43	3.03
55-59	19,569.84	2.12	1,112.71	1.63	4,030.86	2.36	137.59	4.41	24,851.00	2.15
60-64	48,883.50	1.65	5,455.70	1.14	12,095.68	1.77	800.65	1.35	67,235.53	1.63
65-69	65,154.99	1.45	28,422.34	1.37	24,072.19	1.46	5,020.34	1.47	122,669.86	1.44
70-74	54,382.92	1.29	26,509.92	1.23	24,290.49	1.15	10,847.95	1.08	116,031.28	1.23
75-79	43,885.26	1.11	22,924.21	1.06	19,770.48	1.13	8,484.33	1.05	95,064.28	1.10
80-84	26,419.09	1.09	15,698.44	1.03	14,695.97	1.11	6,153.69	1.07	62,967.19	1.08
85-89	11,781.53	1.12	8,317.57	1.11	7,035.52	1.11	3,565.75	1.04	30,700.37	1.10
90-94	3,554.36	1.13	2,862.16	1.06	2,132.79	1.09	1,456.58	1.20	10,005.89	1.11
95 and over	673.16	0.96	718.66	0.94	438.35	1.06	421.59	1.05	2,251.76	0.99
Total	279,898.49	1.20	112,534.11	1.10	109,942.69	1.16	36,959.30	1.09	539,334.59	1.16
Female Income										
Under 55	\$ 14,714,387	2.40	\$ 1,361,472	3.83	\$ 4,217,212	18.74	\$ 204,210	0.00	\$ 20,497,281	5.76
55-59	50,293,497	1.80	2,765,136	0.95	13,358,097	1.73	451,547	5.16	66,868,277	1.78
60-64	127,353,799	1.40	13,949,615	1.35	37,104,012	1.53	3,140,952	1.24	181,548,377	1.42
65-69	146,300,720	1.28	61,353,326	1.41	69,155,596	1.47	13,887,119	1.56	290,696,761	1.37
70-74	89,913,527	1.21	50,428,144	1.19	56,572,788	1.06	23,254,660	1.02	220,169,118	1.15
75-79	57,433,625	1.10	32,558,882	0.95	35,187,582	1.02	14,737,448	1.07	139,917,537	1.04
80-84	28,816,219	1.07	19,275,901	0.97	20,660,717	1.05	8,935,202	1.03	77,688,039	1.04
85-89	11,503,864	1.06	8,278,796	1.06	8,636,711	1.10	4,821,805	1.03	33,241,176	1.07
90-94	3,046,887	1.09	2,795,593	1.06	1,999,925	1.36	1,795,533	1.08	9,637,938	1.13
95 and over	633,867	0.85	489,846	0.86	467,471	1.01	469,198	1.20	2,060,382	0.97
Total	\$530,010,391	1.17	\$193,256,711	1.08	\$247,360,111	1.17	\$71,697,674	1.09	\$1,042,324,887	1.14

TABLE 7

EXPERIENCE BY RETIREMENT CLASS FOR CALENDAR-YEARS 1989 AND 1990
 EXPECTED MORTALITY BASIS—1983 GROUP ANNUITY MORTALITY

Attained Age	Prior to NRD		On/After NRD		No Stated NRD		Past NRD With No Payment		Total	
	Exposure	A/E Ratio	Exposure	A/E Ratio	Exposure	A/E Ratio	Exposure	A/E Ratio	Exposure	A/E Ratio
Male Lives										
Under 55	8,801.06	3.18	976.32	1.78	3,111.18	3.36	65.49	3.78	12,954.05	3.13
55-59	67,619.12	1.80	2,983.07	1.86	27,744.35	1.53	197.01	3.34	98,543.55	1.73
60-64	181,432.03	1.42	16,582.67	1.27	67,569.68	1.34	954.75	0.79	266,539.13	1.39
65-69	241,892.13	1.22	103,841.09	1.05	108,098.88	1.19	6,127.45	0.89	459,959.55	1.17
70-74	188,645.40	1.18	115,145.48	1.04	100,252.88	1.09	15,373.31	1.04	419,417.07	1.11
75-79	129,889.66	1.18	101,504.08	0.98	80,258.04	1.04	11,734.86	1.08	323,386.64	1.08
80-84	57,466.17	1.17	61,869.04	0.96	55,702.84	1.00	7,069.31	0.99	182,107.36	1.04
85-89	21,255.22	1.20	29,367.31	0.98	23,325.84	0.98	3,746.24	1.04	77,694.61	1.04
90-94	5,688.64	1.17	9,167.04	1.06	6,571.63	1.01	1,490.17	1.13	22,917.48	1.08
95 and over	928.98	1.04	1,907.72	1.07	1,358.56	0.91	396.33	0.88	4,591.59	1.00
Total	903,618.41	1.22	443,343.82	1.00	473,993.88	1.06	47,154.92	1.03	1,868,111.03	1.10
Male Income										
Under 55	\$ 59,866,340	2.25	\$ 9,617,734	0.27	\$ 19,651,744	3.08	\$ 440,212	0.24	\$ 89,576,031	2.24
55-59	312,929,938	1.42	18,387,862	1.54	159,856,458	1.12	1,555,352	1.11	492,729,610	1.33
60-64	941,289,625	1.19	86,129,984	1.01	446,402,348	1.14	7,482,965	0.64	1,481,304,921	1.16
65-69	1,047,385,331	1.09	420,270,279	0.94	615,126,775	0.98	32,250,765	0.70	2,115,033,150	1.02
70-74	606,913,034	1.02	379,991,765	0.97	457,696,671	0.98	64,590,667	0.81	1,509,192,137	0.99
75-79	327,279,991	1.07	265,707,998	0.90	269,889,923	0.94	36,141,234	0.87	899,019,146	0.97
80-84	119,224,375	1.11	139,249,101	0.93	147,077,230	0.96	17,845,109	0.91	423,395,815	0.99
85-89	36,760,248	1.12	56,463,798	0.98	50,677,847	1.00	8,058,223	1.03	151,960,116	1.02
90-94	9,239,547	1.01	15,642,086	1.08	11,583,440	1.11	3,494,499	0.96	39,959,572	1.06
95 and over	1,412,027	0.85	2,657,172	0.94	2,026,363	0.89	687,882	0.96	6,783,444	0.91
Total	\$3,462,300,457	1.09	\$1,394,117,778	0.95	\$2,179,988,799	0.99	\$172,546,909	0.88	\$7,208,953,942	1.02

TABLE 8
EXPERIENCE BY RETIREMENT CLASS FOR CALENDAR-YEARS 1989 AND 1990
EXPECTED MORTALITY BASIS—1983 GROUP ANNUITY MORTALITY

Attained Age	Prior to NRD		On/After NRD		No Stated NRD		Past NRD With No Payment		Total	
	Exposure	A/E Ratio	Exposure	A/E Ratio	Exposure	A/E Ratio	Exposure	A/E Ratio	Exposure	A/E Ratio
Female Lives										
Under 55	8,825.71	2.76	1,159.85	1.61	3,241.31	2.89	106.01	0.00	13,332.88	2.67
55-59	31,135.96	2.10	2,685.79	1.79	10,616.80	2.33	201.35	2.99	44,639.90	2.14
60-64	77,152.19	1.66	12,691.90	1.28	29,654.13	1.81	1,050.29	1.20	120,548.51	1.65
65-69	97,677.13	1.50	57,720.61	1.36	55,612.86	1.49	6,004.75	1.31	217,015.35	1.45
70-74	76,084.21	1.36	60,352.36	1.21	55,288.86	1.17	12,322.72	1.07	204,048.15	1.25
75-79	56,465.51	1.22	52,849.08	1.01	46,572.79	1.08	9,284.38	1.05	165,171.76	1.10
80-84	31,113.18	1.20	34,088.91	0.98	33,113.56	1.08	6,572.61	1.07	104,888.26	1.08
85-89	13,433.93	1.22	16,534.26	1.05	15,001.45	1.08	3,762.66	1.03	48,732.30	1.11
90-94	3,944.35	1.24	5,400.69	1.12	4,260.36	1.11	1,514.58	1.21	15,119.98	1.15
95 and over	740.41	1.08	1,324.41	0.92	893.27	0.97	431.59	1.07	3,389.68	0.99
Total	396,572.58	1.30	244,807.86	1.07	254,255.39	1.15	41,250.94	1.09	936,886.77	1.17
Female Income										
Under 55	\$ 24,710,322	2.76	\$ 3,155,765	1.88	\$ 10,765,165	8.20	\$ 279,873	0.00	\$ 38,911,125	4.18
55-59	81,393,196	1.87	6,951,051	1.98	36,429,639	2.12	580,455	4.03	125,354,341	1.96
60-64	204,891,210	1.48	31,554,197	0.97	94,476,488	1.59	3,872,874	1.04	334,794,768	1.46
65-69	220,342,358	1.33	126,178,775	1.34	160,495,396	1.38	16,267,133	1.36	523,283,662	1.35
70-74	123,023,640	1.30	110,151,385	1.14	127,020,474	1.09	26,167,489	0.97	386,362,987	1.17
75-79	72,185,405	1.21	74,052,032	0.95	83,969,809	1.01	16,109,529	1.04	246,316,774	1.05
80-84	32,816,015	1.19	41,465,655	0.94	46,778,737	1.09	9,673,089	1.00	130,733,495	1.06
85-89	12,702,963	1.16	17,202,671	1.01	17,881,616	1.08	5,084,573	1.03	52,871,823	1.08
90-94	3,300,900	1.15	5,535,628	1.19	4,141,720	1.27	1,872,902	1.08	14,851,151	1.19
95 and over	729,819	0.85	1,077,486	0.72	929,937	0.87	479,881	1.25	3,217,123	0.87
Total	\$776,095,826	1.28	\$417,324,646	1.05	\$582,888,981	1.16	\$80,387,798	1.05	\$1,856,697,251	1.16

TABLE 9

EXPERIENCE BY BENEFIT CLASS FOR CALENDAR-YEARS 1989 AND 1990
 EXPECTED MORTALITY BASIS—1983 GROUP ANNUITY MORTALITY

Attained Age	Life		Life and Certain		Modified Cash Refund		Total	
	Exposure	A/E Ratio	Exposure	A/E Ratio	Exposure	A/E Ratio	Exposure	A/E Ratio
Male Lives								
Under 55	9,726.08	3.27	1,766.34	2.61	1,461.63	2.74	12,954.05	3.13
55-59	80,849.08	1.76	8,995.28	1.67	8,699.19	1.54	98,543.55	1.73
60-64	206,329.78	1.41	27,695.01	1.38	32,514.34	1.23	266,539.13	1.39
65-69	343,604.48	1.19	55,386.91	1.19	60,968.16	1.04	459,959.55	1.17
70-74	306,871.36	1.16	55,471.79	1.02	57,073.92	0.99	419,417.07	1.11
75-79	234,001.82	1.11	44,794.32	1.04	44,590.50	0.98	323,386.64	1.08
80-84	133,265.28	1.06	23,276.87	1.02	25,565.21	0.95	182,107.36	1.04
85-89	59,973.70	1.06	7,028.20	0.99	10,692.71	0.98	77,694.61	1.04
90-94	18,101.84	1.10	1,540.93	1.14	3,274.71	0.94	22,917.48	1.08
95 and over	3,750.06	1.01	254.85	1.13	586.68	0.85	4,591.59	1.00
Total	1,396,473.48	1.13	226,210.50	1.07	245,427.05	0.99	1,868,111.03	1.10
Male Income								
Under 55	\$ 60,276,527	2.42	\$ 13,252,876	2.37	\$ 16,046,628	1.40	\$ 89,576,031	2.24
55-59	399,935,698	1.35	37,525,101	1.43	55,268,810	1.12	492,729,610	1.33
60-64	1,181,633,628	1.18	129,665,493	1.16	170,005,800	1.07	1,481,304,921	1.16
65-69	1,656,029,256	1.01	231,225,972	1.14	227,777,921	0.96	2,115,033,150	1.02
70-74	1,158,568,928	1.00	193,878,903	0.96	156,744,307	0.96	1,509,192,137	0.99
75-79	670,826,661	0.99	128,052,526	0.95	100,139,959	0.88	899,019,146	0.97
80-84	318,062,724	1.00	54,183,757	0.98	51,149,333	0.92	423,395,815	0.99
85-89	119,217,947	1.03	14,287,466	1.05	18,454,703	0.98	151,960,116	1.02
90-94	32,698,994	1.04	2,510,834	1.66	4,749,744	0.90	39,959,572	1.06
95 and over	5,788,569	0.92	345,302	0.72	649,573	0.94	6,783,444	0.91
Total	\$5,603,038,933	1.02	\$804,928,231	1.03	\$800,986,779	0.95	\$7,208,953,942	1.02

TABLE 10
EXPERIENCE BY BENEFIT CLASS FOR CALENDAR-YEARS 1989 AND 1990
EXPECTED MORTALITY BASIS--1983 GROUP ANNUITY MORTALITY

Attained Age	Life		Life and Certain		Modified Cash Refund		Total	
	Exposure	A/E Ratio	Exposure	A/E Ratio	Exposure	A/E Ratio	Exposure	A/F Ratio
Female Lives								
Under 55	10,843.41	2.32	1,316.99	4.78	1,172.48	3.73	13,332.88	2.67
55-59	35,621.68	2.14	4,471.04	2.12	4,547.18	2.15	44,639.90	2.14
60-64	92,094.10	1.57	13,175.58	2.02	15,278.83	1.83	120,548.51	1.65
65-69	161,504.43	1.44	24,567.58	1.56	30,943.34	1.43	217,015.35	1.45
70-74	149,664.85	1.26	25,068.39	1.25	29,314.91	1.16	204,048.15	1.25
75-79	122,330.47	1.11	20,183.79	1.06	22,657.50	1.08	165,171.76	1.10
80-84	80,608.58	1.10	10,777.20	1.07	13,502.48	1.02	104,888.26	1.08
85-89	39,154.42	1.10	3,627.10	1.19	5,950.78	1.06	48,732.30	1.11
90-94	12,423.28	1.17	794.60	1.26	1,902.10	1.02	15,119.98	1.15
95 and over	2,829.12	1.01	153.22	0.90	407.34	0.91	3,389.68	0.99
Total	707,074.34	1.18	104,135.49	1.20	125,676.94	1.12	936,886.77	1.17
Female Income								
Under 55	\$ 32,736,404	4.35	\$ 3,999,206	2.20	\$ 2,175,515	5.06	\$ 38,911,125	4.18
55-59	103,681,238	1.90	10,376,465	2.00	11,296,638	2.50	125,354,341	1.96
60-64	263,604,814	1.44	31,224,130	1.73	39,965,824	1.36	334,794,768	1.46
65-69	398,543,299	1.36	56,429,581	1.38	68,310,782	1.27	523,283,662	1.35
70-74	289,663,935	1.18	45,747,985	1.07	50,951,068	1.18	386,362,987	1.17
75-79	186,175,189	1.04	28,678,732	1.11	31,462,853	1.08	246,316,774	1.05
80-84	102,534,957	1.07	12,615,752	1.09	15,582,787	0.97	130,733,495	1.06
85-89	43,653,448	1.07	3,638,007	1.24	5,580,369	1.00	52,871,823	1.08
90-94	12,750,047	1.19	713,865	1.20	1,387,239	1.22	14,851,151	1.19
95 and over	2,810,720	0.87	164,665	0.40	241,739	1.33	3,217,123	0.87
Total	\$1,436,154,050	1.16	\$193,588,388	1.18	\$226,954,813	1.14	\$1,856,697,251	1.16

TABLE 11
 EXPERIENCE BY SURVIVOR STATUS FOR CALENDAR-YEARS 1989 AND 1990
 EXPECTED MORTALITY BASIS—1983 GROUP ANNUITY MORTALITY

Attained Age	Single Life		Joint Life		Total	
	Exposure	A/E Ratio	Exposure	A/E Ratio	Exposure	A/E Ratio
Male Lives						
Under 55	9,270.59	3.09	3,683.46	3.23	12,954.05	3.13
55-59	72,062.11	1.75	26,481.44	1.67	98,543.55	1.73
60-64	191,428.75	1.41	75,110.38	1.33	266,539.13	1.39
65-69	340,411.02	1.20	119,548.53	1.07	459,959.55	1.17
70-74	332,624.52	1.14	86,792.55	1.02	419,417.07	1.11
75-79	275,381.05	1.10	48,005.59	0.96	323,386.64	1.08
80-84	163,235.88	1.05	18,871.48	0.95	182,107.36	1.04
85-89	69,948.57	1.05	7,746.04	0.99	77,694.61	1.04
90-94	20,800.35	1.08	2,117.13	1.05	22,917.48	1.08
95 and over .	4,307.48	1.00	284.11	0.97	4,591.59	1.00
Total	1,479,470.32	1.11	388,640.71	1.04	1,868,111.03	1.10
Male Income						
Under 55	\$ 58,388,217	2.10	\$ 31,187,814	2.49	\$ 89,576,031	2.24
55-59	338,258,598	1.33	154,471,012	1.32	492,729,610	1.33
60-64	976,274,667	1.19	505,030,254	1.10	1,481,304,921	1.16
65-69	1,417,307,336	1.06	697,725,814	0.93	2,115,033,150	1.02
70-74	1,102,191,572	1.01	407,000,565	0.92	1,509,192,137	0.99
75-79	711,331,166	1.00	187,687,981	0.86	899,019,146	0.97
80-84	354,400,611	1.00	68,995,204	0.94	423,395,815	0.99
85-89	126,903,509	1.02	25,056,607	1.04	151,960,116	1.02
90-94	33,978,314	1.07	5,981,258	1.00	39,959,572	1.06
95 and over .	5,973,318	0.95	810,126	0.62	6,783,444	0.91
Total	\$5,125,007,308	1.04	\$2,083,946,634	0.95	\$7,208,953,942	1.02

TABLE 12
 EXPERIENCE BY SURVIVOR STATUS FOR CALENDAR-YEARS 1989 AND 1990
 EXPECTED MORTALITY BASIS--1983 GROUP ANNUITY MORTALITY

Attained Age	Single Life		Joint Life		Total	
	Exposure	A/E Ratio	Exposure	A/E Ratio	Exposure	A/E Ratio
Female Lives						
Under 55	10,333.75	3.02	2,999.13	1.55	13,332.88	2.67
55-59	37,171.22	2.27	7,468.68	1.48	44,639.90	2.14
60-64	104,786.88	1.73	15,761.63	1.09	120,548.51	1.65
65-69	197,685.26	1.49	19,330.09	1.10	217,015.35	1.45
70-74	192,391.12	1.27	11,657.03	0.88	204,048.15	1.25
75-79	160,297.70	1.11	4,874.06	0.63	165,171.76	1.10
80-84	103,549.53	1.09	1,338.73	0.73	104,888.26	1.08
85-89	48,329.46	1.11	402.84	0.81	48,732.30	1.11
90-94	15,024.22	1.15	95.76	1.60	15,119.98	1.15
95 and over .	3,368.10	1.00	21.58	0.26	3,389.68	0.99
Total	872,937.24	1.18	63,949.53	0.92	936,886.77	1.17
Female Income						
Under 55	\$ 27,948,852	4.51	\$ 10,962,273	3.30	\$ 38,911,125	4.18
55-59	101,543,396	1.90	23,810,945	2.21	125,354,341	1.96
60-64	279,145,746	1.54	55,649,022	1.07	334,794,768	1.46
65-69	459,563,968	1.39	63,719,694	1.03	523,283,662	1.35
70-74	353,611,175	1.20	32,751,813	0.77	386,362,987	1.17
75-79	234,982,664	1.08	11,334,110	0.46	246,316,774	1.05
80-84	127,842,770	1.07	2,890,726	0.58	130,733,495	1.06
85-89	52,018,541	1.08	853,282	0.90	52,871,823	1.08
90-94	14,717,358	1.19	133,793	1.06	14,851,151	1.19
95 and over .	3,113,432	0.94	103,692	0.00	3,217,123	0.87
Total	\$1,654,487,902	1.18	\$202,209,349	0.88	\$1,856,697,251	1.16

TABLE 13

EXPERIENCE BY YEARS SINCE RETIREMENT FOR CALENDAR-YEARS 1989 AND 1990
 EXPECTED MORTALITY BASIS—1983 GROUP ANNUITY MORTALITY

Attained Age	Years Since Retirement									
	0-1		2-5		6-10		11 and Over		Total	
	Exposure	A/E Ratio	Exposure	A/E Ratio	Exposure	A/E Ratio	Exposure	A/E Ratio	Exposure	A/E Ratio
Male Lives										
Under 55	5,118.35	3.10	6,303.23	2.95	1,132.47	3.82	400.00	4.67	12,954.05	3.13
55-59	39,989.98	1.93	53,854.54	1.57	3,894.50	2.13	804.53	1.67	98,543.55	1.73
60-64	75,427.67	1.36	134,839.61	1.35	52,202.93	1.46	4,068.92	2.09	266,539.13	1.39
65-69	63,624.11	1.13	225,777.37	1.12	130,203.69	1.17	40,354.38	1.46	459,959.55	1.17
70-74	19,183.84	1.16	88,578.73	1.07	199,329.52	1.09	112,324.98	1.18	419,417.07	1.11
75-79	10,992.48	1.19	41,301.65	1.04	47,176.36	1.06	223,916.15	1.09	323,386.64	1.08
80-84	5,678.27	1.13	19,340.66	1.03	13,269.38	1.03	143,819.05	1.04	182,107.36	1.04
85-89	2,473.62	0.95	7,227.04	1.02	4,684.71	1.00	63,309.24	1.05	77,694.61	1.04
90-94	759.75	0.98	2,137.43	1.17	1,094.24	1.15	18,926.06	1.07	22,917.48	1.08
95 and over	124.26	0.65	463.00	0.85	223.17	0.86	3,781.16	1.04	4,591.59	1.00
Total	223,372.33	1.22	579,823.26	1.12	453,210.97	1.11	611,704.47	1.08	1,868,111.03	1.10
Male Income										
Under 55	\$ 33,191,498	2.05	\$ 47,766,606	2.25	\$ 6,912,797	1.89	\$ 1,705,129	8.56	\$ 89,576,031	2.24
55-59	210,787,101	1.50	256,781,060	1.18	21,352,523	1.55	3,808,925	0.84	492,729,610	1.33
60-64	487,789,691	1.10	817,157,576	1.13	160,953,803	1.42	15,403,852	2.17	1,481,304,921	1.16
65-69	286,497,464	0.98	1,178,068,225	0.98	558,545,289	1.05	91,922,172	1.39	2,115,033,150	1.02
70-74	87,162,084	0.96	422,454,418	0.94	689,747,137	1.00	309,828,498	1.03	1,509,192,137	0.99
75-79	39,122,457	1.02	153,254,294	0.91	151,323,996	0.92	555,318,400	1.00	899,019,146	0.97
80-84	16,577,907	0.99	60,032,964	0.99	35,474,551	0.92	311,310,393	1.00	423,395,815	0.99
85-89	6,454,680	0.88	18,912,282	1.09	10,481,405	1.12	116,111,750	1.01	151,960,116	1.02
90-94	1,407,328	0.97	6,387,499	1.12	2,094,776	1.08	30,069,969	1.05	39,959,572	1.06
95 and over	285,733	0.26	1,334,389	0.71	370,326	0.71	4,792,996	1.04	6,783,444	0.91
Total	\$1,169,275,943	1.05	\$2,962,149,312	1.00	\$1,637,256,603	1.02	\$1,440,272,084	1.02	\$7,208,953,942	1.02

TABLE 14
EXPERIENCE BY YEARS SINCE RETIREMENT FOR CALENDAR-YEARS 1989 AND 1990
EXPECTED MORTALITY BASIS—1983 GROUP ANNUITY MORTALITY

Attained Age	Years Since Retirement									
	0-1		2-5		6-10		11 and Over		Total	
	Exposure	A/E Ratio	Exposure	A/E Ratio	Exposure	A/E Ratio	Exposure	A/E Ratio	Exposure	A/E Ratio
Female Lives										
Under 55	5,029.78	2.67	6,484.03	2.54	1,348.34	3.29	470.73	2.89	13,332.88	2.67
55-59	17,339.87	2.11	23,438.14	2.22	3,199.93	1.70	661.96	1.85	44,639.90	2.14
60-64	34,694.51	1.40	59,851.54	1.66	22,887.02	1.96	3,115.44	1.96	120,548.51	1.65
65-69	35,018.87	1.24	104,668.40	1.46	57,230.49	1.54	20,097.59	1.51	217,015.35	1.45
70-74	13,509.96	1.13	51,837.27	1.23	86,731.93	1.27	51,968.99	1.26	204,048.15	1.25
75-79	7,299.09	1.09	25,147.50	1.11	27,807.30	1.05	104,917.87	1.11	165,171.76	1.10
80-84	3,828.96	1.28	12,889.16	1.09	8,920.39	1.10	79,249.75	1.07	104,888.26	1.08
85-89	1,528.14	1.19	5,411.76	1.04	3,374.47	1.09	38,417.93	1.11	48,732.30	1.11
90-94	607.52	1.06	1,501.75	1.22	957.91	1.16	12,052.80	1.15	15,119.98	1.15
95 and over	102.67	1.00	399.00	0.82	221.83	0.86	2,666.18	1.03	3,389.68	0.99
Total	118,959.37	1.25	291,628.55	1.26	212,679.61	1.24	313,619.24	1.12	936,886.77	1.17
Female Income										
Under 55	\$ 14,370,992	6.53	\$ 20,128,480	2.76	\$ 3,434,479	2.28	\$ 977,174	2.60	\$ 38,911,125	4.18
55-59	51,415,069	1.91	65,660,486	1.92	7,130,901	2.65	1,147,885	1.84	125,354,341	1.96
60-64	109,690,637	1.30	176,853,789	1.52	42,893,989	1.59	5,356,354	1.35	334,794,768	1.46
65-69	91,631,028	1.18	288,850,666	1.38	115,519,292	1.37	27,282,677	1.51	523,283,662	1.35
70-74	33,630,032	1.04	126,429,726	1.09	156,466,863	1.23	69,836,366	1.20	386,362,987	1.17
75-79	14,459,158	1.05	49,256,813	1.00	46,305,382	1.07	136,295,421	1.06	246,316,774	1.05
80-84	6,612,700	1.20	22,389,129	1.08	12,822,102	1.03	88,909,564	1.05	130,733,495	1.06
85-89	2,292,325	1.37	8,746,752	1.00	4,257,343	1.15	37,575,404	1.07	52,871,823	1.08
90-94	627,458	1.16	2,615,047	1.18	1,099,253	1.28	10,509,392	1.18	14,851,151	1.19
95 and over	196,292	0.80	701,758	0.51	280,069	0.47	2,039,005	1.13	3,217,123	0.87
Total	\$324,925,691	1.25	\$761,632,646	1.20	\$390,209,672	1.20	\$379,929,241	1.09	\$1,856,697,251	1.16

TABLE 15
 COMPARISON OF MALE AND FEMALE MORTALITY EXPERIENCE
 FOR CALENDAR-YEARS 1989 AND 1990
 EXPECTED MORTALITY BASIS—1983 GROUP ANNUITY MORTALITY

Attained Age	Exposure		A/E Ratio		Ratio of Female to Male Mortality
	Male	Female	Male*	Female	
Lives					
Under 55	12,954.05	13,332.88	3.13	1.12	0.36
55-59	98,543.55	44,639.90	1.73	0.94	0.54
60-64	266,539.13	120,548.51	1.39	0.77	0.55
65-69	459,959.55	217,015.35	1.17	0.64	0.55
70-74	419,417.07	204,048.15	1.11	0.61	0.55
75-79	323,386.64	165,171.76	1.08	0.62	0.57
80-84	182,107.36	104,888.26	1.04	0.64	0.61
85-89	77,694.61	48,732.30	1.04	0.69	0.66
90-94	22,917.48	15,119.98	1.08	0.81	0.75
95 and over	4,591.59	3,389.68	1.00	0.84	0.84
Total	1,868,111.03	936,886.77	1.10	0.66	0.60
Income					
Under 55	\$ 89,576,031	\$ 38,911,125	2.24	1.76	0.79
55-59	492,729,610	125,354,341	1.33	0.86	0.65
60-64	1,481,304,921	334,794,768	1.16	0.68	0.58
65-69	2,115,033,150	523,283,662	1.02	0.60	0.59
70-74	1,509,192,137	386,362,987	0.99	0.57	0.57
75-79	899,019,146	246,316,774	0.97	0.59	0.60
80-84	423,395,815	130,733,495	0.99	0.62	0.63
85-89	151,960,116	52,871,823	1.02	0.67	0.66
90-94	39,959,572	14,851,151	1.06	0.84	0.79
95 and over	6,783,444	3,217,123	0.91	0.76	0.83
Total	\$7,208,953,942	\$1,856,697,251	1.02	0.63	0.62

*Expected deaths for both males and females using male mortality.

TABLE 16
 EXPERIENCE BY GUARANTEED STATUS FOR CALENDAR-YEAR 1989
 EXPECTED MORTALITY BASIS—1983 GROUP ANNUITY MORTALITY

Attained Age	Guaranteed		Nonguaranteed		Total	
	Exposure	A/E Ratio	Exposure	A/E Ratio	Exposure	A/E Ratio
Male Lives						
Under 55	3,874.45	2.70	1,682.60	3.54	5,557.05	2.96
55-59	25,643.49	1.57	19,524.11	1.93	45,167.60	1.73
60-64	74,626.16	1.41	45,722.68	1.44	120,348.84	1.42
65-69	142,796.67	1.16	58,426.90	1.28	201,223.57	1.20
70-74	139,695.11	1.12	41,027.89	1.11	180,723.00	1.11
75-79	107,448.45	1.07	26,849.43	1.09	134,297.88	1.08
80-84	59,996.24	1.04	12,527.98	1.09	72,524.22	1.04
85-89	24,739.53	1.04	4,932.61	0.99	29,672.14	1.03
90-94	6,949.78	1.11	1,295.56	1.21	8,245.34	1.12
95 and over	1,338.42	1.05	219.89	1.03	1,558.31	1.05
Total	587,108.30	1.10	212,209.65	1.17	799,317.95	1.11
Male Income						
Under 55	\$ 24,996,798	2.54	\$ 16,037,239	2.58	\$ 41,034,037	2.55
55-59	130,152,206	1.24	94,852,739	1.49	225,004,945	1.35
60-64	386,260,370	1.17	288,439,019	1.22	674,699,389	1.19
65-69	638,574,465	0.98	307,424,026	1.12	945,998,492	1.02
70-74	484,556,314	0.97	172,702,487	1.03	657,258,801	0.98
75-79	293,711,005	0.96	90,834,576	1.01	384,545,580	0.97
80-84	139,884,907	0.99	35,112,944	1.02	174,997,851	1.00
85-89	49,105,681	1.09	11,471,769	0.90	60,577,450	1.05
90-94	12,004,641	1.20	2,678,954	1.14	14,683,594	1.19
95 and over	2,150,060	0.93	337,845	0.85	2,487,905	0.92
Total	\$2,161,396,446	1.01	\$1,019,891,599	1.08	\$3,181,288,045	1.03

TABLE 17
 EXPERIENCE BY GUARANTEED STATUS FOR CALENDAR-YEAR 1989
 EXPECTED MORTALITY BASIS—1983 GROUP ANNUITY MORTALITY

Attained Age	Guaranteed		Nonguaranteed		Total	
	Exposure	A/E Ratio	Exposure	A/E Ratio	Exposure	A/E Ratio
Female Lives						
Under 55	4,718.62	2.08	1,056.83	2.68	5,775.45	2.20
55-59	14,070.29	2.10	5,718.61	2.19	19,788.90	2.13
60-64	39,909.39	1.72	13,403.59	1.57	53,312.98	1.68
65-69	74,540.53	1.45	19,804.96	1.58	94,345.49	1.47
70-74	73,161.97	1.27	14,854.90	1.26	88,016.87	1.27
75-79	59,363.17	1.11	10,744.31	1.06	70,107.48	1.10
80-84	35,696.37	1.08	6,224.70	1.14	41,921.07	1.09
85-89	15,230.89	1.12	2,801.04	1.06	18,031.93	1.11
90-94	4,360.09	1.26	754.00	1.10	5,114.09	1.23
95 and over	989.51	0.96	148.41	1.10	1,137.92	0.98
Total	322,040.83	1.19	75,511.35	1.21	397,552.18	1.19
Female Income						
Under 55	\$ 15,445,862	2.51	\$ 2,967,982	2.15	\$ 18,413,844	2.45
55-59	42,877,339	2.03	15,608,725	2.53	58,486,064	2.17
60-64	110,361,075	1.50	42,885,316	1.50	153,246,391	1.50
65-69	176,968,155	1.28	55,618,746	1.48	232,586,901	1.33
70-74	134,927,010	1.20	31,266,859	1.16	166,193,869	1.19
75-79	87,920,771	1.07	18,478,466	1.03	106,399,237	1.06
80-84	43,979,301	1.08	9,066,156	1.14	53,045,457	1.09
85-89	16,124,851	1.10	3,505,797	1.05	19,630,647	1.09
90-94	4,250,719	1.30	962,494	1.25	5,213,212	1.29
95 and over	894,707	0.84	262,034	0.43	1,156,742	0.72
Total	\$633,749,790	1.17	\$180,622,574	1.21	\$814,372,364	1.18

TABLE 18
 EXPERIENCE BY GUARANTEED STATUS FOR CALENDAR-YEAR 1990
 EXPECTED MORTALITY BASIS—1983 GROUP ANNUITY MORTALITY

Attained Age	Guaranteed		Nonguaranteed		Total	
	Exposure	A/E Ratio	Exposure	A/E Ratio	Exposure	A/E Ratio
Male Lives						
Under 55	4,941.05	3.15	2,455.95	3.50	7,397.00	3.26
55-59	31,333.87	1.62	22,042.08	1.89	53,375.95	1.73
60-64	94,193.68	1.34	51,996.61	1.40	146,190.29	1.36
65-69	185,896.21	1.15	72,839.77	1.15	258,735.98	1.15
70-74	190,676.29	1.09	48,017.78	1.21	238,694.07	1.12
75-79	156,423.36	1.08	32,665.40	1.09	189,088.76	1.08
80-84	93,495.26	1.03	16,087.88	1.05	109,583.14	1.03
85-89	41,536.87	1.05	6,485.60	1.03	48,022.47	1.05
90-94	12,676.58	1.08	1,995.56	0.91	14,672.14	1.05
95 and over	2,642.13	0.99	391.15	0.84	3,033.28	0.97
Total	813,815.30	1.08	254,977.78	1.14	1,068,793.08	1.09
Male Income						
Under 55	\$ 27,185,428	1.42	\$ 21,356,565	2.71	\$ 48,541,994	1.97
55-59	155,545,093	1.27	112,179,571	1.37	267,724,664	1.31
60-64	463,637,921	1.13	342,967,611	1.15	806,605,532	1.14
65-69	780,549,690	1.00	388,484,968	1.06	1,169,034,659	1.02
70-74	643,193,938	0.97	208,739,398	1.04	851,933,336	0.99
75-79	402,647,903	0.97	111,825,663	1.01	514,473,566	0.97
80-84	202,328,168	0.97	46,069,795	1.04	248,397,964	0.98
85-89	76,816,594	1.01	14,566,073	0.98	91,382,666	1.00
90-94	21,065,789	1.02	4,210,189	0.81	25,275,978	0.99
95 and over	3,589,374	0.98	706,165	0.55	4,295,539	0.90
Total	\$2,776,559,899	0.99	\$1,251,105,998	1.05	\$4,027,665,897	1.01

TABLE 19
 EXPERIENCE BY GUARANTEED STATUS FOR CALENDAR-YEAR 1990
 EXPECTED MORTALITY BASIS—1983 GROUP ANNUITY MORTALITY

Attained Age	Guaranteed		Nonguaranteed		Total	
	Exposure	A/E Ratio	Exposure	A/E Ratio	Exposure	A/E Ratio
Female Lives						
Under 55	5,364.69	3.43	2,192.74	2.11	7,557.43	3.03
55-59	16,955.14	2.11	7,895.86	2.22	24,851.00	2.15
60-64	49,374.15	1.60	17,861.38	1.70	67,235.53	1.63
65-69	95,535.27	1.45	27,134.59	1.37	122,669.86	1.44
70-74	96,865.85	1.23	19,165.43	1.24	116,031.28	1.23
75-79	81,283.23	1.10	13,781.05	1.09	95,064.28	1.10
80-84	54,451.23	1.07	8,515.96	1.13	62,967.19	1.08
85-89	26,554.60	1.10	4,145.77	1.13	30,700.37	1.10
90-94	8,535.47	1.13	1,470.42	1.04	10,005.89	1.11
95 and over	1,977.14	1.00	274.62	0.97	2,251.76	0.99
Total	436,896.77	1.15	102,437.82	1.19	539,334.59	1.16
Female Income						
Under 55	\$ 15,651,198	6.85	\$ 4,846,083	2.44	\$ 20,497,281	5.76
55-59	46,232,278	1.86	20,635,999	1.60	66,868,277	1.78
60-64	128,082,835	1.41	53,465,542	1.45	181,548,377	1.42
65-69	219,780,863	1.36	70,915,898	1.40	290,696,761	1.37
70-74	179,386,247	1.13	40,782,871	1.21	220,169,118	1.15
75-79	116,394,622	1.05	23,522,914	0.97	139,917,537	1.04
80-84	65,396,914	1.03	12,291,125	1.08	77,688,039	1.04
85-89	28,407,545	1.05	4,833,631	1.16	33,241,176	1.07
90-94	8,147,583	1.14	1,490,355	1.11	9,637,938	1.13
95 and over	1,729,189	0.99	331,193	0.85	2,060,382	0.97
Total	\$809,209,275	1.13	\$233,115,611	1.18	\$1,042,324,887	1.14

TABLE 20
 EXPERIENCE BY GUARANTEED STATUS FOR CALENDAR-YEARS 1989 AND 1990
 EXPECTED MORTALITY BASIS—1983 GROUP ANNUITY MORTALITY

Attained Age	Guaranteed		Nonguaranteed		Total	
	Exposure	A/E Ratio	Exposure	A/E Ratio	Exposure	A/E Ratio
Male Lives						
Under 55	8,815.50	2.95	4,138.55	3.52	12,954.05	3.13
55-59	56,977.36	1.60	41,566.19	1.91	98,543.55	1.73
60-64	168,819.84	1.37	97,719.29	1.42	266,539.13	1.39
65-69	328,692.88	1.15	131,266.67	1.21	459,959.55	1.17
70-74	330,371.40	1.10	89,045.67	1.17	419,417.07	1.11
75-79	263,871.81	1.08	59,514.83	1.09	323,386.64	1.08
80-84	153,491.50	1.03	28,615.86	1.07	182,107.36	1.04
85-89	66,276.40	1.05	11,418.21	1.01	77,694.61	1.04
90-94	19,626.36	1.09	3,291.12	1.03	22,917.48	1.08
95 and over	3,980.55	1.01	611.04	0.91	4,591.59	1.00
Total	1,400,923.60	1.09	467,187.43	1.15	1,868,111.03	1.10
Male Income						
Under 55	\$ 52,182,226	1.96	\$ 37,393,805	2.65	\$ 89,576,031	2.24
55-59	285,697,299	1.26	207,032,310	1.43	492,729,610	1.33
60-64	849,898,291	1.15	631,406,630	1.18	1,481,304,921	1.16
65-69	1,419,124,155	0.99	695,908,995	1.08	2,115,033,150	1.02
70-74	1,127,750,252	0.97	381,441,885	1.03	1,509,192,137	0.99
75-79	696,358,908	0.96	202,660,238	1.01	899,019,146	0.97
80-84	342,213,076	0.98	81,182,739	1.03	423,395,815	0.99
85-89	125,922,274	1.04	26,037,842	0.94	151,960,116	1.02
90-94	33,070,430	1.09	6,889,142	0.93	39,959,572	1.06
95 and over	5,739,434	0.96	1,044,010	0.64	6,783,444	0.91
Total	\$4,937,956,345	1.00	\$2,270,997,597	1.06	\$7,208,953,942	1.02

TABLE 21
 EXPERIENCE BY GUARANTEED STATUS FOR CALENDAR-YEARS 1989 AND 1990
 EXPECTED MORTALITY BASIS—1983 GROUP ANNUITY MORTALITY

Attained Age	Guaranteed		Nonguaranteed		Total	
	Exposure	A/E Ratio	Exposure	A/E Ratio	Exposure	A/E Ratio
Female Lives						
Under 55	10,083.31	2.80	3,249.57	2.30	13,332.88	2.67
55-59	31,025.43	2.10	13,614.47	2.21	44,639.90	2.14
60-64	89,283.54	1.65	31,264.97	1.64	120,548.51	1.65
65-69	170,075.80	1.45	46,939.55	1.46	217,015.35	1.45
70-74	170,027.82	1.25	34,020.33	1.25	204,048.15	1.25
75-79	140,646.40	1.11	24,525.36	1.08	165,171.76	1.10
80-84	90,147.60	1.07	14,740.66	1.13	104,888.26	1.08
85-89	41,785.49	1.11	6,946.81	1.10	48,732.30	1.11
90-94	12,895.56	1.17	2,224.42	1.06	15,119.98	1.15
95 and over	2,966.65	0.99	423.03	1.01	3,389.68	0.99
Total	758,937.60	1.17	177,949.17	1.20	936,886.77	1.17
Female Income						
Under 55	\$ 31,097,060	4.66	\$ 7,814,065	2.33	\$ 38,911,125	4.18
55-59	89,109,617	1.94	36,244,724	2.00	125,354,341	1.96
60-64	238,443,910	1.45	96,350,858	1.47	334,794,768	1.46
65-69	396,749,018	1.32	126,534,644	1.43	523,283,662	1.35
70-74	314,313,258	1.16	72,049,730	1.19	386,362,987	1.17
75-79	204,315,393	1.06	42,001,381	1.00	246,316,774	1.05
80-84	109,376,215	1.05	21,357,280	1.11	130,733,495	1.06
85-89	44,532,395	1.07	8,339,428	1.12	52,871,823	1.08
90-94	12,398,302	1.19	2,452,849	1.17	14,851,151	1.19
95 and over	2,623,896	0.94	593,227	0.63	3,217,123	0.87
Total	\$1,442,959,065	1.15	\$413,738,186	1.19	\$1,856,697,251	1.16

TABLE 22
SUMMARY OF GROUP ANNUITY MORTALITY EXPERIENCE BY MALE LIVES
EXPECTED MORTALITY BASIS—1983 GROUP ANNUITY MORTALITY

	1989		1990		Change in A/E Ratios
	Exposure	A/E Ratio	Exposure	A/E Ratio	
Total	799,318	1.11	1,068,793	1.09	-0.02
By Retirement Class					
Prior to NRD	266,429	1.45	637,189	1.14	-0.31
On/After NRD	226,436	0.97	216,908	1.04	0.07
No Stated NRD	301,710	1.05	172,284	1.08	0.03
Past NRD/No Payment	4,743	1.06	42,411	1.03	-0.03
By Benefit Class					
Life	555,798	1.17	840,675	1.10	-0.07
Life and Certain	112,665	1.03	113,545	1.11	0.08
Modified Cash Refund	130,855	0.98	114,572	1.01	0.03
By Survivor Class					
Single Life	601,147	1.14	878,323	1.10	-0.04
Joint Life	198,171	1.01	190,470	1.08	0.07
By Years Since Retirement					
0-1	100,429	1.26	122,943	1.19	-0.07
2-5	270,120	1.17	309,703	1.08	-0.09
6-10	184,720	1.11	268,491	1.12	0.01
11+	244,048	1.08	367,656	1.08	0.00
By Attained Age					
Under 55	5,557	2.96	7,397	3.26	0.30
55-59	45,168	1.73	53,376	1.73	0.00
60-64	120,349	1.42	146,190	1.36	-0.06
65-69	201,224	1.20	258,736	1.15	-0.05
70-74	180,723	1.11	238,694	1.12	0.01
75-79	134,298	1.08	189,089	1.08	0.00
80-84	72,524	1.04	109,583	1.03	-0.01
85-89	29,672	1.03	48,022	1.05	0.02
90-94	8,245	1.12	14,672	1.05	-0.07
95 and over	1,558	1.05	3,033	0.97	-0.08
Comparison of Female/ Male		0.60		0.60	0.00

TABLE 23

SUMMARY OF GROUP ANNUITY MORTALITY EXPERIENCE BY MALE INCOME
EXPECTED MORTALITY BASIS—1983 GROUP ANNUITY MORTALITY

	1989		1990		Change in A/E Ratios
	Exposure	A/E Ratio	Exposure	A/E Ratio	
Total	\$3,181,288,045	1.03	\$4,027,665,897	1.01	-0.02
By Retirement Class					
Prior to NRD	\$1,001,429,714	1.27	\$2,460,870,743	1.04	-0.23
On/After NRD	765,718,683	0.91	628,399,095	1.00	0.09
No Stated NRD	1,398,855,085	0.99	781,133,714	0.98	-0.01
Past NRD/No Payment	15,284,564	0.88	157,262,345	0.88	0.00
By Benefit Class					
Life	\$2,365,458,420	1.05	\$3,237,580,513	1.01	-0.04
Life and Certain	380,994,438	1.01	423,933,793	1.05	0.04
Modified Cash Refund	434,835,188	0.93	366,151,591	0.96	0.03
By Survivor Class					
Single Life	\$2,097,352,473	1.07	\$3,027,654,835	1.02	-0.05
Joint Life	1,083,935,572	0.93	1,000,011,062	0.97	0.04
By Years Since Retirement					
0-1	\$ 540,963,449	1.07	\$ 628,312,494	1.04	-0.03
2-5	1,380,730,523	1.05	1,581,418,789	0.96	-0.09
6-10	648,074,270	1.00	989,182,333	1.03	0.03
11+	611,519,803	1.02	828,752,281	1.02	0.00
By Attained Age					
Under 55	\$ 41,034,037	2.55	\$ 48,541,994	1.97	-0.58
55-59	225,004,945	1.35	267,724,664	1.31	-0.04
60-64	674,699,389	1.19	806,605,532	1.14	-0.05
65-69	945,998,492	1.02	1,169,034,659	1.02	0.00
70-74	657,258,801	0.98	851,933,336	0.99	0.01
75-79	384,545,580	0.97	514,473,566	0.97	0.00
80-84	174,997,851	1.00	248,397,964	0.98	-0.02
85-89	60,577,450	1.05	91,382,666	1.00	-0.05
90-94	14,683,594	1.19	25,275,978	0.99	-0.20
95 and over	2,487,905	0.92	4,295,539	0.90	-0.02
Comparison of Female/ Male		0.62		0.62	0.00

TABLE 24

SUMMARY OF GROUP ANNUITY MORTALITY EXPERIENCE BY FEMALE LIVES
EXPECTED MORTALITY BASIS—1983 GROUP ANNUITY MORTALITY

	1989		1990		Change in A/E Ratios
	Exposure	A/E Ratio	Exposure	A/E Ratio	
Total	397,552	1.19	539,335	1.16	-0.03
By Retirement Class					
Prior to NRD	116,674	1.68	279,898	1.20	-0.48
On/After NRD	132,274	1.04	112,534	1.10	0.06
No Stated NRD	144,313	1.13	109,943	1.16	0.03
Past NRD/No Payment	4,292	1.02	36,959	1.09	0.07
By Benefit Class					
Life	282,808	1.22	424,267	1.15	-0.07
Life and Certain	49,460	1.18	54,675	1.23	0.05
Modified Cash Refund	65,284	1.10	60,393	1.15	0.05
By Survivor Class					
Single Life	365,876	1.20	507,061	1.16	-0.04
Joint Life	31,676	0.85	32,273	0.99	0.14
By Years Since Retirement					
0-1	52,745	1.34	66,214	1.18	-0.16
2-5	135,466	1.30	156,162	1.23	-0.07
6-10	86,097	1.21	126,583	1.26	0.05
11+	123,244	1.13	190,375	1.11	-0.02
By Attained Age					
Under 55	5,775	2.20	7,557	3.03	0.83
55-59	19,789	2.13	24,851	2.15	0.02
60-64	53,313	1.68	67,236	1.63	-0.05
65-69	94,345	1.47	122,670	1.44	-0.03
70-74	88,017	1.27	116,031	1.23	-0.04
75-79	70,107	1.10	95,064	1.10	0.00
80-84	41,921	1.09	62,967	1.08	-0.01
85-89	18,032	1.11	30,700	1.10	-0.01
90-94	5,114	1.23	10,006	1.11	-0.12
95 and over	1,138	0.98	2,252	0.99	0.01

TABLE 25

SUMMARY OF GROUP ANNUITY MORTALITY EXPERIENCE BY FEMALE INCOME
EXPECTED MORTALITY BASIS—1983 GROUP ANNUITY MORTALITY

	1989		1990		Change in A/E Ratios
	Exposure	A/E Ratio	Exposure	A/E Ratio	
Total	\$814,372,364	1.18	\$1,042,324,887	1.14	-0.04
By Retirement Class					
Prior to NRD	\$246,085,435	1.64	\$ 530,010,391	1.17	-0.47
On/After NRD	224,067,935	1.02	193,256,711	1.08	0.06
No Stated NRD	335,528,870	1.15	247,360,111	1.17	0.02
Past NRD/No Payment	8,690,124	0.67	71,697,674	1.09	0.42
By Benefit Class					
Life	\$608,803,586	1.20	\$ 827,350,465	1.13	-0.07
Life and Certain	91,799,267	1.16	101,789,121	1.20	0.04
Modified Cash Refund	113,769,511	1.11	113,185,302	1.17	0.06
By Survivor Class					
Single Life	\$715,766,803	1.20	\$ 938,721,098	1.16	-0.04
Joint Life	98,605,561	0.89	103,603,789	0.87	-0.02
By Years Since Retirement					
0-1	\$150,356,743	1.26	\$ 174,568,948	1.24	-0.02
2-5	352,895,354	1.26	408,737,293	1.15	-0.11
6-10	155,204,716	1.17	235,004,956	1.23	0.06
11+	155,915,551	1.10	224,013,690	1.08	-0.02
By Attained Age					
Under 55	\$ 18,413,844	2.45	\$ 20,497,281	5.76	3.31
55-59	58,486,064	2.17	66,868,277	1.78	-0.39
60-64	153,246,391	1.50	181,548,377	1.42	-0.08
65-69	232,586,901	1.33	290,696,761	1.37	0.04
70-74	166,193,869	1.19	220,169,118	1.15	-0.04
75-79	106,399,237	1.06	139,917,537	1.04	-0.02
80-84	53,045,457	1.09	77,688,039	1.04	-0.05
85-89	19,630,647	1.09	33,241,176	1.07	-0.02
90-94	5,213,212	1.29	9,637,938	1.13	-0.16
95 and over	1,156,742	0.72	2,060,382	0.97	0.25

TABLE 26
 COMPARISON OF 1989-90 WITH 1987-88 GROUP ANNUITY MORTALITY EXPERIENCE
 BY MALE LIVES
 EXPECTED MORTALITY BASIS—1983 GROUP ANNUITY MORTALITY

	1987-88		1989-1990		Change in A/E Ratios
	Exposure	A/E Ratio	Exposure	A/E Ratio	
Total	1,598,503	1.18	1,868,111	1.10	-0.08
By Retirement Class					
Prior to NRD	565,518	1.21	903,618	1.22	0.01
On/After NRD	582,148	1.13	443,344	1.00	-0.13
No Stated NRD	445,970	1.22	473,994	1.06	-0.16
Past NRD/No Payment	4,867	1.06	47,155	1.03	-0.03
By Benefit Class					
Life	1,056,808	1.20	1,396,473	1.13	-0.07
Life and Certain	261,926	1.16	226,210	1.07	-0.09
Modified Cash Refund	279,769	1.11	245,427	0.99	-0.12
By Survivor Class					
Single Life	1,207,275	1.18	1,479,470	1.11	-0.07
Joint Life	391,227	1.15	388,641	1.04	-0.11
By Years Since Retirement					
0-1	212,451	1.29	223,372	1.22	-0.07
2-5	462,277	1.21	579,823	1.12	-0.09
6-10	404,913	1.20	453,211	1.11	-0.09
11+	518,861	1.15	611,704	1.08	-0.07
By Attained Age					
Under 55	10,821	3.35	12,954	3.13	-0.22
55-59	84,656	1.88	98,544	1.73	-0.15
60-64	226,293	1.47	266,539	1.39	-0.08
65-69	398,305	1.25	459,960	1.17	-0.08
70-74	377,359	1.21	419,417	1.11	-0.10
75-79	274,918	1.15	323,387	1.08	-0.07
80-84	146,696	1.10	182,107	1.04	-0.06
85-89	59,523	1.08	77,695	1.04	-0.04
90-94	16,831	1.12	22,917	1.08	-0.04
95 and over	3,103	1.13	4,592	1.00	-0.13
Comparison of Female/ Male		0.60		0.60	0.00

TABLE 27

COMPARISON OF 1989-90 WITH 1987-88 GROUP ANNUITY MORTALITY EXPERIENCE
 BY MALE INCOME
 EXPECTED MORTALITY BASIS—1983 GROUP ANNUITY MORTALITY

	1987-88		1989-1990		Change in A/E Ratios
	Exposure	A/E Ratio	Exposure	A/E Ratio	
Total	\$5,386,269,151	1.07	\$7,208,953,942	1.02	-0.05
By Retirement Class					
Prior to NRD	\$1,948,479,245	1.05	\$3,462,300,457	1.09	0.04
On/After NRD	1,739,163,641	1.02	1,394,117,778	0.95	-0.07
No Stated NRD	1,685,579,855	1.15	2,179,988,799	0.99	-0.16
Past NRD/No Payment	13,046,410	0.83	172,546,909	0.88	0.05
By Benefit Class					
Life	\$3,755,046,205	1.07	\$5,603,038,933	1.02	-0.05
Life and Certain	785,257,259	1.07	804,928,231	1.03	-0.04
Modified Cash Refund	845,965,688	1.06	800,986,779	0.95	-0.11
By Survivor Class					
Single Life	\$3,447,485,487	1.08	\$5,125,007,308	1.04	-0.04
Joint Life	1,938,783,664	1.05	2,083,946,634	0.95	-0.10
By Years Since Retirement					
0-1	\$1,086,308,737	1.07	\$1,169,275,943	1.05	-0.02
2-5	1,935,669,662	1.05	2,962,149,312	1.00	-0.05
6-10	1,210,125,802	1.09	1,637,256,603	1.02	-0.07
11+	1,154,164,951	1.07	1,440,272,084	1.02	-0.05
By Attained Age					
Under 55	\$ 71,992,513	1.88	\$ 89,576,031	2.24	0.36
55-59	374,691,572	1.51	492,729,610	1.33	-0.18
60-64	1,129,993,206	1.20	1,481,304,921	1.16	-0.04
65-69	1,562,841,935	1.06	2,115,033,150	1.02	-0.04
70-74	1,136,088,092	1.06	1,509,192,137	0.99	-0.07
75-79	668,902,444	1.06	899,019,146	0.97	-0.09
80-84	302,517,789	1.02	423,395,815	0.99	-0.03
85-89	107,986,227	0.98	151,960,116	1.02	0.04
90-94	27,261,157	1.07	39,959,572	1.06	-0.01
95 and over	3,994,215	1.10	6,783,444	0.91	-0.19
Comparison of Female/ Male		0.62		0.62	0.00

TABLE 28

COMPARISON OF 1989-90 WITH 1987-88 GROUP ANNUITY MORTALITY EXPERIENCE
BY FEMALE LIVES
EXPECTED MORTALITY BASIS—1983 GROUP ANNUITY MORTALITY

	1987-88		1989-1990		Change in A/E Ratios
	Exposure	A/E Ratio	Exposure	A/E Ratio	
Total	730,001	1.26	936,887	1.17	-0.09
By Retirement Class					
Prior to NRD	227,764	1.38	396,573	1.30	-0.08
On/After NRD	304,956	1.22	244,808	1.07	-0.15
No Stated NRD	194,579	1.25	254,255	1.15	-0.10
Past NRD/No Payment	2,701	1.22	41,251	1.09	-0.13
By Benefit Class					
Life	495,673	1.26	707,074	1.18	-0.08
Life and Certain	99,949	1.28	104,135	1.20	-0.08
Modified Cash Refund	134,380	1.25	125,677	1.12	-0.13
By Survivor Class					
Single Life	688,597	1.25	872,937	1.18	-0.07
Joint Life	41,404	1.43	63,950	0.92	-0.51
By Years Since Retirement					
0-1	98,692	1.37	118,959	1.25	-0.12
2-5	214,069	1.35	291,629	1.26	-0.09
6-10	172,081	1.31	212,680	1.24	-0.07
11+	245,159	1.21	313,619	1.12	-0.09
By Attained Age					
Under 55	6,899	4.60	13,333	2.67	-1.93
55-59	32,108	2.44	44,640	2.14	-0.30
60-64	93,067	1.85	120,549	1.65	-0.20
65-69	174,060	1.53	217,015	1.45	-0.08
70-74	169,883	1.35	204,048	1.25	-0.10
75-79	132,630	1.16	165,172	1.10	-0.06
80-84	77,610	1.14	104,888	1.08	-0.06
85-89	32,275	1.22	48,732	1.11	-0.11
90-94	9,482	1.22	15,120	1.15	-0.07
95 and over	1,986	1.04	3,390	0.99	-0.05

TABLE 29

COMPARISON OF 1989-90 WITH 1987-88 GROUP ANNUITY MORTALITY EXPERIENCE
BY FEMALE INCOME
EXPECTED MORTALITY BASIS—1983 GROUP ANNUITY MORTALITY

	1987-88		1989-1990		Change in A/E Ratios
	Exposure	A/E Ratio	Exposure	A/E Ratio	
Total	\$1,227,245,686	1.24	\$1,856,697,251	1.16	-0.08
By Retirement Class					
Prior to NRD	\$ 417,953,888	1.39	\$ 776,095,826	1.28	-0.11
On/After NRD	456,258,409	1.18	417,324,646	1.05	-0.13
No Stated NRD	347,928,640	1.24	582,888,981	1.16	-0.08
Past NRD/No Payment	5,104,749	1.10	80,387,798	1.05	-0.05
By Benefit Class					
Life	\$ 845,670,017	1.23	\$1,436,154,050	1.16	-0.07
Life and Certain	167,363,711	1.31	193,588,388	1.18	-0.13
Modified Cash Refund	214,211,959	1.21	226,954,813	1.14	-0.07
By Survivor Class					
Single Life	\$1,113,890,287	1.22	\$1,654,487,902	1.18	-0.04
Joint Life	113,355,400	1.50	202,209,349	0.88	-0.62
By Years Since Retirement					
0-1	\$ 260,806,591	1.29	\$ 324,925,691	1.25	-0.04
2-5	446,336,756	1.37	761,632,646	1.20	-0.17
6-10	253,684,929	1.29	390,209,672	1.20	-0.09
11+	266,417,410	1.14	379,929,241	1.09	-0.05
By Attained Age					
Under 55	\$ 20,011,087	3.93	\$ 38,911,125	4.18	0.25
55-59	79,015,017	2.13	125,354,341	1.96	-0.17
60-64	225,866,801	1.76	334,794,768	1.46	-0.30
65-69	347,995,148	1.40	523,283,662	1.35	-0.05
70-74	262,953,677	1.29	386,362,987	1.17	-0.12
75-79	167,939,596	1.13	246,316,774	1.05	-0.08
80-84	83,021,563	1.07	130,733,495	1.06	-0.01
85-89	30,863,480	1.18	52,871,823	1.08	-0.10
90-94	8,000,167	1.15	14,851,151	1.19	0.04
95 and over	1,579,150	0.81	3,217,123	0.87	0.06

TABLE 30

SUMMARY OF MORTALITY IMPROVEMENT FOR MALE LIVES
FOR CALENDAR-YEARS 1985 TO 1990
EXPECTED MORTALITY BASIS—1983 GROUP ANNUITY MORTALITY

Attained Age	A/E Ratio						Annual Improvement Factors					Arithmetic Average
	1990	1989	1988	1987	1986	1985	1990 to 1989	1989 to 1988	1988 to 1987	1987 to 1986	1986 to 1985	
Male Lives												
Under 55	3.26	2.96	3.73	2.94	2.84	3.97	-0.104	0.208	-0.272	-0.033	0.284	0.017
55-59	1.73	1.73	1.96	1.80	1.89	2.04	-0.004	0.122	-0.094	0.051	0.073	0.030
60-64	1.36	1.42	1.47	1.47	1.50	1.64	0.043	0.034	0.001	0.018	0.086	0.036
65-69	1.15	1.20	1.24	1.27	1.25	1.39	0.041	0.031	0.029	-0.015	0.096	0.037
70-74	1.12	1.11	1.20	1.22	1.13	1.31	-0.000	0.071	0.018	-0.079	0.132	0.028
75-79	1.08	1.08	1.15	1.16	1.10	1.24	-0.001	0.059	0.008	-0.052	0.117	0.026
80-84	1.03	1.04	1.10	1.10	1.06	1.14	0.010	0.046	0.005	-0.037	0.070	0.019
85-89	1.05	1.03	1.07	1.09	0.99	1.15	-0.016	0.031	0.021	-0.096	0.139	0.016
90-94	1.05	1.12	1.10	1.14	1.01	1.18	0.060	-0.016	0.031	-0.123	0.139	0.018
95 and over	0.97	1.05	1.17	1.09	0.81	1.06	0.071	0.108	-0.073	-0.348	0.236	-0.001
Total	1.09	1.11	1.17	1.18	1.12	1.27	0.017	0.048	0.012	-0.053	0.114	0.028
Male Income												
Under 55	1.97	2.55	1.76	2.02	1.76	2.67	0.228	-0.448	0.127	-0.150	0.341	0.020
55-59	1.31	1.35	1.61	1.38	1.66	1.67	0.025	0.166	-0.168	0.170	0.005	0.039
60-64	1.14	1.19	1.20	1.21	1.19	1.28	0.046	0.004	0.012	-0.014	0.065	0.023
65-69	1.02	1.02	1.06	1.06	1.08	1.18	0.009	0.034	-0.005	0.021	0.089	0.030
70-74	0.99	0.98	1.05	1.08	1.02	1.19	-0.004	0.058	0.035	-0.057	0.140	0.034
75-79	0.97	0.97	1.04	1.08	1.01	1.14	-0.004	0.065	0.040	-0.069	0.112	0.029
80-84	0.98	1.00	1.01	1.03	1.03	1.03	0.015	0.012	0.022	-0.002	0.001	0.010
85-89	1.00	1.05	0.99	0.97	0.93	1.05	0.050	-0.064	-0.022	-0.045	0.115	0.007
90-94	0.99	1.19	1.03	1.11	1.00	1.21	0.167	-0.147	0.069	-0.110	0.173	0.030
95 and over	0.90	0.92	1.13	1.07	0.78	1.09	0.020	0.183	-0.055	-0.376	0.287	0.012
Total	1.01	1.03	1.06	1.08	1.05	1.16	0.020	0.030	0.016	-0.028	0.096	0.027

TABLE 31
SUMMARY OF MORTALITY IMPROVEMENT FOR FEMALE LIVES
FOR CALENDAR-YEARS 1985 TO 1990
EXPECTED MORTALITY BASIS—1983 GROUP ANNUITY MORTALITY

Attained Age	A/E Ratio						Annual Improvement Factors					Arithmetic Average
	1990	1989	1988	1987	1986	1985	1990 to 1989	1989 to 1988	1988 to 1987	1987 to 1986	1986 to 1985	
Female Lives												
Under 55	3.03	2.20	3.71	5.73	3.96	3.64	-0.379	0.408	0.352	-0.446	-0.090	-0.031
55-59	2.15	2.13	2.55	2.33	2.09	2.62	-0.010	0.166	-0.094	-0.115	0.203	0.030
60-64	1.63	1.68	1.82	1.87	1.74	2.06	0.032	0.078	0.028	-0.077	0.154	0.043
65-69	1.44	1.47	1.49	1.58	1.50	1.65	0.025	0.008	0.060	-0.055	0.094	0.026
70-74	1.23	1.27	1.38	1.32	1.30	1.40	0.032	0.077	-0.044	-0.015	0.074	0.025
75-79	1.10	1.10	1.16	1.16	1.13	1.24	0.005	0.045	0.004	-0.031	0.090	0.023
80-84	1.08	1.09	1.14	1.14	1.06	1.18	0.009	0.046	-0.002	-0.072	0.098	0.016
85-89	1.10	1.11	1.22	1.22	1.12	1.25	0.003	0.095	-0.005	-0.082	0.104	0.023
90-94	1.11	1.23	1.20	1.25	1.16	1.24	0.098	-0.030	0.040	-0.077	0.069	0.020
95 and over	0.99	0.98	1.09	0.97	0.93	0.90	-0.011	0.103	-0.125	-0.044	-0.035	-0.022
Total	1.16	1.19	1.26	1.26	1.20	1.33	0.028	0.053	0.003	-0.050	0.096	0.026
Female Income												
Under 55	5.76	2.45	3.72	4.27	2.13	2.25	-1.352	0.342	0.129	-1.002	0.051	-0.366
55-59	1.78	2.17	2.54	1.60	1.93	2.20	0.180	0.148	-0.590	0.173	0.123	0.007
60-64	1.42	1.50	1.48	2.12	1.66	1.71	0.050	-0.016	0.302	-0.272	0.025	0.018
65-69	1.37	1.33	1.33	1.48	1.38	1.59	-0.030	-0.001	0.104	-0.076	0.136	0.026
70-74	1.15	1.19	1.32	1.26	1.25	1.42	0.033	0.101	-0.050	-0.005	0.116	0.039
75-79	1.04	1.06	1.11	1.14	1.09	1.19	0.023	0.040	0.031	-0.046	0.076	0.025
80-84	1.04	1.09	1.10	1.03	1.02	1.08	0.052	0.006	-0.069	-0.005	0.052	0.007
85-89	1.07	1.09	1.19	1.17	1.17	1.19	0.020	0.088	-0.021	-0.000	0.014	0.020
90-94	1.13	1.29	1.10	1.21	1.17	1.30	0.122	-0.171	0.086	-0.035	0.105	0.021
95 and over	0.97	0.72	0.75	0.93	0.90	0.88	-0.349	0.044	0.192	-0.031	-0.020	-0.033
Total	1.14	1.18	1.22	1.26	1.21	1.32	0.031	0.035	0.027	-0.041	0.086	0.027

CHART I

SUMMARY OF MORTALITY IMPROVEMENT FOR MALE LIVES FOR CALENDAR-YEARS 1985 TO 1990
 EXPECTED MORTALITY BASIS--1983 GROUP ANNUITY MORTALITY

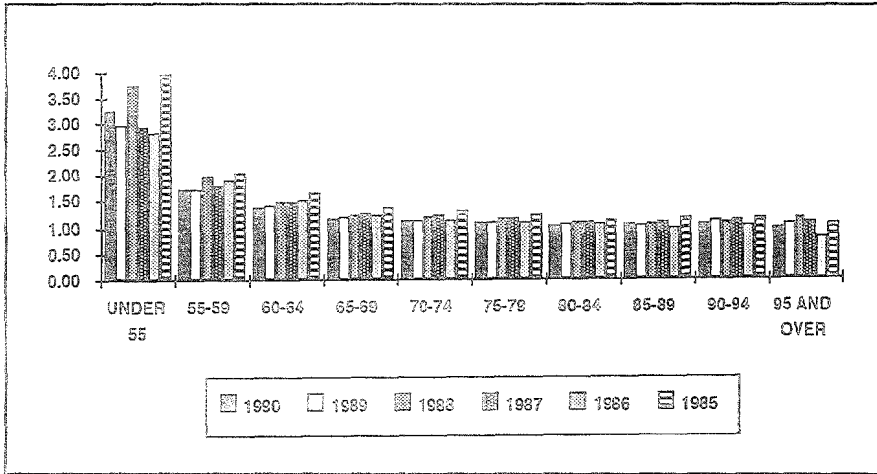


CHART II

SUMMARY OF MORTALITY IMPROVEMENT FOR MALE INCOME FOR CALENDAR-YEARS 1985 TO 1990
 EXPECTED MORTALITY BASIS—1983 GROUP ANNUITY MORTALITY

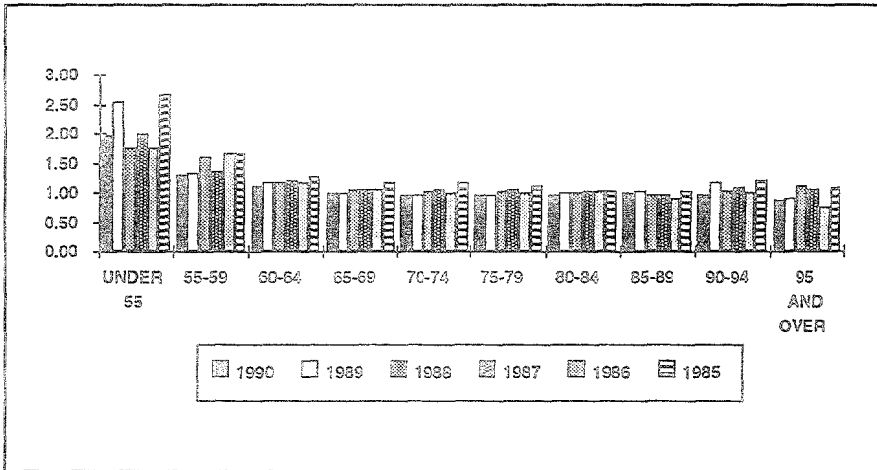


CHART III

SUMMARY OF MORTALITY IMPROVEMENT FOR FEMALE LIVES FOR CALENDAR-YEARS 1985 TO 1990
 EXPECTED MORTALITY BASIS—1983 GROUP ANNUITY MORTALITY

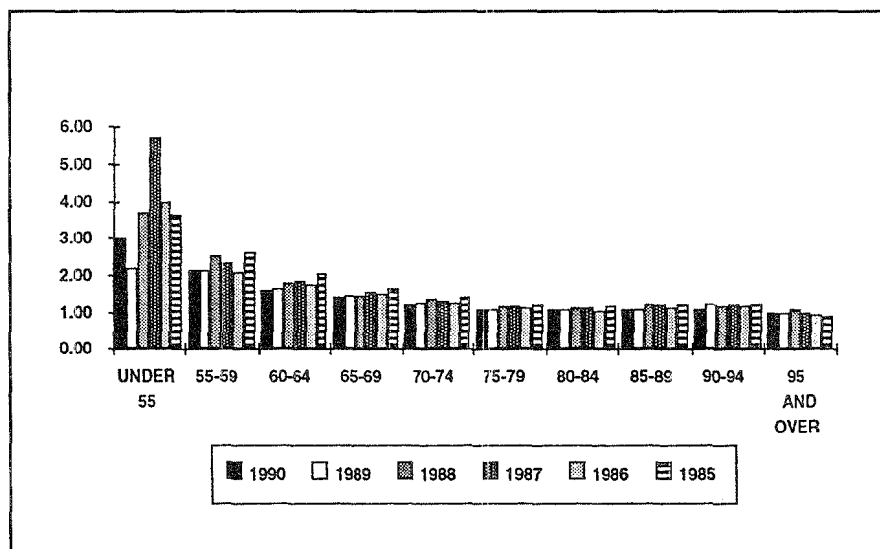


CHART IV

SUMMARY OF MORTALITY IMPROVEMENT FOR FEMALE INCOME FOR CALENDAR-YEARS 1985 TO 1990
 EXPECTED MORTALITY BASIS—1983 GROUP ANNUITY MORTALITY

