ACTUARIAL NOTE

SOME ASPECTS OF THE DYNAMIC PROJECTION OF BENEFITS UNDER THE 1973 SOCIAL SECURITY AMENDMENTS (P.L. 93–233)[1]

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This Note analyzes some of the effects that the changes in the automatic increase provisions included in the Social Security Amendments enacted on December 31, 1973 will have on the benefits payable in the future.[2] The analysis is based on the following group of seven sets of economic assumptions regarding annual increases in earnings and in the Consumer Price Index (CPI) which revolves around a central set of annual increases in earnings of 5% and in the CPI of 3%.[3]

Assumed Increase In Earnings	Assumed Increase In CPI	Implied Increase in Real Earnings
5%	4%	1%
4	3	1
6	4	2
5	3	2
4	2	2
6	3	3
5	2	3

These increases were used to compute old-age benefits to a male worker retiring in the month of June at age 65 under the following

three earning assumptions: the maximum taxable earnings, the median taxable earnings for a male worker, which are estimated at $7,681 in 1974 and low taxable earnings which are estimated as equivalent to $3,200 in 1974.[4] The automatic increases in benefits and in the earnings base were assumed to occur every year.[5] All calculations were based on the procedure for extending the benefit table whenever the taxable earnings base is increased that is provided for in the Social Security Act.[6]

Tables 1, 2, and 3 show, for selected years, projections for the three earning schedules based on the central economic assumption (5%–3%). Included are the computation period, the taxable earnings, the AMW (Average Monthly Wage) for worker retiring in the year, the PIA (Primary Insurance Amount) for June of that year, and the replacement ratio (ratio of PIA to monthly taxable earnings in the year just prior to retirement). In Table 3, the low taxable earnings, the assumed wages in the years prior to 1974 needed to calculate the AMW follow the trends of the median wage in past years.

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[1] For previous discussion of this subject refer to *Some Aspects of the Dynamic Projection of Benefits Under the 1972 Social Security Amendments*, Actuarial Note No. 81, January 1973, Social Security Administration, Baltimore, Md.

[2] For further discussion of the automatic increase provisions refer to the Appendix in *Changes In Social Security Benefits Under Public Law 93–233*, Actuarial Note No. 85, March 1974, Social Security Administration, Baltimore, Md.

[3] It should be emphasized that the projections based on the 5%–3% assumption are different from those used in our short-range cost estimates.

[4] The value of $3,200 in 1974 was selected as representative of low earnings for a steady worker. The Federal minimum wages, $1.60 per hour for a 40 hour week, would be slightly higher than this value, but there is a large number of workers covered by Social Security who are not affected by the Federal standards. It should be pointed out that the Federal minimum wage is increased to $2.00 per hour as of May 1, 1974.

[5] The Amendments require an increase in CPI of at least 3 percent from the previous computation quarter before an automatic adjustment is "triggered." However, for simplicity of the analysis in this Note, the 3% "triggering" requirement, when applicable, was disregarded.

[6] The procedure may be furnished upon request by writing to the Office of the Actuary.

Tables 4, 5, and 6 show the replacement ratios for each of the three earning schedules for each of the seven economic assumptions.

The computation period is defined as the number of years over which the AMW is computed and is based on an age-62 computation point as provided by the 1972 Amendments. For the male worker, this period is 18, 19, 19, 19, and 19 for the years 1974–78, respectively. It will become 20 in 1979, and will increase by one each year thereafter until it reaches a maximum of 35 years in 1994. For female workers, the computation period is 15 in 1974 and increases by 1 for every year thereafter, so that after 1977 it will be the same as for male workers. Thus, the figures in Table 1 for years after 1977 are also applicable to female workers. For earlier years, AMW and PIA figures for females are somewhat higher.

The dollar amounts shown for the later calendar years in Tables 1, 2, and 3 may appear to be high when compared with today's earnings and benefits. This is due to the fact that they reflect the effects of the assumed increases in prices and earnings for periods as long as 75 years. Even 50 years from today, the Consumer Price Index would be more than four times as high as present levels, and therefore the value of the dollar would depreciate by more than 75%, if, as assumed, the CPI in fact increases at 3% per year. Similarly, the earnings levels will be nearly 12 times as high as today, and therefore, the standard of living almost three times as high, under the economic assumptions underlying these tables. Because of the difficulty of interpreting dollar amounts under these conditions, the tables are most useful when emphasis is placed on the replacement ratio rather than on the absolute dollar amounts shown.

We can notice from the tables that the replacement ratios are lowest for the maximum-earnings schedule and highest for the low-earnings schedule. This phenomenon is due to the weighted nature of the benefit formula, whereby benefits are relatively higher for lower AMW's.

Probably the most important point to note is that the trend of the replacement ratio of the years, for all earnings schedules, becomes relatively level when the assumed increase in CPI is half the assumed increase in earnings (i.e., the 6%–3% and 4%–2% cases).

The ranges of the replacement ratios are summarized below:

Earnings Schedule	Range of Replacement Ratio
Maximum	24–63%
Median	30–92
Low	45–165

For a worker with a wife retiring at the same age (65), the above rates should be increased by 50 percent.

A dip in the replacement ratios generally occurs around 1994 when the computation period first reaches the maximum of 35 years.

The following trends are noted for 1995 and after:

1. For a 1% increase in real earnings. the replacement ratios steadily increase.

2. For a 2% increase in real earnings. the replacement ratios steadily increase for the 6%–4% case and increase slightly for the 5%–3% case. For the 4%–2% case they steadily increase up to year 2010 for the maximum and up to year 2015 for the low earnings schedules, and then slightly decrease thereafter. However, for the median earnings schedule, they show a slightly decreasing trend.

3. For a 3% increase in real earnings, the replacement ratios tend to remain level under the 6%–3% case and decrease slightly under the 5%–2% case.

It can also be observed that, for the same level of increase in real earnings, the level of the replacement ratio will depend on the assumed increase in CPI; the ratios will be higher for higher CPI increases.

Table 1

Man Retiring at Age 65 in Year
Maximum Taxable Earnings In All Years
Earnings Increasing at 5% and CPI at 3%

Year of Attainment of Age 65 [1]	Computation Period	Taxable Earnings in Year	AMW	PIA at Award [1]	Replacement Ratio [2]
1974	18	$ 13,200	$ 511	$ 304.90	.339
1975	19	13,800	542	323.50	.294
1976	19	14,400	584	353.40	.307
1977	19	15,000	628	387.80	.323
1978	19	15,900	676	419.20	.335
1979	20	16,800	708	441.00	.333
1980	21	17,700	741	465.20	.332
1985	26	22,500	911	591.80	.333
1990	31	28,800	1,099	748.00	.329
1995	35	36,900	1,341	953.50	.326
2000	35	46,800	1,768	1,256.80	.337
2005	35	60,000	2,305	1,645.00	.346
2010	35	76,800	2,980	2,141.10	.351
2015	35	98,100	3,809	2,768.90	.356
2020	35	125,100	4,866	3,575.70	.360
2025	35	159,600	6,216	4,611.90	.364
2030	35	203,700	7,937	5,941.00	.367
2035	35	259,500	10,133	7,645.90	.371
2040	35	331,500	12,933	9,832.20	.374
2045	35	423,000	16,503	12,632.70	.376
2050	35	540,000	21,057	16,219.50	.379

[1] Assumes retirement in June.

[2] Replacement Ratio represents the ratio of PIA at award to monthly taxable earnings in the year just prior to retirement.

Table 2

Man Retiring at Age 65 in Year
Median Taxable Earnings In All Years
Earnings Increasing at 5% and CPI at 3%

Year of Attainment of Age 65 [1]	Computation Period	Taxable Earnings in Year	AMW	PIA at Award [1]	Replacement Ratio [2]
1974	18	$ 7,681	$ 407	$ 261.30	.436
1975	19	8,065	419	272.90	.426
1976	19	8,468	439	289.40	.431
1977	19	8,892	460	308.20	.437
1978	19	9,236	484	328.30	.443
1979	20	9,803	499	344.80	.443
1980	21	10,293	514	361.80	.443
1985	26	13,137	597	471.20	.452
1990	31	16,767	696	606.60	.456
1995	35	21,399	828	760.80	.448
2000	35	27,311	1,060	989.00	.456
2005	35	34,857	1,357	1,288.70	.466
2010	35	44,487	1,734	1,674.00	.474
2015	35	56,778	2,213	2,171.10	.482
2020	35	72,465	2,825	2,809.70	.489
2025	35	92,486	3,605	3,632.10	.495
2030	35	118,038	4,601	4,689.70	.501
2035	35	150,650	5,873	6,047.00	.506
2040	35	192,271	7,495	7,788.90	.510
2045	35	245,392	9,566	10,027.60	.515
2050	35	313,190	12,210	12,895.20	.519

[1] Assumes retirement in June.
[2] Replacement Ratio represents the ratio of PIA at award to monthly taxable earnings in the year just prior to retirement.

Table 3

Man Retiring at Age 65 in Year
Low Taxable Earnings In All Years
Earnings Increasing at 5% and CPI at 3%

Year of Attainment of Age 65 [1]	Computation Period	Taxable Earnings in Year	AMW	PIA at Award [1]	Replacement Ratio [2]
1974 ----------	18	$ 3,200	$ 169	$ 157.20	.630
1975 ----------	19	3,360	174	162.30	.611
1976 ----------	19	3,528	183	172.20	.615
1977 ----------	19	3,704	192	181.80	.618
1978 ----------	19	3,889	201	191.70	.621
1979 ----------	20	4,084	207	260.20	.618
1980 ----------	21	4,288	214	210.80	.619
1985 ----------	26	5,473	249	264.10	.608
1990 ----------	31	6,985	290	336.10	.606
1995 ----------	35	8.914	345	435.20	.615
2000 ----------	35	11,377	441	593.50	.657
2005 ----------	35	14.520	565	814.70	.707
2010 ----------	35	18.532	722	1,116.30	.759
2015 ----------	35	23,652	922	1,446.30	.771
2020 ----------	35	30,187	1,176	1,880.40	.785
2025 ----------	35	38.527	1,502	2,442.70	.799
2030 ----------	35	49,172	1,917	3,169.70	.812
2035 ----------	35	62,757	2,446	4,106.80	.825
2040 ----------	35	80.095	3,122	5,310.50	.835
2045 ----------	35	102,224	3,985	6,356.90	.845
2050 ----------	35	130,467	5,086	8,849.60	.855

[1] Assumes retirement in June.

[2] Replacement Ratio represents the ratio of PIA at award to monthly taxable earnings in the year just prior to retirement.

Table 4

Replacement Ratios [1]
Man Retiring At Age 65 in Year
Maximum Taxable Earnings in All Years

Assumed Annual Increases in Earnings and in CPI

Calendar Year	5.00%–4.00%	4.00%–3.00%	6.00%–4.00%	5.00%–3.00%	4.00%–2.00%	6.00%–3.00%	5.00%–2.00%
1975	.296	.294	.296	.294	.292	.294	.292
1980	.351	.344	.336	.332	.325	.317	.314
1985	.370	.364	.335	.333	.328	.302	.300
1990	.383	.369	.337	.329	.317	.290	.282
1995	.398	.380	.343	.326	.311	.281	.267
2000	.429	.407	.359	.337	.318	.283	.265
2005	.457	.427	.372	.346	.322	.284	.262
2010	.479	.443	.387	.351	.322	.286	.257
2015	.501	.457	.396	.356	.321	.286	.254
2020	.522	.471	.405	.360	.320	.285	.250
2025	.541	.483	.413	.364	.320	.285	.247
2030	.560	.496	.420	.367	.320	.284	.245
2035	.578	.507	.427	.371	.318	.284	.242
2040	.596	.517	.433	.374	.317	.284	.241
2045	.612	.528	.439	.376	.317	.283	.239
2050	.627	.538	.444	.379	.317	.283	.237

[1] Replacement Ratio represents the PIA at award (June of year) to monthly taxable earnings in the year just prior to retirement.

Table 5

Replacement Ratios [1]
Man Retiring At Age 65 in Year
Median Taxable Earnings In All Years

Assumed Annual Increases in Earnings and in CPI

Calendar Year	5.00%–4.00%	4.00%–3.00%	6.00%–4.00%	5.00%–3.00%	4.00%–2.00%	6.00%–3.00%	5.00%–2.00%
1975	.430	.426	.430	.426	.423	.426	.423
1980	.468	.462	.450	.443	.437	.425	.419
1985	.501	.485	.467	.452	.436	.421	.407
1990	.531	.512	.474	.456	.439	.407	.391
1995	.548	.522	.472	.448	.427	.387	.366
2000	.585	.548	.492	.456	.426	.383	.355
2005	.626	.574	.511	.466	.425	.382	.346
2010	.665	.599	.530	.474	.424	.381	.338
2015	.701	.623	.548	.482	.423	.380	.330
2020	.736	.646	.564	.489	.421	.379	.324
2025	.770	.667	.578	.495	.420	.379	.318
2030	.802	.688	.591	.501	.419	.379	.314
2035	.933	.707	.603	.506	.418	.378	.310
2040	.862	.725	.614	.510	.417	.378	.306
2045	.890	.743	.624	.515	.416	.377	.303
2050	.916	.759	.633	.519	.415	.377	.300

[1] Replacement Ratio represents the PIA at award (June of year) to monthly taxable earnings in the year just prior to retirement.

Table 6

Replacement Ratios [1]
Man Retiring At Age 65 in Year
Low Taxable Earnings In All Years

Calendar Year	Assumed Annual Increases in Earnings and in CPI						
	5.00%–4.00%	4.00%–3.00%	6.00%–4.00%	5.00%–3.00%	4.00%–2.00%	6.00%–3.00%	5.00%–2.00%
1975 ____	.615	.611	.615	.611	.606	.611	.606
1980 ____	.655	.650	.625	.619	.615	.591	.586
1985 ____	.675	.663	.627	.608	.597	.566	.547
1990 ____	.706	.679	.636	606	.583	.546	.521
1995 ____	.751	.706	.659	.615	.576	.539	.502
2000 ____	.843	.771	.725	.657	.599	.565	.511
2005 ____	.951	.834	.817	.707	.618	.607	.524
2010 ____	1.072	.920	.848	.759	.650	.601	.536
2015 ____	1.141	1.001	.885	.771	.672	.597	.518
2020 ____	1.220	1.044	.923	.785	.668	.596	.502
2025 ____	1.299	1.089	.957	.799	.664	.594	.489
2030 ____	1.375	1.138	.988	.812	.662	.593	.477
2035 ____	1.448	1.185	1.016	.825	.659	.592	.468
2040 ____	1.518	1.230	1.042	.835	.657	.591	.459
2045 ____	1.584	1.272	1.066	.845	.655	.590	.451
2050 ____	1.647	1.313	1.087	.855	.653	.590	.445

[1] Replacement Ratio represents the PIA at award (June of year) to monthly taxable earnings in the year just prior to retirement.