

AN UPDATED MONEY'S-WORTH ANALYSIS  
OF SOCIAL SECURITY RETIREMENT BENEFITS

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ABSTRACT

The question is frequently raised: Do workers get their money's worth from the payroll taxes that they pay under the U.S. Social Security program? Analyses by nonactuaries are usually faulty because of incorrect methodology and/or incorrect assumptions. This paper presents an analysis of cash retirement benefits for various cases of workers at two earnings levels who attained age 65 and retired in the past and who will attain the normal retirement age and retire at several dates in the future.

In summary, the vast majority of workers who retired in the past received, and are receiving, benefits of far greater value than the taxes that they paid. This situation will change in the future, especially if tax rates rise to a level sufficient to support the program over the long run. Many workers who retire in the future will not get their money's worth when the combined employer-employee taxes are considered. This result would be expected eventually for a program that is financed almost entirely by these payroll taxes; however, the vast majority of workers will get their money's worth if only the employee tax is considered.

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I. INTRODUCTION

A subject that is widely discussed in connection with the Social Security cash-benefits program (Old-Age, Survivors, and Disability Insurance, or OASDI) is whether individuals receive their "money's worth" from the Social Security taxes that they pay. Such a question is easier to ask than to answer precisely because of the many variables and intangibles involved. Nonactuaries frequently analyze this issue inadequately, by using inconsistent assumptions (such as interest rates that are too high relative to assumed earnings growth), ignoring important benefit features, or having incorrect methodology. While perhaps no analysis can provide precise answers to this money's-worth question, a proper analysis can produce approximate ratios that can be used to make valid comparisons among classes of workers retiring at various times.

This paper updates "A Money's-Worth Analysis of Social Security Retirement Benefits," by Myers and Schobel, *TSA XXXV* (1983): 533-45. That paper was based on the law in effect before the very significant Social Security Amendments of 1983 (Public Law 98-21), although the new law was reflected to a large extent in the Authors' Review of Discussion (pp. 555-61). This paper uses essentially the same methodology as the original paper, but it reflects the current law completely and uses the latest economic and demographic assumptions of Social Security's Board of Trustees. The latest assumptions, which were the subject of a review in 1990 by a Technical Panel of Actuaries and Economists appointed by the quadrennial Advisory Council on Social Security, are significantly different from the ones used in 1983.

## II. METHODOLOGY

A major element in any money's-worth analysis is whether only the employee taxes or the combined employer-employee taxes should be the basis for comparison between accumulated taxes and the present value of future benefits. Some individuals (including many economists) believe that the latter basis is more appropriate, because they believe that the employer tax is borne entirely by employees through lower wages than would otherwise be paid, although this would not necessarily be the case on an individual-by-individual basis. Others believe, however, that—at least in part—the employer tax is passed on to consumers in general (who, in the aggregate, consist largely of employees and their families) in the form of higher prices. Under these circumstances, one cannot determine whether employees bear the employer tax, either individually or in the aggregate. Still others believe that some portion of the employer tax may be reflected in lower corporate profits, which implies that the stockholders (who also may consist partially of employees, at least through employee pension funds) may bear some of the burden in that way.

For this paper, only the employee tax is used. Obviously, all the results can be adjusted to a combined employer-employee tax basis by multiplying the accumulated tax figures by two, thus halving the ratios of the value of the benefits to the value of the taxes. (In the original money's-worth paper, in 1983, we took the opposite approach, showing ratios based on employer-employee taxes. We have changed our view on which approach is more appropriate, but conversion from one to the other is a trivial calculation in any event.)

Self-employed workers pose a special problem. They pay “payroll” taxes at the combined employer-employee rate but, since 1990 (and in a somewhat different manner in 1984–89), receive income-tax deductions equal to 50 percent of these taxes. In our view, the most appropriate analysis considers only the portion of their tax that represents the employee share and treats the remainder as an employer tax, which is pooled for the benefits of high-cost categories.

Another problem of money’s-worth comparisons is the technical one of precisely evaluating the very complex OASDI benefit structure. A proper analysis must consider not only the provisions for computing initial benefits, but also the automatic-adjustment provisions applicable to benefits in payment status. Moreover, the analysis should consider the possible entitlement of other family members to auxiliary or survivor benefits.

To simplify the concepts (and the computations), such comparisons frequently deal only with retirement benefits—as does this paper—and are applicable to individuals who have attained retirement age. The failure to consider disability benefits, survivor benefits payable in the case of death before retirement age, and Hospital Insurance (HI) benefits can be mitigated to a considerable extent by taking into account only the Old-Age and Survivors Insurance (OASI) portion of the total payroll tax, which supports both the OASDI and the HI programs.

This analysis is based on the OASI tax rates scheduled in present law, which actually decline slightly from the current rate, starting in 2000, and remain level thereafter. We recognize, however, that these rates are likely to be inadequate in the very long term. For example, under the intermediate (alternative II) assumptions in the *1991 OASDI Trustees Report*,<sup>1</sup> a higher OASI tax rate will be required some 50 years from now to support the present benefit structure. The effects of higher future tax rates on the money’s-worth situation are discussed in general terms. Of course, we cannot predict with any certainty how anticipated future financial difficulties would be resolved, even if the assumptions turn out to be exactly right. The last time that Social Security had major financial problems, in 1983, they were corrected by a combination of tax increases, benefit reductions, and other changes not so easily characterized. A similar combination of changes would be likely to occur in the future as well.

<sup>1</sup>*1991 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Disability Insurance Trust Funds* (House Document No. 102-88), House of Representatives, Washington, D.C., May 17, 1991, pp. 38–44.

The basic procedure used in the money's-worth analysis is to relate (1) the OASI taxes accumulated with interest to the retirement age to (2) the present value of the future benefits measured as of that same time. Nonetheless, comparability is still incomplete, because the value of survivor benefits in the case of death occurring prior to attaining retirement age is thereby implicitly presumed to be the accumulated taxes as of the time of death. Of course, in actual practice the value of these benefits could range from zero, if no surviving spouse or children are left, to a very high figure, if such beneficiaries are present and are young.

We believe that this implicit assumption as to the value of preretirement survivor benefits is reasonably accurate, because *in the aggregate* the taxes and benefits have roughly equal values for any cohort of workers. In any event, because so few workers die before reaching retirement age, these benefits have a relatively small value.<sup>2</sup> (The value of postretirement survivor benefits, as well as spousal benefits, is discussed later.) The use of this simple approach produces reasonably precise and accurate results, while being easy for nonactuaries to understand. Moreover, the hypothetical-worker approach does not lend itself to any other methodology.

Another technical problem is choosing the appropriate interest rates for the preretirement and postretirement periods. In accumulating taxes paid during the preretirement period, we use the yearly average interest rate (nominal, compounded semiannually) payable on new special-issue investments of the Social Security trust funds: an assumed rate of 2.25 percent for 1937–50, the actual experience for 1951–90, and the nominal rates projected for the future under the intermediate assumptions of the *1991 OASDI Trustees Report* for 1991 and after (see Table 1).

The same interest rates could theoretically be used to discount the stream of future benefits as of the retirement date, based on the benefit amounts that were actually payable before 1991 and on the estimated benefit amounts that would be payable after 1991, based on the intermediate assumptions of the *1991 OASDI Trustees Report*. This procedure would directly take into account postretirement increases in Social Security benefits. Such increases were on an ad hoc basis before 1975; since then, they have been based on

<sup>2</sup>Under current mortality conditions, 11 percent of male workers die before age 55, by which time relatively few of them still have children who are eligible for Social Security survivor benefits. For those who do have such children, the potential period of benefit receipt is relatively short. The corresponding percentage for women is lower, of course. Also, such percentages will decrease in the future as mortality rates decline.

increases in the Consumer Price Index (CPI).<sup>3</sup> An essentially equivalent procedure, however, is to use a “real” interest rate (relative to the CPI) to compute annuity factors that can be applied to the *initial* benefit amount. We believe that the best interest rate to use in this analysis for obtaining the present value of benefits after retirement, either in the past or in the future, is 2 percent. This is a good approximation of the real interest rate relative to the CPI—and thus implicitly adjusts for benefit increases after retirement. Because the results are sensitive to the real interest rate chosen, figures are also presented for interest rates of 0, 1, and 3 percent. Although 2 percent is an appropriate interest rate generally, in some periods a slightly higher or lower rate might have applied (for example, in 1969–72, the benefit increases far exceeded the increases in the CPI). We do not believe that the use of a constant real rate to discount future benefits introduces any material distortion in the money’s-worth results.

The choice of 2 percent as the best (or most appropriate) real interest rate could be questioned. This is approximately the long-term rate that was used for the intermediate (alternative II or II-B) assumptions in the annual Trustees Reports for many years. Several decades ago, some people believed that a 3 percent real rate would be better, but the experience in the 1960s, when the real interest rate was less than 1 percent, caused most analysts to lower their sights. Most recently, in the *1991 OASDI Trustees Report*, the intermediate nominal interest-rate assumption was raised slightly to 6.3 percent, compounded semiannually; when considered along with assumed CPI increases of 4.0 percent annually, this nominal rate represents an effective annual *real* interest rate of 2.31 percent. Obviously, the use of an interest rate higher than 2 percent for obtaining the present value of the benefits results in lower ratios of benefits to taxes.

Another problem is the selection of an appropriate mortality basis for the valuation of the future retirement benefits, especially considering the increases in longevity that have occurred in the past and are likely to occur in the future. The best procedure considers the decreases in mortality rates that occurred or will occur, as the case may be, after the date of retirement, rather than merely the mortality conditions prevailing at the time of retirement. Such “cohort” mortality rates have been developed by the Social Security Administration using the “period” rates derived from the U.S.

<sup>3</sup>More specifically, Social Security regulations require the use of the Consumer Price Index for Urban Wage Earners and Clerical Workers, or CPI-W.

decennial life tables (the latest ones available being those for 1979–81) and from projected future rates developed for the annual Trustees Reports.<sup>4</sup> However, results are also presented on a static-mortality basis.

This analysis focuses on workers retiring at the normal retirement age (NRA), the earliest age at which unreduced retirement benefits can be obtained. Retirement is assumed to occur at the beginning of various years, as follows: 1960, 1970, 1980, 1991, 2002 (the last year in which workers can retire at an NRA of 65), 2009 (the first year in which workers can retire at an NRA of 66), 2020 (the last year in which workers can retire at an NRA of 66), and 2027 (the first year in which workers can retire at an NRA of 67).<sup>5</sup>

This paper also presents a supplementary analysis of the so-called “notch” issue: the significantly different benefit amounts that can be paid to people with essentially the same earnings histories who were born in slightly different years. Specifically, people born in the “notch” years, 1917–21, can receive less than people born earlier. No significant differences occur when retirement occurs at age 62, but for later retirement the “notch babies” can receive as much as \$200 per month less than those born earlier (with the same earnings history in each case). In addition, some believe, although erroneously, that the notch babies are treated worse than those born after 1921.

All the hypothetical workers considered in this paper are assumed to have begun working in Social Security-covered employment at age 21 (or 1937, if later) and stopped working at the end of the year before retirement. Two alternative earnings levels are assumed:

1. *Average*. Defined to be earnings equal to the national average wage in every year. The national average wage has been computed and officially

<sup>4</sup>The Office of the Actuary, Social Security Administration, occasionally publishes its mortality studies (see, for example, *Life Tables for the United States: 1900–2050*, Actuarial Study No. 87, September 1982). The mortality rates used in this paper were developed for the *1991 Trustees Report* and are unpublished to date. The authors thank Alice H. Wade for her assistance in providing tables of mortality rates and annuity factors.

<sup>5</sup>For more details on the normal retirement age and how it is scheduled to increase under present law, see Robert J. Myers and Bruce D. Schobel, “Early-Retirement Reduction and Delayed-Retirement Increase Factors under U.S. Social Security Law,” *TSA XLII* (1990): 295–320.

promulgated by the Social Security Administration for 1937–90 (although the 1990 figure was not released until after this paper was written).<sup>6</sup> The series was extended forward after 1989 on the basis of the intermediate (alternative II) assumptions in the *1991 OASDI Trustees Report*.

2. *Maximum*. Defined to be earnings equal to the maximum taxable earnings for OASDI purposes<sup>7</sup> in each year, extended beyond 1991 on the basis of the same intermediate assumptions used to project the national average wage.

The average and maximum earnings levels, as well as the OASI tax rates, are shown in Table 1 for each year in the period 1937–2030.

The relationship between the average wage and the OASDI maximum taxable earnings amount is significant, both in the past and in the future, under the provisions of present law. When the program began operations in 1937, the maximum taxable amount was about 270 percent of the average wage. This ratio fell during the 1940s and was only 118 percent in 1950, because the maximum taxable amount, which was specified in the law, was never increased in that period. Beginning with 1951, the maximum amount was raised several times, and its ratio to the average wage fluctuated between 114 percent and 129 percent during 1951–61. The ratio decreased to a low of 103 percent in 1965 and then, in 1966–73, fluctuated between 120 percent and 142 percent. The maximum taxable amount was raised substantially by legislation during the 1970s and became subject to automatic adjustment after 1974. As a result, the ratio of this amount to the average wage rose to about 165 percent during 1974–78 and further each subsequent year, until reaching a level of about 235 percent in 1983–89. In 1990 and after, the ratio is (and will be, under present law) about 240 percent.

The hypothetical workers are assumed to have no periods of unemployment in their lives. Thus, contributions are assumed to be made continuously

<sup>6</sup>Since 1979, this national average wage series has been used to index such program parameters as the maximum taxable earnings amounts for Social Security and Medicare (HI) payroll taxes, the amount of earnings needed to earn a “quarter of coverage,” the exempt amounts under the retirement earnings test, and the so-called “bend points” of the benefit formulas. In addition, this series is used to index the actual earnings of workers in computing their average indexed monthly earnings (AIME).

<sup>7</sup>The maximum taxable amount for OASDI purposes in 1991 was \$53,400. This needs to be distinguished from the maximum taxable amount for Medicare (HI) payroll taxes, which was \$125,000. Before 1991, these amounts were identical. Starting in 1991, they are different, and the difference will continue because both amounts are indexed by changes in the national average wage.

TABLE 1

INTEREST RATE USED TO ACCUMULATE TAXES DURING PRERETIREMENT PERIOD,  
OASI TAX RATE, AND AVERAGE AND MAXIMUM EARNINGS LEVELS  
AND OASI TAXES, 1937-2030

Year	Interest Rate	OASI Tax Rate	Average Earner		Maximum Earner	
			Earnings	OASI Tax	Earnings	OASI Tax
1937 ...	2.250%	1.000%	\$ 1,150.45	\$ 11.50	\$ 3,000.00	\$ 30.00
1938 ...	2.250	1.000	1,053.23	10.53	3,000.00	30.00
1939 ...	2.250	1.000	1,142.35	11.42	3,000.00	30.00
1940 ...	2.250	1.000	1,195.01	11.95	3,000.00	30.00
1941 ...	2.250	1.000	1,276.03	12.76	3,000.00	30.00
1942 ...	2.250	1.000	1,454.27	14.54	3,000.00	30.00
1943 ...	2.250	1.000	1,713.52	17.14	3,000.00	30.00
1944 ...	2.250	1.000	1,936.32	19.36	3,000.00	30.00
1945 ...	2.250	1.000	2,021.39	20.21	3,000.00	30.00
1946 ...	2.250	1.000	1,891.76	18.92	3,000.00	30.00
1947 ...	2.250	1.000	2,175.32	21.75	3,000.00	30.00
1948 ...	2.250	1.000	2,361.66	23.62	3,000.00	30.00
1949 ...	2.250	1.000	2,483.19	24.83	3,000.00	30.00
1950 ...	2.250	1.500	2,543.95	38.16	3,000.00	45.00
1951 ...	2.188	1.500	2,799.16	41.99	3,600.00	54.00
1952 ...	2.250	1.500	2,973.32	44.60	3,600.00	54.00
1953 ...	2.354	1.500	3,139.44	47.09	3,600.00	54.00
1954 ...	2.302	2.000	3,155.64	63.11	3,600.00	72.00
1955 ...	2.292	2.000	3,301.44	66.03	4,200.00	84.00
1956 ...	2.469	2.000	3,532.36	70.65	4,200.00	84.00
1957 ...	2.500	2.000	3,641.72	72.83	4,200.00	84.00
1958 ...	2.562	2.000	3,673.80	73.48	4,200.00	84.00
1959 ...	2.625	2.250	3,855.80	86.76	4,800.00	108.00
1960 ...	2.917	2.750	4,007.12	110.20	4,800.00	132.00
1961 ...	3.812	2.750	4,086.76	112.39	4,800.00	132.00
1962 ...	3.854	2.875	4,291.40	123.38	4,800.00	138.00
1963 ...	3.906	3.375	4,396.64	148.39	4,800.00	162.00
1964 ...	4.136	3.375	4,576.32	154.45	4,800.00	162.00
1965 ...	4.198	3.375	4,658.72	157.23	4,800.00	162.00
1966 ...	4.948	3.500	4,938.36	172.84	6,600.00	231.00
1967 ...	4.958	3.550	5,213.44	185.08	6,600.00	234.30
1968 ...	5.490	3.325	5,571.76	185.26	7,800.00	259.35
1969 ...	6.594	3.725	5,893.76	219.54	7,800.00	290.55
1970 ...	7.260	3.650	6,186.24	225.80	7,800.00	284.70



TABLE 1—Continued

Year	Interest Rate	OASI Tax Rate	Average Earner		Maximum Earner	
			Earnings	OASI Tax	Earnings	OASI Tax
1971 ...	5.979%	4.050%	\$ 6,497.08	\$ 263.13	\$ 7,800.00	\$ 315.90
1972 ...	5.927	4.050	7,133.80	288.92	9,000.00	364.50
1973 ...	6.646	4.300	7,580.16	325.95	10,800.00	464.40
1974 ...	7.490	4.375	8,030.76	351.35	13,200.00	577.50
1975 ...	7.396	4.375	8,630.92	377.60	14,100.00	616.88
1976 ...	7.146	4.375	9,226.48	403.66	15,300.00	669.38
1977 ...	7.083	4.375	9,779.44	427.85	16,500.00	721.88
1978 ...	8.198	4.275	10,556.03	451.27	17,700.00	756.68
1979 ...	9.115	4.330	11,479.46	497.06	22,900.00	991.57
1980 ...	11.000	4.520	12,513.46	565.61	25,900.00	1,170.68
1981 ...	13.333	4.700	13,773.10	647.34	29,700.00	1,395.90
1982 ...	12.781	4.575	14,531.34	664.81	32,400.00	1,482.30
1983 ...	11.031	4.775	15,239.24	727.67	35,700.00	1,704.68
1984 ...	12.396	5.200	16,135.07	839.02	37,800.00	1,965.60
1985 ...	10.781	5.200	16,822.51	874.77	39,600.00	2,059.20
1986 ...	7.990	5.200	17,321.82	900.73	42,000.00	2,184.00
1987 ...	8.396	5.200	18,426.51	958.18	43,800.00	2,277.60
1988 ...	8.823	5.530	19,334.04	1,069.17	45,000.00	2,488.50
1989 ...	8.656	5.530	20,099.55	1,111.51	48,000.00	2,654.40
1990 ...	8.625	5.600	21,024.11	1,177.35	51,300.00	2,872.80
1991 ...	8.000	5.600	21,780.69	1,219.72	53,400.00	2,990.40
1992 ...	7.600	5.600	22,925.64	1,283.84	55,800.00	3,124.80
1993 ...	7.200	5.600	24,143.42	1,352.03	57,900.00	3,242.40
1994 ...	6.800	5.600	25,384.98	1,421.56	60,900.00	3,410.40
1995 ...	6.800	5.600	26,737.74	1,497.31	64,200.00	3,595.20
1996 ...	6.700	5.600	28,141.28	1,575.91	67,500.00	3,780.00
1997 ...	6.600	5.600	29,613.54	1,658.36	71,100.00	3,981.60
1998 ...	6.500	5.600	31,147.78	1,744.28	74,700.00	4,183.20
1999 ...	6.500	5.600	32,765.11	1,834.85	78,600.00	4,401.60
2000 ...	6.400	5.490	34,464.16	1,892.08	82,800.00	4,545.72
2001 ...	6.300	5.490	36,221.83	1,988.58	87,000.00	4,776.30
2002 ...	6.300	5.490	38,069.15	2,090.00	91,500.00	5,023.35
2003 ...	6.300	5.490	40,010.67	2,196.59	96,300.00	5,286.87
2004 ...	6.300	5.490	42,051.22	2,308.61	101,100.00	5,550.39
2005 ...	6.300	5.490	44,195.83	2,426.35	106,200.00	5,830.38
2006 ...	6.300	5.490	46,449.82	2,550.09	111,600.00	6,126.84
2007 ...	6.300	5.490	48,818.76	2,680.15	117,300.00	6,439.77
2008 ...	6.300	5.490	51,308.51	2,816.84	123,300.00	6,769.17
2009 ...	6.300	5.490	53,925.25	2,960.50	129,600.00	7,115.04
2010 ...	6.300	5.490	56,675.43	3,111.48	136,200.00	7,477.38

TABLE 1—Continued

Year	Interest Rate	OASI Tax Rate	Average Earner		Maximum Earner	
			Earnings	OASI Tax	Earnings	OASI Tax
2011 ...	6.300%	5.490%	\$ 59,565.88	\$3,270.17	\$143,100.00	\$ 7,856.19
2012 ...	6.300	5.490	62,603.74	3,436.95	150,300.00	8,251.47
2013 ...	6.300	5.490	65,796.53	3,612.23	158,100.00	8,679.69
2014 ...	6.300	5.490	69,152.16	3,796.45	166,200.00	9,124.38
2015 ...	6.300	5.490	72,678.92	3,990.07	174,600.00	9,585.54
2016 ...	6.300	5.490	76,385.54	4,193.57	183,600.00	10,079.64
2017 ...	6.300	5.490	80,281.20	4,407.44	192,900.00	10,590.21
2018 ...	6.300	5.490	84,375.54	4,632.22	202,800.00	11,133.72
2019 ...	6.300	5.490	88,678.70	4,868.46	213,000.00	11,693.70
2020 ...	6.300	5.490	93,201.31	5,116.75	223,800.00	12,286.62
2021 ...	6.300	5.490	97,954.58	5,377.71	235,200.00	12,912.48
2022 ...	6.300	5.490	102,950.26	5,651.97	247,200.00	13,571.28
2023 ...	6.300	5.490	108,200.72	5,940.22	259,800.00	14,263.02
2024 ...	6.300	5.490	113,718.96	6,243.17	273,000.00	14,987.70
2025 ...	6.300	5.490	119,518.63	6,561.57	286,800.00	15,745.32
2026 ...	6.300	5.490	125,614.08	6,896.21	301,500.00	16,552.35
2027 ...	6.300	5.490	132,020.40	7,247.92	316,800.00	17,392.32
2028 ...	6.300	5.490	138,753.44	7,617.56	333,000.00	18,281.70
2029 ...	6.300	5.490	145,829.86	8,006.06	350,100.00	19,220.49
2030 ...	6.300	5.490	153,267.18	8,414.37	368,100.00	20,208.69

## Notes:

1. Interest rates are nominal, compounded semiannually. Figures are actual through 1990, projected thereafter.
2. Tax rates are employee rates only. Figures are actual through 1991, scheduled in law thereafter.
3. Average earnings amounts are actual through 1989, projected thereafter.
4. Maximum earnings amounts are actual through 1991, projected thereafter.
5. All projections are based on the intermediate (alternative II) assumptions of the *1991 OASDI Trustees Report* (footnote 1).

in every year. If periods of unemployment were assumed, these would reduce the accumulated taxes, but not necessarily the benefits payable, because the dropout-years provision of the Social Security benefit computation has a much greater effect for fluctuating earnings history than for a steady one.

Because of the assumption of no unemployment and for other reasons, the two hypothetical earnings patterns used are really not "typical." The relative earnings levels of workers tend to vary over their lifetimes, with earnings usually being below average in the early working years, being above average in the middle years, and declining somewhat in later years. These patterns often reflect service increases, promotions, and so on.

If a typical average-earnings pattern could be developed, including periods of unemployment and a more usual trend of earnings, the money's-worth analysis would not be very different from that shown here for steady average

earners. The present value of benefits would be slightly higher, because of the dropout-years provision, which would eliminate years with significant unemployment and the early years with low earnings; while the accumulated value of taxes paid would be somewhat lower, because of unemployment and because relatively larger tax payments would be made in later years, when the effects of interest would be less. The overall effect might be an increase in the benefits/taxes ratios of about 10–20 percent relatively.

The steady maximum earner was once common but is becoming less so. Because of the many ad hoc increases in the maximum taxable amount that occurred in 1972–81, few workers in their 20s and early 30s today are able to earn the maximum, although this was not so uncommon in the past. Thus, the lifetime maximum earner will not often occur in the future. A typical future maximum earner might not reach maximum earnings until perhaps age 30. Because such a worker would still have time to earn the maximum amount for the 35 years that are needed for maximum benefits, the effect on the present value of retirement benefits would be insignificant, but the accumulated value of taxes would be somewhat lower. Therefore, the ratio of the value of the benefits to the value of the taxes would be higher than those shown in this analysis, by perhaps 5–10 percent relatively.

Results are shown separately for men and women. No computations were made for the case of a married couple, because most people retiring currently receive benefits on their own earnings records, with perhaps residual spouse benefits, rather than solely on the earnings records of their spouses. This will be even more true in the future, because of greater labor-force participation by women. Thus, in a very large proportion of cases, both husband and wife will have benefits based on their own earnings records and will not receive spouse benefits at all, or else one spouse will receive a small residual benefit.

However, in past years and even to a considerable extent for those retiring currently, spousal auxiliary and survivor benefits have had considerable value. For example, considering a couple of the same age, with the man being the only earner, the value of the wife's benefits is 85–90 percent of the value of the husband's retired-worker benefits. Under these circumstances, the ratios of the present value of benefits to the accumulated taxes for retirement cases would be almost twice as large, thus further enlarging the "bargain" nature of the benefit protection provided for those who retired in the program's early decades of operation.

These hypothetical workers are assumed to have no children eligible for benefits. This assumption, which was made to simplify the calculations,

does not distort the results. The Office of the Actuary, Social Security Administration, estimates that, over the long run, benefits to children of retired workers will represent only about 1 percent of the total cost of retirement benefits. Therefore, the ratios of benefits to taxes would be only slightly affected if eligible children were assumed to be present.

Figures are shown for retirement at the NRA only (except for two cases in the supplementary “notch” analysis). The ratios of the present value of future benefits to the accumulated taxes would not be very much different for retirement at ages between 62 and the NRA, because the early-retirement reduction factors are close to being “actuarial,”<sup>8</sup> and the amount of taxes not paid in the several years before the NRA would be counterbalanced, in part, by the lower benefits resulting from not having earnings in those years. (The earnings assumed to occur in those years are somewhat higher than those in the previous years and thus produce a larger benefit.) On balance, the ratios of benefits to taxes for retirement at ages between 62 and the NRA would be slightly higher than those for retirement at the NRA.

On the other hand, for those reaching the NRA before 2009, the ratios would be significantly lower for retirement at ages after the NRA, because the delayed-retirement increases are less than the actuarial equivalent, and the additional taxes paid would more than counterbalance the effect of the increase in the benefit resulting from the higher additional earnings. For those reaching the NRA in 2009 and after, the delayed-retirement increase is 8 percent per year of delay (until age 70), which is approximately the actuarial-equivalent factor.

As noted earlier, as to economic assumptions, the future wage and CPI increases are those used for the intermediate (alternative II) assumptions of the *1991 OASDI Trustees Report*. No changes in the law as it was at the end of 1991 are assumed to occur, even though this assumption is probably not valid for the tax rates if the benefit structure remains unchanged. Based on such intermediate assumptions, higher tax rates will be necessary by 2040 at the latest if the program is to continue to be self-supporting.

<sup>8</sup>For more information about the adjustment of Social Security benefits, see the Myers and Schobel paper (footnote 5).

No consideration is given in this analysis to the income taxation of OASDI benefits. Since 1984, relatively high-income beneficiaries<sup>9</sup> have been required to include in their taxable incomes up to one-half of their OASDI benefits. At current tax rates, this can result in an effective benefit reduction of about 16 percent. We believe that this income taxation is not an appropriate element in a Social Security money's-worth analysis, because it depends on a number of factors outside the scope of Social Security. Moreover, including its effects would require estimating future income-tax rates, which are considerably more volatile and unpredictable than payroll-tax rates. Only about 15 percent of beneficiaries currently pay any income taxes on their benefits; this proportion is expected to rise to about 40 percent ultimately if no changes in the laws are made.<sup>10</sup> One obvious change that could occur is indexing of the earnings thresholds, which have remained unchanged since 1984. If this occurs, then the proportion of beneficiaries paying income taxes on their benefits will not rise very much.

Digressing a moment, we would like to point out that some readers may be aware of another money's-worth analysis (which we believe involves faulty methodology). The Congressional Research Service (part of the Library of Congress) recently prepared such an analysis of Social Security retirement benefits.<sup>11</sup> The approach taken was to reduce the combined OASDI-HI tax rate by deducting (1) the HI rate, (2) the DI rate, and (3) the estimated portion of the OASI rate that finances survivor benefits. The remainder—the portion of the OASI rate that finances retirement benefits—was then applied to the assumed earnings history and accumulated at interest to the retirement age. The accumulated tax amount was then compared to the value of projected future benefits.

<sup>9</sup>The earnings thresholds are \$25,000 for single individuals and heads of households, \$32,000 for married couples filing joint returns, and \$0 for married persons filing separate returns if they lived with their spouses at any time during the year. At present, many individuals with maximum Social Security-covered earnings have no income-tax liability attributable to their OASDI benefits. On the other hand, some individuals with relatively small OASDI benefits must pay income taxes on them because of substantial other income, which may include their own earnings or those of a spouse.

<sup>10</sup>At first glance, one might expect even those with small OASDI benefits to pay taxes on them eventually, because the earnings thresholds in the law are not indexed. In fact, this will not occur, because the personal exemption and standard deductions (including the additional standard deductions for those age 65 and over) in the income tax law are indexed by changes in the CPI.

<sup>11</sup>See *1991 Green Book—Background Material and Data on Programs Within the Jurisdiction of the Committee on Ways and Means* (WMCP 102-9), House of Representatives, Washington, D.C., May 7, 1991, pp. 1120–31.

The significant error in this methodology is that the taxes should have been accumulated to retirement age using *both* interest and mortality (survival rates). Otherwise, the analysis implicitly assumes a preretirement death benefit equal to taxes plus accumulated interest. Use of the proper procedure would have resulted in larger accumulations of taxes at retirement and lower ratios of benefits to taxes.

A "perfect" money's-worth analysis would consider all members of a cohort, rather than just the hypothetical cases considered here. For example, to analyze the situations of workers retiring at age 65 in 2000, one could theoretically consider all persons born in 1935 and compare all the taxes paid by those persons (including appropriate interest) with the present value of all the benefits that they (and their family members) actually receive. Such an analysis would show precisely the declining rate of return for succeeding cohorts and even the relative proportions of "winners" and "losers." Unfortunately, the Social Security Administration does not collect the required data, not even on a sample basis; therefore, such an analysis would seem to be impossible.

### III. RESULTS AND INTERPRETATION

#### A. "Most Reasonable" Basis

This paper focuses on figures based on what we consider the "most reasonable" assumptions, namely, cohort mortality and a 2 percent "real" interest rate after retirement. The tables, however, show a broader range of results, using interest rates of 0, 1, 2, and 3 percent and both static and cohort mortality, for men and women separately.

Table 2 shows certain figures that do not vary according to postretirement interest and mortality: the employee OASI taxes accumulated at interest to NRA and the initial monthly benefit amount payable then (to a single worker), for average earners and maximum earners. Table 3 shows the present value of future benefits as of NRA, based on the assumptions described previously. Table 4 shows the ratios of the present value of benefits to the accumulated taxes.

For single average-earning men, the ratio of the present value of retirement benefits to the accumulated value of taxes was 1,417 percent for the 1960 case. In other words, the value of the benefits was 14 times the value of the employee taxes. This ratio steadily decreased to 232 percent for the 1991 case and is expected to decrease further, until it stabilizes at about 155 percent for those retiring in 2009 and later. The corresponding ratios for

**TABLE 2**  
**DESCRIPTION OF HYPOTHETICAL WORKERS, ACCUMULATED OASI TAXES AT NRA,**  
**AND INITIAL MONTHLY BENEFIT AMOUNTS**

Year of Birth	Normal Retirement Age	Year of Attaining NRA	Accumulated OASI Taxes at NRA		Initial Monthly Benefit Amount			
			Average Earner	Maximum Earner	Average Earner		Maximum Earner	
					Men	Women	Men	Women
1895 .....	65	1960	\$ 987	\$ 1,378	\$ 105.00	\$ 105.00	\$ 118.10	\$ 118.10
1905 .....	65	1970	3,510	4,520	168.40	173.90	189.80	196.40
1915 .....	65	1980	12,251	17,129	450.90	450.90	572.00	572.00
1926 .....	65	1991	50,542	83,361	751.10	751.10	1,022.90	1,022.90
1937 .....	65	2002	118,661	219,777	1,257.50	1,257.50	1,850.00	1,850.00
1943 .....	66	2009	184,881	367,559	1,776.50	1,776.50	2,736.40	2,736.40
1954 .....	66	2020	326,517	740,894	3,071.10	3,071.10	4,874.80	4,874.80
1960 .....	67	2027	444,655	1,098,515	4,334.50	4,334.50	6,872.30	6,872.30

Note: Initial benefit amounts are before deduction of monthly premiums for Medicare Part B (Supplementary Medical Insurance) and rounding down to whole dollars, where applicable. Medicare was available beginning in 1966, and the dollar-rounding rule was first applied in 1982.

TABLE 3

## PRESENT VALUE OF RETIREMENT BENEFITS USING VARIOUS INTEREST RATES AND MORTALITY BASES

	Year of Retirement at NRA							
	1960	1970	1980	1991	2002	2009	2020	2027
<i>Average Earner</i>								
<b>Cohort Mortality</b>								
0% Men	\$16,637	\$28,002	\$ 80,298	\$142,594	\$247,451	\$340,662	\$605,673	\$ 831,882
Women	21,912	38,779	103,648	178,794	306,275	422,547	748,777	1,032,116
1% Men	15,213	25,512	72,874	128,991	223,275	308,010	546,328	751,947
Women	19,676	34,658	92,377	158,863	271,456	375,364	663,510	916,696
2% Men	13,986	23,376	66,531	117,409	202,760	280,228	496,001	683,981
Women	17,788	31,198	82,948	142,257	242,545	336,066	592,737	820,606
3% Men	12,922	21,531	61,075	107,478	185,226	256,424	453,012	625,777
Women	16,184	28,270	74,999	128,306	218,335	303,068	533,492	739,948
<b>Static Mortality</b>								
0% Men	16,215	26,458	75,743	137,978	239,986	330,334	587,533	807,686
Women	19,968	35,622	99,084	171,177	295,863	408,179	723,555	998,078
1% Men	14,881	24,246	69,113	125,241	217,312	299,749	531,896	732,629
Women	18,120	32,125	88,801	152,924	263,454	364,251	644,110	890,409
2% Men	13,722	22,331	63,404	114,340	197,960	273,575	484,437	668,439
Women	16,535	29,152	80,128	137,590	236,346	327,405	577,694	800,138
3% Men	12,711	20,662	58,456	104,947	181,333	251,024	443,670	613,184
Women	15,167	26,607	72,749	124,615	213,497	296,263	521,736	723,886
<i>Maximum Earner</i>								
<b>Cohort Mortality</b>								
0% Men	\$18,712	\$31,560	\$101,863	\$194,194	\$364,043	\$524,733	\$ 961,392	\$1,318,940
Women	24,646	43,796	131,485	243,494	450,583	650,863	1,188,544	1,636,407
1% Men	17,111	28,755	92,447	175,669	328,476	474,437	867,194	1,192,204
Women	22,130	39,142	117,187	216,351	399,359	578,185	1,053,199	1,453,412
2% Men	15,731	26,347	84,400	159,896	298,295	431,644	787,309	1,084,443
Women	20,008	35,234	105,226	193,735	356,826	517,654	940,860	1,301,061
3% Men	14,534	24,267	77,478	146,371	272,499	394,979	719,072	992,162
Women	18,203	31,928	95,141	174,736	321,208	466,825	846,819	1,173,179
<b>Static Mortality</b>								
0% Men	18,239	29,820	96,086	187,908	353,061	508,824	932,600	1,280,576
Women	22,460	40,230	125,695	233,121	435,265	628,731	1,148,509	1,582,441
1% Men	16,737	27,327	87,675	170,562	319,703	461,713	844,286	1,161,575
Women	20,380	36,281	112,651	208,262	387,586	561,067	1,022,405	1,411,733
2% Men	15,434	25,168	80,433	155,716	291,234	421,396	768,953	1,059,802
Women	18,597	32,924	101,648	187,380	347,706	504,312	916,981	1,268,610
3% Men	14,297	23,288	74,156	142,924	266,771	386,661	704,243	972,197
Women	17,059	30,050	92,300	169,709	314,091	456,344	828,158	1,147,713



TABLE 4  
RATIO OF PRESENT VALUE OF RETIREMENT BENEFITS  
TO ACCUMULATED VALUE OF OASI TAXES

	Year of Retirement at NRA							
	1960	1970	1980	1991	2002	2009	2020	2027
Average Earner								
Cohort Mortality								
0% Men	1,686%	798%	655%	282%	209%	184%	185%	187%
Women	2,220	1,105	846	354	258	229	229	232
1% Men	1,541	727	595	255	188	167	167	169
Women	1,993	987	754	314	229	203	203	206
2% Men	1,417	666	543	232	171	152	152	154
Women	1,802	889	677	281	204	182	182	185
3% Men	1,309	613	499	213	156	139	139	141
Women	1,640	805	612	254	184	164	163	166
Static Mortality								
0% Men	1,643	754	618	273	202	179	180	182
Women	2,023	1,015	809	339	249	221	222	224
1% Men	1,508	691	564	248	183	162	163	165
Women	1,836	915	725	303	222	197	197	200
2% Men	1,390	636	518	226	167	148	148	150
Women	1,675	831	654	272	199	177	177	180
3% Men	1,288	589	477	208	153	136	136	138
Women	1,537	758	594	247	180	160	160	163
Maximum Earner								
Cohort Mortality								
0% Men	1,358%	698%	595%	233%	166%	143%	130%	120%
Women	1,788	969	768	292	205	177	160	149
1% Men	1,241	636	540	211	149	129	117	109
Women	1,605	866	684	260	182	157	142	132
2% Men	1,141	583	493	192	136	117	106	99
Women	1,452	780	614	232	162	141	127	118
3% Men	1,054	537	452	176	124	107	97	90
Women	1,321	706	555	210	146	127	114	107
Static Mortality								
0% Men	1,323	660	561	225	161	138	126	117
Women	1,629	890	734	280	198	171	155	144
1% Men	1,214	605	512	205	145	126	114	106
Women	1,479	803	658	250	176	153	138	129
2% Men	1,120	557	470	187	133	115	104	96
Women	1,349	728	593	225	158	137	124	115
3% Men	1,037	515	433	171	121	105	95	89
Women	1,238	665	539	204	143	124	112	104

single average-earning women are about 20 percent higher relatively than those for men; this is due almost entirely to the greater longevity of women.<sup>12</sup>

As noted earlier, the foregoing analysis is based on the tax rates scheduled in present law. Based on the intermediate (alternative II) assumptions in the *1991 OASDI Trustees Report*, these scheduled rates are not quite adequate in the long term. If the program is to be financed on the pay-as-you-go (or current-cost) basis completely through payroll taxes, then, based on the intermediate assumptions, the ultimate combined employer-employee OASI tax rate (for 2065 and later) would be about 15 percent.<sup>13</sup> On this basis, the ultimate benefits/taxes ratios for average earners would be about 115 percent for single men and 135 percent for single women.

The benefits/taxes ratios for maximum-earning workers are significantly lower than those for average-earning workers. This result reflects the weighted nature of the OASDI benefit formula, which favors lower-paid individuals over higher-paid ones. Nonetheless, the benefits/taxes ratios have been well above 100 percent for all maximum-earning retirees in the past, being 192 percent for single men retiring in 1991, as compared to 232 percent for the average-wage case. (The difference would have been larger except that, in 1951-73, the maximum taxable amount was not much higher than the average wage, as mentioned previously.)

The ratios for maximum earners decrease significantly in the future and approach the 100 percent break-even point by 2027 for single men. Moreover, if future tax rates are increased to an adequate level, these ratios would fall below 100 percent. Ultimately, the ratios would be 73 percent for single men and 86 percent for single women. Thus, if one considers only the employee taxes paid, the maximum earners who retired in the past have easily received their money's worth, even ignoring the possibility of auxiliary and survivor benefits for spouses and children. In the very long run, however, if tax rates are increased to a level sufficient to finance the scheduled benefits, based on the intermediate (alternative II) assumptions of the *1991 OASDI Trustees Report*, then maximum-earning single workers will not receive benefits equal to the value of their accumulated taxes.

<sup>12</sup>The only exception shown is the case of workers attaining age 65 and retiring in 1970. For workers born in 1897-1912 (a period that includes 1905, the year of birth for the workers in this example), women had their average earnings computed over a shorter period than did men born in the same year. Thus, women received slightly larger benefits than did men with identical earnings.

<sup>13</sup>See *1991 OASDI Trustees Report* (footnote 1), Table 26, pp. 77-78.

If one considers the combined employer-employee taxes (halving the ratios of benefits to taxes shown in the tables), until about now the value of the benefits has exceeded the accumulated taxes for maximum earners. For men now and for women in about five years, the situation is reversed. This is not surprising in a program that is intended to be self-supporting primarily from payroll taxes, because not everybody can receive benefits worth more than the combined employer-employee taxes. In essence—and quite properly, in our opinion—the employer tax can be viewed as being used for the benefit of the lower-paid persons and those near retirement age when the system began (or when coverage was extended to them).

### *B. Static Mortality*

The preceding analysis was based on mortality rates after retirement that decline, as actually occurred in the past, where applicable, and as projected to occur in the future, using the intermediate (alternative II) assumptions in the *1991 OASDI Trustees Report*. Alternatively, we have also computed ratios based on static mortality. In other words, workers retiring in any particular year are assumed to experience, in all future years thereafter (whether prior to the present time or after it), the mortality rates that occurred or are assumed to occur in that year of retirement.

On the whole, the use of static mortality reduces the present value of the benefits by about 2–3 percent relative to the use of cohort mortality. The ratio of the present value of benefits to accumulated taxes is reduced correspondingly.

### *C. Various Postretirement Interest Rates*

As noted previously, we believe that the most reasonable postretirement real interest rate is 2 percent; however, we also computed benefits/taxes ratios using real interest rates of 0, 1, and 3 percent. As would be expected, these ratios increase as the interest rate declines, by about 10 percent relatively for each 1 percent decrease in the interest rate.

Using an interest rate of 3 percent, for single maximum-earning men, with the currently scheduled tax rates, the money's-worth test based on employee taxes alone is not met beginning with retirements in the mid-2010s. In all cases, for interest rates of 0 and 1 percent, the test is met.

### D. Payback Periods

Table 5 shows the number of months required for the aggregate retirement benefits to exceed the employee OASI taxes accumulated at interest to NRA for each of the cases described previously. These figures do not reflect (1) any interest earnings on the accumulated taxes after retirement, (2) any cost-of-living increases in monthly benefits, or (3) mortality of the beneficiaries. For 1991 retirees, the "payback period" for single average earners is 68 months, while for maximum earners it is 82 months. Ultimately, this period will be about 8½ years for single average earners and about 13½ years for single maximum earners.

TABLE 5  
NUMBER OF MONTHS REQUIRED TO RECOVER ACCUMULATED OASI TAXES

Year of Retirement at NRA	Average Earner		Maximum Earner	
	Men	Women	Men	Women
1960.....	10	10	12	12
1970.....	21	21	24	24
1980.....	28	28	30	30
1991.....	68	68	82	82
2002.....	95	95	119	119
2009.....	105	105	135	135
2020.....	107	107	152	152
2027.....	103	103	160	160

Note: Assumes no postretirement interest on accumulated taxes and no cost-of-living adjustments in benefits.

### E. Money's-Worth and the "Notch"

Table 6 shows money's-worth results for three pairs of closely adjacent individuals who are just in and just out of the so-called "notch-baby" cohorts (births in 1917-21).

The first pair is workers retiring at age 62 who are (1) born in December 1916, just before the "notch-baby" cohort, and (2) born in January 1917,<sup>14</sup> at the beginning of the cohort. As can be seen from both the initial monthly benefits payable and the present values of the benefits, no really significant difference is present between these two cases.

<sup>14</sup>Special rules apply to people born on January 1. Those special cases are not considered in this paper.

TABLE 6

## ANALYSIS OF SO-CALLED "NOTCH" SITUATION

	Pair 1		Pair 2		Pair 3	
	Dec. 1916 Jan. 1979 62:1	Jan. 1917 Jan. 1979 62:0	Dec. 1916 Jan. 1982 65:1	Jan. 1917 Jan. 1982 65:0	Dec. 1921 Jan. 1987 65:1	Jan. 1922 Jan. 1987 65:0
Month of Birth						
Month of Retirement						
Retirement Age						
Accumulated OASI Taxes at Retirement						
Average Earner	\$10,675	\$10,675	\$16,806	\$16,806	\$33,149	\$33,149
Maximum Earner	14,574	14,574	24,384	24,384	51,962	51,962
Initial Monthly Benefit Amounts						
Average Earner	\$312.80	\$306.50	\$623.70	\$535.40	\$589.10	\$593.50
Maximum Earner	395.70	388.90	789.90	679.30	785.20	789.20
Present Value of Retirement Benefits						
Average Earner						
Cohort Mortality						
2% Men	\$51,510	\$50,472	\$ 93,210	\$ 80,014	\$ 90,490	\$ 91,165
Women	63,276	62,002	115,368	99,035	110,534	111,360
Maximum Earner						
Cohort Mortality						
2% Men	\$65,161	\$64,041	\$118,048	\$101,519	\$120,612	\$121,226
Women	80,046	78,670	146,110	125,652	147,329	148,079
Ratio of Present Value of Retirement Benefits to Accumulated Value of OASI Taxes						
Average Earner						
Cohort Mortality						
2% Men	483%	473%	555%	476%	273%	275%
Women	593	581	686	589	333	336
Maximum Earner						
Cohort Mortality						
2% Men	447%	439%	484%	416%	232%	233%
Women	549	540	599	515	284	285

The second pair is the same workers, except that they retire at age 65. For these workers, a significant difference is evident. For the single average-earning men, the present value of the retirement benefits is \$13,196 (or 16 percent) higher for the 1916 year-of-birth case as compared to the person born in 1917 (possibly as little as 2 days later). However, the latter worker is really not treated unfairly, because the present value of his benefits is \$63,208 (or 376 percent) higher than his accumulated employee taxes—quite an “actuarial bargain”!

For the corresponding maximum-earning men, the excess of the present value of benefits for the 1916 case over that for the 1917 case is \$16,529 (or 16 percent), but nonetheless the latter is receiving benefits with a present value that is \$77,135 (or 316 percent) more than the accumulated value of his taxes. Thus, the “notch baby” (the 1917 case) is not being treated unfairly, but rather the “bonanza baby” (the 1916 case) is getting a windfall.

The last pair is workers retiring at age 65 who are (1) born in December 1921, at the end of the “notch-baby” cohort, and (2) born in January 1922, at the beginning of the post-notch cohort. Once again, as can be seen from both the initial monthly benefits payable and the present values of the benefits, no significant difference is present between these two cases. This is true despite what some “notch-baby” advocates assert—that their cohort is worse off than those born after them.

#### *F. Money's Worth and the Medicare Program*

The foregoing analysis and discussion have related solely to the Social Security cash-benefits program (OASDI), although primarily to the retirement benefits portion. How does the money's-worth concept apply to the Medicare program?

Applying the money's-worth concept to the Medicare program is difficult, because its two parts—Hospital Insurance (HI) and Supplementary Medical Insurance (SMI)—are financed in very different ways. Also, future projection of Medicare costs—and especially of how they are distributed among various categories of persons—is more uncertain than projections of cash benefits.

For HI benefits, which are financed almost entirely by payroll taxes, exactly the same benefit protection is provided regardless of earnings and, thus, regardless of taxes paid (although not the same benefits for each individual, of course). Because HI taxes have been payable only since 1966, clearly those who retired in the past have received far more in present value

of HI benefits than the accumulated HI employee taxes paid. For example, such accumulated taxes for a maximum earner retiring at age 65 at the beginning of 1991 amounted to \$15,434. If this amount is annuitized at 2 percent interest and male cohort mortality, it results in an initial annual payment of \$1,185 (actually, a lower interest rate, yielding a smaller initial payment, would be justified because hospital costs have risen more rapidly than the CPI). This is only 60 percent of the average per-capita cost of the HI program in 1990: \$1,990 (benefit outgo of \$66.2 billion divided by 33.2 million average monthly number of beneficiaries). Thus, all current beneficiaries have received far more than their money's worth from their HI employee taxes.

This situation will gradually change in the future as workers pay HI taxes over their entire working careers. This is especially so for high earners, because beginning in 1991, the maximum taxable amount for HI was "decoupled" from the OASDI amount and was made 134 percent higher (\$125,000 versus \$53,400). This relationship will continue in the future under the automatic-adjustment provisions applicable to both maximum amounts. By the same reasoning, the HI maximum amount will always be about 5.6 times the national average wage.

For SMI benefits, which are financed by enrollee premiums and payments from the general fund of the Treasury, the money's-worth situation is quite clear. For all enrollees, the premium structure is the same (\$29.90 per month in 1991 for those who enroll when first eligible), and it pays 25 percent of the average cost of the program for the aged (those 65 and older). Thus, all enrollees—both low-income and high-income—receive far more than their money's worth, even if the situation is looked at on a term-insurance approach, under which the annual cost for an enrollee aged 65 is only about half of that for enrollees at, say, age 85 and over. Of course, the general-fund contribution, which pays the remaining 75 percent of the cost, is paid by the public as well, but its incidence cannot be determined with any precision.

#### IV. CONCLUSIONS

This analysis clearly shows that, on the average, workers who retired in the past have received benefits of far greater value than the accumulated employee taxes paid and likewise even more than the accumulated employer-employee taxes. Furthermore, this situation will continue in the near future. For each succeeding cohort of retirees, however, the ratio of the present value of future retirement benefits to the accumulated OASI employee taxes

will decrease toward 100 percent. Over the long run, as shown in Table 4, this situation will eventually reach the point at which the maximum earner cannot expect to receive more in benefits than was "paid for" in taxes—not even with the inadequate tax rates scheduled in present law.

If the payroll-tax rates are increased in the long term to a sufficiently high level so that the program is again self-supporting, then the failure to receive one's money's worth will apply to a small extent for the maximum earner, but not for the average earner.



## DISCUSSION OF PRECEDING PAPER

RICHARD S. FOSTER AND ORLO R. NICHOLS:

The issue of whether participants in the Social Security program "get their money's worth" from their taxes continues to be of great interest. In many respects, the issue should be largely irrelevant, because Social Security is designed along broad social insurance principles and there has never been an intent to provide benefits that were strictly commensurate with taxes paid. Nonetheless, the question continues to be asked, and the authors are to be congratulated for providing useful and interesting information on this issue.

Unfortunately, the authors' study relates primarily to only one aspect of the money's-worth issue. The Social Security program provides a broad array of retirement, survivor, disability, and health insurance benefits. Benefits are payable not only to covered participants but also to their eligible family members. Out of this array of income-security provisions, the authors have chosen to evaluate only retirement benefits and only for single workers who survive to retirement age. Thus, their question "Do workers get their money's worth from the payroll taxes they pay under the U.S. Social Security program?" is not answered as completely as it might be.

Ease of calculation and comprehension are the reasons given for limiting the evaluation to retirement benefits and for invoking a number of methodological simplifications. We would like to have seen a more complete and refined analysis (particularly in view of the fact that the authors' methodology received considerable criticism when it was originally published in 1983 [1]).

For instance, additional money's-worth illustrations would be informative. The authors present results for theoretical steady workers with average or "maximum" earnings who have no qualifying family members and who survive to normal retirement age. The range of possible results could have been further illustrated by including workers with low earnings, workers who retire before or after the normal retirement age, and family examples such as one- and two-earner married couples with children.

A problematic choice in methodology concerns the comparison of retirement benefits to retirement and survivors taxes. The authors acknowledge that this procedure implicitly assumes that preretirement death benefits are equal to accumulated taxes. In practice, of course, preretirement death benefits are paid only if there are eligible survivors and the amount of the benefit is unrelated to the amount of taxes paid. The authors suggest that the error

introduced through this process is minimal. A more concrete justification of this belief would have been helpful, as would a more complete discussion of how broadly their examples are intended to apply to groups other than single workers who survive to retirement age.

The authors' interest rate assumptions also are of concern. They use actual past interest rates and assumed future rates from the *1991 OASDI Trustees Report* (alternative II) to accumulate the value of taxes. These same rates are not used, however, to discount future benefits. Instead, a constant implicit real rate of 2 percent is used (with alternatives of 0 percent, 1 percent, and 3 percent also discussed). The authors state that 2 percent "is a good approximation of the real interest rate relative to the CPI," despite the fact that real interest rates in the 1980s were considerably higher than 2 percent and are projected under alternative II to remain well above 2 percent for many years. It would have been more consistent to use the actual and assumed rates for both taxes and benefits. An alternative possibility would have been to base the study on real internal rates of return.

Finally, Table 5 in the article presents the number of months required to recoup a worker's past taxes. The authors indicate that these figures do not reflect interest on accumulated taxes after retirement or future benefit increases. While this methodology simplifies the calculations, it also understates the resulting number of months by roughly 10 to 15 percent compared to the more refined methodology incorporating both factors.

In their discussion of methodology, the authors describe a "perfect" money's-worth analysis that "would consider all members of a cohort, rather than just the hypothetical cases considered here" and that would "compare all the taxes paid by those persons (including appropriate interest) with the present value of all the benefits that they (and their family members) actually receive." The authors suggest that such an analysis is not possible because of data limitations. Actually, such an analysis not only is feasible, but also is already under way based on the actual experience of a 1 percent sample of persons born in 1919. Bertram M. Kestenbaum, of the Office of the Actuary, Social Security Administration, anticipates completing his study in mid-1993.

It is also possible to approximate such a calculation for the future, using the detailed worker and beneficiary projections underlying the annual trustees report. Nichols has prepared the estimates shown in Table 1 for the cohort of persons aged 15 to 19 in 1992, based on the *1992 OASDI Trustees Report*

projections. The present values of benefits and taxes are expressed as percentages of the present value of the cohort's future taxable earnings. Payroll taxes shown include those payable by employees, employers, and self-employed workers [2].

TABLE 1  
ESTIMATED PRESENT VALUES OF OASDI BENEFITS AND TAXES  
FOR COHORT OF PERSONS AGED 15-19 IN 1992

Present Value of Future Benefits for:	
Retired workers	8.45%
Dependents of retired workers	
Aged spouses	0.41
Young spouses	0.01
Children	0.07
Disabled workers	1.61
Dependents of disabled workers	
Aged spouses	0.01
Young spouses	0.01
Children	0.11
Survivors of deceased workers	
Aged surviving spouses	1.67
Young surviving spouses	0.05
Children	0.29
Lump-sum death benefits	*
Total benefits	12.69
Present Value of Future Taxes:	
OASDI payroll taxes, based on present law	12.40
OASDI payroll taxes, based on adequate rates	13.00
Income taxes on OASDI benefit payments	0.56
Ratio of Benefits to Present Law Taxes:	
Based on gross benefits before income taxes	102
Based on net benefits after income taxes	98
Ratio of Benefits to Adequate Taxes:	
Based on gross benefits before income taxes	98
Based on net benefits after income taxes	93

\*Less than 0.005 percent of taxable earnings.

These results suggest that, as a group, current new entrants can expect to receive OASDI benefits of roughly the same value as the OASDI taxes they and their employers would pay under the present schedule of tax rates. If tax rates are increased sufficiently to eliminate projected future deficits, however, and if benefits are considered net of income taxes, then the 15-to-19 cohort can expect to receive benefits worth about 93 percent of the value of their payroll taxes.

The authors note that the ratio of benefits to taxes can vary significantly depending on the level of an individual's earnings and on his or her family status. The range of variation can be dramatic, as illustrated by Nichols' estimates in Table 2 based on individual new entrants to the labor force in 1992 [3]. (As before, present values of benefits and taxes are shown as percentages of future taxable earnings, and both employee and employer payroll taxes are considered. Only present law taxes are shown, and income taxes on benefits are ignored.)

TABLE 2  
ESTIMATED PRESENT VALUES OF OASDI BENEFITS AND TAXES  
FOR INDIVIDUAL NEW ENTRANTS TO THE LABOR FORCE IN 1992

	Maximum Earnings	Average Earnings	Low Earnings*
Present Value of Future OASDI Benefits for Single Male Worker:			
Retired worker	5.01%	7.61%	10.20%
Disabled worker	1.81	2.72	3.67
Total	6.82	10.33	13.87
Present Value of Future OASDI Benefits for Single Female Worker:			
Retired worker	6.43	9.76	13.09
Disabled worker	1.42	2.14	2.89
Total	7.85	11.90	15.98
Present Value of Future OASDI Benefits for One-Earner Couple with 2 Children†:			
Retired worker	5.01	7.61	10.20
Dependents of retired worker‡	4.97	7.54	10.11
Disabled worker	1.81	2.72	3.67
Dependents of disabled worker	0.11	0.16	0.18
Survivors of deceased worker	1.61	2.46	3.17
Total	13.51	20.49	27.33
Present Value of Future OASDI Payroll Taxes	12.40	12.40	12.40
Ratio of Benefits to Taxes (in percent) for:			
Single male worker	55	83	112
Single female worker	63	96	129
One-earner couple with two children†	109	165	220

\*Low earnings are defined as 45 percent of average earnings.

†For purposes of this illustration, the worker is assumed to be a 22-year-old male with a wife who is the same age and who does not work outside the home. The children are assumed to be born when the parents reach ages 25 and 27.

‡Includes present value of benefits to surviving spouse.

As indicated, the ratio of lifetime OASDI benefits to combined employee-employer taxes can vary from as little as 55 percent for single male workers with maximum earnings to as much as 220 percent for low-wage, one-earner couples with children. Thus, the money's-worth relationship can vary even more widely than suggested in the authors' article—reflecting, of course, the social insurance principle of “social adequacy” that underlies the benefit computation procedures specified for the Social Security program.

In general, we enjoyed reading the authors' study of money's worth and found it particularly illuminating concerning the change in rates of return over time. We would encourage the authors to evaluate the money's-worth issue more broadly, however, by considering the full range of benefits, taxes, and participant examples and by performing more detailed calculations.

#### END NOTES

1. MYERS, ROBERT J., AND SCHOBEL, BRUCE D. “A Money's-Worth Analysis of Social Security Retirement Benefits,” *TSA XXXV* (1983): 533–55.
2. For more details on money's-worth calculations of this type, see NICHOLS, ORLO R., “A New Look at Social Security Issues,” *RSA 9*, no. 4 (1983): 1640–43.
3. Corresponding estimates for new entrants in 1978 and a discussion of the methodology used in estimates of this type are available in NICHOLS, ORLO, R., AND SCHREITMUELLER, RICHARD G. “Some Comparisons of the Value of a Worker's Social Security Taxes and Benefits,” *Actuarial Note No. 95*. Washington, D.C.: U.S. Department of Health, Education, and Welfare, Social Security Administration, 1978.

#### PETER G. HENDEE:

Messrs. Myers and Schobel have provided a useful update to their previous paper on this subject. An analysis of this type, using appropriate methodology and assumptions, provides insight into various aspects of the Social Security program.

One conclusion reached in the paper is that the ratio of the value of future retirement benefits to the accumulated OASI employee taxes will decrease for each succeeding cohort of retirees. This result is to be expected, as mentioned in the paper, based on the following:

- The value of benefits paid to all retirees should not exceed the value of all OASI employee taxes (the program is intended to be self-supporting), and
- The value of benefits for those near retirement when the system began exceeds the value of their OASI taxes.

The decreasing ratio of benefit value to accumulated taxes can be viewed as a measure of how much “extra” benefits, relative to previously collected taxes, have been paid or promised by the system to date. These benefits are being funded by those paying taxes into the system.

The fact that no changes in the law, as it was at the end of 1991, are assumed to occur results in an understatement of the “extra” benefits that must be funded by those remaining in the system. This is because currently scheduled tax rates are inadequate to fund currently scheduled benefits.

The paper also documents that the system redistributes income from those highly compensated to others. This suggests that even though the Social Security tax is regressive, it is not unfair because those for whom the tax is most burdensome (lower-paid individuals) receive a greater benefit value, relative to their taxes, than those for whom the tax is less burdensome.

GEOFFREY KOLLMANN\*:

I have the following comments. On pages 259 and 260, the authors, in an admitted digression, mischaracterize the analysis that appears in the 1991 *Green Book* prepared by the House Committee on Ways and Means. They describe it as a “money’s-worth” analysis, implying that it is meant to serve the same purpose as their paper. In fact, the approach in the *Green Book* is illustrative only, as it clearly explains. It is not a cohort analysis—it does not compare how well past and future generations of recipients fare, nor does it imply that the illustrations are typical. The illustrations are a comparison of the taxes paid and the benefits expected to be received for people who are currently retiring at age 65. It is a *given* that they have survived to retirement age and that the value of their accumulated taxes is what they actually paid, plus interest. Under these conditions, to include the value of forfeited taxes of workers who died before retirement, as the authors insist should be done, is unnecessary and would be needlessly confusing given the objective of the *Green Book* (to provide illustrations, *in real life terms*, of what current retirees receive compared to the taxes they paid).

Moreover, this alleged defect in methodology (of failing to take into account preretirement mortality) is inherent in the authors’ own analysis. They acknowledge the problem, but downplay it by stating “. . . because so few

\*Mr. Kollmann, not a member of the Society, is a specialist in social legislation, Congressional Research Service, The Library of Congress, Washington, D.C.

(emphasis added) workers die before reaching retirement age, these [pre-retirement survivor] benefits have a relatively small value.” Later, however, they describe this same procedure in the *Green Book* analysis as a “significant” error in methodology. Actually, if one is to cast about for methodological differences that are significant, the authors’ approach could be criticized for its failure to take into account the value of survivor benefits that are paid from the Old Age Survivors Insurance (OASI) tax. As other researchers\* have stated, it is inconsistent to include Survivor Insurance (SI) benefits on the cost side but not the benefit side of money’s-worth analysis. The value of SI benefits is not trivial. Under the alternative II assumptions of the *1991 OASDI Trustees’ Report*, the Social Security Administration’s actuaries estimate that currently about 23 percent of the costs of OASI are attributable to survivors. Although this proportion will decline in the future as women earn more benefits in their own right, it will still be significant; for example, SI benefits are projected to be 22 percent of OASI costs in 2010.

ETHAN E. KRA:

In developing the accumulated OASDI taxes paid, the authors discuss the choice of the appropriate interest rate to be used. However, the interest rates they chose are gross, pre-tax interest rates (Table 1). They do not reflect the fact that an individual would have to pay income tax on interest earnings. Thus, the effective interest rate for an individual is lower than the theoretical earnings on the investment assumed by the authors. This affects the analysis of value from the individual’s perspective.

KRZYSZTOF OSTASZEWSKI:

Mr. Myers and Mr. Schobel should be congratulated and thanked for the very important contribution they have made to our understanding of the complex issues surrounding Social Security benefits.

In this discussion I address several issues of perspective that appear to be somewhat ignored by the authors. One must, however, acknowledge that such issues are marginal in relation to the main question of analysis of

\*COHEN, LEE, AND MALE, ALISA. “Old Age Insurance, Who Gets What for Their Money?” *AARP Issue Brief #15*. Washington, D.C.: American Association of Retired Persons, October 1992.

money's worth. Nevertheless, I ask for the authors' patience in listening to my queries, because I believe them to be of significance.

The authors choose only the employee taxes as the basis for their comparison. The choice is a question of perspective. The employee taxes are the employee's only contribution psychologically, but the combined employer-employee taxes are the contribution in the economic reality. The authors argue that the employer tax is passed on to consumers in general in the form of higher prices. So is, in fact, the employee tax, or any labor cost, or any other cost at that. If any cost is not (in the long run) passed on to consumers, the firm will suffer a loss and cease to exist. To argue that employer tax burden may be reflected in lower corporate profits is again faulty, because that simply represents higher capital cost. The main difference between capital and labor is that the capital will always earn the rate of return required by international capital markets, possibly adjusted for the risk associated with government's regulatory or confiscatory activities. Yet to the firm, the cost of capital is a cost nevertheless, and it must be passed on to the consumers, if the firm is to survive.

The main point is that in the economic reality (as opposed to the psychological reality, that is, an illusion), the combined employer-employee taxes are paid by the employee. The firm must receive consideration (in the form of employees' labor) for the employer-paid payroll taxes; otherwise the firm is engaging in a charitable activity that will be promptly eliminated either by its management or by the capital markets.

Not only from the individual recipient's point of view, but also of society's as a whole, the question of money's worth is of utmost importance, and here again it is vital that the combined employer-employee taxes be considered. Schultze,\* in his analysis of the pattern of U.S. Government spending, states: "Total federal spending as a share of GNP rose substantially between 1929 and 1989. But in the 35 years since the end of the Korean War, all of the rise in the share has been due to the growth of Social Security outlays (including hospital insurance)." In view of that information, the following results of Myers and Schobel are elevated to exceptional significance:

- For a single average-earning man retiring in 1960, the ratio of the present value of retirement benefits to the accumulated value of the combined employer-employee taxes was approximately 7.

\*SCHULTZE, CHARLES L. "Is There a Bias Toward Excess in U.S. Government Budgets or Deficits?" *The Journal of Economic Perspectives* 6, no. 2 (Spring 1992): 25-43.



- For the single average woman in the same situation, the ratio was approximately 9.
- The two ratios described above for a 1970 retirement were approximately 3.3 and 4.4, respectively.
- For a 1980 retirement, the ratios were 2.7 and 3.4.
- For a 1991 retirement, they declined to 1.16 and 1.4.

The authors indicate that the ratios will drop below 1 somewhere between 2002 and 2009. The main question is: How long can the American economy sustain those ratios above 1?

One of the major problems facing our country is very anemic productivity growth over the last 20 years. Productivity, in the long run, results from investment—in human and other capital. We are undoubtedly registering productivity increases in the areas in which the recipients of Social Security and Medicare benefits spend their money. At the same time, the government is running large structural budget deficits and dwarfing public investment, and the 1986 Tax Reform Act deepened the punitive taxation of private capital.

GREGORY SAVORD:

It would be appropriate to expect that one's knowledge of the Social Security money's-worth question would be greatly enhanced by this update to the authors' paper in *TSA XXXV*. Such is not the case. This paper is essentially a rewrite of the previous paper, containing updated numbers but no explanation whatsoever of why the updated numbers differ so substantially from those in the earlier paper. The table below compares the ratios in the present paper with the ratios in *TSA XXXV* as modified by the authors' discussion in *TSA XXXV*. I am not aware of any legislative changes since 1983 that would bias any comparisons between the two papers.

A comparison between the two papers shows a significant deterioration in the money's-worth ratios in the current paper (as compared with the previous paper) after 1980. Although the authors mention that the economic and demographic assumptions differed between the two papers, they do not acknowledge the substantial differences in the ratios between the two papers. It would be enlightening if the authors would compare the substantial differences in the two papers and explain the changes. If changes in assumptions explain the differences, the authors should discuss how the money's-worth ratios are a function of assumptions.

RATIO OF PRESENT VALUE OF RETIREMENT BENEFITS  
TO ACCUMULATED VALUE OF OASI TAXES  
FOR AVERAGE EARNERS USING 2% POSTRETIREMENT REAL INTEREST RATE

Year of Retirement at NRA	TSA XLIV <sup>a</sup>		TSA XXXV <sup>b</sup>		Ratio XLIV/XXXV <sup>c</sup>	
	Male	Female	Male	Female	Male	Female
1960	1,417%	1,802%	710%	888%	99.7%	101.5%
1970	666	889	334	430	99.7	103.4
1980	543	677	275	353	98.7	95.9
1990			149	190	77.9 <sup>d</sup>	73.9 <sup>d</sup>
1991	232	281				
2000			116	149	73.7 <sup>e</sup>	68.5 <sup>e</sup>
2002	171	204				
2005			104	133	82.2 <sup>f</sup>	76.7 <sup>f</sup>
2009	152	182			§	§
2010			97	123	§	§
2020	152	182	92	117	§	§
2025			86	109	§	§
2027	154	185			§	§

<sup>a</sup>Benefits compared to employee payroll taxes only.

<sup>b</sup>Benefits compared to combined employee-employer payroll taxes.

<sup>c</sup>Divided by 2 to adjust for different treatment of payroll taxes.

<sup>d</sup>1991 compared to 1990.

<sup>e</sup>2002 compared to 2000.

<sup>f</sup>2002 compared to 2005, but age 65 in TSA XXXV is treated as an early retirement, whereas age 65 in TSA XLIV is normal retirement.

<sup>g</sup>The authors' discussion in TSA XXXV uses retirement at age 65, but treated as early retirement consistent with the 1983 amendments. In TSA XLIV retirement occurs at the actual normal retirement age as specified in the statute. Consequently, any further comparisons need further analysis.

The authors state, “. . . the value of survivor benefits in the case of death occurring prior to attaining retirement age is thereby implicitly presumed to be the accumulated taxes as of the time of death.” They further state, “We believe that this implicit assumption as to the value of preretirement survivor benefits is reasonably accurate, because *in the aggregate* the taxes and benefits have roughly equal values for any cohort of workers.” It is not clear whether this statement about taxes and benefits applies to survivor benefits or to retirement benefits. If this statement applies to survivor benefits, it is not substantiated. However, if it applies to retirement benefits, the tables make it obvious that *in the aggregate* the values of taxes and benefits are not equal for any cohort of workers.

In their criticism of the analysis done by the Congressional Research Service, the authors state “The significant error in this methodology is that the taxes should have been accumulated to retirement age using *both* interest and mortality (survival rates). Otherwise, the analysis implicitly assumes a

preretirement death benefit equal to taxes plus accumulated interest.” I read the analysis done by the Congressional Research Service. Table 26 on pages 1128 and 1129 makes it clear that the Congressional Research Service performed the analysis for workers who actually retired in January 1991. Thus this report analyzes the benefits and payroll taxes for beneficiaries already retired; that is, the analysis is limited to those who survived and paid a lifetime of payroll taxes. If the analysis is restricted to this retired group, as was clearly done by the Congressional Research Service, and the results are not extrapolated to any other group, then accumulating the value of payroll taxes with *survival*, as suggested by Myers and Schobel, would be entirely inappropriate. Even if the Congressional Research Service had done an analysis in which survival should have been used, the error would not be *significant* since the authors admit “In any event, because so few workers die before reaching retirement age, these benefits have relatively small value.”

There is an inconsistency in the authors’ interest rate methodologies that skews comparability between cohorts. For example, 1992 taxes for cohorts yet to retire are accumulated at 7.6 percent, while 1992 benefits for those already retired are discounted at 6.0 percent (4.0 percent CPI from the *1991 Trustees Report* + 2.0 percent real interest rate). These interest rates differ by 1.6 percent, a substantial difference. This inconsistency is carried even further in the *real interest* sensitivity analysis in which the interest rate for future benefits is varied, but the contribution interest rate for the same year is held constant. For 1992 the differences would range from 0.6 percent to 3.6 percent. Because of this inconsistency, money’s-worth comparisons between cohorts are of questionable validity.

The authors state “Self-employed workers pose a special problem. . . . In our view, the most appropriate analysis considers only the portion of their tax that represents the employee share and treats the remainder as an employer tax. . . .” Because of historical changes in the self-employed tax structure, self-employed persons cannot be treated like payroll workers for purposes of the money’s-worth analysis. Even though self-employed persons currently pay the combined employee-employer tax rate whereby one-half of this tax is deductible for income tax purposes, this was not the case before the 1983 amendments in which the self-employed paid one-and-one-half times the employee tax rate with none of it income-tax-deductible. Either the money’s-worth analysis for self-employed should have been adjusted for this difference, or the self-employed should not have been simply dismissed

as equivalent to payroll workers when the self-employed obviously have lower benefit/contribution ratios.

The authors state "This analysis is based on the OASI tax rates in present law. . . . We recognize, however, that these rates are likely to be inadequate in the very long term." In fact, the *1992 Trustees Report* projects that the tax rate will become inadequate to support the benefits by the year 2016, early in the projection period. The inadequacy of the financing of the OASI system is crucial to the money's-worth analysis. If future payroll taxes are increased, then workers who will pay these increased taxes will be paying more for the same benefits. Alternatively, if future benefits are reduced, the workers who receive these reduced benefits would have paid the same amount for lower benefits. In either case, future cohorts will surely receive a lower money's-worth ratio than those presented in this paper. Thus, because of the financial inadequacy of the OASI tax rate, the money's-worth ratios in this paper are purely hypothetical and would, as a practical matter, never be achieved. The analysis of the money's-worth issue for future cohorts would be greatly enhanced, and more meaningful, if the authors presented examples of money's-worth ratios under different scenarios that improve the financial status of the OASI system.

In summary, this paper would be improved considerably if the authors described and explained changes in the money's-worth ratios from the earlier paper and used consistent interest rates between cohorts. The Social Security money's-worth analysis is critical to questions of generational equity and deserves a better evaluation.

(AUTHORS' REVIEW OF DISCUSSIONS)

ROBERT J. MYERS AND BRUCE D. SCHOBEL:

We thank Messrs. Foster and Nichols, Hendee, Kollmann, Kra, Ostaszewski, and Savord for their discussions. We respond to them in order.

*Richard S. Foster and Orlo R. Nichols*

We agree with Messrs. Foster and Nichols that the money's-worth issue continues to be of great interest. We also agree that the issue should be largely irrelevant. Social Security serves many worthwhile social purposes, regardless of whether individuals can expect to receive benefits roughly equal in value to their accumulated taxes. Still, the relationship of value of benefits

to accumulated employee taxes directly and visibly payable should not fall too far below 1-to-1.

Furthermore, we do not see why Social Security should be held to a money's-worth standard when other government activities are not. For example, we cannot know whether we get our money's worth from the Department of Defense, but few people propose abolishing it! The same thing applies to public school taxes. Still, all of us must recognize that money's-worth analyses are going to be made—if not by actuaries, then by less qualified people. We tried to provide an analysis that would be not only reasonably valid but also understandable and reproducible by laypeople.

Messrs. Foster and Nichols note that our analysis was limited in at least two ways: (1) it focused on retirement benefits, even though Social Security payroll taxes pay for disability and survivor benefits also, and (2) the illustrations covered only steady earners who retire at normal retirement age. With respect to the first point, we believe that the illustrative-worker approach that we prefer does not lend itself to analysis of disability or survivor benefits, for obvious reasons. Hypothetical workers who become disabled while young and who survive a long time would have very high ratios of benefits to taxes, while the opposite would be true for workers disabled close to normal retirement age, at which point only a small amount of disability benefits could be payable. The situation with survivor benefits is analogous. These results would not be meaningful.

Disability and survivor benefits can be included in a cohort-type analysis, such as Bert Kestenbaum is developing. We are pleased that the Social Security Administration is doing more work on this subject, but we still tend to prefer our illustrative-worker approach, for several reasons. First, the figures are understandable to laypeople. Second, the figures are easily reproduced. In contrast, cohort-type results must be accepted, essentially on faith, as output from Social Security's enormously complex computer model, with all its myriad assumptions, both explicit and implicit. In any case, we believe that most people's interest in money's worth is limited to retirement benefits. No one would want to be a big "winner," from the standpoint of money's worth, by becoming disabled or dying at an early age.

Regarding the second point, Messrs. Foster and Nichols mention that we might have included in our analysis "workers with low earnings, workers who retire before or after the normal retirement age, and family examples such as one- and two-earner married couples with children." Obviously, we could have included such additional cases, and even others. We did not,

however, because we wanted to keep the amount of data manageable and because the direction of the changes would be fairly easy to anticipate in most cases. For example, because of Social Security's weighted benefit formula, low earners get better returns than average earners. (Few workers have lifetime low earnings in any case.) The addition of children to our illustrations would have added very little, because few retired couples have children eligible for benefits, or else they are eligible for just a short time. In the long range, benefits to children of retired workers represent just under 1 percent of the value of benefits to retired workers themselves.

Messrs. Foster and Nichols (and other discussants) question whether we properly handled the value of preretirement survivor benefits. We believe that our treatment of these benefits was reasonably satisfactory, although perhaps not perfectly accurate. We implicitly assumed that any preretirement survivor benefits have a value equal to the accumulated taxes at the time of death. Therefore, we accumulated Old-Age and Survivors Insurance taxes with interest only, not survivorship. We could have tried the alternative approach of isolating the Old-Age Insurance taxes (which are not defined in the law and must be approximated somehow) and then accumulating them with interest and survivorship. We rejected that approach as introducing too many assumptions and making the results much more difficult to understand and to reproduce. We do not believe that our approximate approach could have introduced significant distortions; after all, preretirement survivor benefits represent just 3 percent of the long-range cost of the OASDI program. Also, one of our main purposes was to show the trend in money's-worth ratios, and any distortion introduced by our treatment of preretirement survivor benefits would be consistent over time.

*Peter G. Hendee*

Mr. Hendee quite correctly points out that the apparent long-range deficit of the OASDI program as now constituted must be funded by those currently in the system (or to be in it in the future). As a result, their money's-worth ratios will be somewhat lower than we show. He also points out, quite correctly and importantly, that the program redistributes income from highly compensated workers to others. Thus, the regressivity of the Social Security tax (when it is considered alone) is far more than offset by the weighted benefits, and the program as a whole is not unfair.

*Geoffrey Kollmann*

Mr. Kollmann, of the Congressional Research Service, is the author of the study that we criticized in our paper. He asserts that his work is not a money's-worth analysis, but we reject that statement. His work is clearly a money's-worth analysis; every reader must interpret it as such, and, as stated above in our response to Messrs. Foster and Nichols, we continue to believe that our treatment of preretirement survivor benefits is reasonably accurate. Mr. Kollmann's observation that survivor benefits are currently about 23 percent of total OASI costs is misleading; that figure is almost entirely the cost of *postretirement* survivor benefits.

*Ethan E. Kra*

Dr. Kra makes the point that we chose to use gross, or pre-tax, interest rates. His point, which is quite valid, is that income taxes on interest earnings would reduce the accumulated values of payroll taxes and increase the ratios of benefits to taxes. While this is correct, we consciously chose to use gross rates on the theory that these interest earnings should get qualified-plan treatment. We cannot be sure how an IRA-type social insurance program would work in every detail, but we do not believe that interest earnings would be subject to current taxation.

*Krzysztof Ostaszewski*

Dr. Ostaszewski makes some relevant points regarding our use of employee taxes only in computing the accumulated tax values. This is an important issue, and one on which we have changed our position since writing our original money's-worth paper in 1982. Then, we used the combined employee-employer taxes, on the principle that employees really must earn both halves of the tax. While we still believe that, we do not believe that each employee necessarily should be individually credited with the precise amount of employer tax paid on account of his or her earnings. The employer tax is paid in the aggregate, and no particular employee can be certain how much of it he or she would receive in the absence of Social Security.

Dr. Ostaszewski also observes the declining money's-worth ratios over time. This result, which should not be too surprising to anyone, is really the heart of our work. We wanted to show how the windfalls provided to Social Security's earliest beneficiaries have been declining and will eventually disappear for tomorrow's retirees. We believe that we accomplished that goal, even if the figures may not be absolutely precise in every instance.

*Gregory Savord*

Mr. Savord disagrees with many aspects of our paper. We address his points in the same order that they appear in his discussion:

1. *The paper is essentially a rewrite of our 1983 paper, but we did not explain why the figures changed.* Our original paper was written before enactment of the Social Security Amendments of 1983 (Public Law 98-21). We incorporated many aspects of that law into our response to the discussions, but the results were an incomplete hybrid, combining old assumptions and new law. Moreover, since 1983, while the law has remained essentially the same, Social Security's Board of Trustees has changed its actuarial assumptions many times, most significantly in 1991. We wanted to present updated results, but we did not—and still do not—believe that readers would want to go through the complicated exercise of showing the effects of all the changes that occurred between 1983 and 1991. Most readers want to see current results only, and we showed them.
2. *The accuracy of our approximation with respect to preretirement survivor benefits has not been substantiated.* We addressed this matter previously, in response to Messrs. Foster and Nichols.
3. *The Congressional Research Service was correct in its accumulation of Old-Age taxes without survivorship.* We addressed this matter previously, in response to Messrs. Foster and Nichols. We also responded to the discussion from Mr. Kollmann, who authored the study published by the Congressional Research Service.
4. *The preretirement and postretirement interest rates are inconsistent.* We acknowledge the inconsistency that Mr. Savord notes, but he should not focus on just one particular year. Real interest rates have varied considerably over time. In computing annuity values using constant interest rates, we undoubtedly understated the real rate in some years and overstated it in other years. Overall, we believe that the use of 2 percent as a long-term real interest rate is reasonable. If others disagree, we have provided values using real interest rates ranging from 0 percent to 3 percent. The fact that these rates are long-term averages and do not reflect year-by-year fluctuations does not make them invalid.
5. *Self-employed individuals cannot be treated like payroll workers.* We certainly agree, and we explained why we did not do so.



6. *The paper does not include examples of money's-worth ratios under various scenarios that improve the financial status of the OASDI program. We agree that Social Security will need to be changed sometime during the first quarter of the next century (or even earlier) to be restored to sound financial condition. We acknowledge this fact in our discussion of the inadequacy of current-law tax rates. However, because the number of ways in which the program could be changed is essentially infinite, we chose not to speculate about how the ratios of value of benefits to accumulated taxes might be affected.*

In summary, we appreciate the discussions of our paper, and we hope that we and the discussants have contributed to the public's knowledge of the Social Security program.

