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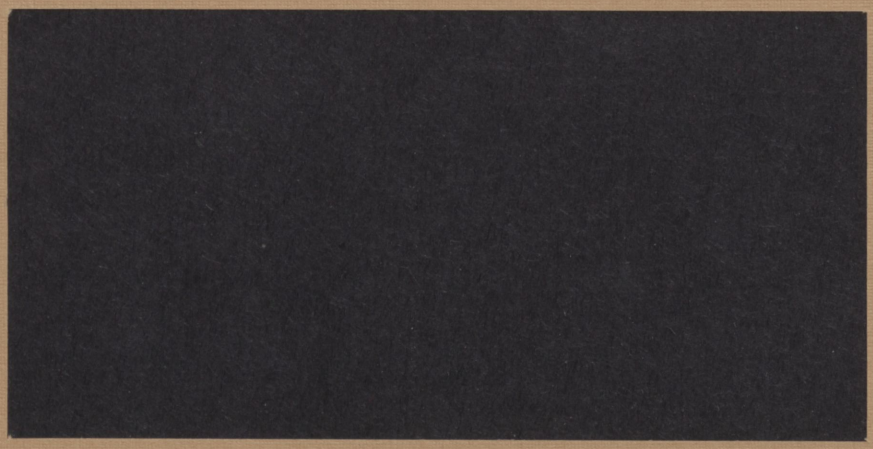

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SOCIAL SECURITY: A FINANCIAL APPRAISAL ACROSS AND WITHIN GENERATIONS

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We wish to thank the Stanford University Center for Economic Policy Research for support of this research and seminar participants at Harvard, UC-Berkeley, UCLA and Stanford for valuable suggestions.

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"Social Security: A Financial Appraisal Across and Within Generations"

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ABSTRACT

This paper computes the expected present value of Social Security retirement benefits and taxes for households of different marital circumstances, incomes, and age cohorts. Also computed are the net gain or loss from participation in the system and the expected internal rate of return it offers various participants. The paper calculates the marginal linkage between benefits and contributions, and also examines how the age of entry into the covered workforce affects the participant. All computations are made for the 1985 Social Security and income tax laws. The general results are that Social Security offers vastly different terms to households in different circumstances. The net gain or loss varies by $200,000 and the real internal rate of return on contributions ranges from negative numbers to 6.6% for households of different ages, income levels, and marital status. These differences are far greater than the widely debated distributional affects of relevant income tax alternatives. We also find that there is a great deal of variance in the marginal linkage of benefits and taxes with many households facing a situation where the present value of benefits increases from 0 to 30 cents per extra dollar of taxes paid.

1. Introduction

For most Americans, anticipated Social Security retirement benefits have a value larger than the total value of their other financial assets.* Likewise, more than half of the workers in the United States pay more in OASDHI "contributions" than they pay in personal income taxes. Because the program looms so large in the financial picture of so many, it is reasonable to assume that there is a significant demand for an investment evaluation of the deal it offers Americans. However, the program is extremely complex, with the expected benefits depending on one's marital status, sex, age-earnings profile, length of career, number of children, and other factors.

In this paper we simplify the analysis by exclusively evaluating the retirement portion of the program. We also only examine it from the perspective of the household or the individual and our study is partial equilibrium in the sense that we do not tackle the consequences of the program for labor force participation or private saving behavior. Further, the household or individual is not particularly concerned about whether the program is fully funded or on a pay-as-you-go basis. What the participant is interested in is how large are his or her taxes (or "contributions" or "investments") and what is the expected value of benefits to which he or she will be entitled. The economically sophisticated household will also be interested in the marginal linkage between taxes and benefits. That is, they would like to know the incremental value of the retirement benefits for an incremental payment of Social Security taxes. We calculate this marginal linkage as well as the expected present value of taxes and benefits for

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* This value may very well be enhanced by the fact that the benefits are paid out as an inflation adjusted life annuity.

households of different income levels, marital status, and belonging to different age cohorts. In computing the present value, we use a three percent real discount rate, although some sensitivity analysis to that figure is presented in the Appendix to the paper. We also calculate the present value of transfers offered by Social Security as the difference between the present value of benefits and taxes. The transfer figure is the surplus or gain one receives from participating in the system (if the figure is positive). Finally, we compute the internal rate of return offered by the retirement portion of Social Security. That is, we calculate the rate of discount which equates the expected present value of benefits with the expected present value of taxes. Throughout the analysis, we assume the participant bears the burden or effectively pays both the employer and the employee contributions to the system.

The emphasis of the paper is to calculate the financial terms of Social Security for households in different circumstances. Our results indicate that the "deal" varies enormously by marital status, income, and cohort. The difference in the transfer figures for different households examined can exceed $200,000. The internal rate of return ranges from our six percent to negative numbers. And, the linkage between incremental taxes and benefits can be significant or zero, depending on the particular household's circumstances. While some of these differences are undoubtedly intentional, others are probably not. It is our feeling that both participants and analysts of Social Security need this information in order to evaluate the current structure of the program.

The remainder of the paper is laid out as follows: the next section contains a brief survey of related literature. Then, section three describes our methodology and data. The intergenerational results are contained in

section four, while the intragenerational results are presented in the fifth section. The sixth section looks at both the relationship of benefits to remaining lifetime taxes and the marginal linkage of taxes and benefits. The paper concludes with some observations on the importance of our findings.

2. Literature Review

Several studies have attempted to estimate the "deal" various households have received or can expect to receive from Social Security's retirement program. The general conclusion is that the early cohorts of retirees had very large rates of return on their taxes and that future retirees, especially well off ones, are likely to fare poorly, with a rate of return below that available on private assets. Hurd and Shoven (1985) document this pattern of rates of return for various cohorts and earnings levels, but their analysis was made prior to the 1983 amendments and hence does not include consideration of the increased age of eligibility for future retirees or the partial taxation of benefits. Also, there have been some changes in the economic and demographic assumptions used by the Social Security Administration.

Boskin, Avrin, and Cone (1983) report the average transfer per household and for aggregate ten year age cohorts, with transfers defined as the difference in the expected present value of benefits and taxes. They also present estimates of how different cohorts and the system finances as a whole would be affected by various policy changes, such as increases in the retirement age. They conclude that those retiring recently are receiving benefits which are about three times as large as the sum of their employee and employer contributions plus three percent real interest, i.e. about two-thirds of their benefits are transfers as defined above.

These results are updated to the post-1983 amendments case in Boskin (1986). The pattern of transfers remains qualitatively similar to that mentioned above, but attention is called to the fact that OASDI is unlikely to be financially solvent over the next 75 years, despite the 1983 amendments. The financial solvency problem is much worse if HI is included. Thus, <u>how</u> and <u>when</u> the financial solvency issue is addressed will affect the Social Security benefits, taxes and transfers of individuals of various ages, income levels and

marital status quite differently. For example, changes in the tax rates, benefit formulas, the age of eligibility for full retirement benefits, or the method of financing Social Security could impact various households quite differently.

Finally, Pellechio and Goodfellow (1983) attempt to examine the net impact of the 1983 amendments on various types of households. Their analysis is similar in spirit to the analysis presented below. However, the range of cases, the updating to 1985 SSA assumptions, the sensitivity analyses, the examination of the marginal linkage between taxes paid and benefits received and the analysis of the relationship between benefits and future taxes (as opposed to lifetime taxes which include taxes already paid), are but some of the innovations in our work.

3. Methodology and Data

In the present study, we use a computer simulation to convert assumptions about households' wages, expected mortality, and economy-wide growth in real wages into expected values of Social Security taxes, benefits, net transfers (positive or negative) and internal rates of return. Assumed wage histories lead in a straight-forward manner (following legal provisions) to derivation of taxes paid during working lives and benefits received after retirement. A separate procedure, described below, determines income-taxation of benefits. These taxes and net-of-income-tax benefits are weighted by the probabilities of household members remaining alive at each age and discounted (we consider real rates of 2%, 3%, and 4%) to a common year (we use both 1985 and the year a household reaches age 25). We also derive the transfer, or difference between discounted expected taxes and benefits, and the internal real rate of return, the rate at which discounted expected taxes equal discounted benefits.

We consider typical households which differ in a number of respects: in marital status, the amount of total household earnings, and the division of total earnings between wife and husband. We also compare households born in 1915, 1930, 1945, 1960, 1975, and 1990, since these cohorts differ in the tax rates they pay, the economy's level of real wages, and life expectancy. Husbands and wives are presumed born in the same year.

For most of the results reported below we assume that individuals work, and pay Social Security taxes, from age 21 until they become eligible for full retirement benefits - at age 65 for those born in 1915 and 1930, 66 for those born in 1945, and 67 for later cohorts. We also, however, consider results for individuals who begin work at ages 18, 25, and 30. We do not consider unemployment.

Wages vary for individuals both with economy-wide wage growth (as indexed by the Social Security Administration's "Average Wage Series") and according to their age: we assume that male wages increase one percent per year of age beyond the economy-wide growth in wages until age 50 and that female wages increase one-half percent per year of age until age 50. The "earnings levels" reported in the tables below correspond to the 1960 cohort -- 25-year-olds in 1985. By 2010, when the 1960 cohort is 50 years old, its real wages will have increased 45 percent with economy-wide wage growth plus an additional 28.4 percent for males and 13.3 percent for females in keeping with their age-profile of wages. The 1930 and 1945 cohorts have wages in 1985 which vary by the age-profile from the "earnings level" listed. All cohorts other than the 1960 cohort have age-25 wages which differ from that reported as the "earnings level" by the difference in the wage index between 1985 and the year they are 25. In our principal research we follow the Social Security Administration's intermediate assumption (Assumption II-B) for future wage growth; however, we do consider other assumptions as well below.

In considering expected values of taxes and benefits we assume 100 percent survival only until age 25.* Subsequent taxes and benefits are weighted by the probabilities of individuals remaining alive at each age. Since wives may collect spouse or survivors' benefits based on their husbands' earnings histories, we derive their benefits as the weighted average of benefits for each age of husband death, including death before retirement. Marriages are assumed to take place at age 25, widows are assumed to remain single, and divorce is not considered.

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* 25 is the age at which we compare households in different cohorts. It is the age of the 1960 cohort - the first cohort in the mature system - in 1985, the base year for most of our reported results.

Mortality probabilities are considered separately for males and females. Separate mortality tables are used for each cohort. The tables used are those used for the intermediate assumption (Assumption II) in the 1983 Annual Report of the Board of Trustees of the Old Age and Survivors' Insurance and Disability Insurance Trust Funds.* The male and female life expectancies implicit in these tables, conditional on survival to age 25, are 71.2 and 79.0 years for those born in 1915, 72.1 and 79.8 for 1930, 73.9 and 81.4 for 1945, 74.6 and 82.1 for 1960, 75.3 and 82.9 for 1975, and 76.0 and 83.6 for 1990.

Another matter of some importance which we do not consider is the existence of beneficiaries other than retirees and their spouses - especially the young children of retirees and deceased persons. Currently about 7% of OASI benefits go to (or to surviving spouses on behalf of) such beneficiaries, and about 4% of benefits are expected to go to such beneficiaries in the long-run future.**

The recent legislation of taxation of Social Security benefits has added substantial complication to our derivations. The law provides for the taxation as ordinary income of half one's benefits to the extent that this portion of one's benefits, plus other adjusted gross income, exceeds the un-indexed threshold levels of $25,000 for singles and $32,000 for couples. The chief difficulty arises in deriving adjusted gross income and marginal tax rates for retired households for which we otherwise make assumptions only about wage income in pre-retirement years. Our procedure is as follows: Census Bureau data are used to determine the percentile rankings of the household earnings levels we consider.*** IRS

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* Social Security Administration, Actuarial Study No. 88, 1983.

** Derived from Social Security Bulletin, 1982 Annual Statistical Supplement, Table 54, and 1985 Report of the Trustees of the Old Age and Survivors and Disability Insurance Trust Funds, Table A3.

*** "Money Income of Households, Families, and Persons in the United States: 1983," Bureau of the Census, Current Population Reports, Series P-60, No. 146, Table 34. The figures are for wage, salary, and self-employment income for all married households and unrelated individuals ages 25-64 with some such income.

data are used to determine the adjusted gross income and taxable earnings of taxpayers over age 65 which correspond to these same percentile rankings.* These figures for adjusted gross income and taxable earnings are assumed to vary with our wage index from the year of the data to the year five years after a cohort's retirement, but to vary for each given cohort only with the Consumer Price Index. The figures for adjusted gross income determine the amount of benefits subject to taxation, while the figures for taxable earnings determine the marginal tax rate which is applied. Since tax brackets are indexed by the CPI a common marginal tax rate is thus derived for all years of one's retirement. We have not added the complication of considering that part of benefits will generally fall within higher brackets.

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* Dan Holik and John Kozielec, "Taxpayers Age 65 or Over, 1977-81," Internal Revenue Service, Statistics of Income Bulletin 4,1 (Summer 1984): 1-16, Table 2. The figures are for all income-tax returns filed for 1981 by those age 65 or over.

4. Intergenerational Transfers in Social Security

Social Security - when it was introduced and each time it has expanded - has been a major vehicle for transferring resources from the younger, richer, working generation to the older, poorer, retired generation. While part of this public redistribution of wealth between generations may be offset by private intrafamily intergenerational transfers, it is unlikely that this offset is sufficient to alter our general conclusions.* While the percentage of transfers in benefits is largest for the first cohort of retirees (who receive virtually a complete windfall), the positive intergenerational transfers received by retirees may continue to be substantial for decades, turning negative for subsequent retirees.

Tables 1A and 1B highlight the expected intergenerational transfers under current law and the Social Security Administration's intermediate (II.B) economic and demographic projections.** Table 1A compares the expected present value of benefits, taxes, and transfers (the difference between benefits and taxes) across six cohorts of curent and future retirees at various earnings levels. It also presents the internal rate of return on the taxes paid, i.e. the rate which equates the expected present values of taxes and benefits. The dollar figures are discounted at a real 3% rate; sensitivity analyses to variations in the discount rate are discussed in the appendix.

The three earnings levels presented ($10,000, $30,000, and $50,000) are wage indexed levels for 1985. For the 1960 cohort, they represent actual 1985 wages at age 25. For the 1945 cohort, actual earnings levels at the age of 40

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* The argument is made most forcefully by Barro (1978); however, see Boskin and Kotlikoff (1986) for an empirical refutation of the Barro model.

** There is some ambiguity concerning these assumptions due to the fact that the OASDI system is not actuarially solvent over the next 75 years. See Boskin (1986) for a discussion of the magnitude, sources and implications of this problem.

Table 1A
Comparison Across Cohorts of
Single-earner Couples, Various Earnings Levels
(1985 dollars discounted at rate 3% to 1985)

Year of Birth		Earnings Level (at 1985 wage index) 10,000	30,000	50,000
1915	P.V. Benefits	92,277	144,845	133,969
	P.V. Taxes	36,280	68,340	72,205
	P.V. Transfer	55,997	76,505	61,764
	Rate of Return	6.6%	5.81%	5.23%
1930	P.V. Benefits	77,524	122,968	114,499
	P.V. Taxes	48,176	110,574	110,848
	P.V. Transfer	29,348	12,394	3,651
	Rate of Return	4.56%	3.38%	3.12%
1945	P.V. Benefits	62,679	109,128	100,503
	P.V. Taxes	48,951	136,498	140,253
	P.V. Transfer	13,727	-27,370	-39,750
	Rate Of Return	3.74%	2.30%	1.95%
1960	P.V. Benefits	46,546	84,059	76,842
	P.V. Taxes	41,263	123,788	138,302
	P.V. Transfer	5,283	-39,728	-61,459
	Rate of Return	3.35%	1.85%	1.30%
1975	P.V. Benefits	37,774	67,464	63,051
	P.V. Taxes	33,273	99,819	112,081
	P.V. Transfer	4,501	-32,355	-49,028
	Rate Of Return	3.37%	1.85%	1.36%
1990	P.V. Benefits	30,607	54,278	50,314
	P.V. Taxes	26,399	79,196	88,866
	P.V. Transfer	4,208	-24,918	-38,551
	Rate of Return	3.43%	1.90%	1.39%

for low-wage males in 1985 would be $11,610, which exceeds the $10,000 figure by 15 years of movement along their age earnings profile. For the 1915 cohort, which is 70 in 1985, these figures must be deflated by the real wage index to ascertain their actual wages earlier in their lives; similarly, for cohorts not yet working, these figures would be compounded at real wage growth projections (1.5%/annum in the II.B scenario) to ascertain the actual future real wages at age 25, and at real wage growth plus the movement along the age-earnings profile from age 25 to 50. Thus, as one moves down a column across cohorts, we are, roughly speaking, maintaining the relative position in the income distribution. The three earnings levels correspond roughly to the poverty line, median income, and the earnings of well-off professionals above the taxable maximum ceiling, respectively.

Table 1A reveals, reading down each column (within earnings classes, across age cohorts), that the internal rate of return declines rapidly for the first four cohorts; for example, from 6.6% to 3.4% for the $10,000 earnings level and from 5.2% to 1.3% for the $50,000 earnings level. The youngest two cohorts are presently expected to receive rates of return about equal to the 1960 cohort. This occurs because their increasing life expectancy offsets increased taxation of benefits. However, the returns of 9%* or so received by the 1905-1910 cohort (who paid taxes for five to ten fewer years than the 1915 cohort) are no longer evident, despite successive expansions of the system. The start-up effect is roughly over by the 1945 cohort.

Next, notice that future poor families will receive only very small transfers -- amounting to a present value of $4,000 or $5,000 from 1960 onwards. Despite the progressive nature of the benefit formula, current Social Security law does little for poor working families in the future.

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* As reported in Hurd and Shoven (1985).

The present value of transfers turns negative as early as the 1945 cohort for the earnings levels above $10,000. Correspondingly, the internal rates of return drop below 3%. For the $50,000 earnings level, the (negative) transfer peaks at over $61,000 for the 1960 cohort (the real wage growth of 1 $\frac{1}{2}$% does not offset the higher discount rate, so later cohorts appear to do better, discounted to 1985).

Looking across columns within each age cohort reveals some interesting results. First, while for the 1915 cohort, the rates of return are highest for the poorest families, the absolute dollars of transfers are higher for the middle and upper-income family. The reason is that the level of participation in Social Security is related to earnings. Higher wage workers in this cohort were allowed to play in a favorable game for higher stakes. The positive transfers to the rich continue in the 1930 cohort. The deal for the rich, absolutely and relatively, worsens dramatically relative to the other earnings levels in succeeding cohorts.

Table 1B presents analogous numbers to those in Table 1A, but discounted to the year each cohort reaches age 25 - roughly speaking when they "enter" the system. The dollar figures, while discounted to different years, are all in constant 1985 dollars. Real wages and taxes increase cohort to cohort, and starting Social Security benefits are wage-indexed, so the internal rates of return, for each cohort and earnings level combination, are identical to those reported in Table 1A. If we take the 1990 cohort and the $50,000 earnings level, the expected value of the loss for the family is $93,573, discounted to 2015. Discounted to 1985, the figure becomes $38,551, the corresponding entry in Table 1A.

In summary, the intergenerational transfers in Social Security have been, and continue to be, substantial. The size of such transfers varies substantially by cohort and earnings level. In the next section, we will see

Table 1B
Comparison Across Cohorts of
Single-earner Couples, Various Earnings Levels
(1985 dollars discounted at rate 3%
to the year in which cohort is age 25.)

Year of Birth (Year Age 25)		Earnings Level (at 1985 wage index) 10,000	30,000	50,000
1915	P.V. Benefits	24,402	38,303	35,427
(1940)	P.V. Taxes	9,594	18,072	19,094
	P.V. Transfer	14,808	20,231	16,333
	Rate of Return	6.6%	5.81%	5.23%
1930	P.V. Benefits	31,939	50,661	47,172
(1955)	P.V. Taxes	19,848	45,555	45,668
	P.V. Transfer	12,091	5,106	1,504
	Rate of Return	4.56%	3.38%	3.12%
1945	P.V. Benefits	40,231	70,045	64,509
(1970)	P.V. Taxes	31,420	87,613	90,023
	P.V. Transfer	8,811	-17,568	-25,514
	Rate of Return	3.74%	2.30%	1.95%
1960	P.V. Benefits	46,546	84,059	76,842
(1985)	P.V. Taxes	41,263	123,788	138,302
	P.V. Transfer	5,283	-39,728	-61,459
	Rate of Return	3.35%	1.85%	1.30%
1975	P.V. Benefits	58,851	105,106	98,232
(2000)	P.V. Taxes	51,839	155,515	174,618
	P.V. Transfer	7,013	-50,408	-76,384
	Rate of Return	3.37%	1.85%	1.36%
1990	P.V. Benefits	74,292	131,746	122,125
(2015)	P.V. Taxes	64,077	192,229	215,700
	P.V. Transfer	10,215	-60,482	-93,573
	Rate of Return	3.43%	1.90%	1.39%

that it also depends heavily on family status. Before doing so, we note two points. First, the expected present value of benefits may underestimate the value to the recipient because benefits are paid as indexed annuities. In the absence of a well-functioning market for real annuities, risk averse households will value the benefits at more than their expected present value. Because the long run financial solvency of Social Security is uncertain, considerable uncertainty exists concerning future benefits, especially for those retiring many years from now.* This risk discount probably partly offsets the annuity bonus for those in the 1945 cohort or younger. Of course, for those already retired, the annuity bonus dominates, and the deal is probably better than the figures presented in the tables indicate.

One type of uncertainty is over future economic and demographic conditions. In Table 2, we present estimates similar to those in Table 1A for the four cohorts beginning with 1945 under two alternative real wage growth assumptions: the 2 $\frac{1}{2}$% per year growth assumed by SSA in their optimistic scenario (I) and the 1% per year assumed in their pessimistic scenario (III). The rates of return decline as we move from the optimistic to the intermediate to the pessimistic real wage growth scenarios. The dollar amounts of transfers also follow this path except for the wealthy group in the 1990 birth cohort. This anomoly is similar to that reported above for the 1915 cohort, but in reverse: this group is playing for higher stakes for longer in a disadvantageous system, and therefore does better - in terms of Social Security transfers as opposed to lifetime earnings - with slower wage growth.

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* See Boskin (1986).

Table 2
Comparison of Assumptions About Real Wage Growth
for Single-earner Couples of Low and High Earnings
(1985 dollars discounted at rate 3% to 1985)

Earnings Levels:		-----$10,000-----		---$50,000---	
	SSA Assumptions:	I	III	I	III
Year of Birth					
1945	P.V. Benefits	80,490	53,838	127,629	88,247
	P.V. Taxes	51,505	47,664	150,071	134,449
	P.V. Transfer	28,985	6,174	-22,442	-46,202
	Rate of Return	4.37%	3.36%	2.48%	1.70%
1960	P.V. Benefits	69,535	38,538	115,503	62,339
	P.V. Taxes	48,242	37,809	163,045	125,528
	P.V. Transfer	21,293	729	-47,542	-63,188
	Rate of Return	4.11%	3.05%	1.96%	1.02%
1975	P.V. Benefits	65,587	28,389	107,996	47,562
	P.V. Taxes	44,828	28,366	152,446	94,274
	P.V. Transfer	20,759	23	-44,450	-46,712
	Rate Of Return	4.14%	3.00%	1.98%	1.09%
1990	P.V. Benefits	61,685	21,473	100,003	35,108
	P.V. Taxes	41,345	20,922	140,546	69,484
	P.V. Transfer	20,340	551	-40,542	-34,376
	Rate of Return	4.20%	3.07%	1.99%	1.10%

5. Intragenerational Transfers

The current Social Security system not only offers different rates of return to different generational cohorts, but also presents different households within a cohort with significantly different expected rates of return. We have examined the present value of expected benefits, taxes, and transfers for single men and women of different income levels and for married couples with different levels and composition of income. The results are shown in Table 3 for the cohort born in 1945, and hence 40 years of age in 1985.

The upper-most segment of the table compares the expected present value of retirement benefits and Social Security taxes for singles and one-earner couples with the same level of earnings. In comparing the single male with the one-earner couple with the same earnings history, note that while the expected present value of taxes paid is the same, the expected present value of benefits is more than twice as great for the married couple. This is due to the fact that the couples receive an inflation indexed joint survivor annuity with the initial benefit level set at 150 percent of the single person's benefit (as long as both spouses survive). The surviving member of the couple receives a benefit exactly equal to that of the single person. Thus, the benefits for couples are 50 percent greater for a period of time, and have a longer expected period of receipt. Naturally, these extra benefits for the same tax payments translate into a higher expected real rate of return. In fact, couples, regardless of the division of earnings, never do worse than two singles, because the system permits couples to claim their own benefits as if they were single. Of course, the fact that half of benefits may be subject to the personal income tax alters this relationship somewhat.

A second fact which is evident in the upper most panel of Table 3A is that single women receive a larger transfer (or a smaller negative transfer) and a higher rate of return than single men. This is primarily a consequence

of the longer life expectancy of women and the fact that the benefit levels do not differ according to sex. Finally, that panel, and the rest of the table, illustrates that higher income households in this cohort receive a lower real rate of return and larger negative transfers than lower income households. At a three percent real discount rate (i.e. if the opportunity cost of funds is three percent), the single male loses $19,038 from the system if his wage at 25 is $10,000, but $84,216 if his wage at that age is $30,000, and $91,721 if his wage is $50,000. The middle and upper income single males actually have a negative expected real rate of return indicating that they cannot even expect to recoup the purchasing power of their Social Security taxes.

How Social Security treats various members of the same cohort differently can be expressed in several ways. If we still concentrate on the upper panel of Table 3A, note that the rate of return ranges from -.6 percent to 3.74 percent. Given that this is a large program which covers one's entire adult lifetime, these rates of return differences translate into transfers ranging from +$13,727 to -$91,721. These figures are large relative to the typical value of a private pension and even relative to the median value of a house in the United States in 1985.

The remainder of Table 3A explores the situation of two earner couples and compares their outcomes to singles with the same earnings record. Note that the expected present value of taxes paid by the couples is in all cases equal to the sum of the singles with the same earnings levels. The couples with a two-thirds/one-third income split still benefit from the spousal survivor benefit, and thus they do better than their "component singles." However, the women's taxes do not affect the couple's benefits at all, and hence there is absolutely no linkage between her tax payments and retirement benefits. We discuss the issue of linkage in greater depth in the next section. The final

Table 3A
Comparison Across Family Types of
1945 Cohort, Various Earnings Levels
(1985 dollars discounted at rate 3% to 1985)

	Earnings Level (at 1985 wage index) (Husband-Wife earnings split)		
Family Type	10,000	30,000	50,000
Single-earner Couple	(10,000-0)	(30,000-0)	(50,000-0)
P.V. Benefits	62,679	109,128	100,503
P.V. Taxes	48,951	136,498	140,253
P.V. Transfer	13,727	-27,370	-39,750
Rate of Return	3.74%	2.30%	1.95%
Single Male	(10,000)	(30,000)	(50,000)
P.V. Benefits	29,913	52,282	48,532
P.V. Taxes	48,951	136,498	140,253
P.V. Transfer	-19,038	-84,216	-91,721
Rate of Return	1.42%	-0.25%	-0.60%
Single Female	(10,000)	(30,000)	(50,000)
P.V. Benefits	40,306	71,715	69,590
P.V. Taxes	46,901	130,802	144,723
P.V. Transfer	-6,595	-59,087	-75,133
Rate of Return	2.55%	1.13%	0.68%
Two-earner Couple	(6667-3333)	(20,000-10,000)	(33,333-16,667)
P.V. Benefits	53,293	96,044	108,428
P.V. Taxes	48,264	144,760	218,119
P.V. Transfer	5,029	-48,715	-109,689
Rate of Return	3.30%	1.75%	0.80%
Single Male	(6667)	(20,000)	(33,333)
P.V. Benefits	24,593	46,323	52,074
P.V. Taxes	32,635	97,872	139,971
P.V. Transfer	-8,042	-51,548	-87,896
Rate of Return	2.10%	0.57%	-0.34%
Single Female	(3333)	(10,000)	(16,667)
P.V. Benefits	24,100	40,300	54,736
P.V. Taxes	15,630	46,889	78,149
P.V. Transfer	8,471	-6,589	-23,412
Rate of Return	4.27%	2.55%	1.93%

Table 3A (cont'd)
Comparison Across Family Types of
1945 Cohort, Various Earnings Levels
(1985 dollars discounted at rate 3% to 1985)

	Earnings Level (at 1985 wage index) (Husband-wife earnings split)		
Family Type	10,000	30,000	50,000
Two-earner Couple	(5,000-5,000)	(15,000-15,000)	(25,000-25,000)
P.V. Benefits	50,936	89,578	109,457
P.V. Taxes	47,926	143,777	233,433
P.V. Transfer	3,010	-54,199	-123,975
Rate of Return	3.18%	1.54%	0.61%
Single Male	(5,000)	(15,000)	(25,000)
P.V. Benefits	21,291	38,220	49,796
P.V. Taxes	24,476	73,427	119,304
P.V. Transfer	-3,184	-35,207	-69,509
Rate of Return	2.56%	0.89%	0.11%
Single Female	(5,000)	(15,000)	(25,000)
P.V. Benefits	29,187	51,056	68,537
P.V. Taxes	23,451	70,350	114,128
P.V. Transfer	5,736	-19,294	-45,592
Rate of Return	3.65%	2.04%	1.45%

panel of Table 3A compares two-earner couples with a 50-50 earnings split with the corresponding singles. The general result is that the 50-50 couples do somewhat worse than the $\frac{2}{3}$ - $\frac{1}{3}$ couples and that they gain a little from the wives collecting survivor benefits as widows rather than benefits based on their own earnings histories.

Table 3B contains similar intragenerational transfer data as Table 3A, except that it is for the cohort born in 1960. This cohort works one more year, and hence doesn't retire until age 67. This implies more taxes and a shorter annuity period. Offsetting this, however, is the fact that this generation is projected to have a longer life expectancy than the 1945 cohort. The table also adds a higher income bracket whose deal differs from the $50,000 category primarily because of having a higher personal income tax rate.

The results are similar to the previous table. However, the range of transfers and rates of return is even wider. For the table as a whole, the rate of return varies from -1.3 percent to 3.99 percent and the transfer figures go from $5,449 to -$192,075. The general patterns are still that single women do better than single men, that single earner couples do better than two earner couples and that higher earnings households do worse than lower earnings households. The important point of the table, however, is the enormous magnitude of the differences, which are larger than those which generate intense debate in the personal income tax, such as changing the exemption level.

Table 4 shows the expected present value of retirement benefits, taxes, and transfers, as well as the expected real rate of return, for different ages at which work commences. Our standard assumption has been that individuals enter the work force at age 21. In this table we look at three alternative initial ages, 18, 25, and 30 for members of the 1945 birth cohort. Four households of different marital status (all with a $30,000 earnings level as

Table 3B
Comparison Across Family Types of
1960 Cohort, Various Earnings Levels
(1985 dollars discounted at rate 3% to 1985)

	Earnings Level (at 1985 wage index) (Husband-Wife earnings split)			
Family Type	10,000	30,000	50,000	80,000
Single-earner Couple	(10-0)	(30-0)	(50-0)	(80-0)
P.V. Benefits	46,546	84,059	76,842	73,522
P.V. Taxes	41,263	123,788	138,302	138,302
P.V. Transfer	5,283	-39,729	-61,460	-64,780
Rate of Return	3.35%	1.85%	1.30%	1.17%
Single Male	(10,000)	(30,000)	(50,000)	(80,000)
P.V. Benefits	22,548	39,538	36,746	34,885
P.V. Taxes	41,263	123,788	138,302	138,302
P.V. Transfer	-18,715	-84,250	-101,556	-103,417
Rate of Return	1.10%	-0.66%	-1.13%	-1.30%
Single Female	(10,000)	(30,000)	(50,000)	(80,000)
P.V. Benefits	30,611	54,594	53,162	50,470
P.V. Taxes	39,520	118,559	141,972	141,972
P.V. Transfer	-8,909	-63,965	-88,810	-91,502
Rate of Return	2.26%	0.71%	0.13%	-0.03%
Two-earner Couple	(6.7-3.3)	(20-10)	(33-17)	(53-27)
P.V. Benefits	39,476	73,298	82,004	84,654
P.V. Taxes	40,680	122,038	197,883	243,663
P.V. Transfer	-1,204	-48,740	-115,877	-159,009
Rate of Return	2.91%	1.48%	0.36%	-0.17%
Single Male	(6667)	(20,000)	(33,333)	(53,333)
P.V. Benefits	18,193	35,254	40,291	36,746
P.V. Taxes	27,509	82,528	132,032	138,302
P.V. Transfer	-9,316	-47,274	-91,741	-101,556
Rate of Return	1.71%	0.30%	-0.75%	-1.13%
Single Female	(3333)	(10,000)	(16,667)	(26,667)
P.V. Benefits	18,619	30,606	42,258	52,783
P.V. Taxes	13,170	39,510	65,851	105,360
P.V. Transfer	5,449	-8,904	-23,593	-52,577
Rate of Return	3.99%	2.26%	1.70%	0.96%

Table 3B (Cont'd)
Comparison Across Family Types of
1960 Cohort, Various Earnings Levels
(1985 dollars discounted at rate 3% to 1985)

	Earnings Level (at 1985 wage index) (Husband-Wife earnings split)			
Family Type	10,000	30,000	50,000	80,000
Two-earner Couple	(5-5)	(15-15)	(25-25)	(40-40)
P.V. Benefits	37,630	68,257	81,692	88,200
P.V. Taxes	40,391	121,174	201,956	280,275
P.V. Transfer	-2,761	-52,917	-120,264	-192,075
Rate of Return	2.79%	1.27%	0.24%	-0.46%
Single Male	(5,000)	(15,000)	(25,000)	(40,000)
P.V. Benefits	16,300	29,141	37,066	38,607
P.V. Taxes	20,631	61,894	103,157	138,302
P.V. Transfer	-4,331	-32,753	-66,090	-99,695
Rate of Return	2.27%	0.62%	-0.27%	-0.97%
Single Female	(5000)	(15,000)	(25,000)	(40,000)
P.V. Benefits	22,516	39,203	51,414	55,854
P.V. Taxes	19,760	59,280	98,800	141,972
P.V. Transfer	2,756	-20,077	-47,386	-86,188
Rate of Return	3.38%	1.79%	1.08%	0.28%

Table 4
Effect of Starting Work at Different Ages for
1945 Cohort, $30,000 Earnings Level, Various Family Types
(1985 dollars discounted at rate 3% to 1985)

Life-Cycle of Wages	Family Type: 1-earner Couple	2-earner Couple .5 each	Single Male	Single Female
Begin work at age 21 (base case)				
P.V. Benefits	109,128	89,578	52,282	71,715
P.V. Taxes	136,498	143,777	136,498	130,802
P.V. Transfer	-27,370	-54,199	-84,216	-59,087
Rate of Return	2.30%	1.54%	-0.25%	1.13%
Begin work at age 18				
P.V. Benefits	109,128	89,578	52,282	71,715
P.V. Taxes	142,605	153,760	142,605	136,911
P.V. Transfer	-33,478	-64,182	-90,323	-65,196
Rate of Return	2.18%	1.39%	-0.32%	1.04%
Begin work at age 25				
P.V. Benefits	109,128	89,578	52,282	71,715
P.V. Taxes	126,116	129,930	126,116	120,420
P.V. Transfer	-16,987	-40,350	-73,834	-48,705
Rate of Return	2.52%	1.79%	-0.12%	1.31%
Begin work at age 30				
P.V. Benefits	108,371	89,427	52,282	71,715
P.V. Taxes	112,113	110,999	112,113	106,378
P.V. Transfer	-3,742	-21,572	-59,831	-34,665
Rate of Return	2.88%	2.23%	0.13%	1.62%

defined above -- corresponding for males to about $35,000 actual 1985 dollars in 1985) are displayed in the four columns. The principal result of the table is that those who delay entry into the labor force earn a higher rate of return and higher transfers. The reason is that only the highest 35 years of earnings are used in the calculation of Social Security retirement benefits. Thus, the "missing years" do not depress benefits. Looking at it the other way around, the taxes paid in the years in the labor force before age 30 have no affect on benefits and, therefore, no linkage. They are truly taxes and in no part pension contributions. This result would also apply, although perhaps with less force, to any worker who spends several years in the uncovered sector. The loss in benefits from such a departure can be zero or very low.

6. Other Issues

Results reported thus far deal with the total or average relationship between Social Security, taxes paid and benefits received. In this section we consider two further matters of importance: the marginal linkage between taxes and benefits, and the importance of "sunk" taxes in determining people's interest in maintaining the Social Security system in its present form.

The marginal linkage between Social Security taxes and benefits, and the public's perception of this linkage, determine the extent to which individuals treat Social Security taxes as wage taxes or as forced savings (analogous to pension contributions) in their household economic decisions. To the extent that Social Security taxes are treated as wage taxes they add to the distortionary effects of income taxes (Auerbach and Kotlikoff, 1985). Since the distortionary effect of taxation rises with the square of the marginal tax rate, the 10.4 percent of most people's wage income currently contributed to Old Age and Survivors' Insurance could be nearly doubling any labor supply distortion effects of income taxation. It may well be that uncertainty and lack of information about the benefits which one may expect reduce the perceived linkage between taxes and benefits (Boskin, Kotlikoff, and Shoven (1985)); here we consider the actual extent of linkage.

Table 5 presents the ratios of marginal discounted expected benefits divided by marginal discounted expected taxes for households of various composition and various total earnings. The marginal taxes are distributed over one's life in the same proportions as all one's Social Security taxes. The marginal benefits which result from these taxes depend on three factors: (1) one's bracket of the graduated, or "piece-wise linear," formula which converts one's earnings history into retirement benefits, (2) whether one collects benefits based on one's own or one's spouse's earnings history, and (3) the marginal income-tax rate which is applied to up to half one's benefits.

Table 5
Discounted Expected Marginal Benefit per Marginal Taxes Paid,
with Extra Taxes Spread Over Lifetime,
for 1960 Cohort at 3% Real Discount Rate

Earnings Level Derived Marginal Tax Rate Post-Retirement	Contributor	1-earner Couple	2-earner Couple	Single Male	Single Female
$10,000					
Couples .08[a]	Male	.730	.546	.348	-
Singles .113[a]	Female	0	.301	-	.474
$15,000					
Couples .14	Male	.707	.529	.341	-
Singles .15	Female	0	.292	-	.465
$20,000					
Couples .14	Male	.357	.529	.159	-
Singles .16	Female	0	.292	-	.462
$25,000					
Couples .16	Male	.345	.523	.153	-
Couples .23	Female	0	.289	-	.209
$30,000					
Couples .18	Male	.338	.517	.150	-
Singles .26	Female	0	.286	-	.205
$40,000					
Couples .28	Male	*	.229	*	-
Singles .34	Female	0	.270	-	*
$50,000					
Couples .38	Male	*	.216	*	-
Singles .42	Female	0	.119	-	*
$60,000					
Couples .42	Male	*	.211	*	-
Singles .48	Female	0	.116	-	*
$80,000					
Couples .45	Male	*	*	*	-
Singles .50	Female	0	*	-	*

*At maximum tax.
Note: [a]Tax rates below 12% reflect an adjustment for the proportion of low-income households which owe taxes at all.

The formula which determines one's Primary Insurance Amount, the monthly benefit one can get based on one's own earnings when one does not retire early, has brackets in which a function of one's earnings history is multiplied by 90 percent, by 32 percent, and by 15 percent. Only those with very low earnings histories have marginal benefits determined within the 90-percent bracket; this bracket does not apply to any of the cases in Table 5.

Single males in the 32-percent bracket have a gross-of-income-tax marginal linkage ratio of .368; in the 15-percent bracket the linkage ratio is .173. Single females with a higher life expectancy, have linkage ratios of .503 in the 32-percent bracket and .236 in the 15-percent bracket. The figures reported in Table 5 reflect the reduction of these linkage ratios due to income taxation of half one's benefits.

In single-earner couples, wives receive both spouse benefits of half their husband's benefits while their husbands live and survivor benefits, equal to their husbands' full benefits, after their husbands die. As a result of the "joint survivor annuity" which such couples get for the same taxes as are paid by single males, the marginal linkage is more than twice that for single males. Gross of income taxation it is .760 in the 32-percent bracket and .356 in the 15-percent bracket.

Wives in our two-earner couple examples have histories of earnings slightly lower than those of their husbands. As a result, they can receive higher benefits based on their own earnings histories rather than on their husbands' earnings histories while their husbands live, but higher benefits based on their husbands' earnings histories after they are widowed. Thus, the linkage ratios for such couples due to additional tax paid by the husband are between those for single males and for one-earner couples -- .568 in the 32-percent bracket and .266 in the 15-percent bracket -- while the linkage ratios due to additional tax paid by the wife are below those for single females --

In cases (not shown) where wife and husband earnings are equal, each receives benefits based only on their own earnings, and the marginal linkages are the same as for singles (except that as a couple with a combined income they will be subject to a higher marginal income-tax rate). Where the wife's earnings are greater than the husband's earnings, the husband will receive survivor benefits based on the wife's earnings.

Where the husband's benefits are more than twice those of the wife, so that the wife gets a greater benefit as a spouse than she would based on her own earnings history, there is, of course, no marginal linkage from her tax to benefits.

The most striking result to be seen in Table 5 is that in no case is the marginal linkage as high as one. Single-earner couples in the 32-percent bracket of benefit determination and with low income-tax rates have a linkage of nearly three-fourths; all others do substantially worse. Family status has a substantial effect on linkage. Thus, the provision of a joint-survivor annuity to married males produces more than a doubling of the marginal linkage (as also the total benefit) given to single males. It might also be noted that the sum of the linkages for husband and wife in two-earner couples is about the same as the linkages for single males and females with comparable earnings; only the division of the linkage differs.

In viewing Table 5, one should be aware of the following anomalies. The net-of-tax linkages for one-earner couples with earnings levels of $20,000 or more are not based simply on the gross-of-tax linkages for the 15-percent bracket. There is some possibility that the husband will die before retirement with an earnings history which puts the determination of his widow's benefit in the 32-percent bracket. The linkages for such cases are weighted by their probability. Also, for two-earner couples at the $40,000 earnings level husbands and wives are in different brackets of the benefit-computation formula.

It should also be noted that the extent of linkage varies with age. For the computation of benefits one's earnings history is indexed to wages, which are assumed to grow at a real rate of $1\frac{1}{2}$ percent. Our real discount rate is 3 percent. Thus one's later wages "receive too low an interest rate" for a shorter period and one's later marginal taxes yield a greater amount in marginal benefits. Furthermore, in the benefit computation formula only the 35 highest years of indexed earnings are considered, so that marginal taxes in other years have no linkage to benefits. Because we assume that wages increase with age as well as with economy-wide wage growth, in our examples all taxes paid through age 31 have no marginal linkage to benefit (the retirement age for the 1960 cohort is 67). For taxes paid at age 40, the marginal linkages for men are about 1.23 times those reported for taxes paid over one's lifetime; for women the corresponding multiple is about 1.21 (these figures differ by sex because mortality varies by sex). For taxes paid at age 55, marginal linkages are 1.64 times greater for men and 1.55 times greater for women than the proportionately distributed taxes.

Table 6 considers the importance of "sunk" taxes in determining a family's interest in relation to possible changes in the Social Security system. It compares transfers and internal rates of return which various mid-career households can expect based only on future taxes with transfer and internal rates of return based on past taxes as well.

For nearly all households the internal rate of return (where positive) at least doubles. For higher-income single-earner couples a "bad deal" becomes, treating bygones as bygones, a "good deal" while for higher-income households of other configurations a very bad deal becomes only moderately bad. Thus the $40,000 two-earner couple finds that its present value of sunk taxes exceeds by $10,000 its expected $87,000 net loss from Social Security. Single males with

Table 6
The Political Problem in Social Security:
Transfers and Rates of Returns Considering
All Taxes Paid (A) vs. Only Taxes from 1987 on (B),
1945 Cohort. (Tranfers in 1985 dollars, discounted
at rate 3% to 1985)

Earnings Level	1-earner Couples		2-earner Couples		Single Males		Single Females	
	A	B	A	B	A	B	A	B
$10,000								
P.V. Transfer	13,727	38,405	3,010	27,425	-19,038	5,640	-6,595	17,577
Rate of Return	3.74%	7.33%	3.18%	6.57%	1.42%	4.00%	2.55%	5.56%
$15,000								
P.V. Transfer	4,010	41,027	-13,098	23,525	-35,207	1,811	-19,294	16,933
Rate of Return	3.16%	6.43%	2.38%	5.34%	0.89%	3.23%	2.04%	4.79%
$20,000								
P.V. Transfer	-4,496	44,826	-26,891	21,940	-51,545	-2,224	-31,105	17,176
Rate of Return	2.86%	5.96%	1.99%	4.75%	0.57%	2.78%	1.79%	4.42%
$25,000								
P.V. Transfer	-18,138	40,484	-40,915	20,122	-69,509	-10,888	-45,492	11,665
Rate of Return	2.49%	5.30%	1.71%	4.34%	0.11%	2.07%	1.45%	3.82%
$30,000								
P.V. Transfer	-27,370	36,308	-54,199	19,046	-84,216	-20,538	-59,087	3,468
Rate of Return	2.30%	4.82%	1.54%	4.09%	-0.25%	1.44%	1.13%	3.22%
$40,000								
P.V. Transfer	-34,936	31,232	-87,307	10,295	-89,323	-23,156	-71,696	-4,950
Rate of Return	2.10%	4.57%	1.12%	3.47%	-0.43%	1.25%	0.83%	2.71%
$50,000								
P.V. Transfer	-39,750	26,418	-123,975	-8,097	-91,721	-25,553	-75,133	-8,386
Rate of Return	1.95%	4.36%	0.61%	2.68%	-0.60%	1.03%	0.68%	2.50%
$60,000								
P.V. Transfer	-42,758	23,409	-152,854	-26,620	-92,919	-26,751	-76,850	-10,104
Rate of Return	1.86%	4.22%	0.26%	2.06%	-0.68%	0.91%	0.60%	2.40%
$80,000								
P.V. Transfer	-45,165	21,002	-169,769	-36,855	-94,715	-28,548	-79,428	-12,682
Rate of Return	1.78%	4.11%	0.05%	1.76%	-0.82%	0.74%	0.47%	2.23%

negative rates of return can expect positive rates of return on their remaining contributions - while their losses are reduced by seventy percent or more. For low-income households of all configurations and all moderate-income households other than single males, net transfers considering only future taxes are solidly positive.

The result of this is that many for whom Social Security is a bad deal over their lives as a whole would vote to continue the system as it is rather than doing away with it.*

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* Indeed they might vote to increase both taxes and benefits, leaving later generations with greater negative transfers.

7. Conclusion

The results of this research certainly indicate that Social Security offers vastly different terms to households in various circumstances. The declining rates of return and transfers for later cohorts are probably inescapable given the maturing and the pay-as-you-go nature of the system. However, the magnitude of the differences in treatment of households of different income or marital status are enormous and receive little attention relative to the much smaller distributional issues which are prominently debated when considering income tax reform. Our feeling is that the desirability of the transfers of the existing Social Security system deserves more attention.

Our examination of the marginal linkage of taxes and benefits indicated that only the extremely poor receive an extra dollar's worth of benefits for an extra dollar of taxes. For many households, the marginal linkage is only 15 to 30 cents, indicating that most of their Social Security contributions are correctly viewed as taxes.

The paper also offers a possible explanation of why Social Security retains widespread political support despite modest and very uneven expected rates of return. The reason offered is that it is completely rational for voters to treat their past Social Security taxes as "sunk" and simply evaluate the program according to future benefits and taxes. Since the tax payments precede the retirement benefits, any evaluation which truncates the early years will bias the resulting rates of return upwards.

Combined with the inevitable reexamination of the long run financial solvency of Social Security, these results suggest that explicit recognition of the immense distributional impact of Social Security be an important input into decisions concerning future reforms.

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Appendix

A1. Sensitivity of Results to Real Discount Rates

The extent of one's gains or losses under the Social Security system depends in large part on the real discount rate one applies to one's expected streams of taxes and benefits. Because benefits come later in life than taxes, a higher discount rate corresponds to a lower net transfer.

Table 7 examines some of the cases from Table 3A to compare the present values of taxes, benefits, and transfers which result from applying different real discount rates. The low-income couples, whose internal rates of return are between three percent and four percent have negative transfers when the higher discount rate is used instead of the three percent used in Table 3A. The higher-income single-earner couple, which has a negative transfer at a discount rate of three percent, has a positive transfer at a rate of two percent. The higher-income two earner couple, however, has a negative transfer even at a rate of two percent.

It will be noted that the present values of taxes for each case here are roughly equal at each of the three discount rates. This is because discounting is done to about the middle of their taxpaying years. While later taxes are discounted more heavily at higher discount rates, earlier taxes are also grossed up more heavily.

A.2. Sensitivity of Results to the Age-Profile of Wages

Elimination of the age-profile of wages reduces both the taxes one pays, especially in ones' later working years, and one's benefits. Although one's marginal linkage of benefits to taxes is greater in one's later years, the result of this reduced participation in the Social Security system is still, usually, to increase both one's internal rate of return and one's net transfer.

Table 8 considers the difference made by the age-profile of wages for various households in the 1945 cohort.

Table 7
Sensitivity of Present Values of Benefits, Taxes, and Transfers to Different Discount Rates for 1945 Cohort, Various Family Types and Earnings Levels (1985 dollars discounted to 1985)

Earnings Level and Family Type	Discount Rates 2%	3%	4%
$10,000 Single-earner Couple (Rate of Return 3.74%)			
P.V. Benefits	89,074	62,679	44,501
P.V. Taxes	50,097	48,951	48,553
P.V. Transfer	38,978	13,727	-4,052
$10,000 Two-earner Couple (Rate of Return 3.18%)			
P.V. Benefits	72,110	50,936	36,293
P.V. Taxes	48,991	47,926	47,597
P.V. Transfer	23,119	3,010	-11,303
$30,000 Single-earner Couple (Rate of Return 2.30%)			
P.V. Benefits	155,083	109,128	77,480
P.V. Taxes	141,229	136,498	133,830
P.V. Transfer	13,857	-27,370	-56,348
$30,000 Two-earner Couple (each earns .5) (Rate of Return 1.54%)			
P.V. Benefits	126,837	89,578	63,818
P.V. Taxes	146,973	143,777	142,791
P.V. Transfer	-20,134	-54,199	-78,973

Table 8
Sensitivity of Results to Age Profile of Wages for
1945 Cohort, $30,000 Earnings Level, Various Family Types
(1985 dollars discounted at rate 3% to 1985)

	Family Type			
Life-Cycle of Wages	1-earner Couple	2-earner Couple .5 each	Single Male	Single Female
Begin work at age 21 Age profile of wages (base case)				
P.V. Benefits	109,128	89,578	52,282	71,715
P.V. Taxes	136,498	143,777	136,498	130,802
P.V. Transfer	-27,370	-54,199	-84,216	-59,087
Rate of Return	2.30%	1.54%	-0.25%	1.13%
Begin work at age 21 No age profile of wages				
P.V. Benefits	100,386	80,089	47,985	68,805
P.V. Taxes	118,239	129,423	118,239	121,755
P.V. Transfer	-17,851	-49,335	-70,252	-52,949
Rate of Return	2.50%	1.56%	0.06%	1.25%

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