
Earnings Replacement Rates and Total Income: Findings From the Retirement History Study

by Alan Fox*

This article describes and reports on the degree to which Social Security and private pensions replaced preretirement earnings for a sample of individuals retiring in the early 1970's. Although simple in concept, replacement rates can be defined in many different ways. Because no one definition is best for all purposes, several are considered, and the contexts in which each might be utilized are discussed. Both Social Security and total replacement rates are presented for individual retired workers and married couples. Also presented are rough estimates of changes in total income at retirement.

Several types of empirical measures are available for assessing the performance of the Social Security system among its various beneficiary populations. Two such measures—the level of retirement benefits and total retirement income—may be examined either by themselves or in comparison with some measure of income adequacy such as the poverty line or the median income of current workers. In addition, expected lifetime retirement benefits might be compared with total payroll taxes paid before retirement; this comparison would measure the rate of return on taxes paid into the system.

This article applies yet another measure of the system's performance—the earnings replacement rate—to a sample of recently retired workers. At first glance, the concept of an earnings replacement rate is simple: it is the ratio of retirement benefits to preretirement earnings.¹ This ratio approximates the change in living standards at retirement, since for most persons earnings are the primary source of preretirement income, while pension benefits are the primary income source after retirement. Developing this concept, however, can be rather complex because replacement rates are used to examine many different aspects of the retirement system. The nature of the question being asked may lead to different specifications for the replacement rate calculation, with widely varying results. Each of the specifica-

tions is valid, but its appropriateness depends on the use to which it is put. This article therefore presents different constructs of replacement rates and suggests the context for each.

The first section below describes the issues and options for computing replacement rates and provides an overview of the data base used in this study. The remaining sections describe replacement rates calculated on the basis of various sets of specifications. A Technical Note that expands the definitions and methodology used in the analysis is available on request from the Publications Staff, Room 1120, 1875 Connecticut Ave., NW., Washington, D.C. 20009.

Issues in Calculating Replacement Rates

Debate can arise over virtually every aspect of the replacement rate calculation. Perhaps the first issue to be addressed is whether these rates should be based on average earnings for all workers paying into Social Security or on actual earnings experiences of specific individuals. The former method, producing "illustrative" replacement rates, is useful for many program-related purposes, such as assessing overall differences in benefit structures and costs of changes in benefit computation methods. To assess the performance of the system among a group of current retirees, their actual earnings experience may be more appropriate, because the preretirement earnings of individual workers tend to be erratic and, for the most part, rise faster in the immediate preretirement period than do average earnings for workers of all ages.² Throughout this study, calculations are

* Division of Retirement and Survivors Studies, Office of Research and Statistics, Office of Policy, Social Security Administration. Although many persons helped in the preparation of this article, the author especially wishes to acknowledge the assistance of Melinda Upp, Office of Program Analysis.

¹ Throughout this article the word "pension" will be used to include private pensions and public employee pensions earned while the person was simultaneously covered under Social Security. Excluded are public employee pensions that take the place of Social Security, such as Federal Civil Service benefits.

² For a discussion of "illustrative" and "actual" replacement rates, see Alan Fox, "Earnings Replacement Rates of Retired Couples: Findings From the Retirement History Study," *Social Security Bulletin*, January 1979, pages 17-39.

based on the actual earnings of one cohort of individual workers (and, in some instances, their wives).

The next issue is what to include in the denominator of the calculation (the measure of the preretirement standard of living) and what to include in the numerator (the measure of the postretirement standard of living), as well as how to calculate each. Among the factors to be considered are:

- Which years' earnings should be used? The ones immediately preceding retirement? Maximum or average recent earnings? Career or lifetime average earnings?
- Should earnings be indexed to a given year's wage or price levels?
- What definitions of income should be included in the numerator and denominator? Social Security benefits alone or Social Security plus pensions and perhaps other retirement income sources? Earnings restricted to the Social Security taxable wage base, or total earnings? Social Security benefits actually received, or benefits that would be received for age-65 retirement? Earnings and benefits before or after payroll and income taxes?

Which Years' Earnings

Two sets of years are emphasized here: (1) The highest, recent years; specifically, the average of the 3 years of highest earnings out of the 10 years immediately before retirement—the “high-3”—and (2) “typical” recent years; specifically, the average of the 4 years remaining after disregarding the highest and lowest 3 out of the 10 years immediately before retirement. Neither alternative is unequivocally “correct.”

Using the *high-3* is common practice in calculating private pensions. The objective there is to base the pension on the highest justifiable measure of preretirement earnings. The highest single year would be most advantageous but may be anomalous or may be manipulated by the worker. The high-3 therefore represents a reasonable compromise between the desire to provide a favorable base for the computation and the desire to avoid using a nonrepresentative year. However, the high-3 measure is not a representative average of preretirement earnings; rather, it is a measure that guarantees that any deviation in earnings from average preretirement levels will favor the retiree by overstating preretirement earnings levels. Although this may be a reasonable way to compute private pensions, the high-3 measure may not be the most appropriate tool to evaluate how well postretirement income replaces preretirement earnings, especially when examining income sources whose amount is not related solely to these particular earnings.

The base may alternately be measured by recent typical or *average* earnings rather than maximum earnings. The example used here is derived by disregarding both the highest and lowest 3 years of the last 10, and using the remaining 4 years to compute a representative average—“middle-4.” By definition, this measure produces a higher replacement rate than the high-3.

Two other bases can also be used: Career average earnings and earnings in the last full year before retirement. Since Social Security benefits are designed to replace a portion of a worker's lifetime earnings, it is appropriate to compute replacement rates in terms of *career average* earnings. One drawback, however, is that few workers think of their preretirement standard of living in terms of a career average, because that is a difficult value to conceptualize. Of the measures discussed, the career average produces the highest replacement rates because workers' earnings tend to increase as they grow older and have more work experience. Thus, any measure that includes years of earlier, lower earnings provides a less stringent test of a retirement system.

The last part of this article briefly considers the ratio of total postretirement income—including income from earnings, assets, and other sources—to total preretirement income. For that analysis, only data for the last full year before and after retirement are available so no “average” or “maximum” total income levels are considered.

Indexing

Whether earnings should be indexed depends largely on which years' earnings are being used. Clearly, it is more necessary to index earnings received several years before retirement than more recent earnings. On average, the midpoint of the middle-4 period was about 6 years before retirement; for workers retiring in 1976, a dollar in 1970 earnings was worth only 68 cents. But the midpoint for the high-3 measure was, on average, 3 years before retirement, and the Consumer Price Index increased 28 percent between 1973 and 1976—so it can be argued that even these more recent earnings should be indexed. On the other hand, it can be argued that workers do not mentally index their earnings when they think about how their postretirement income replaces preretirement income. In this article, when the middle-4 years of earnings are used, they are indexed; and when the highest-3 years are used, replacement rates are based on both indexed and nonindexed earnings.

If wages and prices were not increasing at the same rate, it would also be necessary to decide whether to use a wage or price index. During most of this study, wages and prices were both rising at about the same rate, so the issue is moot. With one exception, all earnings here are price-indexed. The one exception is career average earnings, which were wage-indexed to more closely ap-

proximate the indexing done as the basis for determining a person's Social Security benefit.

Replacement rates based on nonindexed earnings will tend to be higher than those based on indexed earnings because indexing increases the dollar amount of the earnings and therefore the amount to be replaced. This is particularly true during times of rapid inflation.

Types and Amounts of Income

What income sources should be included in the calculation, whether to include earnings above the maximum subject to Social Security taxes, and whether to use earnings before or after taxes depends on the focus of the inquiry. Each of the sections in this article has a slightly different focus and includes different sources of income and amounts of earnings.

One section of this article looks at the role of Social Security benefits alone and presents replacement rates based on Social Security benefits as a percent of Social Security taxable earnings (that is, earnings up to the amount subject to Social Security payroll taxes). Another section looks at the extent to which all retirement benefits—Social Security as well as public and private employer pensions—replace total preretirement earnings; these rates are most useful in assessing the Social Security system in conjunction with the private pension system. Another section briefly discusses replacement rates based on after-tax (disposable) income. The final section focuses on total income ratios—retirement income from all sources, including assets and earnings (if any), as a percent of total preretirement income.

Structure of Social Security

It is important to remember several key elements in the design of the Social Security system. First, the benefit formula is weighted to replace a higher portion of lower paid workers' earnings than of higher paid workers' (although higher paid workers will always receive higher benefits). In 1982, for example, 90 percent of the first \$211 of average indexed monthly earnings is replaced, 32 percent of the next \$1,063, and 15 percent of earnings above that amount.

Second, as noted earlier, earnings only up to a set amount are taxed and included in the benefit calculation. In 1982, this taxable maximum is \$32,400. (In 1976, the maximum was considerably lower, even in relation to prevailing wages. At 1982 wage levels, the 1976 ceiling was about \$25,100. Starting in 1974, the ceiling has been indexed to average wages.) Both the weighting in the formula and the ceiling on taxable earnings are intended to encourage private savings and to permit supplementation of retirement income for higher earners by employer pensions.

Third, Social Security pays the spouse (almost always the wife) of a worker a benefit equal to half the worker's if she has not worked or has not worked long enough to become insured on the basis of her own earnings. If a spouse is also entitled to a benefit as a worker, then she receives that benefit plus the difference, if any, between it and the benefit to which she is entitled as the spouse of a worker. In this article, married women are categorized as spouses if they receive benefits only on the basis of their husbands' earnings. If they receive only a worker's benefit or a worker's benefit plus a partial spouse benefit, they are categorized as workers.

The Data Base

Replacement rates in this article are based on the Social Security Administration's Retirement History Study (RHS), a 10-year longitudinal survey of a sample of 11,153 persons aged 58–63 when first interviewed in 1969. By December 1976, persons in the sample were aged 65–71, and 9 out of 10 had claimed Social Security benefits of one sort or another. Replacement rates were computed for those who had begun receiving cash benefits as retired workers by December 1976. Persons who had ever received disabled-worker benefits were excluded, as were those whose benefits began before 1968 or whose earnings or benefit records were unusable for any reason.

For all types of replacement rates presented in this article, preretirement earnings were taken from the Summary Earnings Record (SER), which is updated yearly for all persons with Social Security numbers. For each RHS sample person (and wife, if married), both the SER and extracts from the Master Beneficiary Record (MBR) have been linked to the survey data. Because the SER contains only taxable earnings, total earnings in many instances had to be estimated using a rather crude, but relatively unbiased, method. (The estimation procedure is explained in the Technical Note, available separately as indicated.)

This study tabulates replacement rates for all men, married men, and nonmarried men and women (never married, widowed, or divorced). Married women were not sampled separately for the RHS, but are included where possible as wives of married men in the sample. Surviving spouses—widows of married men in the RHS sample—are excluded from all tabulations.

Standardizing Replacement Rates to 1976

Because of the longitudinal nature of this survey, sample persons and their wives retired in different years and under different circumstances during the period 1968–76. Persons retiring during early years of the survey tended to have done so at younger ages and with greater benefit reductions than those retiring later.

Those retiring later tended to have had higher preretirement earnings. Furthermore, the benefit formula was changed to increase benefits substantially during the early 1970's, and, since 1974, benefits have been automatically indexed to changes in average wages; benefits after entitlement are indexed to changes in the Consumer Price Index. Benefit increases totaled 94 percent over the 1968-76 period, compared with a 64-percent rise in the CPI.

Thus, several counteractive factors confound the levels of replacement rates among RHS persons. To put everyone on the same footing, all replacement rates have been standardized to 1976 levels. Preretirement earnings have been wage-indexed from the year of actual retirement to 1976 levels, as have pension benefits. Social Security benefits have been adjusted upward by the rate of increase in the benefit formula.

Replacement of Earnings Subject to Social Security Taxes

Social Security offers workers the option of retiring at age 65 with full benefits or at ages 62-64 with actuarially reduced benefits.³ The reduction is designed to ensure that, roughly speaking, workers on average will receive the same total amount of benefits over their remaining years regardless of the age at which they first claim benefits. In effect, the early retiree trades a lower monthly benefit for receipt of benefits over a longer period of time. Thus, it is debatable whether the numerator in the replacement rate calculation should be based on the amount a retiree actually receives (the monthly benefit amount—MBA) or the amount to which he or she would be entitled by waiting until 65 to retire (the primary insurance amount—PIA). Using the MBA shows the system's actual performance; using the PIA shows its potential. Because both are reasonable measures, this section includes illustrations of both to examine the extent to which Social Security benefits alone replace earnings subject to payroll taxes.

Only taxable earnings are included in these replacement rate calculations because Social Security was designed to permit higher earners to save for their own retirement and because higher earners also are more likely to be covered by private pension systems. Thus, if one wishes to focus on the degree to which Social Security alone replaces preretirement income, it seems reasonable to limit the denominator to earnings subject to the Social Security payroll tax. For this article, these earnings have been calculated using the high-3 indexed, middle-4 indexed, and career average indexed measures, as highlighted in the tabulation in the next column.

³ The reduction is 5/9 of 1 percent of the worker's primary insurance amount for every month before age 65 that benefits are claimed, for a maximum reduction of 20 percent at age 62. Workers claiming benefits after age 65 receive an increase of 3 percent of PIA per year.

Sex and marital status	Median Social Security replacement rates, based on taxable earnings		
	High-3, price-indexed	Middle-4, price-indexed	Career average, wage-indexed
Benefits actually paid (MBA)			
All men	34	39	45
Married men	34	38	45
Nonmarried men	35	40	45
Nonmarried women	39	46	53
Benefits unreduced by actuarial reduction (PIA)			
All men	36	40	46
Married men	36	40	46
Nonmarried men	37	43	48
Nonmarried women	41	48	55

Source: Tables 1-3.

High-3 Indexed Earnings

As would be expected, the actual benefit amount (MBA) as a percent of the high-3 years of earnings produces the lowest replacement rate. For men, both married and nonmarried, the median Social Security benefit replaced approximately one-third of indexed preretirement earnings (table 1). Nonmarried women, whose preretirement earnings tend to be lower and who therefore tend to receive proportionately higher benefits from the weighted Social Security formula, had a median replacement rate of 39 percent. In all cases, the range of rates was very narrow: for men, half fell in the 30-38 percent range, while for women this range was slightly wider—33-47 percent. Had all persons in the sample claimed benefits at age 65, instead of choosing to retire earlier or later, median replacement rates would have been about 5 percent (or 2 percentage points) higher than those based on the MBA.

Middle-4 Indexed Earnings

Replacement rates based on average recent earnings are, by definition, higher than those based on maximum earnings, as discussed above. As shown in table 2, the median was about 40 percent for men and 46 percent for nonmarried women, or about 15 percent higher than the rates based on maximum earnings. As before, the distribution of these replacement rates was highly concentrated, and PIA replacement rates were slightly higher than those based on actual benefits.

Career Average Taxable Earnings

As expected, the much longer averaging period for this measure, which most closely approximates the intent of the Social Security benefit calculation, results in median replacement rates that are considerably higher

Table 1.—Social Security benefits with and without reduction for early retirement as percent of indexed earnings limited to the annual taxable maximum in the highest 3 years of the last 10, by sex and marital status at award ¹

[Standardized to 1976 levels]

Replacement rate	Men			Non-married women
	Total	Married	Non-married	
With reduction for early retirement				
Total number	3,323	2,921	402	823
Total percent	100	100	100	100
0.1-19.9	1	1	1	1
20-39.9	85	87	77	55
40-59.9	12	11	17	37
60-79.9	1	1	2	3
80-99.9	0	0	1	2
100 or more	1	1	2	3
First quartile	30	30	30	33
Median	34	34	35	39
Third quartile	38	38	40	47
Without reduction for early retirement				
Total number	3,323	2,921	402	823
Total percent	100	100	100	100
0.1-19.9	0	0	0	0
20-39.9	82	83	72	45
40-59.9	15	14	21	44
60-79.9	2	2	3	6
80-99.9	1	1	1	1
100 or more	1	1	3	4
First quartile	33	33	33	35
Median	36	36	37	41
Third quartile	39	39	42	48

¹ Restricted to those with earnings records usable for computation of estimated total earnings, who received their first retired-worker benefit in 1968-76.

than those based only on earnings shortly before retirement: about 45 percent for men and 55 percent for non-married women, as shown in table 3. PIA replacement rates again are slightly higher than rates based on MBA's.

Replacement of Total Earnings

This section examines the extent to which Social Security and private and public employer pensions together replace total earnings, including earnings above the taxable maximum. As noted, Social Security is not intended to replace total earnings. In addition to excluding earnings above the taxable maximum from the benefit calculation, the system encourages private savings and the provision of private pensions by using a benefit formula that replaces a smaller fraction of a higher-paid worker's earnings than of a lower-paid worker's. That is, a greater portion of a lower-paid worker's earnings are replaced by Social Security bene-

fits than of a higher-paid worker's. Pensions are usually designed as supplements to Social Security for workers at or near the taxable maximum and provide the primary source of wage replacement for earnings above that level. Therefore, it is appropriate to evaluate the way in which Social Security and pensions together replace total earnings.

This section also examines replacement of a couple's total earnings, in addition to individual earnings. The spouse's earnings, if any, are included in the couple's preretirement earnings, and the spouse's Social Security benefit and pension income, if any, is included in the couple's postretirement income.

Three measures of preretirement earnings are used here: price-indexed earnings for the high-3 years, nonindexed earnings for the high-3 years, and price-indexed earnings for the middle-4 years of the 10 years preceding retirement. As already discussed, using the high-3 years will most closely approximate the base for most pension calculations. The middle-4 measure is a more typical representation of "average" preretirement earnings. By

Table 2.—Social Security benefits with and without reduction for early retirement as percent of indexed earnings limited to the annual taxable maximum in the middle-4 years, by sex and marital status at award ¹

[Standardized to 1976 levels]

Replacement rate	Men			Non-married women
	Total	Married	Non-married	
With reduction for early retirement				
Total number	3,126	2,752	374	761
Total percent	100	100	100	100
0.1-19.9	0	0	0	0
20-39.9	58	59	49	23
40-59.9	34	34	36	60
60-79.9	4	4	9	10
80-99.9	2	2	2	3
100 or more	2	1	4	5
First quartile	34	34	34	40
Median	39	38	40	46
Third quartile	46	46	49	54
Without reduction for early retirement				
Total number	3,126	2,752	374	761
Total percent	100	100	100	100
0.1-19.9	0	0	0	0
20-39.9	50	51	40	11
40-59.9	40	40	42	69
60-79.9	6	5	9	10
80-99.9	2	2	3	5
100 or more	2	2	5	5
First quartile	35	35	36	43
Median	40	40	43	48
Third quartile	48	47	52	57

¹ Restricted to those with earnings records usable for computation of estimated total earnings, who received their first retired-worker benefit in 1968-76.

Table 3.—Social Security benefits with and without reduction for early retirement as percent of wage-indexed career taxable earnings, by sex and marital status at award ^{1, 2}

[Standardized to 1976 levels]

Replacement rate	Men			Non-married women
	Total	Married	Non-married	
With reduction for early retirement				
Total number	3,936	3,494	442	896
Total percent	100	100	100	100
0.1-19.9	0	0	0	0
20-39.9	29	29	30	13
40-59.9	62	63	56	56
60-79.9	5	5	6	20
80-99.9	1	1	2	4
100 or more	3	3	6	7
First quartile	38	38	38	44
Median	45	45	45	53
Third quartile	51	51	54	64
Without reduction for early retirement				
Total number	4,023	3,579	444	901
Total percent	100	100	100	100
0.1-19.9	0	0	0	0
20-39.9	18	18	17	4
40-59.9	71	72	65	61
60-79.9	6	6	9	22
80-99.9	1	1	2	5
100 or more	4	3	7	8
First quartile	41	41	42	47
Median	46	46	48	55
Third quartile	53	52	57	66

¹ Earnings limited to annual taxable maximum, from 1951 to year before benefits claimed, less the 5 lowest years. Wage-indexed to age 60, nonindexed thereafter. Resembles Average Indexed Monthly Earnings (AIME) computation.

² Restricted to persons who received their first retired-worker benefit in 1968-76.

definition, if both are indexed in the same way, the high-3 measure will produce lower replacement rates than the middle-4 measure.

High-3 Indexed Earnings

The median replacement rate including both Social Security and pensions was almost 40 percent for men: 37 percent for married men and 39 percent for nonmarried men (table 4). The distribution of rates was quite concentrated, with three-fourths of the men having replacement rates below 48 percent. Reflecting their generally lower preretirement earnings, nonmarried women had somewhat higher median replacement rates, 46 percent.

Almost one-half the men reported having pensions. Their median replacement rate was 44 percent, compared with 33 percent for those with only Social Security benefits. Furthermore, their high-3 indexed earnings were about 60 percent higher: \$14,410 versus \$9,140 for

Table 4.—Social Security and total replacement rates of sample respondents and married couples based on high-3 price-indexed estimated total earnings, by pension receipt, wife's benefit type, sex, and marital status at award ¹

[Standardized to 1976 levels]

Replacement rate	Total		With pension		Without pension (Social Security only)
	Social Security benefits	All retirement benefits	Social Security alone	All retirement benefits	
All men					
Total number	3,457	3,312	1,495	1,495	1,962
Total percent	100	100	100	100	100
0.1-19.9	17	5	26	1	10
20-39.9	69	53	70	36	68
40-59.9	11	32	3	47	17
60-79.9	2	7	0	12	3
80-99.9	1	2	0	2	1
100 or more	1	2	0	2	1
First quartile	22	30	19	36	25
Median	29	38	25	44	33
Third quartile	36	48	31	55	39
Married men					
Total number	3,033	2,898	1,336	1,336	1,697
Total percent	100	100	100	100	100
0.1-19.9	18	5	27	1	10
20-39.9	70	54	70	37	70
40-59.9	10	31	3	46	16
60-79.9	1	7	0	12	2
80-99.9	0	1	0	2	1
100 or more	1	1	0	2	1
First quartile	22	30	19	35	25
Median	28	37	25	44	32
Third quartile	36	47	30	54	39
Nonmarried men					
Total number	424	414	159	159	265
Total percent	100	100	100	100	100
0.1-19.9	12	3	21	0	6
20-39.9	65	49	72	29	61
40-59.9	16	35	7	57	22
60-79.9	3	7	0	10	5
80-99.9	2	2	0	2	3
100 or more	3	4	0	3	4
First quartile	24	32	21	38	28
Median	32	39	27	47	36
Third quartile	39	50	33	56	45
Nonmarried women					
Total number	880	842	288	288	592
Total percent	100	100	100	100	100
0.1-19.9	3	1	6	0	1
20-39.9	55	31	74	8	45
40-59.9	35	46	21	52	42
60-79.9	3	14	0	31	5
80-99.9	2	4	0	7	2
100 or more	3	4	0	2	5
First quartile	31	37	27	47	33
Median	38	46	34	56	41
Third quartile	47	59	39	66	49

See footnotes at end of table.

Table 4.—Social Security and total replacement rates of sample respondents and married couples based on high-3 price-indexed estimated total earnings, by pension receipt, wife's benefit type, sex, and marital status at award ¹—Continued

Replacement rate	Total		With pension		Without pension (Social Security only)
	Social Security benefits	All retirement benefits	Social Security alone	All retirement benefits	
All married couples ²					
Total number	1,911	1,802	930	905	981
Total percent	100	100	100	100	100
0.1-19.9	6	2	9	0	4
20-39.9	53	29	67	20	40
40-59.9	33	48	23	53	42
60-79.9	6	15	2	19	10
80-99.9	1	4	0	5	2
100 or more	1	3	0	3	2
First quartile	28	37	25	42	33
Median	37	48	32	51	43
Third quartile	47	58	40	61	54
Wife retired worker					
Total number	939	880	489	469	450
Total percent	100	100	100	100	100
0.1-19.9	6	1	9	0	3
20-39.9	64	37	76	25	51
40-59.9	24	47	14	55	36
60-79.9	4	11	1	14	6
80-99.9	1	3	0	4	1
100 or more	1	3	0	2	3
First quartile	27	35	24	40	32
Median	34	45	31	49	39
Third quartile	43	55	37	58	48
Wife with spouse's benefits					
Total number	972	922	441	436	531
Total percent	100	100	100	100	100
0.1-19.9	6	2	8	0	5
20-39.9	42	22	57	15	30
40-59.9	41	50	32	51	48
60-79.9	9	19	2	25	14
80-99.9	1	4	0	7	2
100 or more	1	2	0	3	2
First quartile	30	40	26	44	35
Median	41	51	35	54	46
Third quartile	52	61	44	65	57

¹ Restricted to those who received their first retired-worker benefit in 1968-76. Pensions include private or public employee pensions assumed to be combined with Social Security; see Technical Note for further explanation.

² Both husband and wife first receiving benefits in 1968-76; husband as retired worker, wife as retired worker or spouse. High-3 earnings based on last 10 years before husband's first benefit.

men, and \$10,200 versus \$6,140 for nonmarried women. Thus, pensioners were better off before retirement, and the combination of Social Security and pensions replaced a greater proportion of their earnings, allowing them to come closer than others to maintaining their preretirement standard of living.

The distributions themselves, and the interquartile ranges, indicate a much greater degree of concentration among persons with Social Security benefits alone (mostly in the 20-40 percent range) than among persons with pensions (for whom replacement rates were most commonly in the 20-60 percent range). The different degrees of concentration indicate the wider range of replacement rates resulting from pensions than from Social Security benefits.

Among those who had it, the pension income came close to doubling the Social Security-only replacement rate. For example, among men with pensions, on average, Social Security benefits replaced 25 percent of preretirement earnings, while pensions and Social Security benefits together replaced 44 percent.

Nonmarried women were somewhat less likely than men (married or nonmarried) to receive pensions (33 percent, compared with 43 percent), and their total replacement rates, whether with or without pensions, were higher than those of men: 56 percent among women with pensions, and 41 percent among women without pensions, compared with 44 percent and 33 percent, respectively, for men.

The second part of table 4 shows couples' replacement rates by pension receipt (mostly attributable to the husband) and by benefit type of the wife. As highlighted in the tabulation below, on average, the presence of a beneficiary wife raised the couple's replacement rate about 10 percentage points, from 37 percent for the husband alone to 48 percent for both the husband and wife.

Median total replacement rate ¹	Husband alone	Couples		
		Total	Wife receiving retired-worker benefit	Wife receiving only spouse benefit
All couples	37	48	45	51
With pension	44	51	49	54
Without pension	32	43	39	46

¹ Total retirement benefits as percent of high-3 price-indexed earnings. Source: Table 4.

Among all retired couples, three-fourths had total replacement rates below 58 percent and one-fourth were below 37 percent.

Couples in which the wife was a retired worker had a median replacement rate of 45 percent, compared with 51 percent for couples with the wife receiving a spouse's benefit. Because the replacement rate calculation includes the earnings of both spouses in the denominator, the rate tends to be higher if only one spouse had earnings. Absolute benefit levels, however, are somewhat higher for couples in which both spouses are entitled as workers.⁴

⁴ Alan Fox, *op. cit.*

High-3 Nonindexed Earnings

As shown in table 5, the median nonindexed replacement rate for men was 45 percent, with three-fourths having replacement rates below 60 percent. The median replacement rate for nonmarried women was 55 percent. These medians are somewhat higher than the indexed rates shown in table 4 because, as noted, indexing increases the amount of preretirement earnings and therefore the denominator of the replacement rate calculation.

Of course the difference between indexed and nonindexed replacement rates would be far greater during a time of high inflation than when inflation is not rapid. For workers retiring in the 1960's inflation was not much of a factor, but in more recent times it has been much harder to ignore. For instance, for a 1970 beneficiary, prices in that year were 16 percent higher than 3 years previously, while for a 1976 beneficiary, the 3-year difference was 28 percent.

Among couples, the median total replacement rate was almost 60 percent, about 15 percentage points higher than that of the husband alone. Three-fourths had replacement rates below 71 percent. Pension receipt and wife's benefit type had the same general effects on nonindexed replacement rates as with indexed ones: Couples with pensions had higher total replacement rates than those without, and couples with retired-worker wives had lower replacement rates than those with wives receiving spouse benefits only. These relationships are summarized in the following tabulation.

Median total replacement rate ¹	Husband alone	Couples		
		Total	Wife receiving retired-worker benefit	Wife receiving only spouse benefit
All couples	45	58	55	62
With pension	54	63	60	66
Without pension	39	52	48	56

¹ Total retirement benefits as percent of high-3 nonindexed earnings. Source: Table 5.

Middle-4 Indexed Earnings

This measure produces replacement rates that are quite similar to those based on high-3 nonindexed earnings. As shown in table 6, the median replacement rate for all men was 46 percent—52 percent for those with second pensions and 40 percent for those without pensions. For nonmarried women, the overall median was 55 percent—64 percent for those with pensions and 48 percent for those without. For married men and their wives, the previously noted relationships obtain, as shown in the tabulation in the next column.

Median total replacement rate ¹	Husband alone	Couples		
		Total	Wife receiving retired-worker benefit	Wife receiving only spouse benefit
All couples	46	58	54	63
With pension	52	61	58	65
Without pension	40	53	47	59

¹ Total retirement benefits as percent of middle-4 price-indexed earnings. Source: Table 6.

Thus, as expected, the data indicate that replacement rates based on high-3 price-indexed earnings are the lowest of the group, and the high-3 nonindexed rates are, purely coincidentally, very close to the middle-4 indexed rates, as illustrated in the following tabulation. For couples, replacement rates that include the earnings and benefits of the wife are higher than those where only the husband's earnings and benefits are considered.

Median total replacement rate	High-3, price-indexed	High-3, non-indexed	Middle-4, price-indexed
All men	38	45	46
Married men:			
Alone	37	45	46
With wives	48	58	58
Nonmarried women	46	55	55

Although median replacement rates are a useful measure, the role of pensions can more clearly be seen if the data are disaggregated by preretirement earnings levels, as shown in tables 7 and 8. The earnings distribution is divided into five equal intervals, based on the combined distribution of the RHS sample.⁵ Table 7 shows that the Social Security replacement rate falls rapidly with each succeeding increase in the level of preretirement earnings. Because pension receipt is increasingly likely for higher earners, however, the *total* replacement rate falls at a lower rate than the Social Security replacement rate over the income spectrum.

Men and women are concentrated in different earnings quintiles. In addition, the RHS sample does not represent the entire population of retired workers, since married women were included only as spouses of men in the sample; they were not sampled separately. To highlight nonmarried women and married couples, all men, married couples, and nonmarried women are classified in table 8 by their own preretirement earnings quintiles. That is, the quintile limits were computed separately for each of the three groups. This assures an even distribu-

⁵ That is, the earnings of men and women were combined and one set of earnings quintiles developed for use with both subgroups of the sample.

Table 5.—Social Security and total replacement rates of sample respondents and married couples based on high-3 nonindexed estimated total earnings, by pension receipt, wife's benefit type, sex, and marital status at award ¹

[Standardized to 1976 levels]

Replacement rate	Total		With pension		Without pension (Social Security only)
	Social Security benefits	All retirement benefits	Social Security alone	All retirement benefits	
All men					
Total number	3,457	3,312	1,495	1,495	1,962
Total percent	100	100	100	100	100
0.1-19.9	9	2	14	0	5
20-39.9	58	33	69	15	49
40-59.9	29	44	16	50	38
60-79.9	3	14	1	24	6
80-99.9	1	4	0	7	1
100 or more	1	3	0	4	2
First quartile	26	35	23	44	31
Median	35	45	30	54	39
Third quartile	44	58	38	66	48
Married men					
Total number	3,033	2,898	1,336	1,336	1,697
Total percent	100	100	100	100	100
0.1-19.9	9	3	14	0	6
20-39.9	59	33	69	15	50
40-59.9	28	44	16	50	37
60-79.9	3	14	1	24	4
80-99.9	1	4	0	7	1
100 or more	1	3	0	4	2
First quartile	26	35	23	43	30
Median	34	45	30	53	38
Third quartile	43	57	37	66	47
Nonmarried men					
Total number	424	414	159	159	265
Total percent	100	100	100	100	100
0.1-19.9	5	1	9	0	3
20-39.9	51	29	71	14	39
40-59.9	34	46	18	48	44
60-79.9	4	13	3	26	5
80-99.9	2	5	0	8	3
100 or more	4	6	0	4	6
First quartile	30	38	25	46	34
Median	38	47	32	56	43
Third quartile	48	60	39	67	52
Nonmarried women					
Total number	880	842	288	288	592
Total percent	100	100	100	100	100
0.1-19.9	1	0	3	0	0
20-39.9	31	16	47	4	24
40-59.9	52	46	48	30	54
60-79.9	9	24	2	44	12
80-99.9	2	8	0	16	3
100 or more	5	7	0	7	7
First quartile	37	44	32	56	40
Median	45	55	40	66	48
Third quartile	55	69	47	79	59

See footnotes at end of table.

Table 5.—Social Security and total replacement rates of sample respondents and married couples based on high-3 nonindexed estimated total earnings, by pension receipt, wife's benefit type, sex, and marital status at award ¹—Continued

Replacement rate	Total		With pension		Without pension (Social Security only)
	Social Security benefits	All retirement benefits	Social Security alone	All retirement benefits	
All married couples ²					
Total number	1,911	1,802	930	905	981
Total percent	100	100	100	100	100
0.1-19.9	2	1	3	0	2
20-39.9	36	14	50	7	22
40-59.9	41	39	39	36	42
60-79.9	16	32	7	38	24
80-99.9	3	9	1	13	5
100 or more	2	5	0	6	4
First quartile	34	46	31	52	40
Median	45	58	39	63	52
Third quartile	58	71	49	76	65
Wife retired worker					
Total number	939	880	489	469	450
Total percent	100	100	100	100	100
0.1-19.9	3	1	4	0	1
20-39.9	41	15	54	7	26
40-59.9	43	45	38	43	48
60-79.9	10	28	3	35	18
80-99.9	2	7	1	9	4
100 or more	2	5	0	6	4
First quartile	33	44	31	50	38
Median	42	55	38	60	48
Third quartile	53	67	46	71	60
Wife with spouse's benefits					
Total number	972	922	441	436	531
Total percent	100	100	100	100	100
0.1-19.9	2	1	2	0	2
20-39.9	31	13	44	7	19
40-59.9	39	33	40	28	38
60-79.9	22	36	12	42	30
80-99.9	4	11	1	16	7
100 or more	3	6	1	7	5
First quartile	36	48	32	54	42
Median	49	62	42	66	56
Third quartile	62	74	54	79	68

¹ Restricted to those who received their first retired-worker benefit in 1968-76. Pensions include private or public employee pensions assumed to be combined with Social Security; see Technical Note for further explanation.

² Both husband and wife first receiving benefits in 1968-76; husband as retired worker, wife as retired worker or spouse. High-3 earnings based on last 10 years before husband's first benefit.

tion across the earnings distribution for each demographic group. The lower earnings of nonmarried women are reflected in the fact that the top quintile among nonmarried women approximated the median among married men.

Table 6.—Social Security and total replacement rates of sample respondents and married couples based on “middle-4” price-indexed estimated total earnings, by pension receipt, wife’s benefit type, sex, and marital status at award ¹

[Standardized to 1976 levels]

Replacement rate	Total		With pension		Without pension (Social Security only)
	Social Security benefits	All retirement benefits	Social Security alone	All retirement benefits	
All men					
Total number	3,282	3,144	1,458	1,458	1,824
Total percent	100	100	100	100	100
0.1-19.9	7	2	11	0	4
20-39.9	59	31	76	16	46
40-59.9	25	45	12	53	36
60-79.9	5	15	1	22	8
80-99.9	2	4	0	6	3
100 or more	2	4	0	4	4
First quartile	27	37	23	43	32
Median	35	46	29	52	40
Third quartile	45	59	37	64	50
Married men					
Total number	2,888	2,759	1,304	1,304	1,584
Total percent	100	100	100	100	100
0.1-19.9	7	2	12	0	4
20-39.9	60	31	76	17	47
40-59.9	25	45	11	52	36
60-79.9	4	14	1	22	7
80-99.9	2	5	0	6	3
100 or more	2	4	0	4	3
First quartile	26	36	23	43	31
Median	34	46	29	52	40
Third quartile	44	58	36	64	49
Nonmarried men					
Total number	394	385	154	154	240
Total percent	100	100	100	100	100
0.1-19.9	4	1	7	0	2
20-39.9	51	26	73	11	37
40-59.9	30	45	18	57	38
60-79.9	9	18	3	24	13
80-99.9	2	4	0	4	4
100 or more	5	7	0	5	8
First quartile	30	39	25	45	35
Median	39	48	31	54	44
Third quartile	49	63	39	65	59
Nonmarried women					
Total number	802	767	279	279	523
Total percent	100	100	100	100	100
0.1-19.9	1	0	1	0	0
20-39.9	33	14	52	3	23
40-59.9	49	47	43	36	52
60-79.9	9	25	1	44	14
80-99.9	3	6	0	10	4
100 or more	5	8	1	8	7
First quartile	37	44	32	55	41
Median	45	55	39	64	48
Third quartile	54	69	46	76	60

See footnotes at end of table.

Table 6.—Social Security and total replacement rates of sample respondents and married couples based on “middle-4” price-indexed estimated total earnings, by pension receipt, wife’s benefit type, sex, and marital status at award ¹—Continued

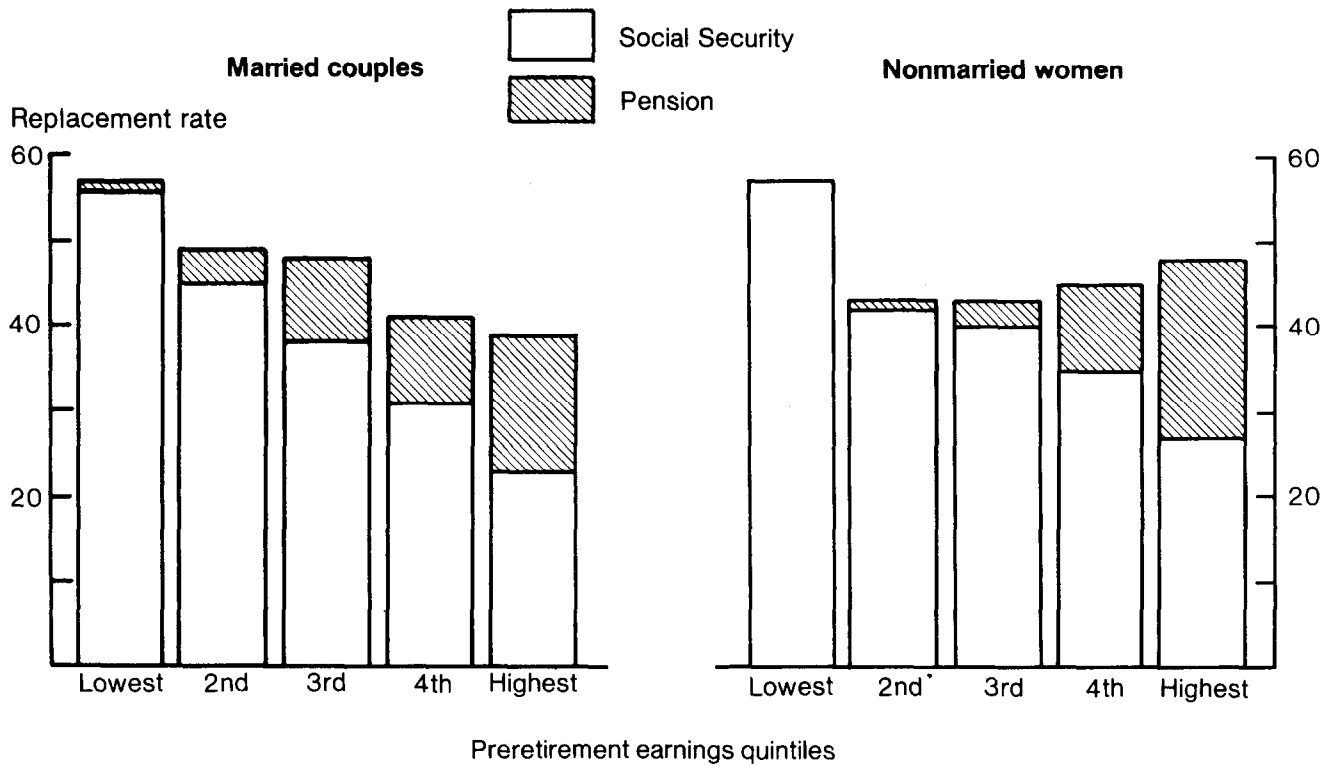
Replacement rate	Total		With pension		Without pension (Social Security only)
	Social Security benefits	All retirement benefits	Social Security alone	All retirement benefits	
All married couples ²					
Total number	1,859	1,753	916	891	943
Total percent	100	100	100	100	100
0.1-19.9	2	0	2	0	1
20-39.9	37	14	53	9	21
40-59.9	40	40	38	38	42
60-79.9	14	30	6	36	21
80-99.9	4	9	1	10	7
100 or more	5	8	1	6	9
First quartile	36	46	31	50	41
Median	45	58	38	61	53
Third quartile	58	72	47	74	68
Wife retired worker					
Total number	924	866	485	465	439
Total percent	100	100	100	100	100
0.1-19.9	2	1	3	0	1
20-39.9	45	18	60	11	27
40-59.9	39	46	33	45	46
60-79.9	8	23	3	31	14
80-99.9	3	6	1	7	5
100 or more	3	7	1	7	6
First quartile	33	43	30	47	38
Median	41	54	37	58	47
Third quartile	51	67	45	69	60
Wife with spouse's benefits					
Total number	935	887	431	426	504
Total percent	100	100	100	100	100
0.1-19.9	1	0	2	0	1
20-39.9	29	10	45	7	15
40-59.9	40	34	43	32	37
60-79.9	19	36	9	43	28
80-99.9	5	11	1	14	8
100 or more	6	9	1	5	12
First quartile	37	50	32	53	45
Median	49	63	41	65	59
Third quartile	64	76	50	77	75

¹ Restricted to those who received their first retired-worker benefit in 1968-76. Pensions include private or public employee pensions assumed to be combined with Social Security; see Technical Note for further explanation.

² Both husband and wife first receiving benefits in 1968-76; husband as retired worker, wife as retired worker or spouse. Middle-4 earnings based on last 10 years before husband's first benefit.

As was true in table 7 when all sample persons' earnings were combined, table 8 and chart 1 show that even though the Social Security replacement rates decline sharply with increasing levels of preretirement earnings, reflecting the tilted benefit formula, total replacement

Chart 1. —Replacement rates by preretirement earnings quintiles¹



¹Based on price-indexed estimated total earnings in high-3 years.

Source: Table 8, part 1.

Table 7.—Median Social Security and total earnings replacement rates, by preretirement earnings levels and pension receipt¹

[Standardized to 1976 levels]

Pension receipt and type of replacement rate	Preretirement earnings quintiles ²					
	Total	Lowest	Second	Third	Fourth	Highest
All men						
Total number.....	3,457	536	589	714	819	799
Median replacement rate:						
Social Security alone.....	29	44	35	32	26	18
Social Security and pension.....	38	44	37	37	38	33
Percent with pension.....	43	4	19	44	63	67
With pension: Median total replacement rate.....	44	(3)	55	48	45	38
Without pension: Median Social Security replacement rate.....	33	43	35	32	26	19
Nonmarried women						
Total number.....	880	333	256	181	66	44
Median replacement rate:						
Social Security alone.....	38	47	39	33	28	4 22
Social Security and pension.....	46	48	44	47	48	4 44
Percent with pension.....	33	8	33	59	62	4 70
With pension: Median total replacement rate.....	56	4 58	56	57	4 57	4 53
Without pension: Median Social Security replacement rate.....	41	48	39	33	(3)	(3)

¹ Social Security plus pension benefits, if any, as percent of estimated total price-indexed earnings in highest 3 years of last 10.

² Quintiles derived from combined earnings distribution of all sample re-

spondents. Quintile boundaries are—\$6,283, \$9,290, \$12,780, and \$16,246.

³ Not computed; base fewer than 25.

⁴ Based on 50 or fewer cases; subject to high sampling variability.

Table 8.—Median Social Security and total earnings replacement rates, by preretirement earnings levels, pension receipt, sex, and marital status ¹

[Standardized to 1976 levels]

Pension receipt and type of replacement rate	Preretirement earnings quintiles					
	Total	Lowest	Second	Third	Fourth	Highest
All men						
Social Security plus pension, if applicable, as percent of high-3, price-indexed estimated total earnings: ²						
Total number	3,033	571	595	602	623	642
Median replacement rate:						
Social Security alone	28	50	34	30	25	17
Social Security and pension	37	42	37	37	38	33
Percent with pension	44	6	26	52	64	67
With pension: Median total replacement rate	44	³ 67	52	47	44	38
Without pension: Median Social Security replacement rate	32	41	34	29	25	18
Nonmarried women						
Total number	880	173	184	169	178	176
Median replacement rate:						
Social Security alone	38	57	42	40	35	27
Social Security and pension	46	57	43	43	45	48
Percent with pension	33	1	16	33	51	64
With pension: Median total replacement rate	56	(4)	³ 59	55	56	57
Without pension: Median Social Security replacement rate	41	57	41	39	35	29
Married couples						
Total number	1,911	381	382	391	396	361
Median replacement rate:						
Social Security alone	37	56	45	38	31	23
Social Security and pension	48	57	49	48	41	39
Percent with pension	49	9	34	60	66	74
With pension: Median total replacement rate	51	³ 84	64	55	47	44
Without pension: Median Social Security replacement rate	43	56	44	38	32	23
All men						
Social Security plus pension, if applicable, as percent of high-3, nonindexed estimated total earnings: ⁵						
Total number	3,033	560	600	579	666	628
Median replacement rate:						
Social Security alone	34	49	42	36	31	21
Social Security and pension	45	50	44	45	45	41
Percent with pension	44	6	26	50	66	67
With pension: Median total replacement rate	53	³ 89	61	58	53	47
Without pension: Median Social Security replacement rate	38	49	41	36	31	21
Nonmarried women						
Total number	880	173	179	177	179	172
Median replacement rate:						
Social Security alone	45	69	49	46	42	32
Social Security and pension	55	69	51	51	50	61
Percent with pension	33	1	16	32	47	67
With pension: Median total replacement rate	66	(4)	³ 67	66	64	68
Without pension: Median Social Security replacement rate	48	68	49	45	42	33
Married couples						
Total number	1,911	385	377	382	385	382
Median replacement rate:						
Social Security alone	45	68	55	47	37	28
Social Security and pension	58	69	61	59	51	48
Percent with pension	49	9	34	59	68	74
With pension: Median total replacement rate	63	³ 98	78	67	58	53
Without pension: Median Social Security replacement rate	52	68	55	46	38	28

See footnotes at end of table.

Table 8.—Median Social Security and total earnings replacement rates, by preretirement earnings levels, pension receipt, sex, and marital status ¹—Continued

Pension receipt and type of replacement rate	Preretirement earnings quintiles					
	Total	Lowest	Second	Third	Fourth	Highest
All men						
Social Security plus pension, if applicable, as percent of middle-4 price-indexed estimated total earnings: ⁶						
Total number	2,288	553	545	577	613	600
Median replacement rate:						
Social Security alone	34	56	42	34	30	23
Social Security and pension	46	57	44	45	43	41
Percent with pension	45	7	26	54	64	70
With pension: Median total replacement rate	52	(3,7)	59	54	51	47
Without pension: Median Social Security replacement rate	40	56	42	34	31	23
Nonmarried women						
Total number	802	161	160	162	158	161
Median replacement rate:						
Social Security alone	45	70	50	44	41	32
Social Security and pension	55	70	52	48	49	59
Percent with pension	35	4	19	33	49	69
With pension: Median total replacement rate	64	(4)	³ 66	62	62	66
Without pension: Median Social Security replacement rate	48	70	50	44	41	33
Married couples						
Total number	1,859	366	386	373	366	368
Median replacement rate:						
Social Security alone	45	76	55	45	37	28
Social Security and pension	58	79	60	57	50	46
Percent with pension	49	9	35	57	69	76
With pension: Median total replacement rate	61	(3,7)	74	65	57	51
Without pension: Median Social Security replacement rate	53	77	55	46	37	31

¹ Earnings measures correspond to base of replacement rate. Quintiles computed separately for each group.

² Quintile boundaries are: All men—\$7,127, \$10,304, \$13,600, and \$17,567; nonmarried women—\$4,435, \$6,563, \$8,583, and \$11,167; married couples—\$8,568, \$13,000, \$16,342, and \$21,957.

³ Based on 50 cases or fewer; subject to high sampling variability.

⁴ Not computed; base fewer than 25.

⁵ Quintile boundaries are: All men—\$5,934, \$8,600, \$11,230, and \$14,528; nonmarried women—\$3,646, \$5,525, \$7,236, and \$9,516; married couples—\$7,018, \$10,484, \$13,345, and \$17,400.

⁶ Quintile boundaries are: All men—\$5,731, \$9,133, \$11,801, and \$14,317; nonmarried women—\$3,803, \$5,792, \$7,713, and \$9,988; married couples—\$6,891, \$10,800, \$13,766, and \$18,027.

⁷ More than 100 percent.

rates vary less across the income distribution. For nonmarried women the relationship is U-shaped: Total replacement rates fall and then rise as income increases. This pattern reflects the very strong relationship between earnings level and the probability of receiving a pension. Far fewer nonmarried women than married couples in the lowest two quintiles have pensions (1 percent and 16 percent for the nonmarried women, compared with 9 percent and 34 percent for the married couples), so their total replacement rate drops virtually as fast as the Social Security replacement rate up to the third quintile.

Table 8 also shows pensioners and nonpensioners separately. At all income levels, the total replacement rates of pensioners are considerably higher than the replacement rates from Social Security of those without pensions. One group stands out: Persons or couples with high earnings but no pensions have particularly low replacement rates. This group comprises slightly under one-third of the married couples in the top two quintiles.

These figures represent the retirees' situation only in the year they first collect benefits. Most private pensions are not regularly adjusted for cost-of-living increases after retirement, although Social Security benefits are adjusted every year.⁶ Therefore, the relative advantage enjoyed by retired persons with pensions might well be rapidly eroded in times of high inflation. Nevertheless, their level of preretirement earnings is on average 55–70 percent higher, as shown in the tabulation on the following page, and their total retirement benefits are commensurately higher.

After-Tax Replacement Rates

Probably the best measure of a person's or couple's standard of living is disposable income—income net of taxes, fringe benefits, and work-related expenses. It is

⁶ Bankers Trust Company, "1975 Study of Corporate Pension Plans," 1975; and Gayle B. Thompson, "Impact of Inflation on Private Pensions of Retirees, 1970–74: Findings From the Retirement History Study," *Social Security Bulletin*, November 1978, pages 16–25.

Sex and marital status and pension receipt	Median preretirement earnings, price-indexed ¹	
	High-3	Middle-4
Married men, total	\$12,570	\$10,660
With pension	14,520	13,050
Without pension	9,390	7,940
Nonmarried women, total	7,680	6,780
With pension	10,200	9,180
Without pension	6,140	5,390

¹ In 1976 dollars.

difficult to estimate the value of fringe benefits and the cost of work expenses for individual workers, and no attempt to do so was made here. It was possible, however, to estimate Federal and State income taxes as well as the employee portion of the Social Security tax; the replacement rates in this section are based on those estimates. These rates are particularly relevant because the major source of retirement income—Social Security—is tax exempt and the other source—pensions—is fully taxable, and because each person over age 65 is eligible for two personal exemptions from the Federal income tax.

As shown in table 9, median total replacement rates after taxes were approximately 15 percent higher than before taxes. For example, for all married couples the median rates based on high-3 price-indexed earnings were 48 percent before taxes and 55 percent after taxes. For nonmarried women these medians were 46 percent and 52 percent, respectively. Couples in higher income brackets—notably those with pensions—benefited only slightly more by the tax computation than those without pensions. For instance, after-tax replacement rates (based on price-indexed, high-3 earnings) were 17 percent higher for married couples with pensions, compared with a 14-percent increase for those without. Similar relationships between before- and after-tax replacement rates are shown in table 9 for all three replacement rate definitions.

Table 10 shows after-tax replacement rates by relative level of preretirement earnings. As was seen in table 8, the increased incidence of pensions partially counteracts the sharp decline in Social Security replacement rates as earnings rise. The combination of income and payroll taxes further evens out the structure of total replacement rates, especially for nonmarried women, as shown in table 10 for rates based on high-3 price-indexed earnings. A regression analysis of the relationship between earnings and replacement rates, before and after taxes, is discussed in the Appendix, page 22.

Total Income Ratios

The most comprehensive measure of the change in living standards that accompanies retirement is the comparison of total income before and after retirement. A

low replacement rate based on Social Security benefits and pensions may well be counterbalanced by other income sources. In particular, workers expecting low retirement benefits relative to their preretirement standards of living might be expected to save more; indeed, the maximum on earnings subject to Social Security taxes leaves room for just such savings. High asset income might therefore make up for low retirement benefits. Or persons might supplement low replacement rates or low benefits by working, at least part time, after claiming retirement benefits.

Total income ratios have been computed for persons receiving retired-worker benefits and for couples in which the wife receives any sort of cash benefit. The ratios are price-indexed to the year of first benefit payment. For nonmarried individuals, the ratios are derived from total income reported in the RHS survey in the full years nearest to when Social Security benefits were first claimed. For couples, total income in the last full year before the first spouse received benefits is compared with total income in the first full year after the second spouse received benefits; these amounts are price-indexed to the year in which the first spouse received benefits. (Additional details are included in the Technical Note.) Because of high nonresponse on income, figures presented here must be regarded as **preliminary**.

Table 11 presents total income ratios by pension receipt. For married men and their wives, the median was 62 percent. Of particular interest is that while by any measure pension recipients have higher median replacement rates than nonrecipients, median total income ratios are the same for the two groups—62 percent. Detailed examination of the distributions shows that somewhat more nonpensioners had relatively high ratios: the top one-fourth of the married couples without pensions had income ratios above 90 percent while among those with pensions, one-fourth had a 78-percent or higher income ratio.

As expected, however, the ratio among pension recipients starts at an initial level of absolute income 60–100 percent higher for recipients than nonrecipients, as shown in the first part of table 11. Therefore, it is obvious that absolute income after retirement is higher among pension recipients than nonrecipients.

Postretirement work among pension nonrecipients is the major reason for the equality of total income ratios. Although 57 percent of married men without pensions reported earnings 1 or 2 years after retirement, only 26 percent of pension recipients did so (table 12). Furthermore, nonrecipients who worked after retirement earned slightly more (the median was \$2,390 in 1976 dollars for married men) than did working recipients (\$2,150)—presumably because the nonpensioners, who had significantly lower preretirement earnings, continued to earn less but worked more hours than did pensioners.

Table 9.—Total earnings replacement rates before and after taxes, by pension receipt and marital status¹

[Standardized to 1976 levels]

Replacement rate	Married couples		Nonmarried men		Nonmarried women	
	Before taxes	After taxes	Before taxes	After taxes	Before taxes	After taxes
Total						
Social Security plus pension, if applicable, as percent of price-indexed estimated total earnings in highest 3 years of last 10:						
Total number	1,952	1,939	318	317	807	806
Total percent	100	100	100	100	100	100
0.1-19.9	2	1	4	1	1	0
20-39.9	28	18	45	32	31	18
40-59.9	47	44	36	44	46	50
60-79.9	16	27	8	14	14	21
80-99.9	4	7	2	4	4	6
100 or more	4	4	4	4	5	5
First quartile	38	43	32	36	37	43
Median	48	55	40	46	46	52
Third quartile	59	67	52	59	58	66
With pension ²						
Total number	944	935	116	115	276	275
Total percent	100	100	100	100	100	100
0.1-19.9	0	0	0	0	0	0
20-39.9	19	9	27	11	8	4
40-59.9	52	42	59	54	52	35
60-79.9	20	35	11	27	32	46
80-99.9	6	10	1	5	7	11
100 or more	4	5	3	3	3	5
First quartile	42	49	39	47	47	55
Median	52	59	48	55	57	65
Third quartile	63	70	56	65	66	76
Without pension						
Total number	1,008	1,004	202	202	531	531
Total percent	100	100	100	100	100	100
0.1-19.9	3	1	6	2	1	0
20-39.9	37	26	56	44	43	25
40-59.9	42	46	23	38	44	58
60-79.9	12	19	7	7	5	8
80-99.9	3	4	3	4	2	3
100 or more	4	4	5	5	6	6
First quartile	34	39	30	33	34	40
Median	44	50	37	41	42	47
Third quartile	56	61	47	49	50	56

See footnotes at end of table.

The other major source of postretirement income—asset income—is lower in both incidence and amount among pension nonrecipients than recipients. This finding reflects the pattern of asset ownership found in previous studies of the elderly: Persons who are better-off during their working lifetimes tend to accumulate more assets than those less well-off.⁷ The amounts of asset income are much lower than earnings, however, so it is the greater propensity to work after retirement that equal-

izes income ratios between pensioners and nonpensioners. Note again that nonpensioners' earnings cannot be expected to continue indefinitely, although they will eventually increase their Social Security benefits, while asset income can be expected to continue for some time, if not indefinitely.

Nonmarried men and women have somewhat higher total income ratios, 69 percent and 77 percent, respectively, compared with 62 percent for married couples (table 11). This difference, of course, reflects the progressive benefit formula, which results in higher replacement rates for lower earners. Although married couples with pensions have the same income ratio as those with-

⁷ Joseph Friedman and Jane Sjogren, "Assets of the Elderly as They Retire," *Social Security Bulletin*, January 1981, pages 16-31. (Reprinted as Retirement History Study Report No. 23.)

Table 9.—Total earnings replacement rates before and after taxes, by pension receipt and marital status¹—Continued

Replacement rate	Married couples		Nonmarried men		Nonmarried women	
	Before taxes	After taxes	Before taxes	After taxes	Before taxes	After taxes
Total						
Social Security plus pension, if applicable, as percent of nonindexed estimated total earnings in highest 3 years of last 10:						
Total number	1,952	1,939	318	317	807	806
Total percent	100	100	100	100	100	100
0.1-19.9	1	0	2	0	0	0
20-39.9	13	7	26	16	15	7
40-59.9	38	30	46	42	46	38
60-79.9	32	37	14	27	24	33
80-99.9	10	16	5	7	8	13
100 or more	7	10	7	8	7	10
First quartile	46	53	38	44	44	51
Median	59	67	48	56	55	63
Third quartile	73	81	61	70	70	78
With pension ²						
Total number	944	935	116	115	276	275
Total percent	100	100	100	100	100	100
0.1-19.9	0	0	0	0	0	0
20-39.9	7	3	10	4	3	1
40-59.9	35	21	51	30	31	13
60-79.9	38	42	28	47	44	46
80-99.9	13	22	7	11	16	28
100 or more	7	12	4	7	7	12
First quartile	52	61	47	55	56	65
Median	64	73	56	66	67	76
Third quartile	77	88	67	77	79	91
Without pension						
Total number	1,008	1,004	202	202	531	531
Total percent	100	100	100	100	100	100
0.1-19.9	1	0	3	1	0	0
20-39.9	19	12	35	23	22	10
40-59.9	41	38	44	48	55	51
60-79.9	26	33	7	15	13	26
80-99.9	6	10	4	5	3	4
100 or more	7	8	8	8	7	8
First quartile	42	48	35	41	41	46
Median	54	60	44	50	49	56
Third quartile	68	75	55	63	59	67

See footnotes at end of table.

out pensions, nonmarried persons without pensions had somewhat higher income ratios than those with pensions: 79 percent and 58 percent, respectively, for nonmarried men, and 83 percent and 71 percent for nonmarried women. The relatively few nonmarried persons who have pensions received somewhat lower pension amounts compared with their total income. Thus, although nonmarried persons without pensions have lower replacement rates than do pension recipients, their other sources of income in retirement more than compensate. The same pattern of postretirement work and receipt of asset income is evident among nonmarried persons as married couples: Those without pensions are much more likely to work but less likely to have income-producing assets.

Summary

The level of earnings replacement is one measure of the performance of the income maintenance system that supports our Nation's retirees. The concept of a replacement rate would seem straightforward: It is the ratio between retirement benefits and preretirement earnings. Implementing this concept, however, involves a complex set of options. No one replacement rate can be considered best for all purposes. For this reason, the study reviews many options involved in replacement rate computations and presents a selection of rates applicable to different circumstances.

A general option is how to define the preretirement standard of living, usually defined here as total earnings

Table 9.—Total earnings replacement rates before and after taxes, by pension receipt and marital status¹—Continued

Replacement rate	Married couples		Nonmarried men		Nonmarried women	
	Before taxes	After taxes	Before taxes	After taxes	Before taxes	After taxes
Total						
Social Security plus pension, if applicable, as percent of price-indexed estimated total earnings in middle 4 years:						
Total number.....	1,893	1,880	295	294	739	738
Total percent.....	100	100	100	100	100	100
0.1-19.9.....	0	0	0	0	0	0
20-39.9.....	13	7	24	11	14	4
40-59.9.....	39	30	45	46	47	42
60-79.9.....	29	36	20	27	26	33
80-99.9.....	9	15	3	8	6	13
100 or more.....	10	12	7	8	7	9
First quartile.....	46	53	40	46	44	52
Median.....	59	66	49	57	55	62
Third quartile.....	74	82	64	72	69	77
With pension ²						
Total number.....	929	920	114	113	268	267
Total percent.....	100	100	100	100	100	100
0.1-19.9.....	0	0	0	0	0	0
20-39.9.....	8	3	11	4	3	0
40-59.9.....	37	24	53	36	35	15
60-79.9.....	36	43	31	45	45	50
80-99.9.....	11	19	3	11	10	24
100 or more.....	7	11	4	4	8	11
First quartile.....	50	59	46	54	55	64
Median.....	62	70	55	64	64	74
Third quartile.....	75	85	66	75	75	88
Without pension						
Total number.....	964	960	181	181	471	471
Total percent.....	100	100	100	100	100	100
0.1-19.9.....	1	0	1	1	0	0
20-39.9.....	18	11	33	16	20	6
40-59.9.....	40	36	40	52	53	57
60-79.9.....	23	30	14	16	15	23
80-99.9.....	8	11	3	6	4	6
100 or more.....	12	12	9	10	7	8
First quartile.....	43	49	37	43	41	48
Median.....	56	62	45	51	49	56
Third quartile.....	73	79	62	66	61	68

¹ Includes those who received their first retired-worker benefit in 1968-76. Taxes simulated. Includes Federal, State, and local income taxes, and Social Security (FICA) taxes, on both preretirement earnings and pension benefits. See

the Technical Note for further explanation.

² Private or public employee pensions assumed to be combined with Social Security benefits; see the Technical Note for further explanation.

in selected years since, for most persons, earnings constitute the bulk of preretirement income. But which years' earnings should be used? One might use the maximum level of recent earnings (such as the highest 3 years of the last 10 before retirement) or average earnings in recent years (such as the 4 years left after disregarding the highest and lowest 3 years of the last 10). Alternately, some lifetime average might be used.

Since the value of income amounts changes over time, earnings can be indexed to remove the effects of inflation. On the other hand, it may be argued that many retirees do not mentally index their earnings when assessing the adequacy of their own retirement bene-

fits. Because neither method is unequivocally "correct," both indexed and nonindexed earnings are used in this article to compute replacement rates based on the highest 3 years' earnings; for replacement rates based on earnings in the more distant past, only indexed earnings are used.

Because persons in this sample retired during the period 1968-76, and did so at different ages and subject to different Social Security benefit formulas, all replacement rates in this article have been standardized to 1976 levels. The replacement rates thus approximate those of a cross-sectional sample retiring in that year.

Social Security benefits are computed on the basis of

Table 10.—Median after-tax Social Security and total earnings replacement rates, by preretirement earnings quintiles and pension receipt for married couples and nonmarried women¹

[Standardized to 1976 levels]

Pension receipt and type of replacement rate	Preretirement earnings quintiles ²					
	Total	Lowest	Second	Third	Fourth	Highest
Married couples						
Total number.....	2,077	431	419	431	425	371
Median replacement rate:						
Social Security alone.....	43	63	51	44	36	28
Social Security and pension.....	55	64	56	56	48	45
Percent with pension.....	47	9	32	59	64	72
With pension: Median total replacement rate.....	59	³ 91	72	64	55	51
Without pension: Median Social Security replacement rate.....	48	63	50	44	36	28
Nonmarried women						
Total number.....	847	166	175	164	171	171
Median replacement rate:						
Social Security alone.....	44	60	47	44	42	33
Social Security and pension.....	52	60	49	49	50	56
Percent with pension.....	33	1	16	32	50	63
With pension: Median total replacement rate.....	65	(⁴)	³ 64	64	63	66
Without pension: Median Social Security replacement rate.....	46	60	47	43	42	34

¹ Includes those who received their first retired-worker benefits in 1968-76. Taxes simulated. Includes Federal, State, and local income taxes, and Social Security (FICA) taxes, on both preretirement earnings and taxable retirement benefits. See the Technical Note for description of simulation procedure. Social Security and total retirement benefits as percent of price-indexed high-3 esti-

mated total earnings, after taxes.

² Earnings quintiles based on pre-tax estimated total price-indexed earnings in highest 3 years, adjusted to 1976 level (see table 7).

³ Based on 50 or fewer cases; subject to high sampling variability.

⁴ Not computed; base fewer than 25.

payroll taxes paid on earnings limited to a maximum in each year. Replacement rates based on these truncated earnings are most useful for assessing the performance of the Social Security system by itself. Both Social Security benefits actually received and benefits that would be received in the absence of the actuarial reduction for early retirement have been used in the numerator as measures of Social Security's actual and potential performance. Selected median replacement rates of taxable earnings are shown in the tabulation on page 6.

Social Security benefits were never intended to be the sole support of workers in retirement. Therefore, for assessing the performance of the Social Security system in conjunction with the private-pension sector, another set of replacement rates is necessary. Most pensions are based on a combination of job tenure and the level of recent earnings, not truncated at the Social Security system's taxable maximum. Indeed, pensions are the primary source of replacement for earnings above the taxable maximum. Therefore, for assessing this broader concept of replacement rate, total retirement benefits (Social Security plus, where applicable, private pensions and certain public employee pensions) are compared with total earnings estimated from the earnings records. Where possible, replacement rates of married couples have been computed and categorized by whether the wife received a retired-worker or spouse's benefit. Selected median replacement rates of total earnings are shown in the tabulation in the next column.

Sex, marital status, and pension receipt	Median total replacement rates, based on total earnings		
	High-3, price-indexed	High-3, non-indexed	Career Middle-4, price-indexed
All men.....	38	45	46
With pension.....	44	54	52
Without pension.....	33	39	40
Married men.....	37	45	46
With pension.....	44	53	52
Without pension.....	32	38	40
Nonmarried men.....	39	47	48
With pension.....	47	56	54
Without pension.....	36	43	44
Nonmarried women.....	46	55	55
With pension.....	56	66	64
Without pension.....	41	48	48
Married couples.....	48	58	58
With pension.....	51	63	61
Without pension.....	43	52	53

Source: Tables 4-6.

Persons with pension benefits have much higher preretirement earnings than those without pensions, and they have higher total replacement rates at retirement. For instance, the replacement rate of indexed earnings in the highest 3 years was 44 percent for married men with pensions, compared with 32 percent for those with only Social Security benefits.

Although the Social Security benefit formula favors low earners, the probability of receiving a pension rises considerably with earnings level. Total replacement

Table 11.—Preretirement total income and total income ratios, by pension receipt, sex, and marital status at award¹

Preretirement total income and total income ratio	Couples			Nonmarried men			Nonmarried women		
	Total	With pension	Without pension	Total	With pension	Without pension	Total	With pension	Without pension
Preretirement total income									
Total number	1,149	486	663	233	74	159	464	146	318
Total percent	100	100	100	100	100	100	100	100	100
Under \$5,000	8	1	14	27	3	38	37	9	49
\$5,000-\$9,999	25	13	33	34	22	40	40	47	37
\$10,000-\$14,999	29	32	26	28	54	15	16	29	10
\$15,000-\$19,999	18	24	13	6	12	4	4	10	1
\$20,000-\$24,999	8	13	5	3	5	1	2	3	2
\$25,000 and over	12	16	8	3	4	2	1	2	1
First quartile	\$8,680	\$12,230	\$6,820	\$4,700	\$10,070	\$3,270	\$3,770	\$7,500	\$3,090
Median income	13,000	15,670	10,520	7,960	12,300	5,970	6,760	9,600	5,070
Third quartile	18,620	21,820	15,500	12,120	14,580	9,520	9,820	12,660	8,270
Total income ratio ²									
Total number	1,143	485	658	233	74	159	461	145	316
Total percent	100	100	100	100	100	100	100	100	100
0.1-19.9	4	3	5	2	0	3	2	1	2
20-39.9	16	12	19	13	15	12	9	3	12
40-59.9	28	32	25	26	41	19	24	32	21
60-79.9	24	31	20	19	22	17	18	28	14
80-99.9	13	14	12	12	11	13	17	22	15
100-124.9	6	6	6	10	7	11	12	6	15
125-149.9	4	1	6	6	3	8	7	3	9
150 and over	6	2	8	12	3	17	11	6	13
First quartile	44	48	41	48	46	50	53	52	52
Median ratio	62	62	62	69	58	79	77	71	83
Third quartile	84	78	90	108	76	124	109	88	119

¹ Limited to those first receiving benefits in 1969-75; sample person with retired-worker benefit, spouse with any payable benefit. Not computed if total income not available for both years.

² Ratio of postretirement to preretirement total income in nearest survey year, price-indexed to year of first benefit payment. For married men, couple's

total income in nearest year before first spouse received benefit (retired-worker for husband, any payable benefit for wife) is compared with couple's total income in nearest year after second spouse claimed benefits; both amounts are price-indexed to year in which the first spouse received benefits.

rates are thus more constant than are Social Security replacement rates over the income spectrum, although the relationship between earnings and total replacement rates is somewhat downward-sloping for married couples and U-shaped for nonmarried women.

Pensions are rarely adjusted after retirement for increases in the cost of living, so it is expected that the relative advantage enjoyed by persons with pensions at the time of retirement will erode over time.

Fully as many RHS wives receive retired-worker benefits in their own right as receive only spouses' benefits. The earnings of a retired-worker wife improve the couple's preretirement standard of living, and result in higher benefits in dollar amounts, but do not add a commensurate amount to their replacement rates. This seeming contradiction occurs primarily because zero earnings are being replaced by the 50-percent spouse benefit for couples in which the wife is not insured in her own right. Therefore, couples with retired-worker wives have lower combined replacement rates—45 percent—than do couples with wives receiving spouses'

benefits—51 percent (based on high-3 price-indexed earnings), as shown in the following tabulation.

Benefit status of wife	Median total replacement rates, based on total earnings		
	High-3, price-indexed	High-3, non-indexed	Middle-4, price-indexed
All married couples	48	58	58
Wife retired worker	45	55	54
Wife with spouse benefit	51	62	63

Replacement rates after income and Social Security payroll taxes were also computed to approximate more closely changes in actual standards of living. They tend to be about 15 percent higher than corresponding before-tax rates for nonmarried persons or couples. Persons with higher incomes and pensions were advantaged slightly more from the effects of excluding taxes than were those without pensions.

Table 12.—Earnings and asset income after retirement of sample respondents, by pension receipt, sex, and marital status at award¹

[Standardized to 1976 levels]

Earnings and asset income	Married men			Nonmarried men			Nonmarried women		
	Total	With pension	Without pension	Total	With pension	Without pension	Total	With pension	Without pension
Earned income ²									
Total number	1,149	486	663	233	74	159	464	146	318
Total percent	100	100	100	100	100	100	100	100	100
\$0	56	74	43	57	86	43	57	77	47
\$1-\$999	10	9	11	11	5	13	9	4	11
\$1,000-\$1,999	8	3	11	5	1	7	11	8	12
\$2,000-\$2,999	12	6	15	12	1	16	9	3	12
\$3,000-\$3,999	5	3	6	5	3	6	6	2	8
\$4,000-\$4,999	2	1	3	4	1	5	1	0	2
\$5,000-\$9,999	5	3	7	4	1	5	6	5	7
\$10,000 and over	2	2	4	3	0	5	1	0	1
Median:									
All persons	\$0	\$0	\$620	\$0	\$0	\$550	\$0	\$0	\$260
With earnings	2,330	2,150	2,390	2,480	(3)	2,500	2,200	1,870	2,290
Asset income ⁵									
Total number	1,149	486	663	233	74	159	464	146	318
Total percent	100	100	100	100	100	100	100	100	100
\$0	35	22	44	48	23	59	36	20	44
\$1-\$999	35	41	30	35	51	27	43	51	39
\$1,000-\$1,999	11	14	9	6	8	6	9	14	7
\$2,000-\$2,999	6	8	5	4	10	1	4	6	4
\$3,000-\$3,999	3	4	2	2	1	2	3	3	2
\$4,000-\$4,999	2	3	1	2	1	2	1	3	0
\$5,000-\$9,999	5	5	5	3	6	2	3	4	2
\$10,000 and over	3	3	3	1	0	1	1	0	1
Median:									
All persons	\$440	\$700	\$180	\$70	\$530	\$0	\$320	\$590	\$150
With asset income	930	950	920	750	750	760	740	780	710

¹ Limited to those claiming benefits in 1969-75; sample person with retired-worker benefit, spouse with any payable benefit. Not computed if total income not available both before and after retirement. Income sources and amounts reported on RHS questionnaire in first full year following retirement of sample person.

² Earned income of sample person only.

³ Not computed; base fewer than 25.

⁴ Based on 50 cases or less; subject to high sampling variability.

⁵ Asset income of sample person and spouse (if any).

Retirement benefits are not, of course, the only source of income in retirement. Notably absent from replacement rates discussed so far are sources such as asset income and postretirement earnings. Total income ratios were therefore also computed, based on income reported in the RHS survey waves closest to the year of retirement. These ratios tend to be higher than the corresponding replacement rates, especially for persons without pensions. Preliminary data show that for married couples the income ratios were the same for pensioners and nonpensioners—62 percent. For nonmarried men, the median income ratio was 69 percent, and for nonmarried women it was 77 percent. Nonmarried persons without pensions had substantially higher ratios than those with pensions: 79 percent compared with 58 percent for nonmarried men, and 83 percent compared with 71 percent for nonmarried women. The principal reason for total income ratios to be equalized

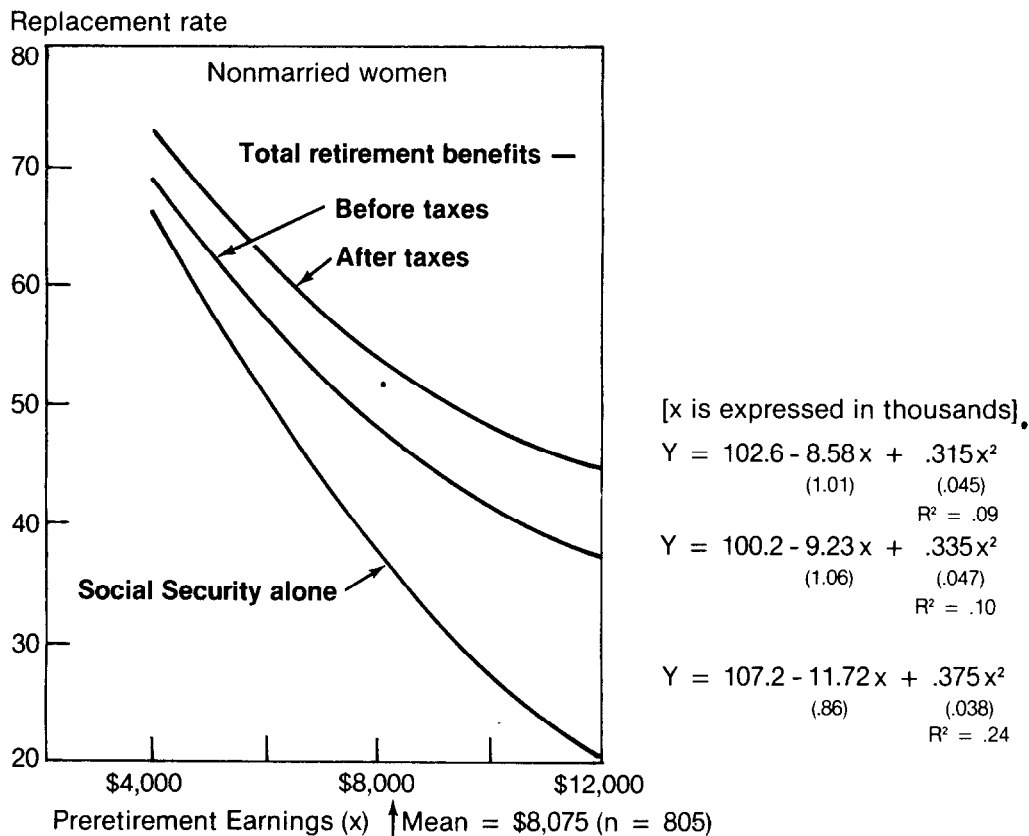
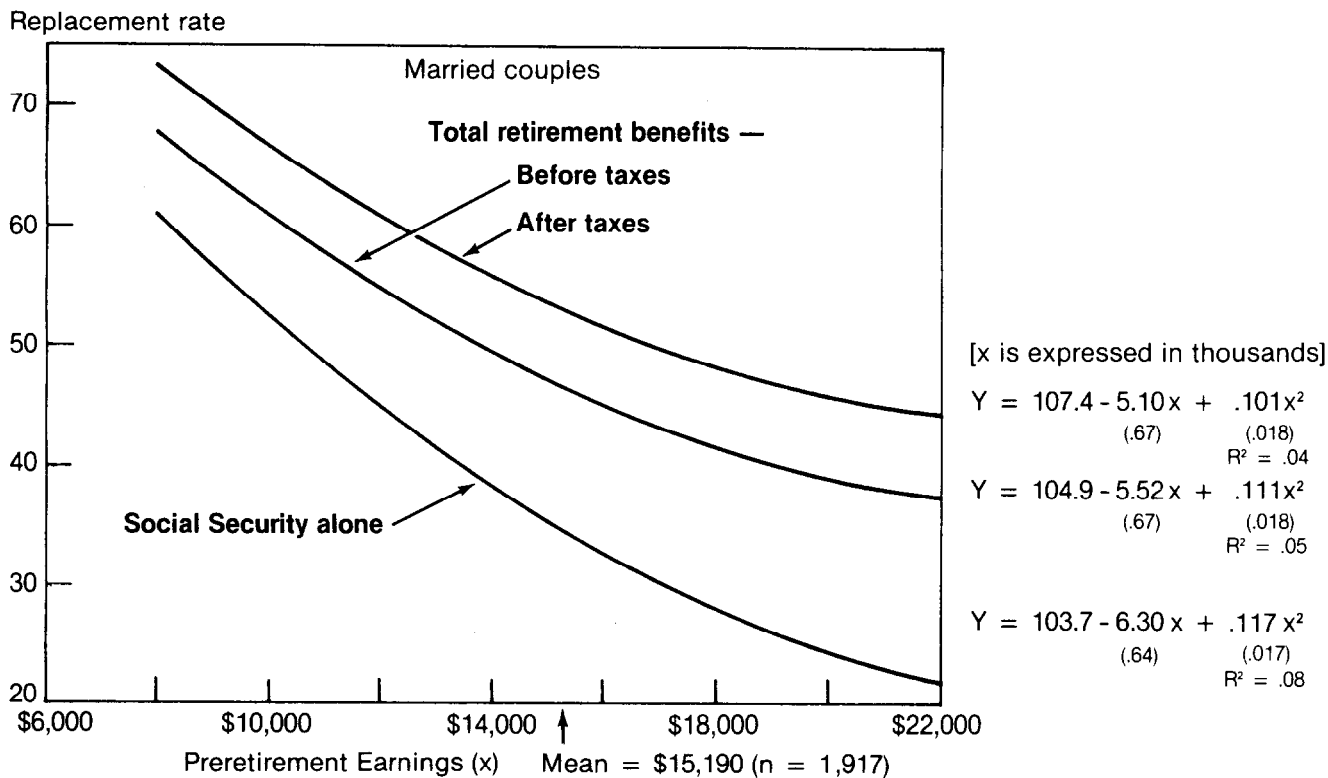
between pensioners and nonpensioners is the greater propensity for nonpensioners to continue working, at least part time, after beginning to receive Social Security benefits. These earnings are not likely to continue indefinitely, however. On the other hand, pensioners much more frequently reported asset income, a source that is likely to be relatively constant (albeit minor) in retirement.

Appendix

Replacement Rates and Earnings: A Regression Analysis

A regression analysis of the relationship between earnings levels and various replacement rate measures is shown in chart 2. Because there was no reason to expect
(Continued on page 53)

Chart 2. — Social Security and total replacement rates by preretirement earnings levels¹
 [Standardized to 1976 levels]



¹Social Security plus pension, if applicable, as percent of high-3 price-indexed estimated total earnings. Includes all persons or couples, whether or not receiving pension.

Table M-27.—Supplemental Security Income: Number of persons receiving State-administered State supplementation only, total amount, and average payment, by reason for eligibility and State, April 1982¹

State	Number of persons				Total amount (in thousands)				Average payment			
	Total	Aged	Blind	Disabled	Total	Aged	Blind	Disabled	Total	Aged	Blind	Disabled
Total.....	2 49,420	29,777	593	18,495	2 \$5,869	\$3,029	\$91	\$2,676	2 \$118.75	\$101.71	\$153.64	\$144.66
Alabama.....	3,328	2,502	16	810	125	93	1	31	37.67	37.37	37.31	38.61
Alaska ³	260	128	2	130	21	10	(4)	10	80.29	79.22	(5)	79.92
Arizona.....	178	141	...	37	21	19	...	2	119.15	135.55	...	56.62
Colorado.....	11,070	9,704	7	1,359	1,533	1,285	1	246	138.52	132.46	207.86	181.41
Connecticut.....	8,583	3,788	51	4,744	1,357	559	6	792	158.15	147.62	124.96	166.91
Florida ⁶.....	...	...	...	...	...	...	...	...	...	...	...	...
Idaho.....	635	333	3	299	59	30	(4)	29	93.35	88.84	(5)	98.55
Illinois.....	7,210	1,487	39	5,684	1,131	146	3	981	156.81	98.23	89.23	172.60
Kentucky.....	1,761	1,315	6	440	215	159	1	55	121.88	120.82	130.17	124.94
Maryland.....	2 555	(7)	(7)	(7)	2 73	(7)	(7)	(7)	2 132.43	(7)	(7)	(7)
Minnesota ³	1,378	493	21	864	287	83	4	201	208.14	167.59	171.62	232.17
Missouri.....	5,895	4,503	294	1,098	287	174	58	55	48.66	38.64	197.23	49.99
Nebraska.....	1,444	609	23	812	112	32	2	78	77.48	52.10	95.35	96.00
New Mexico ⁶.....	...	...	...	...	...	...	...	...	...	...	...	...
North Carolina.....	2,442	1,654	43	745	399	276	9	114	163.25	166.71	208.67	152.95
North Dakota.....	2	1	...	1	(4)	(4)	...	(4)	(5)	(5)	...	(5)
Oklahoma.....	2,439	1,822	10	607	129	98	1	31	52.99	53.64	61.00	50.90
Oregon.....	2,240	1,297	78	865	119	65	4	50	53.16	50.09	57.50	57.36
South Carolina ⁶.....	...	...	...	...	...	...	...	...	...	...	...	...
Utah ⁶.....	...	...	...	...	...	...	...	...	...	...	...	...
West Virginia ⁶.....	...	...	...	...	...	...	...	...	...	...	...	...
Wyoming ⁶.....	...	...	...	...	...	...	...	...	...	...	...	...

¹ Data reported to the Social Security Administration by individual States. All data subject to revision. Excludes data for mandatory and optional programs in New Hampshire, South Dakota, and Virginia; for optional programs in North Dakota.
² Includes data not distributed by reason for eligibility.
³ Represents March 1980 data for Alaska and February 1982 data for Minne-

sota; data not available for April 1982.
⁴ Less than \$500.
⁵ Not computed on base of less than \$500.
⁶ No persons receiving State supplementation only.
⁷ Data not available.

Earnings Replacement Rates and Total Income (Continued from page 22)

the relationship to be strictly linear, a term for the square of earnings was included in the equation. For married couples, the estimated relationship is close to linear, with the earnings-squared term rather low in relation to the earnings term (x). Around the mean earnings level, \$15,190, the combined regression parameters indicate that estimated Social Security-only replacement rates fall by 2.75 percentage points for every \$1,000 rise in preretirement earnings. In contrast, total (pretax) replacement rates fall less, 2.14 percentage points, and after-tax rates fall even less, 2.03 percentage points.⁸

For nonmarried women the relationship is highly curvilinear, as indicated by the relatively large coefficients on the squared earnings term. The same general patterns may be seen as with married couples, however: Total replacement rates drop less as earnings increase than do Social Security replacement rates, and the rates

drop even less when analyzed after taxes. Around the mean earnings level, \$8,075, Social Security replacement rates drop an estimated 5.7 percentage points for every \$1,000 rise in earnings, compared with 3.8 points for pretax total replacement rates, and 3.5 points after taxes.

⁸ Because of the second-degree term (earnings-squared), the rate of change of estimated replacement rate with respect to earnings level is not constant. By evaluating the first derivative at the mean level of preretirement earnings, these rates of change can be compared. For instance, for the Social Security replacement rate equation for married couples, with "x" expressed in *thousands*,

$$\begin{aligned}
 y &= 103.7 - 6.30x + .117x^2 \\
 dy/dx &= -6.30 + 2(.117)x \\
 &= -6.30 + .234x \\
 &= -2.75 \text{ at } x = \$15.19 \text{ thousands}
 \end{aligned}$$

The low R-squares (shown in chart 2) may be attributed to the fact that the regressions used individual-level data rather than grouped measures such as means or medians. For married couples especially, many factors not in the equations may influence replacement rates. Nevertheless, all coefficients are significantly different from zero.