Robert M.
La Follette School of Public Affairs
at the University of Wisconsin-Madison

Do Newly Retired Workers in the U.S. Have Sufficient Resources to Maintain Well-Being?

Robert Haveman
Professor, La Follette School of Public Affairs and Department of Economics
at the University of Wisconsin-Madison

haveman@lafollette.wisc.edu

Karen Holden
Professor, La Follette School of Public Affairs and Department of Consumer Science
at the University of Wisconsin-Madison

holden@lafollette.wisc.edu

Barbara Wolfe
Professor, La Follette School of Public Affairs, Department of Economics
and Department of Population Health Sciences at the University of Wisconsin-Madison

wolfe@lafollette.wisc.edu

Shane Sherlund
Federal Reserve Board

shane.m.sherlund@frb.gov

Do Newly Retired Workers in the U.S.
Have Sufficient Resources to Maintain Well-Being?

Robert Haveman
Professor of Economics and Public Affairs
University of Wisconsin–Madison
haveman@lafollette.wisc.edu

Karen Holden
Professor of Consumer Science and Public Affairs
University of Wisconsin–Madison
Holden@lafollette.wisc.edu

Barbara Wolfe
Professor of Economics and Population Health Sciences
University of Wisconsin–Madison
wolfe@lafollette.wisc.edu

Shane Sherlund
Federal Reserve Board
shane.m.sherlund@frb.gov

Do Newly Retired Workers in the U.S. Have Sufficient Resources to Maintain Well-Being?

Abstract

A persistent policy concern is the ability of individuals to save resources sufficient to sustain economic well-being in retirement. We estimate a measure of resource adequacy that compares wealth at retirement to pre-retirement earnings. Our data, including matched Social Security earnings and benefit records, provide unusually reliable estimates of earnings and retirement resources. Results suggest a modest problem of resource adequacy; about 30 percent of new retirees have insufficient resources using a replacement rate standard. Using longer life expectancy increases this proportion to nearly forty percent. Using the poverty line as a measure of adequacy, about five percent have inadequate resources.

Do Newly Retired Workers in the U.S. Have Sufficient Resources to Maintain Well-Being?

I. INTRODUCTION

A persistent concern regarding the elderly is their ability to sustain economic well-being after they retire. While Social Security benefits provide nearly all retirees with a base level of support, accumulated assets such as financial wealth, housing, and pensions provide the bulk of support above this base for most retirees. A fundamental economic issue regarding such individual wealth holdings concerns the motivation and basis for consumption-savings choices during preretirement years; an extensive and recognized literature addresses this issue.[1] In addition to understanding the motivation for wealth accumulation, a second basic issue is the ex post adequacy of the full constellation of resources to which people have access as they enter retirement: Do preretirement consumption-savings choices yield sufficient resources at retirement to maintain consumption throughout expected retirement? Governmental agencies, policy research organizations and the popular press have commented extensively on this issue,[2] and researchers have reached quite different conclusions regarding the adequacy of the resources available to those who are retired or on the verge of retirement.

I.I   PREVIOUS LITERATURE

Numerous research studies have analyzed the 'adequacy of savings' of people at or near to their retirement, using a variety of approaches. All of these studies assess adequacy by comparing the level of assets held by these older people to a variety of standards (often tied to consumption levels prior to retirement), taking account of the number of years of remaining life over which support is required. They reach quite different conclusions.[3]

Moore and Mitchell (1997, 2000), using data for a sample of individuals aged 51–61 in 1992 from the Health and Retirement Study calculate the level of annual household savings (as a percent of projected gross income) that would be <u>required</u> from the respondent's current age to an assumed age at retirement in order to maintain a 70 percent preretirement consumption in retirement. Assuming retirement at age 62 (or 65), median <u>required</u> saving (that sufficient to enable consumption to be sustained at preretirement levels during retirement) is 16 percent (7 percent) of earnings between the current age and the age of retirement. While these figures seem to imply substantial undersaving as people approach retirement, most of the sample used in this study is still working, and (consistent with observed savings patterns) would not be expected to have accumulated sufficient retirement wealth until just prior to retirement.

Engen, Gale, and Uccello (1999) develop a stochastic life cycle model, in which families save both for retirement and as a precaution against uncertainty.[4] Adequacy is defined as wealth accumulation sufficient to enable smoothing of the marginal utility of consumption over the life cycle. They find that over 60 percent of married couples exceed the target wealth/earnings ratio (relative to an expected 50 percent in a stochastic model, if overall savings were 'optimal', or adequate).[5] They also calculate average replacement rates, defined as the ratio of annuitized wealth to final earnings, of between 70 and 80 percent. Taking account of decreases in consumption needs in moving from work to retirement (due to reductions in work related costs, mortgage expenses, and the costs of children), they conclude that wealth accumulation is generally "adequate."

A quite different conclusion is reached by Wolff (2002), who uses the Survey of Consumer Finances for years 1983, 1985, 1989 and 1998 to examine this same savings adequacy question. He calculates "expected retirement income"—a crude estimate of annuitized wealth at

4

the expected age of retirement—for each household in each of several annual demographic

groups. For the age group 47–64, expected retirement income increases from 1989 to 1998, but

the percent of households in this age range who would have expected retirement income below

the poverty line increases from 17 to 19 over the period. Similarly, the percent with expected

retirement income equal to less than 50 percent of current income increases from 30 percent to

43 percent. He concludes that there is a serious shortfall in retirement income in 1998, and that

the problem has increased over time.[6]

The variation in conclusions among these studies is caused in part by basic differences in

data, assumptions, estimation procedures, and the definition of adequacy used. Engen, Gale, and

Uccello (1999), in assessing differences among these studies, conclude that when a variety of

adjustments are made for differences in assumptions and estimating procedures, there may be

less disagreement regarding the overall adequacy of retirement savings than is generally

recognized. Nevertheless, the question remains how best to:

- Define the retirement resources available in retirement,

- Select an adequacy criterion,

- Incorporate the changes in household structure over the retirement years, particularly the probability of widow(er)hood and associated changes in resources and consumption needs, and

- Estimate the number of years of retirement over which retirement resources must be allocated.

Our results advance the reliability of estimates of adequacy by using fully matched Social

Security benefit data that accurately estimate Social Security wealth at retirement and prior

earnings. These data also provide detailed information for both spouses in married couple

households enabling the estimation of wealth over the lifetimes of both spouses, including the

period when only one survives. We also assess adequacy by estimating the annuitized value of

wealth over alternative projections of remaining retirement years. A social criterion of adequacy

is employed in addition to the private criterion related to the maintenance of consumption.

III   NET WEALTH AND ANNUITIZED NET WEALTH OF NEW RETIREES

In this study, we use the New Beneficiary Data System (NBDS) to assess the adequacy of

economic resources available to older Americans as they enter retirement. The NBDS contains

information on a sample of individuals who first received Social Security benefits in 1980–81;

they were interviewed first in 1982 and again in 1991. Our sample is drawn from the retired-

worker sample and includes individuals age 62–72 who were interviewed in both 1982 and

1991.[7] Because the NBDS contains information on available resources (including survey-based

financial and housing asset holdings and expected employer-provided pensions) as individuals

enter retirement (defined as first accepting Social Security retired-worker benefits), we have no

need to extrapolate savings behavior and asset accretion of sample households who may be

several years from retirement. We have data on Social Security covered earnings histories and

retirement benefits for all individuals in our sample, as the NBDS is linked to Social Security

earnings and benefits records.[8] Because the Social Security and pension data are gathered and

linked for both spouses in a couple we are able to quite precisely estimate pension and social

security wealth.

Net Wealth

From information contained in the NBDS, we first calculate the value of net wealth for

each single and married couple over their remaining lifetimes. We define net wealth to be the

sum of financial and property resources, the net value of own home (home value less outstanding

mortgage), the present discounted value of expected pension benefits, and the present discounted

value of expected Social Security benefits. The 1982 NBDS survey does not contain information on indebtedness other than the mortgage on own home, resulting in some overstatement of net wealth.

Values of financial, property and net home equity wealth are reported by the respondents. In estimating Social Security wealth as of 1982, we project the monthly inflation-adjusted benefits to which each individual is entitled (from the linked Masters Beneficiary File) over the individual's expected remaining lifetime (using 1982 race- and gender-specific life tables NCHS 1985). We discount this stream to 1982 using a 2.75 percent rate, taken to be the individual rate of time preference, yielding the wealth value of Social Security benefits.

The value of current (or future expected) pension benefits is provided by the survey respondent and reflects a nominal value of benefits at the time of interview. While few pension plans are fully price indexed, we incorporate a price adjustment estimated from the NBS data. On average pension benefits grew by 3.25 percent between 1982 and 1991 for those receiving benefits in both years, a rate that is .75 percent less than the 4 percent rate of inflation between those years. We thus use a 3.25 rate to discount pension benefit streams to 1982 (2.75 plus .75).

In calculating Social Security wealth for married couples, we applied Social Security survivorship rules. In calculating couples' pension wealth we account for whether the pension chosen by the recipient would continue to be paid to a surviving spouse. The Social Security plus pension wealth of a couple is the sum of each spouse's wealth where pension and Social Security wealth calculations are over the probable separate and joint survival periods for husband and wife and the benefits expected under each status.[9]

Annuitized Net Wealth (ANW)

We estimate the annuitized value of *all* assets over the remaining expected lifetime (again using race- and gender-specific life tables) of respondents and, if married, of surviving spouses.[10] Because our wealth estimates already reflect differences in inflation indexing, we use a uniform interest rate of 2.75 percent, taken to be the individual rate of time preference. The annuitized value we report is the single-person equivalent income that would be received if an individual or couple maintained a steady level of consumption potential over their remaining lifetimes, including for couples the period when only one is expected to survive.[11]

[Table 1 about here]

Estimates of Wealth and ANW

Table 1 presents a summary of mean total asset values in 1982 (in 1994 dollars) for our sample of new retired-worker beneficiaries.[12] For all individuals and couples in the sample, the mean level of assets is nearly $450,000. On average, 46 percent of total assets are accounted for by Social Security wealth, while financial and property wealth accounts for 24 percent of the total; net housing and pension wealth each account for 14 percent of total wealth. The level of wealth varies substantially by race, marital status, and age. While white households average $470,000 of assets, nonwhite families hold about one-half this amount. While the ratio of white to nonwhite financial wealth is about 6, the white/nonwhite ratios of housing, Social Security, and pension wealth are 2.3, 1.4 and 1.8, respectively. While the average retired worker recipient aged 62 to 69 holds about $430,000 in assets, the wealth of those who first receive Social Security benefits at age 70 or older exceeds $630,000.

The last row of Table 1 presents our estimates of the single-person equivalent ANW values for our sample of new retired-worker recipients in 1982. For couples, mean ANW is

8

$23,888. This compares with an ANW for single respondents of $20,497.[13] ANW is positively related to the age at first benefit receipt. While the wealth of persons who retired when 66–69 years of age is nearly nine percent higher than that of 62–64 year olds, their shorter lifetimes (particularly as couples) leads to an ANW that is about 24 percent higher. And while the wealth of persons who retired at 70–72 (70+) is 54 percent higher than that of the 62–64 year olds, the oldest group's ANW is more than double that of the young retirees.

IV.   PERMANENT PRERETIREMENT EARNINGS

To assess the adequacy of available resources, we relate ANW to the level of "permanent" preretirement earnings for each newly retired individual and couple, representing the income flow available prior to retirement. We estimate this value using the NBDS-linked Social Security records on covered earnings for each respondent (and their spouse, if married) from age 50 to one year prior to respondent's benefit receipt. Because annual covered earnings records are capped at the maximum taxable earnings amount for each year, we use a Tobit estimation procedure, described in appendix II, to predict the value of 'true' earnings for each year of capped earnings for individuals for whom some capped value is recorded; predicted earnings values are substituted for the capped values.

Permanent preretirement earnings are defined as the average of earnings that are below the cap and predicted earnings (in place of capped values) over the relevant years. For married couples, the recorded/predicted earnings of each spouse are summed for each relevant year.

Table 2 presents our two estimates of mean and median permanent preretirement earnings; y_i^* estimated with predicted values substituted for capped values and y_i^c estimated using the capped values. The earnings of married couples are adjusted to account for the greater consumption needs of couples relative to single individuals, making them comparable to the

single person values. Within each cell, the preferred estimate of preretirement earnings (y_i^* estimated with predicted values substituted for capped values) exceeds y_i^c (the recorded capped values), and the standard deviation of y_i^* exceeds that of y_i^c.

[Table 2 about here]

V. THE ADEQUACY OF RESOURCES IN RETIREMENT FOR NEWLY RETIRED WORKERS

Do newly retired workers have sufficient resources (ANW) to maintain the living standards that prevailed during their preretirement years? Do these resources enable them to escape poverty during retirement? The adequacy criterion implicit in the first question is a private one with ambiguous social implications; it concerns the maintenance of an individually chosen living standard. The adequacy criterion suggested by the second question reflects a social norm—the meeting of basic needs, regardless of individual preretirement living standards. To answer the first question regarding individual adequacy, we relate the level of ANW held by a respondent (and spouse, if married) to the level of permanent earnings during their preretirement years. To answer the question of social adequacy, we relate ANW to an absolute standard of basic needs, the nation's family-size-conditioned poverty thresholds.

<u>Do New Retirees have Sufficient Resources to Maintain Consumption?</u>

To answer this question, we calculate a replacement rate (RR) defined as the ratio of ANW to permanent preretirement earnings (y_i^*). Figure 1 shows the median RR of couples and single persons for the entire sample, and by preretirement earnings categories. For the median couple and single individual, the resources available meet the commonly used 70 percent maintenance-of-consumption standard.[14] Over the range of preretirement earnings categories containing the bulk of the population—$10,000 to $60,000—RR drifts downward for couples

(from .95 to .59), but increases for singles (from .67 to .75 for men, and from .76 to .94 for women). While median RRs for couples exceed those of singles at preretirement earnings levels below $30,000, single RRs exceed those for married couples at earnings levels beyond $30,000. The few households with very low permanent earnings prior to retirement (less than $10,000) have a median RR in excess of one.[15]

[Figure 1 about here]

Figure 2 shows that about 30 percent of the entire group of new beneficiaries fail to meet the 70 percent 'preretirement consumption' standard; 31 percent of married couples, 36 percent of single women and 50 percent of single men. For couples, the proportion with inadequate resources increases as preretirement earnings increase; over 50 percent of high lifetime earners (those with preretirement earnings in excess of $40,000) fail to meet the 70 percent standard. For single persons with preretirement earnings of more than $10,000, the percent with inadequate earnings decreases as lifetime earnings increase. Although about 30 percent of older Americans entering retirement face a resource shortage by this 70 percent standard, the bulk of them have relatively high levels of both preretirement earnings and post-retirement ANW. Although consumption in retirement may fall somewhat short of a widely used consumption replacement standard for this well-to-do group, it is not clear that this presents a social policy concern.

[Figure 2 about here]

Do New Retirees have Sufficient Resources to Meet Basic Needs?

An alternative socially-relevant adequacy standard would compare ANW with a socially accepted, minimal level of income, rather than gauging "adequacy" relative to one's own past level of living. The nation's family-size conditioned poverty lines serve as such a standard.[16] For each household, we compare the single-person equivalent ANW with the single-person poverty

level; a ratio of these two values in excess of unity indicates that the living unit has sufficient resources to escape poverty throughout their retirement years.

Figure 3 shows the pattern using the poverty threshold and Table 3 compares results using the poverty threshold and twice the poverty threshold. The median 'poverty replacement rate' exceeds 3.5 for all respondents, and ranges from 3.8 for married couples to 3.0 for single men. For all of the preretirement earnings groups including those with the lowest preretirement earnings, median 'poverty replacement rates' exceed unity; median replacement rises steadily with preretirement earnings. Fewer than two percent of couples have ANW below the poverty line; for single males and females, about 10 percent fail to meet this social adequacy criterion. Inadequacy among single persons is highly concentrated among those with low preretirement earnings. Of all those who do not meet this standard, about 16 percent of couples and one-half of single individuals fall into the lowest earnings category. If the standard of social adequacy is raised to twice the poverty line, about 17 percent of married couples would fall short of adequacy, and over one-third of single individuals; again these retirees are concentrated in the lowest earnings categories although the higher threshold increases the percentage that have earnings above the lowest category.

[Table 3 and Figure 3 about here]

Robustness of Results to Alternative Assumptions Regarding Expected Lifetime

Our findings are based on the assumption that individuals use the life expectancy of persons of their age, race and gender (taken from the U.S. life table) as the number of retirement years for which retirement savings need to be planned. However, in making financial plans individuals may well not base their choices on this expected value, as there is an approximately 50 percent chance they will live longer than this expectation. To test the robustness of our

estimated values of ANW and adequacy, we have used alternative assumptions about the

expected lifetime value; namely, that the person assumes a remaining lifetime equal to that of the

person of his/her age, race and gender who is at the 90th (70th) percentile of the distribution of

remaining years of life. We reestimated wealth and ANW values using these values.

[Table 4 about here]

Table 4 summarizes these results for married couples; similar patterns exist for single

respondents. If all respondents (and spouses) plan retirement adequacy on the basis of the

remaining years of life of the person in their age/race/gender group at the 90th percentile of

expected life years, ANW falls by about $3000 (13 percent) relative to assuming the expected

value of remaining years of life. The mean RR is reduced from 1.22 to 1.06, and the percent of

the sample that fails to meet the 70 percent of preretirement earnings standard increases from

30.6 to 39.7, or by nearly thirty percent. The percent that fails to meet the poverty standard

increases from 17.3 to 20.4 or by 18 percent.

Adopting this longer lifetime assumption reduces the average level of adequacy, and

increases the proportion of new retirees who fail to meet both standards. However, the extent of

the changes in estimates using the longer lifetimes does not overturn the basic picture of

adequacy that our estimates suggest.

VI.   THE CORRELATES OF RETIREMENT RESOURCE ADEQUACY

To describe the correlates of individual resource adequacy, we estimated a regression of

the preretirement replacement rate (ANW/preretirement earnings) on a set of individual

socioeconomic characteristics. Table 5 presents these results for married couples.[17] Those

respondents with a college degree, whose longest job was in uncovered (by Social Security)

employment,[18] and those who first received retired-worker benefits at an older age tend to have a

13

higher RR than respondents without these characteristics. Respondents who have a spouse with a health condition also have a higher RR, perhaps because of a perceived increased "need" for savings. Aside from those married respondents with a college degree, we find little evidence that persons with more schooling (or with better schooled spouses) have more adequate levels of retirement resources. The two variables that capture the presence of components of ANW—having a private pension and owning a home—are positively and significantly related to RR. Finally, those who worked more years have lower replacement rates, suggesting the effect of the progressive benefit formula in Social Security and perhaps a similar progressivity in employer-provided pensions and personal savings behavior.

[Table 5 about here]

VII   CONCLUSION

Our results contribute to the growing literature on the adequacy of resources of older Americans, and to policy discussions regarding alteration in social insurance programs. They are based on unique data, the New Beneficiary Data System (NBDS) that allow us to avoid many of the weaknesses that have detracted from prior studies. In particular, we observe the full covered earnings histories for all sample members and have data on wealth holdings and household structure at the time of retirement rather than having to forecasting these values from observations at a younger preretirement age. Moreover, we estimate permanent preretirement earnings over the prime working years of a new retiree and spouse (if married), rather than relying on single year and possibly transitory values of earnings. We include survivor benefits in estimates of ANW for married couples, and estimate ANW considering the ages and life expectancies of both spouses. Finally, we measure resource adequacy by comparing ANW to both the household's own preretirement living standards and to an absolute national standard of

basic needs adequacy, and we study the distribution of adequacy across categories of preretirement earnings.

Our estimates of replacement rates based on permanent preretirement earnings suggest a modest national problem of resource adequacy, with a median replacement rate of about 80 percent, and only about one-third of all sample households having retirement resources less than 70 percent of preretirement earnings. Using the poverty line as a measure of social adequacy, only about three percent of new retirees have inadequate resources; however, about 20 percent of our sample has ANW less than two times the official national poverty line.

Our results call into question the conclusions of Bernheim (1992) and Wolff (2002), who suggest a serious national problem of undersaving among the older population, and inadequate resources available during retirement years. They are generally consistent with other studies using data with linked information on past earnings, enabling more accurate estimates of Social Security wealth (see note 6).

Using the individual replacement rate (RR) standard, we find problems of inadequacy concentrated among high earners. Using a social criterion reflecting the ability to meet basic needs indicates a problem concentrated among those with the lowest preretirement earnings. For individuals with low permanent earnings, vulnerability to inadequate resources in working life appears to persist into retirement. We also found problems of adequacy concentrated among those who received retired-worker benefits early, suggesting that resource shortfalls perceived in preretirement years were not fully avoided by the choice of a longer working life.

Our conclusions about the adequacy of retirement resources for older Americans must be tempered by a number of considerations. As we have noted, we may underestimate preretirement earnings for those with careers in noncovered employment or with deceased spouses. While our

data are for a unique sample which cannot be taken as representative of all retirees, they may

provide a more accurate picture of actual retirement adequacy than simulations on a

preretirement cohort.[19] In estimating wealth, we included the equity value of owner occupied

housing in our estimate of ANW; some argue that the full value of this asset should not be

included in assessing resource adequacy. And, we relied on current U. S. life tables in assessing

life expectancies, and used estimates at the mean and the 70th and 90th percentiles. Thus while

our core estimates of resource adequacy are biased downwards if longevity increases, our

additional estimates can be viewed as projections of adequacy as life expectancy increases.

Further, we note the difficulty of accurately measuring "adequacy" that plagues all

studies of this issue. The 70 percent of prior earnings criterion is a crude value for gauging the

level of available resources that may or may not be useful in private financial planning; it has

little normative significance, especially for households with high standards of living (earnings)

during preretirement years. Finally, although we observe our cohort of new retirees in the early-

1980s so that unexpected changes in asset values or program rules during the intervening period

could make our results questionable for more recent retirees, we conclude that there is no strong

evidence of wealth increases sufficient to suggest that our results are not still relevant.[20]

Appendix Table IA
New Recipients of Social Security Retired Worker Benefits
Characteristics of Sample

Variable Means	Married Couples[a]	Single Men	Single Women
Distribution by Respondent type	73.1%	9.0%	17.9%
Age in 1982	65.8	66.2	66.8
Nonwhite (%)	8.0	18.5	14.9
Widowed (%)		34.2	50.1
Separated or divorced (%)		39.7	28.6
Respondent high school (%)	31.6	21.9	30.0
Respondent some college (%)	13.9	10.3	19.7
Respondent college or higher (%)	12.2	11.8	12.6
Spouse high school (%)	35.1		
Spouse some college (%)	13.6		
Spouse college or higher (%)	9.3		
Number of children	2.7	1.9	1.9
Years worked	32.4	34.9	28.5
Longest job uncovered (%)	19.2	19.3	10.6
Number of health problems	2.3	2.4	2.2
Spouse has a health condition (%)	41.6		
Couple/single has private health insurance (%)	83.7	69.2	76.7
Couple/single has a pension (%)	55.8	42.7	45.6
Home ownership (%)	87.2	46.5	56.8
Preretirement earnings (PRE)	$24,095	$26,878	$20,113
Standard deviation	10,948	15,947	10,167
Minimum	336	274	24
Maximum	113,332	146,369	54,554
Annuitized net wealth (ANW)	$24,741	$24,353	$19,509
Standard deviation	28,041	25,986	15,608
Minimum	2,006	3,075	2,687
Maximum	742,278	295,385	167,945
Replacement rate (PRE)	1.26	1.12	1.91
Standard deviation	2.22	1.59	18.91
Minimum	0.11	0.20	0.33
Maximum	79.76	16.51	695.72
Replacement rate (PovLine)	3.96	3.90	3.12
Standard deviation	4.49	4.16	2.50
Minimum	0.32	0.49	0.43
Maximum	118.84	47.29	26.89
Number of observations	5,935	731	1,452

[a]Individual characteristics are for the retired-worker respondent; financial data are for the couple.

Appendix II
Estimates of Preretirement Earnings

Data on covered earnings are provided by linked Social Security administrative earnings. Because covered earnings are not subject to FICA above an Annual Maximum Taxable Limit, administrative records include earnings only up to the cap. To calculate preretirement earnings we need observations on total earnings, including amounts earned above the Taxable Limit.[21]

Consider the total earnings for individual i at time t, y_{it}^*. Social Security contributions are withheld from i's earnings up to the taxable cap, c_t, which is year-specific. When i's earnings exceed the cap, we observe $y_{it} = c_t$, rather than $y_{it} = y_{it}^*$. That is:

$$y_{it} = \begin{cases} y_{it}^* & if \ \ y_{it}^* \le c_t \\ c_t & if \ \ y_{it}^* > c_t \end{cases},$$

where y_{it} is the observed covered earnings value for i. In order to estimate total earnings, we posit an intertemporal earnings profile of the form $y_{it}^* = \rho y_{it-1}^* + z_{it}'\delta + \varepsilon_{it}$.

Here, y_{it-1}^* is lagged (total) earnings, z_{it} is a vector of covariates (e.g., age, education, race, region, whether or not i was employed in the previous period, and spouse's age, spouse's education, and lagged spousal earnings, if married), ε_{it} is statistical error, and $[\rho, \delta']'$ are parameters to be estimated.[22]

We estimate the model using a dynamic, rolling-scheme, two-limit tobit approach.[23] The tobit model is useful in econometric analysis of data that is censored due to corner solutions or top- or bottom-coding. In our case, we observe a corner solution (nonnegativity constraint) at zero earnings and top-coding at the time-varying taxable maximum. We include lagged covered earnings as an explanatory variable in estimation, hence the term "dynamic." Moreover, we

include (up to) five lags of total covered earnings as explanatory variables in estimation, hence

the term "rolling-scheme." Under this approach, we estimate the model year-by-year, rather than

as a panel, proceeding as follows. We first estimate our model for $t = 1$ (year 1951), setting

$y_{i0}^* = 0$ and excluding previous-year-employment indicator variables. We then use our

parameter estimates to form tobit predictions of total covered earnings, i.e., the conditional

expectation of y_{i1}^*. We can then estimate the model for $t = 2$ (year 1952), using the predicted

(lagged) y_{i1}^* and previous-year-employment indicator variables as additional explanatory

variables. We use these estimates to form tobit predictions of y_{i2}^*. We continue in this manner

through $t = 31$ (year 1981). Note that we are using all earnings data after 1950 even when

individuals were younger than age 50, the youngest age of the period over which we average

preretirement earnings.

If reported covered earnings lie below the taxable maximum, we accept the reported

covered earnings value. When reported covered earnings are capped, we examine NBS survey

data on earnings during the last year on the last and longest jobs, if available *for that particular*

individual and year. Otherwise, we use the maximum of our tobit prediction and the taxable

maximum. We assume the taxable maximum amount, given by Administrative data, is more

accurate than the tobit prediction if the tobit prediction lies below the reported taxable

maximum.

At this point, we have two covered earnings profiles: one that uses the observed covered

earnings values, and one that replaces capped values with estimates of total covered earnings.

Preretirement earnings may now be calculated for the individual or couple as average (strictly

positive) earnings between the year the retired-worker was age 50 and one year prior to his or

her receipt of retirement benefits. For married couples, we sum both individuals' total covered

earnings and average couple's earnings over the retired-worker's preretirement years.

References

Banks, James, Richard Blundell, and Sarah Tanner. 1998. "Is There a Retirement-Savings Puzzle?" *American Economic Review* 88(4): 769–788.

Bernheim, B. Douglas. 1992. "Is the Baby Boom Generation Preparing Adequately for Retirement? Technical Report." Unpublished. New York, NY: Merrill Lynch and Company.

Bernheim, B. Douglas, Jonathan Skinner, and Steven Weinberg. 2001. "What Accounts for the Variation in Retirement Wealth Among U.S. Households?" *American Economic Review* 91(4): 832–857.

Bloom, David, David Canning, and Bryan Graham. 2002. "Longevity and Life Cycle Savings." NBER Working Paper No. 8808. Cambridge, MA: National Bureau of Economic Research.

Boskin, Michael, and John Shoven. 1987. "Concept and Measures of Earnings Replacement Rates During Retirement." In Zvi Bodie, John Shoven, and David Wise, editors. *Pensions and Retirement in the United States*. Chicago: University of Chicago Press for NBER: 113–41.

Citro, Connie, and Robert Michael. 1995. *Measuring Poverty: A New Approach*. Washington, DC: National Academy Press.

Engen, Eric M., William G. Gale, and Cori E. Uccello. 1999. "The Adequacy of Household Saving." *Brookings Papers on Economic Activity* 2: 65–187.

Grad, Susan. 1990. "Earnings Replacement Rates of New Retired Workers." *Social Security Bulletin* 53(10): 2–19.

Gustman, Alan L., and Thomas L. Steinmeier. 1998. "Effects of Pensions on Saving: Analysis with Data from the Health and Retirement Study." NBER Working Paper No. 6681. Cambridge, MA: National Bureau of Economic Research.

Hurd, Michael, and Susan Rohwedder. 2003. "The Retirement-Consumption Puzzle: Anticipated and Actual Declines in Spending at Retirement." NBER Working Paper No. 9586. Cambridge, MA: National Bureau of Economic Research.

Kotlikoff, Lawrence J., and Lawrence Summers. 1981. "The Role of Intergenerational Transfers in Aggregate Capital Accumulation." *Journal of Political Economy* 89(4): 706–32.

Maddala, George S.1983. *Limited-Dependent Qualitative Variables in Econometrics*, Cambridge: Cambridge University Press.

Mitchell, Olivia, James Moore, and John Phillips. 2000. "Explaining Retirement Saving Shortfalls." In *Forecasting Retirement Needs and Retirement Wealth*, edited by. O.S. Mitchell, B. Hammond, and A. Rappaport. Pension Research Council. Philadelphia, PA: University of Pennsylvania Press: 139–163.

Modigliani, Franco, and R. Brumberg. 1954. "Utility Analysis and the Consumption Function: An Interpretation of Cross-section Data." In *Post-Keynesian Economics*, edited by K. K. Kurihara, New Brunswick, NJ: Rutgers University Press.

Moore, James F., and Olivia S. Mitchell. 1997. "Projected Retirement Wealth and Savings Adequacy in the Health and Retirement Survey." NBER Working Paper No. 6240. Cambridge, MA: National Bureau of Economic Research. (See also Moore, James and Olivia S. Mitchell. 2000. "Projected Retirement Wealth and Saving Adequacy". In *Forecasting Retirement Needs and Retirement Wealth*, edited by O.S. Mitchell, B.

Hammond, and A. Rappaport. Pension Research Council. Philadelphia, PA: University of Pennsylvania Press: 68–94.

Scholz, John Karl, Ananth Sheshadri, and Surachai Khitatrakun. 2004. "Are Americans Saving Optimally for Retirement?" University of Wisconsin-Madison.

U.S. Department of Health and Human Services, Public Health Service, National Center for Health Statistics. 1985. Vital Statistics of the United States, 1982. Life Tables Volume 11, Section 6 Hyattsville, Maryland.

U.S. Congressional Budget Office. 2003. "Baby Boomers' Retirement Prospects: An Overview." November, Washington, DC.

Venti, Steven, and David Wise. 2000. "Choice, Chance, and Wealth Dispersion at Retirement." NBER Working Paper No. 7521. Cambridge, MA: National Bureau of Economic Research.

Wolff, Edward N. 2002. *Retirement Insecurity: The Income Shortfalls Awaiting the Soon-to-Retire*. Washington, DC: Economic Policy Institute.

Ycas, M. A. 1992. "The New Beneficiary Data System: The First Phase." *Social Security Bulletin* 55 (2): 20–35.

Notes

[1]The earliest empirical contributions to this literature include Modigliani and Brumberg (1954) and Kotlikoff and Summers (1981). Recent contributions to this debate are Banks, Blundell and Tanner (1998), Bernheim, Skinner and Weinberg (2000), Hurd and Rohwedder (2003), and Venti and Wise (2000); see also Bloom. et al (2002).

[2]See Engen, Gale, and Uccello (1999) for references to media and governmental analyses of this issue.

[3]U. S. Congressional Budget Office (2004) provides an extensive review of these studies and a summary of their results.

[4] To incorporate uncertainty of earnings in preretirement years, heterogeneous earnings shocks over the preretirement years are introduced. When this stochastic pattern is recognized, some households who have optimal savings will have wealth-earnings ratios below (above) the median and hence be seen as having inadequate (adequate) savings.

[5] However, for those married couples at the 25th percentile or below, the actual ratio lies below the simulated ratio, suggesting that about one-fourth of the households are undersaving.

[6] Other important studies in this literature include Grad (1990), Bernheim (1992), Moore and Mitchell (1997, 2000), Gustman and Steinmeier (1998), and Scholz, Sheshadri, and Khitatrakun (2004).

[7]The NBDS is sample of Social Security beneficiaries who first received benefits between June 1980 and June 1981 (Ycas, 1992). Persons eligible for both survivor/spouse and retired-worker benefits were sampled as retired workers. We restrict our estimates to the sample interviewed in both years; for many spouses of retired-workers, data on earnings and on social

security and pension benefits are available only in the later survey. Because our estimates are based on a sample of new retired-worker beneficiaries, our estimates may not be reflective of the situation of either the population of all retirees or the population 62 and older. We exclude from our sample individuals who have fewer than 10 years of recorded Social Security earnings data after the age of 50 until one year prior to retirement, as reported earnings history before age 50 do not reflect permanent preretirement earnings. The characteristics of our sample are shown in Appendix Table 1A.

[8]The full linkage of Social Security earnings and benefits records in the NBDS contrasts with the partial link in the HRS due to the requirement that HRS respondents agree to that linkage. NBDS respondents reported pension income as well as pension benefits expected in the future.

[9]Social Security wealth for married couples is the sum of spousal wealth values. Each spouse's benefit is the higher of: 1) their own retired-worker benefit, or 2) the benefit as a spouse/widow. The value of Social Security benefits are estimated conditional upon remaining married or being a sole survivor, using Social Security survivorship rules. Pension benefits for married couples are estimated using answers that indicated whether a single-life or some form of survivor benefit was chosen. If a survivor benefit is indicated, a joint and two-thirds (66 percent) survivor benefit is assumed; this allocation reflects consumption needs during both the survival of the couple and the widow(er). For younger spouses and those for whom no age of receipt for an expected pension benefit was reported 1982, we used data from the 1992 survey, if available.

[10]We first calculate these values using life table values of average life expectancy. (See U.S. Department of Health and Human Services,1985). In order to test for adequacy taking

account of uncertainty in life expectancy, we also use longer life expectancy equal to the 70th

percentile and the 90th percentile (see below).

[11]Based on the equivalence scale work reported in the National Academy of Sciences

study of poverty measurement (Citro and Michael, 1995), a couple is assumed to require 1.6

times the resources of a single person. We annuitize wealth over the life of the retired-worker

and spouse assuming this equivalence scale.

[12]We have compared our estimates of asset values for the NBDS sample with those of

other studies. Our estimates are generally consistent with those that rely on data from the Health

and Retirement Study (HRS), and greater than those based on the Survey of Income and Program

Participation (SIPP). However, they are substantially smaller than estimates of asset holdings for

households headed by persons aged 62–70 years in the Survey of Consumer Finances (SCF).

This difference is likely to be due to the higher proportion of older persons in this age range in

the SCF, as well as the substantial efforts of the SCF in collecting wealth data, especially among

high wealth individuals. This comparison is available from the authors upon request.

[13]This is a much smaller difference than in total wealth, a result of both allocating wealth

over the remaining lifetime of the longer surviving spouse and accounting for the greater

consumption needs of married couples when both spouses are alive.

[14] The literature on savings adequacy generally accepts a standard of 70 percent of

preretirement earnings to indicate a level of post-retirement income necessary to maintain

consumption. This 70 percent figure is supported by Boskin and Shoven (1987), who estimate

that the "required" replacement rate is about 75 percent after adjusting for preretirement

expenses in the form of saving, work related expenses, and taxes that are avoided in retirement

years. Bernheim, Skinner and Weinberg (2001) using Consumer Expenditure Data, find the reduction in "goods that are potentially complementary to work" (purchases of clothing, transportation and food away from home) do not vary substantially in percentage terms across income quartiles. (P. 852), supporting the use of a standard replacement rate across income groups.

[15]This is very disparate group. Some have worked in uncovered employment for most of their careers, and established Social Security eligibility from work early in the career or from part-time employment. While our Tobit estimates use information on earnings (in the last year) on uncovered last and longest jobs, our estimates of preretirement earnings for these workers may be biased downward and the RR upward because of the absence of longer earnings histories (see Appendix II). Others in this category may have inherited financial or real estate assets, or be married to a younger spouse with substantial earnings from noncovered work.

[16]We use the revised poverty lines suggested by the NRC study of poverty (See Citro and Michael, 1995). As of 2000, the absolute poverty line for single individuals is $7255, and for couples the line is $11,786.

[17]Regression results for unmarried men and women are less informative since we do not have comparable information on the characteristics of deceased or former spouses (who are unobserved) that would similarly influence the level and patterns of replacement across surviving spouses, the majority of single individuals.

[18]Pensions received on jobs uncovered by Social Security are expected to compensate for absence of that coverage. Workers in uncovered jobs may also compensate for their lower expected Social Security benefits by increasing their private savings.

[19]Virtually all U.S. citizens become new Social Security beneficiaries at some age. For some, that age may reflect retirement-age adjustments in response to the adequacy of savings; for others unexpected events may lead to unexpectedly early retirement.

[20]Using the Survey of Consumer Finance, we estimate that average net wealth in 1998 was no more than 10–20 percent greater than in the early-1980s. (Estimates are available from the authors.). These estimates are consistent with Wolff (2002).

[21]Prior to 1978 earnings were reported to SSA by calendar quarter. The 1977 Social Security Act amendments substituted a system of counting quarters of coverage for each specified dollar amount earned (up to four quarters of coverage), regardless of the calendar quarter in which the income was earned. The Administrative data linked to the NBS file includes only annual quarters earned and annual taxable earnings for all years.

[22] We interact the previous-period-employment indicator variable with all other covariates in z_{it}, as we expect more than just a mean shift for these individuals in our intertemporal covered earning profile equation. In addition, we estimate gender- and marriage-specific profiles, resulting in separate covered earnings profiles for married men, married women, single men, and single women.

[23]The log-likelihood function and the formula for conditional expectations can be found in Maddala (1983).
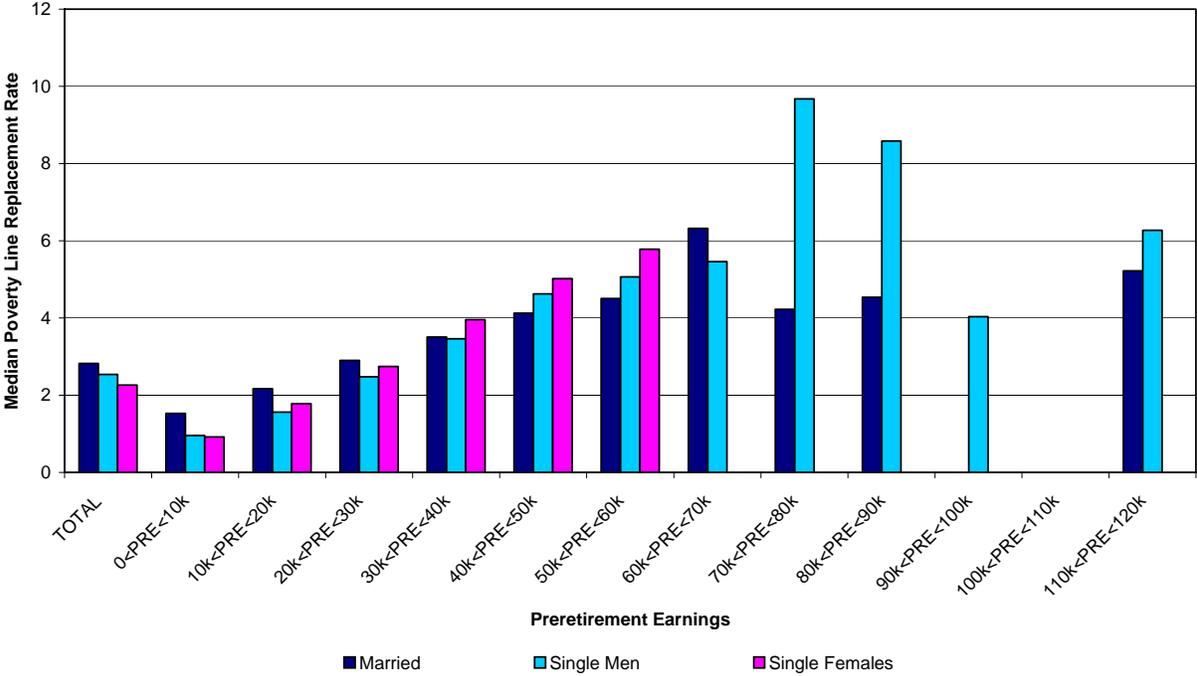
FIGURE 1
Median Replacement Rate
(by Preretirement Earnings)
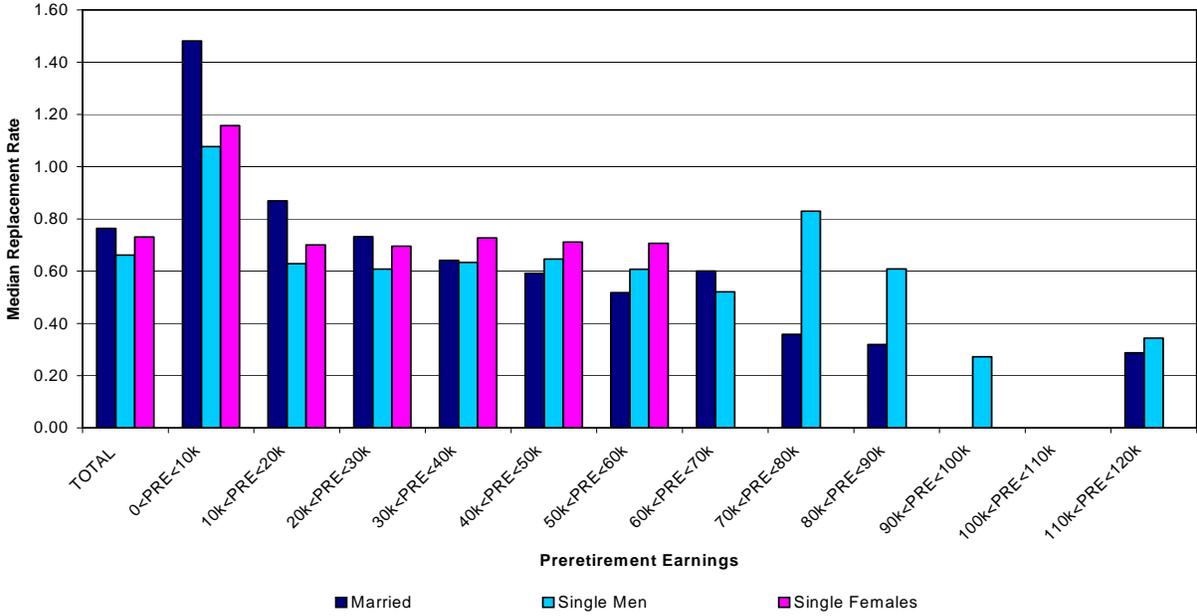
FIGURE 2
Proportion with Replacement Rates Less than 70 Percent
(by Preretirement Earnings)
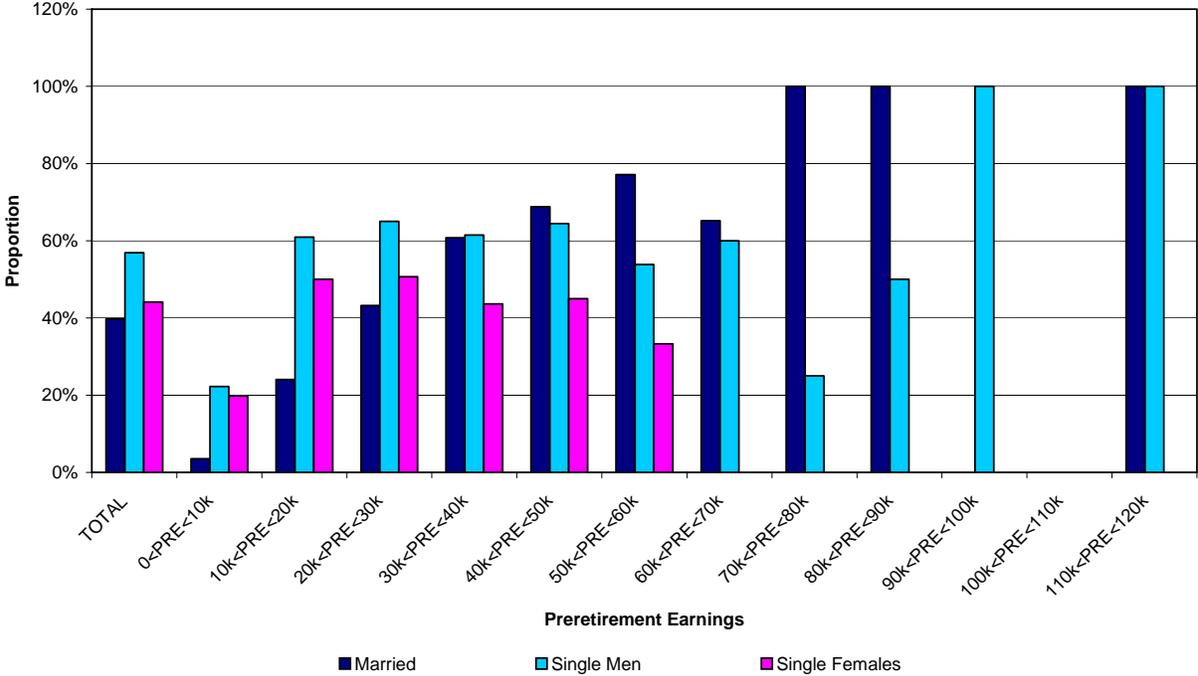
FIGURE 3
Median Poverty Line Replacement Rate
(by Preretirement Earnings)

Table 1
Mean Household Net Wealth
(by Race, Marital Status, and Age for New Social Security Retired-Worker Beneficiaries, $1994)

	All Households	Race		Marital Status		Age in 1982			
		White	Nonwhite	Single	Couples	62–64	65	66–69	70+
Number of households	8,118	7,293	825	2,183	5,935	2,544	771	4,206	597
Total net wealth	$446,865	$470,680	$236,342	$259,872	$515,644	$409,891	$435,855	$445,045	$631,467
Financial/property	109,363	119,465	20,060	56,316	128,875	73,899	97,987	106,201	297,454
Housing	69,845	74,176	31,556	40,966	80,467	63,654	68,361	69,592	99,924
Pensions	61,566	64,590	34,835	38,292	70,127	70,957	62,319	58,107	44,946
Social Security	206,091	212,449	149,890	124,298	236,176	201,380	207,187	211,145	189,143
Annuitized net wealth	22,976	24,024	13,710	20,497	23,888	18,920	21,280	23,427	39,271

Notes: N=8,118 retired-workers included in 1982 and 1991 NBS surveys. Wealth values for couples are combined spousal amounts. Annuitized net wealth is single person equivalent.

Table 2
Permanent Preretirement Earnings, $1994

		Median	Mean	Std. Dev.
Total	y_i^*	$22,900	$23,633	$11,502
	y_i^c	20,635	20,563	8,254
Couples	y_i^*	23,485	24,095	10,948
	y_i^c	20,595	20,545	7,772
Single Men	y_i^*	25,302	26,878	15,947
	y_i^c	24,801	22,976	9,806
Single Women	y_i^*	19,241	20,113	10,167
	y_i^c	19,215	19,424	9,028

Note: y_i^c is based on recorded covered earnings (including the capped value); y_i^* is the value adjusting for the capped value. All values are single person equivalent.

Table 3

Resource Adequacy Relative to Poverty Line Standards

	Married Couples	Unmarried Women	Unmarried Men
Mean Poverty Replacement Rate	3.82	3.79	3.03
Percent with ANW < Poverty Line	1.85	8.89	9.78
Percent in Lowest Earnings Category with ANW < Poverty Line	15.56	51.52	50.21
Percent of those with ANW < Poverty Line who fall into Lowest Earnings Category	79.09	78.46	83.80
Percent with ANW < 2 x Poverty Line	17.25	34.61	36.30
Percent in Lowest Earnings Category with ANW < 2 x Poverty Line	61.36	82.83	82.28
Percent of those with ANW < 2 x Poverty Line who fall into Lowest Earnings Category	33.50	32.41	37.00

Table 4
Robustness of Results to Alternative Assumptions of Remaining Life Years,
Married Couples

	Expected Value	70th Percentile	90th Percentile
Mean Annuitized Net Value	$23,888	$22,176	$20,700
Mean Replacement Rate	1.22	1.14	1.06
Mean Poverty Replacement	3.82	3.55	3.31
Percent Not Meeting Maintenance of Consumption Standard	30.6	35.0	39.7
Percent Not Meeting Two-times Poverty Standard	17.3	18.4	20.4

Note: Column values are those associated with different assumed lengths of life. See text for explanation.

Table 5
Predictors of ANW/Preretirement Earnings Ratio, Married Couples

Regressor	Parameter Estimate	t-Value
Intercept	-4.036	-4.87
Age of respondent in 1982	0.077	6.02
Nonwhite	0.017	0.17
Respondent high school only	0.070	1.03
Respondent some college	0.024	0.26
Respondent college or higher	0.236	2.3
Spouse high school only	-0.001	-0.02
Spouse some college	-0.048	-0.53
Spouse college or higher	0.133	1.18
Number of children ever had	-0.016	-1.05
Years respondent employed	-0.013	-4.87
Longest job uncovered by Social Security (0,1)	0.90	12.61
Number of respondent's health problems	-0.015	-1.04
Spouse health condition	0.15	2.77
Has private health insurance	0.018	0.24
Has (or expects) pension	0.318	5.55
Home ownership (0,1)	0.244	3.00
Number of observations	5,935	
F-value (p-value)	17.67	(<.0001)
Adjusted R-squared	0.0430	
Mean replacement rate	1.22	