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Philip B. Levine
Wellesley College

Olivia S. Mitchell
The Wharton School, University of Pennsylvania, mitchelo@wharton.upenn.edu

John W.R. Phillips
Social Security Administration

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Chapter 3
Worklife Determinants of Retirement Income: Differences Across Men and Women

Philip B. Levine, Olivia S. Mitchell, and John W. R. Phillips

Persons age 65 and over were once among the poorest members of the U.S. population, but today the rate of poverty for the elderly is at least as low as that of younger people and may be even lower. Nonetheless, there remain pockets of elderly poverty. Specifically, women over the age of 65 are about twice as likely to live in poverty as are similarly aged men.[1] Prior research has emphasized the loss of a spouse as a key factor causing retirement income shortfalls for women (Weir and Willis 1999; Burkhauser et al. 1991; Boskin and Shoven 1988). In this chapter, we extend the analysis to examine how variations in people's labor market experiences translate into differential pension and social security benefits later in life. We use the Health and Retirement Study (HRS) to evaluate the role that differences in labor market attachment and pay may play in explaining why older women face relatively poor retirement income prospects.

Our analysis first presents a series of descriptive analyses regarding the levels of retirement income by sex, race, marital status, and source of income. We find that the median wealth of a married couple on the verge of retirement today exceeds half a million dollars, with substantial accumulations in social security, pensions, housing, and other holdings. By contrast, nonmarried people approaching retirement have considerably less wealth. More than half of the nonmarried population have less than $200,000, counting all forms of retirement wealth. Few can look forward to future pension benefits, and even social security wealth is not large. Within the nonmarried group, women are particularly disadvantaged, having a level of wealth about one-quarter lower than that of nonmarried men. This difference is concentrated among the white population, since blacks and His-

panics have very low and relatively similar levels of retirement wealth. Next we report on a statistical analysis of the determinants of these differences in anticipated retirement income that shows how lifetime labor market experiences translate into women's retirement income that is low relative to men's. Our estimates indicate that 85 percent of the retirement income gap between nonmarried men and women can be attributed to differences in these factors. We conclude with a look to the future.

Labor Market Effects on Retirement Income: Previous Research

Previous studies examining the impact of labor market rewards on men and women typically focus on the wages of *currently employed* workers. A commonly used methodology asks whether observed wage gaps can be "explained," or accounted for in a statistical sense, by differences in characteristics likely to be related to worker productivity such as age, education, and labor market experience. To the extent that a wage differential exists after controlling for these factors, it is typically attributed to labor market discrimination. This literature consistently finds evidence of discrimination, by this definition.[2]

Though the literature on younger workers is large, only very few researchers have sought to follow workers into retirement, to determine whether labor market differences continue to have an impact at older ages. One exception is the study by Levine, Mitchell, and Moore (1999) that asked whether differences in lifetime labor market attachment accounted for differences by sex in projected retirement income. Results from that work indicated that employment patterns played a large role, while health and family responsibilities had only tiny measured impacts on projected retirement incomes. One drawback of that study was that only *self-reported* labor market data could be used, rather than *actual* employment records taken from administrative records on labor market experience. In addition, that analysis focused on *total* retirement income and did not consider its components separately.

Determinants of Retirement Income in the Health and Retirement Study

In the recent analysis, by contrast, we use better data than heretofore available on pension and Social Security wealth, and we also explore how labor market and other factors influence anticipated retirement income by source.

Empirical Data Sources

Our analysis uses the Health and Retirement Study (HRS), a nationally representative sample of U.S. households drawn from a cohort on the verge

of retirement (age 51–61 in 1992).[3] This survey provides extensive and very detailed demographic, health, wealth, income, and family structure data for both age-eligible respondents and their spouses. Linked to this under special restrictive conditions are two additional files containing invaluable information on respondents' pension and social security benefits. One file, known as the Earnings and Benefits File (EBF), provides measures of expected retirement income derived from Social Security benefits as well as labor market history data. A second file, the Pension Provider File (PPF), contains estimates of anticipated pension benefits. These merged files have been obtained for a majority of HRS respondents who gave permission to link their survey data with administrative records supplied by the Social Security Administration, and also with pension plan descriptions provided by respondents' employers.[4] Together, the HRS, EBF, and PPF data represent one of the richest data resources available to analyze retirement. There is no other current data source with equivalently detailed linked administrative records for this cohort.[5]

Using these three files, we compute anticipated retirement wealth for each household.[6] This wealth value is allocated or spread over the household's retirement period using conventional annuity factors.[7] In other words, we take each household's assets and divide them up to reflect the annual payments that a given level of wealth would yield if it were drawn down to zero over the household's remaining life expectancy. Annuity factors used to convert wealth to annual income flows reflect the different life expectancies of men and women at different ages: consequently, annuity factors for older respondents and men are smaller than those for younger respondents and women, since older respondents and men have shorter life expectancies than younger respondents and women. Turning a stock of wealth into an annual income flow makes it easier to interpret and understand exactly what retirement resources older Americans can expect to command.

Evaluating HRS respondents' access to anticipated retirement income requires us to distinguish between an individual's own resources and those available to other household members.[8] In the present analysis, we assess projected retiree wealth available within each household, without seeking to divide assets across individual members of a married couple. In other words, the model assumes that retirement income generated by different assets is equally available to a husband and a wife in a married couple; in this way, we presume that household resources are consumed jointly as long as both spouses are living.[9] As a result, sex differences in retirement wellbeing will result only from measured differences in the wellbeing of nonmarried men and women.[10]

We develop and use two indicators to capture patterns in respondent employment and earnings over their working lives. One is "prime-age" earnings, defined as average annual earnings between the respondent's 20th and 50th birthday, based on pay up to the social security earnings

ceiling. It spans the period from the age when most respondents would have completed their schooling to the age that labor market activity would probably be influenced by early retirement preparations. In general, we anticipate that people with higher prime-age earnings will anticipate higher retirement wealth and hence more annual income in retirement. This is a reflection of the way pension formulas work, and also the way earnings are translated into social security benefits. Empirically, of course, it is of interest to estimate the specific way in which higher earnings result in higher retirement income. Our second indicator of labor market attachment is described as "years of work to age 50," or the count of years of covered social security employment to the respondent's 50th birthday. This is helpful in assessing how another year of work is converted into additional retirement income via pension, social security, and saving mechanisms.[11]

The remaining information on respondent characteristics is available directly from the HRS. Thus, for instance, survey respondents supplied extensive information on the economic, social, demographic, and other attributes of household members. The survey delved into household members' incomes, assets, debt, and health for respondents, age 51–61 in 1992, and their spouses of any age.

Two main criteria were used to generate the sample for empirical analysis. We restricted the respondent sample to include only those "age-eligible," namely the 9,714 respondents who were age 51–61 in 1992. It should be noted that people in this age bracket were interviewed as well as their spouses (irrespective of the spouse's age).[12] In addition, the sample included only those respondents and spouses who furnished a consent form, for whom the Social Security Administration could locate a matched file, and who were not receiving disability benefits at the time of the 1992 interview. These restrictions were required in order to obtain anticipated social security benefits. The analysis sample consists of 5,906 individuals.[13]

Methodological Approach

Our methodological approach is informed by prior studies that have sought to explain differences in pay for *active* workers. In this analysis, by contrast, we focus on the influence of labor market history on *retirement income differences* by sex. Along with measures of years in the labor market and average prime-age pay, we also include socioeconomic factors (e.g. education, marital history, and number of children) and race/ethnic indicators. In the case of married respondents, we also include the same measures for the respondent's spouse, since his/her characteristics may also contribute to differences in family resources available in retirement.

In the empirical analysis we estimate multivariate models of annual retirement income for men and women. These regression models are estimated separately by sex and marital status so that results can be compared across

groups. Identical model specifications are estimated for three dependent variables of most interest, namely income flows from social security, pensions, and financial wealth including housing. More formally, the multivariate model uses the natural log of retiment income RY_{ig}, where i refers to the individual; g refers to the respondent's sex (f for female, m for male); WH is lifetime pay and work experience ("work history"); X is a vector of age, ethnicity, previous marital status, number of children, and education; and u refers to a disturbance term that captures otherwise unmeasured characteristics:

$$\ln(\mathrm{RY})_{ig} = b_{0g} + (\mathrm{WHI}_{ig})\, b_{1g} + X_{ig} b_{2g} + u_{ig} \ .$$

For married respondents, analogous variables are included for spouse's characteristics.[14]

Having in hand estimates of the effects of each factor on projected retirement income, we then evaluate how much of anticipated retirement income differences by sex could be attributed to differences in the workers' characteristics.[15] With regard to differences in labor market characteristics , we ask the hypothetical question: how much would the gap in projected retirement income decrease if lifetime labor market characteristics of men and women were identical? In other words, based on estimated returns to these characteristics, we predict what women's retirement income would be if they had characteristics that were equal in value to those of men, on average. Since men tend to have had stronger labor force attachment during their working years, one would expect the gap between men and women's projected retirement income to be smaller, or potentially even zero, when it is based upon this prediction. Finally, we estimate and report the dollar reduction in the gender gap in projected retirement income between the predicted and observed level.

We conduct this decomposition for nonmarried men and women exclusively. As indicated previously, we assign household resources equally to husbands and wives, so that married men and women are defined to have equal retirement wealth. Using the HRS, we can identify differences in retirement wealth among married men and women because both members of the couple need not be age-eligible, which is a requirement for inclusion in our sample, and the characteristics of the age-ineligible men and women may differ. Without such cases, retirement wealth would be identical and there would be no gender gap to explain. Therefore, we restrict this part of the analysis to nonmarried men and women only.

Empirical Findings

Turning to the evidence, we first describe HRS respondents' wealth levels along with the anticipated annual income flows these represent. Next, we

present results from the multivariate estimation, and finally report the decomposition results linking worklife patterns and retirement income differentials.

Descriptive Statistics

Median retirement wealth for HRS respondents appears in Table 1 by sex, marital status, and race/ethnic group.[16] Retirement wealth levels are quite substantial for married couples, exceeding half a million dollars when pensions, social security, and other financial assets are counted. Married men and women have similar levels of retirement wealth because retirement wealth is pooled at the household level. Projected retirement wealth for nonmarried people appears much lower, totaling only about one-third as much as for married couples ($157,000–$198,000).[17] There are striking sex differences disfavoring women: nonmarried men are projected to have 20 percent more retirement wealth than nonmarried women.

These overall differences become even sharper when we examine the subcomponents of wealth. For example, married couples' social security wealth totals about $180,000, a figure not too different from their $155,000 in housing and net financial assets. Their employer-provided pension wealth amounts to approximately $100,000–$116,000. By contrast, social security wealth represents a much more dominant component of total wealth for the nonmarrieds, housing is less important, and—particularly striking—employer pension wealth is very tiny indeed. The median nonmarried woman, for instance, has no pension wealth at all, comparing poorly with her nonmarried male counterpart at $23,000, and her married female counterpart with about $100,000 in household pension assets.

Patterns of retirement wealth by race/ethnic status in Table 1 indicate that the relative disadvantage faced by nonmarried women versus men is most concentrated among the white population. This is because the wealth gap for black and Hispanic nonmarried men versus women is very small or even nonexistent. Thus nonmarried black women actually have higher levels of total wealth ($84,000) than their nonmarried black male counterparts ($77,000); for Hispanics total wealth is $91,000 for nonmarried men and $62,000 for nonmarried women. Pension wealth is effectively nil for black and Hispanic nonmarried people, and other wealth is similarly minuscule. In sum, differences in retirement wealth between whites and minorities are considerably larger than those between men and women.

How these wealth figures would translate into annual retirement income flows by sex, marital status, and race/ethnicity is evident in Table 2. The retirement assets shown previously will produce annual income equivalents for married men and women that are similar to each other, on the order of about $28,000–29,000 per year. Over one-third of the anticipated retirement income is attributable to social security benefits totaling about

Table 1. Median Total Projected Household Retirement Wealth by Race/Ethnicity, Sex, and Current Marital Status ($)

	White		*Black*		*Hispanic*		*All*	
	Nonmarried	*Married*	*Nonmarried*	*Married*	*Nonmarried*	*Married*	*Nonmarried*	*Married*
Men								
Total Wealth	261,702	560,900	76,964	340,407	91,345	242,398	198,108	533,742
Social Security Wealth	87,450	178,836	53,683	147,048	60,968	125,851	80,763	175,903
Pension Wealth	32,078	127,627	0	94,179	0	27,542	23,073	116,156
Other Wealth (Housing + Net Fin)	61,204	166,142	1,902	60,866	2,003	47,113	45,206	154,202
Women								
Total Wealth	194,093	555,868	84,362	340,054	61,594	239,966	157,023	528,823
Social Security Wealth	64,714	187,046	54,324	153,745	19,407	133,363	61,099	185,012
Pension Wealth	8,283	104,839	0	101,924	0	717	0	100,371
Other Wealth (Housing + Net Fin)	55,993	175,13	8,000	60,866	609	58,551	42,927	157,379

Source: Authors' calculations, Health and Retirement Study W1 ($1992)
Note: All data weighted by HRS sample weights.

TABLE 2. Median Projected Annual Household Retirement Income by Race / Ethnicity, Sex, and Current Marital Status ($)

	White		*Black*		*Hispanic*		*All*	
	Nonmarried	*Married*	*Nonmarried*	*Married*	*Nonmarried*	*Married*	*Nonmarried*	*Married*
Men								
Total Income	17,300	29,818	5,212	18,678	6,080	12,198	13,125	27,987
Social Security Income	5,851	9,399	3,582	7,859	4,079	6,659	5,379	9,260
Pension Income	2,141	6,742	0	5,178	0	1,440	1,556	6,104
Other Income (Housing + Net Fin)	4,084	8,829	127	3,325	136	2,551	3,009	8,152
Women								
Total Income	11,066	30,799	4,826	19,536	3,538	13,724	9,016	29,480
Social Security Income	3,727	10,286	3,120	8,665	1,107	7,261	3,507	10,178
Pension Income	476	5,901	0	5,924	0	41	0	5,568
Other Income (Housing + Net Fin)	3,198	9,526	460	3,337	35	3,221	2,460	8,865

Source: Authors' calculations, Health and Retirement Study W1 ($1992)
Note: All data weighted by HRS sample weights.

$10,000 per year for the median married household, exceeding the annuitized value of housing and financial wealth that totals about $8,000–9,000 annually. Median pension income for married couples is somewhat lower, at about $5,500–6,000 per year.[18]

Projected annual retirement income for nonmarried people is expected to be only about one-half to one-third the size of married couples' income, at $13,000 for nonmarried men and $9,000 for nonmarried women. The relative disadvantage of nonmarried women stems partly from the fact that they are anticipated to live longer than men on average, which makes the gap in annual retirement income flows larger than the wealth gap. Furthermore, nonmarried people probably require more than half a married couple's income to maintain a comparable living standard. Hence the finding that nonmarried respondents expect so much less income in retirement than do married couples does not bode well for their prospective retirement wellbeing.

Looking further at the components of retirement income flows, it appears that the redistributive nature of social security benefits somewhat narrows the retirement gap between nonmarried men and women. However, median expected annual benefit levels are low, on the order of $5,400 for men and $3,600 for women. A problem confronting the median nonmarried woman approaching retirement is that she has no pension wealth at all, whereas nonmarried men have small accumulations, and the median married couple can expect $5,500–6,000 of pension income annually. Nonmarried men and women have similar levels of net financial and housing wealth, but it is worth pointing out that more nonmarried men have very high levels of other wealth, since the medians are similar but the means are higher for the men.

Finally, focusing on the differences in anticipated annual retirement income by race / ethnicity, we find that the median married black couple would anticipate $19,000 annually, and the married Hispanic couple $12,000–14,000 annually. This compares to much lower levels expected by nonmarried persons, with black and Hispanic women expecting $3,500–5,000 per year in total income, and black as well as Hispanic men anticipating slightly higher income. Table 2 clearly shows minority groups' heavy reliance on social security since they can expect relatively little income from sources other than social security. These very low income levels do not differ much by sex for minorities.

Regression Results

Moving beyond simple tabulations of the data, we next evaluate how changes in respondent characteristics might improve retirement wellbeing. Specifically, we are interested in the "returns" that people anticipate receiving in the form of higher retirement income, for a given increase in earnings and

TABLE 3. Predicted Changes in Total Projected Annual Household Retirement Income Associated with Key Explanatory Variables (standard errors in parentheses)

Change in Explanatory Variable	*Nonmarried Women*	*Nonmarried Men*	*Married Women*	*Married Men*
+1 Year of Work				
Total Retirement Income	$879	$486	−$52	$62
	(177)	(430)	(86)	(209)
Social Security Income	$645	$914	$167	$642
	(52)	(150)	(32)	(117)
Pension Income	−$65	−$825	−$89	−$486
	(88)	(275)	(65)	(93)
Other Income	$115	$259	−$130	$95
	(109)	(532)	(86)	(160)
+$1,000 Average Prime-Age Earnings				
Total Retirement Income	$374	$1,147	$215	$391
	(111)	(260)	(56)	(137)
Social Security Income	$145	$151	$23	$155
	(19)	(63)	(15)	(60)
Pension Income	$88	$355	$83	$89
	(56)	(148)	(34)	(27)
Other Income	$156	$700	$95	$207
	(54)	(248)	(40)	(72)

Source: Authors' calculations, Health and Retirement Study W1 ($1992)

work experience. To facilitate interpretation of these findings, we focus on the results reported in Table 3, which shows how a change in one of the labor market history variables of reasonable magnitude might be expected to influence the average person's annual retirement income.[19] (A full set of results from our multivariate statistical analysis is reported in Appendix Table 2.)

Simulations of this type are carried out for total retirement income and also for the three components of wealth. For example, the first panel of Table 3 shows how working an extra year between the ages of 20 and 50 influences overall retirement income as well as the three components of wealth. For nonmarried women, an additional year of work is found to have a large positive effect ($879) on annual retirement income, holding other things constant. Nonmarried men also receive a sizeable increase in retirement income of almost $500 per year, for an extra year of work.

By contrast, an additional year worked has no statistically significant effect on retirement income for married men and women. This result is due to the offsetting effects on the three main components of retirement income. Specifically, the results indicate that additional years of work translate into

higher social security benefits for both groups (also true for nonmarried women). But an additional work year is associated with lower lifetime pension payments, particularly for married men. One explanation for this finding may be potential endogeneity bias in which those with greater anticipated retirement income may work fewer years, even prior to the age of 50. Having higher lifetime earnings translates into higher anticipated retirement income levels for all groups, holding other factors constant. Thus an additional $1,000 in average annual pay earned during the prime-age period (age 20–50) is associated with an additional $200–$400 per year in retirement income for women, and $400–$1,100 per year for men. This positive effect is robust across all retirement income components: that is, higher average prime-age earnings are consistently associated with higher social security income, pension income, and other income (although two of the estimated effects are not significantly different from zero).

It is also interesting that, at the margin, social security benefit formulas reward nonmarried men and women, and married men, more for higher earnings than they do married women. This is because many married women in this cohort are entitled to receive a social security benefit based on the earnings history of their husbands rather than their own work histories. As a result, increases in average pay influence the benefits of the relatively few women who will receive benefits based on their own earnings history. Further, married couple benefits are heavily influenced by social security survivor payments that pay off in the event of the death of one spouse, and this valuable benefit stream is influenced only modestly by additional earnings during the prime-age period. By contrast, a nonmarried person's social security benefit is payable only as long as the retiree is alive; lacking the death benefit, retirement income streams become more closely earnings-linked than is true for married persons. Also as a result, higher earnings translate directly into higher pension income, with higher effects for nonmarried men ($355) than for women ($88); this may be because men are covered by more generous pension benefit formulas than women. The fact that other income rises more for additional pay may suggest that personal saving is more feasible for those earning higher salaries.

Decomposition Results

Having described how anticipated retirement income patterns vary across the population, we next decompose projected retirement income gaps into their component parts. This exercise asks the question: how would women fare in terms of retirement income if their labor market and other characteristics were to become equivalent to those of men? Specifically, we evaluate the difference in annual retirement income by sex that can be attributed to differences in labor market experience and other factors. We conduct this exercise for nonmarried respondents only since we have assumed that re-

TABLE 4. Decomposing Differences in Retirement Income by Type: Fraction Attributable to Differences in Respondent Characteristics

Nonmarried Men vs. Women	*Total**	*Social Security**	*Pension***	*Other**
Av. Total Retirement Income Gap	$11,286	$1,487	$5,192	$6,906
Percentage of gap attributable to:				
All Labor Market Differences	85%	151%	10%	82%
Years of Work to Age 50	51%	112%	−6%	26%
Average Prime-Age Earnings	34%	39%	16%	56%

Source: Authors' calculations, Health and Retirement Study W1 ($1992), weighted data.
* Nonnegative wealthholders only.
** Positive wealthholders only.
Note: Decompositions use regression coefficients reported in Appendix Table A2 and means reported in Appendix Table A1.

sources are split evenly among married couples, eliminating the possibility of sex differentials in their retirement wealth.

The results of this analysis appear in Table 4, where we show that nonmarried men anticipate receiving about $11,000 more per year in retirement on average than nonmarried women. Using the decomposition framework, this gap favoring men is accounted for mainly by lifetime work history differences. Roughly one-third of the gap appears to be due to differences in average prime-age earnings, and half to different lengths of labor market attachment. The potent role of the labor market variables for the nonmarried groups is reiterated for each of the three income types, though by far the most powerful influence is for income from social security. Indeed, labor market differences account for more than the entire gap in social security income, indicating that if women had men's labor market experience and pay, the retirement income gap would be expected to be more than fully closed.

Taken as a whole, the decomposition results confirm the central role of labor market variables in accounting for projected retirement gaps by sex. A nonmarried woman with lifetime labor force attachment and pay similar to those of her male counterpart would reasonably expect retirement income quite similar to his.[20]

Conclusions and Discussions

The continuing problem of poverty among older people has prompted analysts and policymakers to ask why some groups have a high likelihood of being poor in old age. Prior studies find that marital status changes (widowhood in particular) influence older women's incomes. In this chapter we take a different tack, asking instead how labor market events influence eventual retirement income. We used the Health and Retirement Study to

explore how earnings patterns and years of labor market experience affect retirement income flows, while controlling for differences in other socioeconomic factors.

We find that the typical older married couple on the verge of retirement today commands around half a million dollars in retirement assets, while the median nonmarried man has about $200,000 and the median nonmarried woman about $160,000. When these asset levels are converted into annual retirement income flows, women's longer life expectancies in retirement exacerbate the gender gap. But the main reason older nonmarried women on the verge of retirement expect lower levels of retirement income than their male counterparts is that they have much lower retirement assets than do other demographic groups. This gap is most prominent for whites, since blacks and Hispanics have fewer assets so differences between men and women are consequently smaller. The median nonmarried minority in the sample expects no employer pension income and only modest income from other financial assets. Our decomposition analysis asks to what extent differences in these factors can explain why women arrive on the doorstep of retirement with fewer resources and lower projected income as compared to men. The results indicate that an additional year of labor market work between the ages of 20 and 50 has a sizeable impact on the retirement income of nonmarried men and women, but only a tiny one for those who are married. An additional $1,000 in average annual earnings raises women's eventual retirement income, but by much less than it improves men's retirement income. Overall, the model indicates that closing the sex gap in years of work and average pay could help shrink quite substantially the retirement income gap for nonmarried people. That is, 85 percent of the overall retirement income gap would be eliminated if, over their lifetimes, women and men had similar lifetime earnings and labor market attachment.

Looking ahead, what might be projected regarding the future? If women's pay levels continue to climb over time as they have in the last decade or so, and retirement income vehicles maintain their same form and structure, it could be anticipated that future cohorts of women will do better. Those approaching retirement will have worked more, and earned more, over their lifetimes, enchancing their wellbeing both absolutely and relative to men.

Appendix

In this study we use age 62 as the common age at which retirement assets are computed. This is the modal age for Social Security benefit filing purposes and is the earliest age at which one can currently file for Social Security benefits. While it is straightforward to specify an assumed retirement age for a nonmarried individual, it is more complex for a married couple since the

retirement date for spouses of differing ages may differ. Here we follow HRS practice where the survey interviewer designated as the "primary respondent" that household member having the greatest knowledge of the household's financial matters. Usually this respondent was age-eligible for the HRS survey, in which case we assume the retirement assumption is triggered on this person's attainment of age 62. If the primary respondent was not HRS age-eligible, this guarantees that the secondary respondent is age-eligible. In this instance, we assume that the age eligible household member keys off retirement at the attainment of age 62.

Values for each of the main retirement asset classes are projected to retirement using a range of projection technologies and assumptions (the approach is described in Moore and Mitchell, 1999). In brief, net financial wealth is projected forward using averages of market returns based on historical rates; housing wealth is projected forward using survey data on the purchase price of the respondent's house, year of purchase, outstanding debt owed on homes, and mortgage payment amount and frequency. We assume that the market value of the house grows in line with the general inflation rate, so there is no real appreciation in housing values, though mortgage payments decrease the remaining principal on the mortgage. Respondents' pension and social security wealth values are projected assuming workers remain employed to their retirement age (see Gustman et al. 1999). Pension benefits are derived based on the plan provisions of employer provided pensions and respondents' answers to salary and years of service (where appropriate). Social security projected amounts are computed as described in Mitchell, Olson, and Steinmeier (1999) for those respondents agreeing to supply a data link; for them we also have available work history and average pay variables for each respondent. This includes average lifetime salary and total labor market experience up to age 50. Present values of benefits are calculated using mortality, interest rate, inflation, and wage growth assumptions as described in Moore and Mitchell (1999). All dollar values are given in $1992. After the death of one spouse, we assume that remaining housing and net financial assets transfer to the survivor; social security benefits are available to the widow(er) according to program rules; and pension rules now require survivor benefits unless a spouse agrees to the contrary in writing. Other research studies using some of these data include Dwyer and Mitchell (1999), Mitchell and Moore (1998), and Mitchell et al. (1999).

We eliminate from the analysis any sample respondents with negative projected total wealth at age 62 (37 individuals), and to produce viable log values, we impute one dollar of wealth to respondents reporting zero total wealth. Similar issues arise with the components of total wealth, namely Social Security, employer pensions, and housing/financial wealth. The last category, which we term "other wealth" here, is the aggregate of financial and housing wealth. It too can take on negative and zero values. The

Appendix Table 1. Mean Values of Explanatory Variables by Sex and Marital Status

	Nonmarried Women		*Nonmarried Men*		*Married Women*		*Married Men*	
	Mean	*Standard Deviation*	*Mean*	*Standard Deviation*	*Mean*	*Standard Deviation*	*Mean*	*Standard Deviation*
Projected Household Wealth ($)								
Total	244,574	283,270	378,844	624,910	715,375	772,985	733,717	823,544
Social Security	61,219	38,623	74,672	32,723	173,205	50,967	163,382	47,051
Pension	71,519	138,616	113,907	171,782	203,305	288,692	226,169	314,348
Other Wealth	111,836	223,686	190,265	581,513	338,866	699,758	344,166	755,091
Projected Annual HH Income ($)								
Total	14,007	16,229	25,294	41,510	39,761	42,716	39,018	44,084
Social Security	3,507	2,214	4,993	2,193	9,668	2,990	8,705	2,671
Pension	4,093	7,932	7,602	11,456	11,274	16,043	12,004	16,622
Other Income	6,429	12,809	12,716	38,611	18,845	38,577	18,339	40,315
Labor Market Variables								
Years of Work to Age 50	18.7	8.78	25.1	6.69	15.3	8.64	26.3	6.13
Average Earnings ($)	11,762	7,768	19,745	8,784	9,934	6,613	23,484	7,968
Socioeconomic Factors								
Age	55.6	3.27	55.4	3.16	55.5	3.22	55.8	f 3.22
Black (%)	19	39	17	38	05	21	06	23
Hispanic (%)	07	26	07	25	04	20	05	21
No High School (%)	28	45	25	43	19	39	20	40
College (%)	12	33	14	35	12	33	17	38
Graduate School (%)	09	29	08	28	06	23	10	31
Ever Divorced (%)	59	49	61	49	21	40	27	44
Ever Widowed (%)	30	46	10	31	04	20	03	15
Number of Children	2.64	1.99	2.14	1.98	3.46	1.98	3.33	1.84

Labor Market Variables								
Years of Work to Age 50	—	—	—	—	26.5	5.79	17.0	8.60
Average Earnings	—	—	—	—	22,207	7,921	10,503	7,064
Socioeconomic Factors								
Age	—	—	—	—	58.6	5.61	52.1	5.69
No High School (%)	—	—	—	—	22	42	16	37
College (%)	—	—	—	—	16	36	14	35
Graduate School (%)	—	—	—	—	10	30	06	24
Ever Divorced (%)	—	—	—	—	20	40	23	42
Ever Widowed (%)	—	—	—	—	05	21	03	18

Source: Authors' calculations, Health and Retirement Study W1 ($1992), weighted data.
Note: Earnings reported in 1992 dollars (not in natural logs)

Appendix Table 2. Regression Results for Projected Retirement Income by Type: Coefficients (Standard Errors)

	Total	*Social Security*	*Pension*	*Other*
Nonmarried Women				
Labor Market Variables				
Years of Work to Age 50	0.06**	0.18**	−0.01	0.02
	(0.01)	(0.02)	(0.01)	(0.02)
Average Prime-age Earnings	0.31**	0.49**	0.16	0.27**
	(0.09)	(0.06)	(0.10)	(0.09)
Socioeconomic Factors				
Age	0.02	0.04	−0.05**	0.02
	(0.02)	(0.02)	(0.02)	(0.03)
Black	−0.71**	−0.61**	0.43**	−1.60**
	(0.16)	(0.16)	(0.11)	(0.29)
Hispanic	−1.52**	−1.06**	−0.51	−1.81**
	(0.40)	(0.33)	(0.32)	(0.44)
No High School	−0.92**	0.01	−0.36*	−1.78**
	(0.17)	(0.18)	(0.16)	(0.26)
College	0.62**	0.41*	0.54**	0.68*
	(0.15)	(0.21)	(0.15)	(0.32)
Graduate School	1.08**	−0.26	0.93**	1.22**
	(0.18)	(0.29)	(0.16)	(0.36)
Ever Divorced	−0.01	0.16	−0.11	−0.31
	(0.13)	(0.15)	(0.13)	(0.23)
Ever Widowed	0.44**	0.14	−0.09	0.82**
	(0.14)	(0.17)	(0.15)	(0.28)
Number of Children	−0.02	0.09*	−0.12**	−0.01
	(0.04)	(0.04)	(0.04)	(0.06)
R-Squared Sample Size	0.41	0.58	0.26	0.28
	939	939	438	882
Nonmarried Men				
Labor Market Variables				
Years of Work to Age 50	0.02	0.18**	−0.06**	0.02
	(0.02)	(0.03)	(0.02)	(0.04)
Average Prime-age Earnings	0.90**	0.60*	0.60*	1.02**
	(0.20)	(0.25)	(0.25)	(0.36)
Socioeconomic Factors				
Age	0.03	0.07**	−0.07*	0.07
	(0.02)	(0.02)	(0.03)	(0.06)
Black	−0.54**	0.18	0.06	−2.32**
	(0.15)	(0.19)	(0.23)	(0.42)
Hispanic	−0.54	0.53	−0.01	−1.88*
	(0.30)	(0.32)	(0.25)	(0.92)
No High School	−0.28*	−0.03	−0.03	−0.94**
	(0.13)	(0.14)	(0.20)	(0.38)

Appendix Table 2. *Continued*

	Total	*Social Security*	*Pension*	*Other*
College	0.65**	−0.56	0.33	0.54
	(0.20)	(0.28)	(0.30)	(0.42)
Graduate School	0.87**	0.18	0.58*	1.31**
	(0.22)	(0.20)	(0.25)	(0.45)
Ever Divorced	−0.04	−0.08	0.42*	−0.14
	(0.13)	(0.16)	(0.20)	(0.32)
Ever Widowed	−0.02	−0.39	0.40	0.21
	(0.18)	(0.34)	(0.30)	(0.54)
Number of Children	−0.03	0.13**	−0.06	−0.09
	(0.03)	(0.04)	(0.05)	(0.08)
R-Squared Sample Size	0.43	0.59	0.15	0.32
	452	452	238	419
Married Women				
Labor Market Variables				
Years of Work to Age 50	−0.001	0.02**	−0.01	−0.01
	(0.00)	(0.00)	(0.00)	(0.01)
Average Prime-age Earnings	0.05**	0.02	0.06*	0.05*
	(0.01)	(0.02)	(0.02)	(0.02)
Socioeconomic Factors				
Age	0.00	0.02	0.00	0.02
	(0.01)	(0.01)	(0.01)	(0.02)
Black	−0.20**	−0.05	0.16	−0.70**
	(0.07)	(0.08)	(0.10)	(0.15)
Hispanic	−0.32**	0.26*	−0.41	−0.77**
	(0.08)	(0.13)	(0.23)	(0.21)
No High School	−0.22**	−0.03	−0.18*	−0.48**
	(0.04)	(0.05)	(0.09)	(0.11)
College	0.14**	0.03	0.28**	0.18
	(0.06)	(0.08)	(0.09)	(0.10)
Graduate School	0.32**	−0.15	0.56**	0.45**
	(0.09)	(0.17)	(0.11)	(0.12)
Ever Divorced	−0.19**	−0.03	−0.20	−0.43**
	(0.05)	(0.06)	(0.11)	(0.12)
Ever Widowed	−0.26**	−0.03	−0.27	−0.50*
	(0.10)	(0.10)	(0.22)	(0.22)
Number of Children	−0.02	0.01	−0.01	−0.03
	(0.01)	(0.01)	(0.02)	(0.02)
R-Squared Sample Size	0.34	0.39	0.15	0.22
	2,163	2,163	1,612	2,121
Married Men				
Labor Market Variables				
Years of Work to Age 50	−0.002	0.07**	−0.03**	0.01
	(0.01)	(0.01)	(0.01)	(0.01)

Appendix Table 2. *Continued*

	Total	*Social Security*	*Pension*	*Other*
Average Prime-age Earnings	0.24**	0.42**	0.14**	0.26**
	(0.08)	(0.16)	(0.04)	(0.09)
Socioeconomic Factors				
Age	0.00	0.03**	−0.03**	0.01
	(0.01)	(0.01)	(0.01)	(0.01)
Black	−0.28**	0.05	−0.02	−0.75**
	(0.08)	(0.09)	(0.09)	(0.13)
Hispanic	−0.33**	0.51**	−0.45**	−0.76**
	(0.09)	(0.17)	(0.14)	(0.22)
No High School	−0.29**	−0.01	−0.43**	−0.54**
	(0.04)	(0.04)	(0.08)	(0.10)
College	0.25**	0.07	0.17	0.40**
	(0.05)	(0.06)	(0.10)	(0.09)
Graduate School	0.43**	0.07	0.45**	0.57**
	(0.06)	(0.09)	(0.10)	(0.10)
Ever Divorced	0.05	−0.03	0.02	0.17
	(0.06)	(0.09)	(0.10)	(0.10)
Ever Widowed	0.16	−0.07	0.36*	0.43*
	(0.12)	(0.08)	(0.18)	(0.21)
Number of Children	−0.03**	0.01	−0.05**	−0.06**
	(0.01)	(0.01)	(0.02)	(0.02)
R-Squared Sample Size	0.30	0.43	0.14	0.22
	2,315	2,315	1,766	2,261

Source: Authors' calculations, Health and Retirement Study W1 ($1992).
* Coefficient statistically significant at the 5% level.
** Coefficient statistically significant at the 1% level.
Notes: Retirement income and average earnings expressed in natural logs. Estimates exclude respondents with negative total wealth. Pension income estimates conditional on positive pension wealth. Other income estimates exclude respondents with negative other wealth. Our estimates also include variables that controls for spousal characteristics where appropriate.

empirical analysis of these other wealth values proceeds in the same fashion as the total wealth analysis: persons reporting negative values are dropped from the sample, and cases with zero wealth are assigned one dollar. There are no negative reports of employer pension wealth in the sample, but 31 percent of the respondents report they anticipate no employer pension. Persons without pensions are excluded from the analysis of employer pension wealth. We have separately estimated, but do not describe here, additional Probit models to explore factors associated with having positive values of each type of wealth. Controlling for sample selection does not change the qualitative conclusions reported here.

The explanatory variables in the multivariate analysis control for various socioeconomic characteristics of survey households (descriptive statistics appear in Appendix Table 1). We also include controls for spouse variables for married couples, which must be included because retirement wealth measures relate to households rather than individuals.

While most explanatory variables (age, race, and education) do not require description, the marital history variables require a brief description. We estimate separate equations for currently married and nonmarried men and women, but each set of estimates controls for respondents' marital history. Qualitative variables identifying previous divorce and widowhood appear in each equation, where the omitted category varies depending on the sample group. (For example, in the case of single women, the omitted category is never married; for married women it is married.) In separate analyses we also focus on the never-married, divorced, and widowed among the nonmarried population; however, sample sizes are small.

Notes

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1. For references on this topic see Levine, Mitchell, and Moore (1999).

2. See Blau and Kahn (1997); Gunderson (1989); and Blau and Ferber (1987).

3. Additional information on the HRS dataset is available at ⟨www.umich.edu/~hrswww⟩; the Data Appendix describes variable creation for the present study; see also Mitchell, Olson, and Steinmeier (1999).

4. Because of the confidential nature of these data, researchers may access the files under restricted conditions; see ⟨www.umich.edu/~hrswww⟩ for details.

5. The availability of the Social Security and pension match data makes the HRS uniquely valuable among all datasets covering retiring Americans. Though Social Security benefits were calculated for most of the age-eligible HRS respondents in the sample, in a few cases this information could not be computed and the respondent had to be omitted from the sample analyzed in this paper (more detail on sample sizes is given below). One reason for missing Social Security benefits was that respondents gave permission for the University of Michigan to request their Social Security records, but no match was obtained because their records did not match SSA identification information. Another reason is that the Social Security Administration excluded from the match file any respondents receiving Social Security Disability Insurance benefits. Also some age-eligible respondents declined to sign the release form permitting their social security data to be matched with the HRS. In this study we rely on social security wealth estimates as well as earnings histories provided in the EBF, so respondents lacking these data are excluded from our analysis. This selection might bias results if those with an EBF file differ from those without a match; we have no evidence that results are biased and indeed respondents lacking consents for a social security match are quite diverse. Thus some of the very wealthy (having high levels of financial assets) did not sign the special release, while some blacks and Hispanics also did not provide consent. Inasmuch as missing EBF matched records appear among people at both ends of the wealth distribution, we believe the direc-

tion of potential bias is ambiguous. More formally, an econometric solution to this sample issue would require finding an instrumental variable correlated with the probability of having an EBF match but uncorrelated with social security wealth. Such a variable does not exist in our sample.

6. Dollar figures throughout this chapter are given in constant 1992 dollars.

7. Levine, Mitchell, and Moore (1999) discuss several ways to model well-being; here we simply focus on levels of retirement income, since these are more readily understood. Burkhauser et al. (1985), Moon (1977), and Hurd (1989) employ similar measures.

8. All values are computed assuming retirement will occur at age 62. See Appendix for more discussion of this point.

9. After one party dies, the surviving spouse is assumed to keep half the pension in a joint-and-survivor arrangement; social security benefits continue for eligible widow(er)s. Housing and other wealth is bequeathable to the surviving spouse in its entirety. While the HRS dataset does not report ownership of assets within couples, other research has acknowledged the potential for intrahousehold bargaining for married couples (McElroy 1990). Incorporating the possibility of spousal behavior of this sort may be feasible with other data sources.

10. Nonmarried persons in the HRS are those who are not currently married; this population includes the never married, the divorced, and the widowed, based on self-reported marital status. Married persons are likewise self reported. Practically speaking, there are slight differences in married men's and women's measured resources in the HRS because the age-eligible women in HRS couples have husbands who are slightly older than do women in couples with HRS age-eligible men.

11. The analysis acknowledges the possibility that there may be dual causality in the regression models between retirement income, on the one hand, and earnings as well as work years, on the other. That is, more work at higher pay could raise retirement income, but conversely, having higher retirement assets might discourage people from working more years or seeking out higher pay. In order to diminish the possibility of variable endogeneity, the labor market measures used are strictly retrospective measures: that is, a worker's years of labor market experience are measured up to age 50 but not thereafter, and average pay is likewise computed based on the worker's social security earnings reported between age 20 and 50. Of course, there is still a chance that retirement wealth considerations could influence the labor market behavior of individuals before age 50. Similar issues of endogeneity may be present regarding decisions made over the lifecourse, including educational attainment, marital history, and childbearing. To assess the influence of this potential problem, we have also estimated reduced form models that include only the labor market history measures with no other covariates and obtained qualitatively similar results to those reported below.

12. In any event, spouse's wealth is included in the analysis irrespective of the spouse's age.

13. To arrive at the final sample, two minor sample restrictions were made as well. Some households were dropped because they lacked a "financial respondent" responsible for providing financial data to the interviewers. We also omit respondents whose race/ethnic status was not white, black, or Hispanic.

14. Levine, Mitchell, and Moore (1999) and Blau and Graham (1990) estimate similar specifications.

15. Oaxaca (1973) devised the statistical technique used here to show how differences in outcomes might be allocated to different sources. In the present context, we have adapted this approach to decompose the difference in projected log annual retirement income between older women and men into two parts: the portion due

to differences in characteristics that differ by sex, and the portion due to differences in returns to those characteristics between the sexes. These analyses are conducted separately by marital status groups. We use women's returns to characteristics to determine how much of the gap in log retirement income would be closed if women's characteristics became like those of men. Specifically, we compute:

$$\overline{R}\,\overline{Y}^{m} - \overline{R}\,\overline{Y}^{f} = \sum_{i=1}^{k} \beta_i^{f} \cdot (\overline{X}_i^{m} - \overline{X}_i^{f}) + \sum_{i=1}^{k} \overline{X}_i^{m} \cdot (\beta_i^{m} - \beta_i^{f}) \ ,$$

where RY represents a particular measure of economic well-being, β represents the vector of regression coefficients estimated using the multivariate model described above, the *X*-values represent a vector of mean characteristics, *f* and *m* represent women and men respectively, and *k* indexes characteristics. The first expression on the right-hand side of this equation is said to represent the "explained" part of the differential in retirement income because it is attributed to the different characteristics of men and women. The second expression is said to represent the "unexplained" part of the differential because it would result in differences in income even if men and women had the same characteristics. Our simulation computes the percentage reduction in the retirement income gap between men and women that would occur if both had identical characteristics. Formally, this involves estimating:

$$\% \text{ gap} = \frac{\sum_{i}^{k} \beta_i^{f} \cdot (\overline{X}_i^{m} - \overline{X}_i^{f})}{\overline{R}\,\overline{Y}^{m} - \overline{R}\,\overline{Y}^{f}} \cdot 100$$

This expression represents the gap in log retirement income that can be "explained" by differences in characteristics as a percentage of the size of the gap. Below we also compute the *dollar* contribution to the gap in retirement income by applying the percentages to the dollar gap in projected annual retirement income.

16. We focus on medians since differences in averages may be driven by a relatively small number of individuals with very large levels of wealth. Mean levels used in the decomposition analysis appear in Appendix Table 1.

17. The difference in wealth levels by marital status goes well beyond differences in household size since a simple division by two of a married household's wealth still surpasses that of nonmarried individuals. Moreover, equivalence scales typically assign a value of less than two to adequately correct for differences in household size (cf. Ruggles 1990; Nelson 1993).

18. Tables 1 and 2 include respondents with zero values for all these wealth sources, but in the multivariate analysis we exclude those with zero, or negative, wealth values. While some may anticipate retirement income from other sources, we expect this to be true for a very small number of respondents. For example, less than 2 percent of HRS households report receiving financial support from friends or relatives over the course of the previous year.

19. Values are computed at the sample mean unless otherwise noted (see Appendix Table 1). We have also examined predicted changes in retirement income associated with changes in the labor market histories of spouses of married respondents; these prove to be similar to those for male and female married respondents themselves.

20. Another multivariate approach (not reported in detail here) indicates that anticipated retirement income does not vary much as a function of prior marital history among nonmarried men, but it does for women. That is, the median never-married woman expects about 60 percent more retirement income than nonmar-

ried divorced or widowed women. The main source of this difference is pension income: the median never-married woman expects over $2,000 in annual pension benefits, while the median widowed and divorced woman expects none. The values may in fact actually be closer than they appear in our data. This is because divorced and widowed respondents have claims to the social security benefits of their former spouses if they had been married for at least 10 years prior to the marital breakup (the 10-year requirement does not pertain to a spouse who becomes widowed while still married). On the other hand, our estimate of Social Security wealth for divorced and widowed women will be somewhat understated for those who had been married at least a decade, since the EBF file does not report social security earnings and benefits for previous spouses because of confidentiality restrictions; see Mitchell, Olson, and Steinmeier (1999).

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