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The Effects of Changing Social Security Administration's Early Entitlement Age and the Normal Retirement Age

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Preface

This report documents findings of an evaluation of the effects of changing Social Security Administration's early entitlement age and the normal retirement age, conducted by RAND for the Social Security Administration, Office of Research, Evaluation, and Statistics.

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Executive Summary

The Old-Age and Survivors Insurance (OASI) program is projected to be unable to meet its obligations by approximately the year 2041. Many proposals that aim to restore solvency include provisions to accelerate the already legislated increase of the normal retirement age (NRA) or to increase it beyond the current target of 67 years; some proposals also suggest raising the early entitlement age (EEA) beyond 62 years.

This document sheds light on the implications of EEA and/or NRA increases on the solvency of the OASI and DI programs. It does not discuss private accounts. The report starts with a characterization of workers who claim benefits at age 62 and a discussion of retirement planning. We then estimate formal models of retirement and DI application and simulate the financial consequences of EEA and/or NRA increases and other policy proposals. We conclude with an assessment of likely responses of employers to changes in Social Security policy.

Most analyses in this report are based on the Health and Retirement Study (HRS), a survey of individuals in their 50s and 60s with very extensive information about work, financial resources including Social security and private pensions, and health.

Workers who take early Social Security retirement benefits at age 62

A little over one-half of all workers who are eligible for OASI benefits claim these benefits at age 62. Many of them, perhaps as much as one-half, stopped working before turning age 62. These very early retirees tend to be healthier, wealthier, and better educated than workers who retire at age 62. The result is that the group of age-62 takers is very diverse, almost as diverse as all OASI beneficiaries combined.

On average, early claimants are quite healthy. However, about 20 percent has a health condition that limits the amount or type of work that they can perform. This group is vulnerable to increases in the EEA and may move onto the DI program. Approximately one-half of early takers with a work-limiting health condition do not have a private pension as alternative source of income. Also approximately one-half was working in a physically demanding job prior to claiming benefits. In all, approximately 5 percent of early claimants is particularly vulnerable to an increase of the EEA due to poor health, lack of a pension, and a physically demanding job.

Retirement planning

About one-in-four workers age 51-61 expects to stop working before age 62, just under half plans on stopping at age 62, another one-in-four intends to stop at age 65, and the remainder plans another retirement age. More than half expects to claim Social Security benefits at age 62 and most others at age 65.

Workers who expect to retire at very early ages (before age 62) or at high ages (after age 65) tend to be healthier, wealthier, and better educated than other workers. By contrast, workers that expect to retire at age 62 are in relatively poor health, more often in physically demanding jobs, and less financially well-off. Workers that expect to retire at ages 63-65 are more mixed. The availability and generosity of private pensions play an important role in determining retirement expectations. Early retirees often also have access to retiree health insurance. There is strong evidence that spouses coordinate their retirement plans.

Retirement plans appear to be a reasonable barometer for actual retirement age. About one-third of workers retire within one year of their stated plans, with the other two-thirds divided roughly evenly over earlier-than-planned and later-than-planned. Among those who retired earlier-than-expected, many felt forced to retire and/or experienced an adverse health event. Increased flexibility on the job, such as through increased ability to reduce hours, delays retirement. The loss of retiree health insurance is also an important determinant of later-than-planned retirement.

Poor retirement planners may also poorly adapt to Social Security policy changes. However, the factors that explain why workers miss their intended retirement age do not lend themselves well to targeted education.

The effects of changing the EEA and/or NRA

The ultimate objective of this document is to determine the financial consequences for the OASDI program of increases in the EEA, NRA, or early retirement penalty (ERP). We took the following approach. We first developed several models that explain when workers retire and whether and when they enroll in DI. Key explanatory factors, insofar as relevant for Social Security policy, are the EEA, NRA, ERP, and generosity of benefits. We applied model estimates to alternative policy scenarios and simulated how workers will change their behavior. We then applied Social Security rules on contributions and benefits to determine how this altered behavior will affect OASDI contributions and benefits.

Focusing first on a hypothetical increase in the EEA, we computed lower and upper bound effects on the OASDI trust funds. A one-year increase in the EEA will only affect individuals who, under current law, apply for OASI benefits at age 62. They will be forced to claim at age 63 or to claim DI instead. Some will retire later and contribute additional payroll taxes; others will retire early anyway and finance their consumption from other resources. We found that labor force responses had virtually no effect on the OASI program. While forced postponement would save the Social Security Administration one year of benefits, this gain is almost exactly offset by higher annual benefits due to the lower early retirement penalty. As an upper bound on the effect of additional DI enrollment, we assume that at most one-out-of-five early OASI claimants will convert to DI. This would cost approximately 2 percent of OASDI liabilities. *This implies that increasing the EEA will not generate any savings*. The findings were confirmed in model-based simulations of behavioral change.

An increase of the NRA is essentially a benefit reduction. We find that the behavioral response to this benefit reduction is very mild. As a result, the average level of benefits decreases and total OASI liabilities decrease accordingly. Roughly speaking, each year of NRA increase saves approximately 5 percent in benefits. Some of this will be lost due to increased DI enrollment, but the vast majority is likely to remain saved. Similarly, we calculated large savings in case of an increase of the ERP—approximately 12 percent for an increase from the current 5/9 of one percent to one percent for each month before the NRA. The behavioral response to this increase is likely to be mild again. A small portion of savings will be lost to additional DI liabilities, but *increases in the NRA and ERP are likely to substantially lower OASDI liabilities*.

The mild expected behavioral responses to Social security policy change may surprise some. It is testimony, however, to a well-designed public retirement system with few incentives that distort workers' behavior.

Employer responses to Social Security policy changes

The current structure of fringe benefit plans, notably the presence of retiree health insurance and the early and normal retirement ages in defined benefit pension plans, indicates that many employers want older workers to separate from their firm. Under current circumstances, a policy change that would induce workers to stay on the job longer is thus unlikely to meet with much enthusiasm among employers. They will likely absorb more older workers, but at the same time counteract with stronger incentives for early retirement.

We found that around 12 percent of defined benefit pension holders are formally integrated with the Social Security program through a benefit offset provision. All else equal, these plans will face greater liabilities when the EEA or NRA increases, thus providing an incentive for adjustment. More than half of DB pension plan workers become eligible for full benefits at age 62 or 65. About two-out-of-three employees with health insurance on the job will remain covered after they retire. If workers are induced to retire later due to increases in the EEA or NRA, retiree health insurance will become less costly and may become more prevalent.

There would be little reason for age-based retirement incentives if older workers were paid according to their marginal productivity. In order for employers to embrace increases in the EEA or NRA, it follows that they need to have greater flexibility in re-negotiating the terms of employment of older workers. In particular, greater flexibility would be needed in wage levels, health insurance, pension accumulation, and perhaps weekly hours and the nature of workers' responsibilities. For example, it may be beneficial for workers and employers to agree that older workers do not accumulate additional pension rights.

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Glossary

ACOL	Annualized Cost of Leaving
ADEA	Age Discrimination in Employment Act
ADL	Activity of Daily Living
AIME	Average Indexed Monthly Earnings
CBO	Congressional Budget Office
COBRA	Consolidated Omnibus Budget Reconciliation Act
COL	Cost of Leaving
CPI	Consumer Price Index
DB	Defined Benefit
DC	Defined Contribution
DI	Disability Insurance
DRC	Delayed Retirement Credit
EBF	Earnings and Benefits File
EBS	Employee Benefit Survey
EEA	Early Entitlement Age
EEOC	Equal Employment Opportunity Commission
EPP	Employer Pension File
ERISA	Employee Retirement Income Security Act
ERP	Early Retirement Penalty
ESOP	Employee Stock Ownership Plan
GED	General Equivalency Diploma
HRS	Health and Retirement Study
IRS	Internal Revenue Service
ISR	Institute for Social Research (University of Michigan)
NRA	Normal Retirement Age
OASDI	Old-Age, Survivors, and Disability Insurance
OASI	Old-Age and Survivors Insurance
OLS	Ordinary Least Squares
OV	Option Value
PBGC	Pension Benefit Guaranty Corporation
PDV	Present Discounted Value
PIA	Primary Insurance Amount
PV	Peak Value
RHS	Retirement History Survey
SIMPLE	Savings Incentive Match Plans for Employees
SSA	Social Security Administration
SSN	Social Security Number
SSW	Social Security Wealth

1. Introduction and Overview

Despite favorable economic conditions in the 1990s, it is by now well-established that the Old-Age and Survivors Insurance (OASI) program will be unable to meet its obligations by approximately the year 2041 (Trustees 2002). Many proposals that aim to restore solvency include provisions to accelerate the already legislated increase of the normal retirement age (NRA) or to increase it beyond the current target of 67 years; some proposals also suggest raising the early entitlement age (EEA) beyond 62 years. Advocates point at the dramatic increases in life expectancy since the inception of the Social Security program, and argue that some of the additional benefit years should be funded by additional contribution years. Opponents argue that the measures would hurt blue-collar workers who may not be able to sustain a physically demanding job much beyond their current retirement age. An increase of the EEA would force some of them onto Disability Insurance (DI); an increase in the NRA while holding the EEA constant would impose hardship on those who are (voluntarily or involuntarily) unable to work beyond age 62 through deeper cuts in their benefits.

The overarching objective of this document is to shed light on the implications of EEA and/or NRA increases on the solvency of the OASI and DI programs. The report is organized as follows:

- Chapter 2 concerns the creation of a data file that formed the basis of all analytical work under this project. It refers to StClair et al. (2002) for extensive documentation of this data file.
- Chapter 3 compares workers who take OASI benefits at age 62 to those who postpone claiming benefits.
- Chapter 4 describes when workers plan to retire and documents how their characteristics differ by planned retirement age. It also evaluates how accurately they predict the timing of their retirement and documents how good planners differ from poor planners.
- Chapter 5 develops and estimates models of retirement timing and DI claiming behavior, simulates how Social Security policy reforms would alter labor force participation and DI participation, and simulates the fiscal impact of policy reforms.
- Chapter 6 gauges employer responses to Social Security policy changes.

Each chapter contains a summary and may be read in isolation from other chapters.

2. The SSA-HRS File

The SSA-HRS data file is a cleaned, processed, and streamlined version of the Health and Retirement Study (HRS). It forms the basis of the analyses reported in the remainder of this document and may be used for policy analyses by SSA staff members. The HRS is a national panel survey of individuals age 51-61 at baseline (1992) and their spouses. Its main goal is to provide panel data that enable research and analysis in support of policies on retirement, health insurance, saving, and economic well-being. The survey elicits information about demographics, income, assets, health, cognition, family structure and connections, health care utilization and costs, housing, job status and history, expectations, and insurance.

The HRS is a biennial panel with several auxiliary files. It is administered by the Institute for Social Research (ISR) at the University of Michigan. The panel started in 1992 with 12,562 respondents in 7,702 households.[1] The study oversamples Hispanics, Blacks, and residents of Florida, and provides weighting variables to make it representative of the community-based population. In addition, the survey interviews the spouses of married respondents, regardless of age. Follow-up surveys were conducted in 1994, 1996, 1998, 2000, and 2002, with proxy interviews after death.

As of June 2002, five waves are available for study. The data described in this document are based on 1992, 1994, and 1996 public releases and the 1998 and 2000 preliminary releases. In addition, the data contain variables from the Social Security Earnings and Benefits File (EBF) and the Employer Pension File (EPF). These files are restricted and require special permission from ISR.

The SSA-HRS file only contains so-called age-eligible respondents, that is, respondents born in 1931-41. There were 9,825 age-eligible respondents in 7,702 households at baseline. Even though spouses that are not age-eligible at baseline or entered the survey in Wave 2 or later do not contribute observations to the SSA-HRS file, their information is not lost. For many variables with respondent information, there is a companion variable with spousal information.

The SSA-HRS file is extensively documented in StClair et al. (2002). Please refer to that document for details.

[1] This document refers to the HRS as the survey of individuals born in 1931-41 and their spouses. Several other cohorts were interviewed using the same or similar questionnaires. The 1993 and 1995 AHEAD interviewed individuals born in 1923 or earlier. Furthermore, starting in 1998, the HRS added individuals born in 1924-1930 or 1942-47, plus their spouses. Some spouses of 1992 HRS respondents were born in or before 1923 and became part of the AHEAD sequence. To the extent possible, the responses of these “overlap cases” are included on the SSA-HRS files as spousal variables. For the remainder, the SSA-HRS file is based on the baseline and follow-up surveys of individuals born in 1931-41, and their spouses.

3. Workers Who Take Early Social Security Retirement Benefits

Summary

The objectives of this analysis are to shed light on the differences between workers who take early Social Security retirement benefits and those that postpone claiming, and to identify the types of individuals that would be particularly vulnerable to an increase in the Early Entitlement Age (EEA) above its current level of age 62. Our analysis is based on the 1992, 1994, 1996, and 1998 waves of the Health and Retirement Study (HRS). Respondents in our sample were born in 1931-41 and became 63 years old during the observation period, so that they had at least 12 months to apply for Old-Age and Survivors Insurance (OASI) benefits. We classify individuals into six mutually exclusive categories based on their claim on Social Security benefits:

1. Individuals who receive OASI benefits while they are 62 years old (Takers);
2. Individuals eligible for early OASI benefits but claim after age 62 (Postponers);
3. Individuals who receive OASI *spousal* benefits while they are 62 years old (Spouse Takers);
4. Individuals eligible for early OASI *spousal* benefits but claim after age 62 (Spouse Postponers);
5. Individuals who are ineligible for OASI benefits (Ineligibles); and
6. Individuals who receive Disability Insurance (DI) benefits (DI Claimants).

As shown in the table below, about nine percent of the respondents claimed DI benefits. Of those who did not claim DI, 14 percent lacked OASI coverage in their own right but claimed benefits as a spouse, and another 3 percent were ineligible for OASI benefits on the basis of both own and spousal earnings histories. Of those who did not claim DI and were eligible for OASI benefits, 55 percent claimed benefits between their 62nd and 63rd birthday. Women are more likely than men to be early claimants, but less likely to claim early based on own benefits. They are less likely to claim DI benefits and more likely to be ineligible.

Table 3.1. Distribution of Claimant Type

	Males		Females		Total	
	Freq.	Percent	Freq.	Percent	Freq.	Percent
Takers	435	42.8	406	40.7	841	41.7
Postponers	432	42.5	243	24.4	675	33.5
Spousal benefits:						
Takers	3	0.3	127	12.7	130	6.5
Postponers	34	3.3	100	10.0	134	6.7
Ineligibles	15	1.5	36	3.6	51	2.5
DI Claimants	98	9.6	86	8.6	184	9.1
Total	1,017	100.0	998	100.0	2,015	100.0

More than half of workers eligible to claim early retirement benefits at age 62 do in fact begin receiving benefits in that year. Proposals to raise the EEA would directly affect this population. The magnitude of the impact depends in part on their ability to continue working and accumulate additional retirement savings. In a population whose health is generally declining there is real concern about the ability to continue working.

Generally speaking, the following picture emerges of individuals who claim early and reduced Social Security benefits, and of those who postpone. We find workers who claim early retirement benefits are less likely to be college educated, less likely to be in management positions or to be professionals and more likely to have left the labor force before age 62. There are no large differences in financial wealth between Takers and Postponers, except for in pension wealth. Takers are more likely to be covered by a pension plan and have higher pension wealth than Postponers. Among individuals who claim spousal benefits the opposite is true: Takers have lower pension wealth and are less likely to have a pension plan than Postponers.

The total cost to society of an increase in the EEA consists of several components.

1. There is a financial effect on OASDI contributions and benefits. OASDI contributions are likely to increase because some workers will work longer; OASI benefits may increase or decrease, depending on the actuarial fairness of the early retirement penalty; DI benefits are likely to increase because a fraction of prospective Takers may successfully apply for DI.
2. Some prospective Takers may unsuccessfully apply for DI and incur lost earnings due to the five-month waiting period until DI benefits are payable.
3. Some Takers may be forced to work longer than they would like and experience potentially substantial welfare losses due a choice restriction.
4. Other financial resources permitting, they may also opt to retire early despite an EEA increase. This may limit their ability to smooth consumption, again implying a welfare loss.

The responses of Takers to an increase in the EEA is likely to depend largely on their health status and financial resources. While quite healthy on average, Takers are more likely to be in poor health than workers who postpone benefits. Workers who are ineligible for OASI benefits based on their own earnings history but claim spousal benefits are less healthy than other workers who claim OASI benefits, particularly if they are early spousal claimants. About one-in-five individuals who take early and reduced benefits have a work-limiting health condition. Among them,

- One-half, i.e., ten percent of Takers or the equivalent of roughly 1.8 million current beneficiaries, do not have any private pension. These workers are particularly likely to apply for DI benefits in case of an increase of the EEA. Almost half (42 percent) were ineligible for OASI on their own account and thus likely also ineligible for DI. The other half, i.e., ten percent of Takers or the equivalent of roughly 1.8 million current beneficiaries, have at least some form of pension. While they are in a better position to retire early despite an EEA increase, they, too, could experience substantial welfare losses because of a diminished ability to smooth consumption.

- Irrespective of pension coverage, also roughly one-half have a physically demanding job.

Overall, about 5 percent of early Takers have a work-limiting health condition, no pension, and were working in a physically demanding job prior to claiming benefits. This group, roughly 0.9 million current beneficiaries, is particularly vulnerable to increases in the EEA and particularly likely to qualify for DI.

Chapter 5 quantifies the likely effects of an increase in the EEA on labor force participation, DI enrollment, and the financial status of the OASDI program. As pointed out before, however, additional welfare costs may be incurred due to the elimination of the option to claim OASI benefits at age 62.

3.1. Introduction

Workers that are insured for Old-Age and Survivors Insurance (OASI) may claim benefits at the Early Entitlement Age (EEA) of 62 years. Benefits are permanently reduced if claimed before the Normal Retirement Age (NRA). Before the year 2000, the NRA was 65 years. For workers that become eligible for (early) benefits in 2000, the NRA is 65 years and two months. The NRA is scheduled to gradually increase to age 67. Benefits may also be payable to the spouse, ex-spouse, and widow(er) of retired-worker beneficiaries. A spouse may receive benefits at age 62, a widow(er) as early as age 60. The same ages apply to divorced spouses and surviving divorced spouses who had been married to the worker for at least 10 years. Spousal and widowhood benefits may be claimed at any age if the (divorced) spouse or widow(er) is caring for a child under age 16 or disabled. A deceased worker's children and dependent parents may also be entitled to benefits.

The objectives of this analysis are, first, to shed light on the differences between workers who take early retirement benefits and those that postpone claiming and, second, to identify the types of individuals that would be particularly vulnerable if the Early Entitlement Age were raised above its current level of age 62.

Specifically, this chapter:

- Identifies early claimants of Social Security benefits and other claimant groups;
- Compares and contrasts the characteristics of workers who take early Social Security benefits (Takers), do not take early benefits (Postponers), take early Social Security spousal benefits (Spouse Takers), do not take early spousal benefits (Spouse Postponer), claim Disability Insurance benefits (DI Claimants), and individuals who are ineligible for benefits (Ineligibles);
- Identifies vulnerable sub-groups by classifying Takers and Postponers by health status and pension wealth, and compares the job characteristics of these groups.

Roughly half of workers eligible to claim early retirement benefits at age 62 do in fact begin receiving benefits in that year. Proposals to raise the EEA would directly affect this population, which motivates this study of its characteristics. The extent to which an increase in the EEA will affect these workers depends in part on their ability to continue work and accumulate additional retirement savings. In a population whose health is generally declining (Ycas 1987) and that is relatively sensitive to economic downturns (Leppel and Clain 1995), there is real concern about the ability to continue working. Workers who claim early retirement benefits may be more likely to be in poor health, have physically demanding jobs, been recently involuntarily separated from a job, and lack private pension and other sources of retirement income. Indeed, some may have retired even earlier if they had been able to borrow against future benefits.

Opponents of raising the EEA therefore argue that it would force individuals with limited means to continue working longer and that many of them, especially those with health problems or recently laid-off, would experience significant welfare losses. Another important concern is that an increase in the EEA would encourage some Takers to apply for Disability Insurance (DI) benefits to carry them over until they are eligible for OASI benefits. This type of program substitution could be costly since DI beneficiaries qualify for Medicare before age 65 and do not incur the permanent reduction in monthly Social Security benefits when they become eligible at the EEA. Some individuals, who claim early and reduced benefits, claim spousal benefits and may not be eligible for DI benefits. Moreover, Mitchell and Phillips (2000) report that the average probability of receiving DI benefits over the 1990s, conditional on application, is around 49 percent. The effect of an increase in the EEA on total Social Security outlay will depend in part on the total number of individuals that shift to the DI program.

3.2. Sample Selection and Claimant Categories

To qualify for Social Security, a person must be insured for benefits. In the OASI program, persons are insured if they have at least as many credits as the number of full calendar years elapsing after age 21 and before age 62, disability, or death, whichever occurs first. In our analysis sample, this implies that workers need 40 credits to qualify for retirement benefits. In 2001, workers earn one credit for each $830 of annual earnings, up to a maximum of four credits per year. This amount is adjusted annually in tandem with average Social Security wages. We also identify individuals who have less than 40 quarters of covered earning but are eligible to claim as the spouse of an eligible beneficiary.

In order to receive benefits, workers must have filed an application for retirement benefits and must be age 62 throughout the entire month in which benefits are first paid. Thus, even if an individual applies for benefits prior to his or her 62nd birthday, he or she will not receive benefits in that first month unless he or she was born on either the first or second day of that month (Olson, 1999).

Our analysis is based on the first four (1992, 1994, 1996, and 1998) waves of the Health and Retirement Study (HRS). We restrict the sample to respondents born in 1931-41. We further require that respondents are at least age 63 in at least one survey interview, leaving 3,063 respondents. These criteria ensure that respondents will have had at least 12 months to apply for OASI benefits and that we observe respondents both before and after their first year of eligibility for OASI benefits. In the tables that follow, we refer to the interview wave after the year-long opportunity to apply as "after 63rd birthday" and the prior wave as “before 63rd birthday”.

We eliminate 338 widow(er)s from the analysis sample. Widow(er)s become eligible for benefits at age 60 and are thus not directly affected by any potential increase in the EEA. We eliminate an additional 290 individuals who report having claimed OASI benefits before age 62. Some of these individuals may care for a dependent child under age 16 and thus be eligible before age 62; they would not be affected by an increase in the EEA. Others may have misreported the age at which they claimed benefits, or may receive DI benefits while reporting OASI benefits.

The remaining sample of 2,435 respondents contains 492 respondents (20 percent) without matched Social Security earnings records.[2] Of these, 72 were married to a spouse with at least 40 quarters of coverage, so that their eligibility status could be established. For the remaining 420 non-matched respondents, based on quarters of coverage we are unable to distinguish between ineligibility and postponement. We therefore eliminate them from the analysis immediately below (but see further below). We divide the remaining sample of 2,015 respondents into six mutually exclusive categories:

1. Individuals who receive OASI benefits while they are 62 years old (Takers);
2. Individuals who are eligible for early OASI benefits but claim after age 62 (Postponers);
3. Individuals who are ineligible for OASI benefits on the basis of their own earnings history, but eligible for spousal benefits that are claimed while they are 62 years old (Spouse Takers);
4. Individuals who are ineligible for OASI benefits on the basis of their own earnings history, but eligible for spousal benefits that are claimed after age 62 (Spouse Postponers);
5. Individuals who are ineligible for OASI benefits (Ineligibles); and
6. Individuals who receive DI benefits (DI Claimants).

Table 3.2 shows the distribution of claimant types, by sex. About nine percent of the respondents claimed DI benefits and almost half claimed OASI benefits at age 62. Of those that did not claim DI, 17 percent lacked coverage on the basis of their own earnings history. The majority (14 percent), however, were eligible for spousal benefits; only 3 percent were ineligible for OASI benefits on the basis of own and spousal earnings histories. Of those who did not claim DI and were eligible for OASI benefits, 55 percent claimed benefits between their 62nd and 63rd birthday. Women are more likely than men to be early claimants, but less likely to claim early based on own benefits. They are less likely to claim DI benefits and more likely to be ineligible.

Table 3.2. Distribution of Claimant Type, by Sex

	Males		Females		Total	
	Freq.	Percent	Freq.	Percent	Freq.	Percent
Takers	435	42.8	406	40.7	841	41.7
Postponers	432	42.5	243	24.4	675	33.5
Spousal benefits:						
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DI Claimants	98	9.6	86	8.6	184	9.1
Total	1,017	100.0	998	100.0	2,015	100.0

[2] Respondents were asked for written permission to merge Social Security earnings and benefit information into their HRS data. Not all respondents consented. In addition, non-matched records may exist where the Social Security Administration was unable to locate a respondent's Social Security Number in its records.

Of the 420 respondents without matched Social Security earnings records, 315 revealed their eligibility status: 167 claimed benefits at age 62 (Takers), 79 took benefits after age 62 (Postponers), 24 claimed spousal benefits at age 62 (Spousal Benefit Takers), 11 claimed spousal benefits after age 62 (Spousal Benefit Postponers) and 34 claimed DI benefits (DI Claimants). For the remaining 105 individuals it is too early to tell whether they are ineligible or choose to postpone benefits.[3] We excluded the 315 apparently-eligible respondents from Table 3.2, as their inclusion would bias the reported column fractions. However, for the purpose of comparing and contrasting the characteristics of Takers, Postponers, Ineligibles, and DI Claimants, we include them in the analysis sample. Olson (1999) and Haider and Solon (2000) found that non-matched Social Security records are more prevalent among the poorly educated and married individuals.[4] The non-match pattern appears to be driven by not having a Social Security Number (SSN). Lack of an SSN implies ineligibility, which does not apply to the 315 apparently-eligible cases. We believe that their inclusion in the analysis thus improves the accuracy of the reported distributions for Takers, Postponers, and DI Claimants. The 105 remaining non-match cases are likely to not have an SSN and thus be Ineligibles; the reader should bear in mind that the reported distribution of Ineligibles (and perhaps, to a milder extent, of Postponers) may overstate the average level of education and understate the fraction married.

We find that almost half of the individuals in our sample claim early and reduced benefits. This figure is not adjusted for retirement status and is likely much higher if we consider only retired individuals. Hurd, Smith and Zissimopoulos (2002) find that 73 percent of individuals who retired before age 62 take early and reduced benefits within 3 months of turning 62 and 88 percent claim by the time they turn 63. Burkhauser, Couch, and Phillips (1996) consider a sample of all individuals age 60-61 in Wave 1 of the HRS and report that in Wave 2, 30 percent accepted Social Security benefits at age 62. While this is number is 18 percentage points lower than our estimate, Olson (1999) claims that Burkhauser, Couch, and Phillips (1996) underestimate the fraction of male Takers by 13 percentage points because not all respondents who are age 62 at the time of the HRS interview are "62 enough" to be receiving Social Security benefits if they so desire. She argues that technicalities in defining age-eligibility are important enough to introduce serious biases in studies that ignore them. This issue is irrelevant for our analysis, as we define Takers as individuals who claim at any time between their 62nd and 63rd birthdays—not just those who claim immediately after their 62nd birthday.

[3] Given the small number of individuals (N=105) whose eligibility status remains undefined, their exclusion would not substantially alter the main results. Nonetheless, we examined the work history of these individuals to determine whether they meet the 10 years of work minimum standard for Social Security coverage. Fully 90 percent have at least 10 years of work experience. However, we do not know whether they worked in covered employment. We therefore chose not to make use of the additional information about work experience to categorize these individuals.

[4] They also found that the match rate was correlated with race and being born outside the United States. This chapter does not analyze those characteristics.

3.3. Characteristics of Takers and Postponers

We tabulate and compare demographic, health, wealth, and employment history characteristics for the six claimant types. We perform all tabulations by sex. Where relevant, we also tabulate variables reported in the last wave prior to the respondent's 63rd birthday and the first wave after the 63rd birthday. For example, for respondents who turn age 63 between Waves 2 and 3, we report data from both Waves 2 and 3.

For categorical variables, we present cross-tabulations of the variable and claimant type. Rather than frequencies for each cell, we report row percents that are weighted by person-level analysis weights. In addition, we report unweighted frequencies for the marginal (total) distributions of claimant type and the variable under study. For continuous variables, we report the weighted mean and standard error by claimant type. For wealth variables, we additionally report the "median" (defined as the unweighted mean of the values between the 45th and 55th percentiles) and the 25th and 75th quantiles. This measure is less prone to select notches in the data than the median. For indicator variables, we report the weighted mean by claimant type.

This document tabulates only characteristics with features that add to our understanding of the differences between Takers, Postponers, DI Claimants, and Ineligibles. In addition to presenting cross-tabulations, we summarize the characteristics of Takers using principal components analysis. For more detail see Zissimopoulos, Panis, and Hurd (2001).

3.3.1. Education

Table 3.3 shows the educational attainment of the claimant categories for males and females. Takers tend to be less well-educated than Postponers. Among men, they are more likely to be high school dropouts than Postponers (22.8 versus 16.9 percent) and less likely to be college graduates (22.3 versus 30.0 percent). The pattern is very similar for women. While these differences in schooling attainments are fairly large, the difference in number of years of schooling is less than one year for both men and women. For males and females who take spousal benefits, education differences are even more pronounced. Among women who take spousal benefits before age 63, 7.4 percent have a college degree or higher compared to 25.8 percent of women who postpone. The educational attainment of female and male DI Claimants is substantially lower than of Takers and Postponers: Approximately one half are high school drop-outs and only 7.4 (4.5) percent of males (females) are college graduates.

Table 3.3. Distribution of Education, by Claimant Type and Sex

	Educational attainment (years)	High school dropout	GED	High school graduate	Some college	College and above	Total N
		(weighted row percentages)					
Male							
Takers	12.5	22.8	7.9	31.8	15.2	22.3	518
Postponers	13.0	16.9	5.8	25.7	21.6	30.0	477
Spousal benefits:							
Takers	10.9	48.8	0.0	0.0	40.5	10.7	7
Postponers	13.2	10.6	3.4	33.6	24.5	27.8	35
Ineligibles	14.3	19.2	0.0	0.0	24.3	56.5	15
DI Claimants	10.1	47.3	3.0	31.1	11.2	7.4	116
Total N	1,168	293	73	335	197	270	1,168
Female							
Takers	12.3	18.9	4.6	42.6	20.6	13.3	490
Postponers	13.1	13.9	4.1	36.4	23.3	22.3	277
Spousal benefits:							
Takers	11.6	29.7	4.2	41.0	17.7	7.4	147
Postponers	12.3	23.1	3.2	37.0	10.9	25.8	110
Ineligibles	12.6	28.7	0.0	24.6	3.8	42.9	36
DI Claimants	9.8	55.4	6.1	29.2	4.8	4.5	102
Total N	1,162	297	53	431	213	168	1,162

Note: Unweighted respondent counts in "Total N" rows and column.

3.3.2. Health

Most HRS respondents in their early 60s, report being in very good or excellent health. Overall, only 21 percent report being in fair or poor health. However, Takers are in somewhat less good health than Postponers and are more likely to report that their health status limits their work. For example, in the survey prior to reaching age 63, 15.9 percent of male Takers report being in fair or poor health, compared to 11.7 percent of male Postponers (Table 3.4). Among women, there is a 4 percent difference between Takers and Postponers with fair or poor health. Those who take early spousal benefits are in much worse health than those who postpone. Although few men take early spousal benefits, those that do have very poor health: almost half report having fair or poor health. Among women who claim spousal benefits, 24.6 percent of Takers are in fair or poor health. As expected, DI Claimants are in much worse health than the other groups: 70.2 percent of male and 70.7 percent of female DI recipients reported being in fair or poor health.

Table 3.4. Distribution of Self Reported Health Status, by Claimant Type and Sex

	Excellent	Very good	Good	Fair	Poor	Total N
Male						
Takers	21.4	32.5	30.2	12.5	3.4	518
Postponers	25.3	35.1	27.9	9.5	2.2	477
Spousal benefits:						
Takers	23.9	0.0	27.0	23.8	25.4	7
Postponers	17.6	42.5	19.5	10.7	9.7	35
Ineligibles	4.6	35.9	39.7	7.2	12.7	15
DI Claimants	3.2	6.6	20.1	44.6	25.6	116
Total N	230	367	331	174	66	1,168
Female						
Takers	16.2	44.6	25.4	11.2	2.6	490
Postponers	23.3	37.8	29.4	8.7	0.9	277
Spousal benefits:						
Takers	12.0	35.6	27.9	17.8	6.8	147
Postponers	14.5	33.2	33.6	12.0	6.8	110
Ineligibles	18.6	20.0	25.1	24.4	12.0	36
DI Claimants	3.2	9.4	16.8	38.6	32.1	102
Total N	173	405	334	175	75	1,162

Note: Weighted row percentages. Unweighted respondent counts in “Total N” rows and column.

Table 3.5 examines a related measure: the percentage of individuals whose health limits their work reported in the survey prior to reaching age 63. Eighteen percent of male Takers and 12.2 percent of male Postponers reported an impairment or health problem that limits the kind or amount of paid work the respondent can perform. The fractions are similar among women: 21.2 percent of Takers and 11.2 percent of Postponers reported a limiting health status. Both men and women who take spousal benefits are much more likely to report a work-limiting health condition than those who are not claiming spouse benefits with those claiming early reporting higher rates than those who delay. Eighty-seven percent of both male and female DI recipients reported being limited in the work they could perform.

Table 3.5. Percentage With Work-Limiting Health, by Claimant Type and Sex

	Male	Female
Takers	18.0	21.2
Postponers	12.2	11.2
Spousal benefits:		
Takers	38.4	32.6
Postponers	27.3	27.4
Ineligibles	35.1	36.0
DI claimants	87.4	87.1

Our results are consistent with several previous studies. Burtless and Moffitt (1985) and Hurd (1999) found that workers in poor health withdraw or plan to withdraw earlier from the labor force. Burkhauser, Couch, and Phillips (1996) and Uccello (1998) confirmed this finding for uptake of Social Security benefits. CBO (1999) found that 24 percent of early claimants reported having a work-limiting disability, although only 6 percent stated that they left their last job for health reasons. While consistently found, the differences in health status between Takers and Postponers are quite small for those who claim 'own' benefits but are large for those who claim spousal benefits. A substantial majority of Takers are in good health with no work-limiting disability. This is less true for individuals who claim spousal benefits. On average, it would not appear that raising the EEA would result in large welfare losses. However, averages can deceive, and we are interested in the magnitude of the fraction of workers whose health and choice set is limiting. Clearly, for individuals in poor health and with limited non-Social Security wealth a rise in the EEA would constitute a serious hardship. CBO (1999) reports that about 10 percent of Takers are both in poor health and have non-Social Security income below the poverty line.

3.3.3. Labor Force Characteristics

Takers claimed retirement benefits at age 62, but many of them stopped working before that age. Already at the interview prior to turning age 63, only half (51.1 percent) of male Takers reported working for pay, compared with 91.9 percent of male Postponers (Table 3.6). By the interview after turning age 63, the rates have dropped to 36.2 percent among Takers and 76.1 percent among Postponers. As expected, men who take spousal benefits have low rates of labor force participation. Among females, even fewer Takers than male Takers are working prior to turning age 63: 42.3 percent. Labor force participation rates prior to turning age 63 are high among women who postpone claiming Social Security benefits Takers. By the interview before turning age 63, 81.9 percent of women are working for pay and after turning age 63, 64 percent of Postponers are working. Among women who take spousal benefits before turning age 63, few are working for pay: 18 percent of Takers and 29 percent of Postponers are working for pay. After turning age 63 the rates drop to 14 and 24 percent.

Table 3.6. Fraction Working for Pay Before and After 63rd Birthday, by Claimant Type and Sex

	Prior to 63rd birthday		After 63rd birthday	
	Freq.	Percentage	Freq.	Percentage
Male				
Takers	518	51.1	517	36.2
Postponers	477	91.7	474	76.1
Spousal benefits:				
Takers	7	23.9	7	0.0
Postponers	35	59.9	35	64.9
Ineligibles	15	76.5	15	76.5
DI Claimants	116	15.7	116	7.1
Female				
Takers	490	42.3	490	28.0
Postponers	276	81.9	273	63.7
Spousal benefits:				
Takers	147	18.2	147	13.8
Postponers	110	29.0	109	23.6
Ineligibles	36	39.1	36	29.1
DI Claimants	102	10.7	101	3.5

While these fractions of male and female early beneficiaries that continue to work are remarkably high, their annual earnings (conditional on being positive) are fairly low (Table 3.7). Compared with the interview reports prior to turning age 63, male “median” earnings (conditional on being positive) fell by about two-thirds to $7,390 and their mean earnings reduced by more than one-half to $12,093. Postponers maintained their earnings levels after reaching age 63. For women, the fraction working is lower than for men and their median earnings fall by 38 percent to $6,652 from the time prior to turning age 63 to the time after age 63. Women who claim early spousal benefits have very low earnings. Women who claim spousal benefits but postpone have slightly lower earnings than Postponers.

Table 3.7. Annual Earnings (Conditional on Being Positive) Before and After 63rd Birthday, by Claimant Type and Sex

	Prior to 63rd birthday				After 63rd birthday			
	Freq.	"Median"	Mean	Std.Dev	Freq.	"Median"	Mean	Std.Dev.
Male								
Takers	321	21,584	26,074	24,282	205	7,390	12,093	13,030
Postponers	379	32,142	44,707	42,993	343	32,374	43,534	47,686
Spousal benefits:								
Takers	1	31,070	31,070	--	0	--	--	--
Postponers	21	30,380	41,147	41,492	16	32,221	36,683	21,669
Ineligibles	9	30,380	31,109	19,887	8	20,792	27,187	21,348
DI Claimants	28	16,452	21,373	15,393	12	6,622	15,615	15,690
Female								
Takers	273	10,789	13,869	12,722	181	6,652	8,675	8,865
Postponers	220	20,359	23,172	14,766	202	19,522	22,918	14,633
Spousal benefits:								
Takers	19	5,070	5,172	3,513	11	5,632	8,914	11,157
Postponers	38	19,454	20,601	15,477	26	13,385	16,823	14,114
Ineligibles	14	25,214	30,483	25,193	9	9,206	18,370	20,094
DI Claimants	17	10,256	14,301	13,935	10	10,401	12,556	9,742

Note: In 1992 dollars; "Median" is mean of 45th to 55th percentile; weighted means, standard deviations.

Workers who claim early Social Security benefits tend to have had somewhat more physically demanding jobs. For males, 41.5 percent of Takers and 37.8 percent of Postponers have jobs that require lots of physical energy all the time or almost all the time (Table 3.8). Female Takers and Postponers are slightly less likely to have had physically demanding jobs than men. However, similar to men, Takers are about six percentage points more likely to have had physically demanding jobs than Postponers. Two-out-of-three women who take early spousal benefits have jobs that require lots of physical energy all the time or almost all the time. (This is based on only 26 women.) DI Claimants also tend to have had jobs that were very physically demanding.

Table 3.8. Current Job Requires Lots of Physical Effort, by Claimant Type and Sex

	Almost all the time	Most of the time	Some of the time	Almost none of the time	Total N
Male					
Takers	21.0	20.5	29.7	28.8	265
Postponers	17.4	20.4	28.3	33.8	432
Spousal benefits:					
Takers	100.0	0.0	0.0	0.0	1
Postponers	14.3	17.6	40.1	28.1	19
Ineligibles	9.5	0.0	46.0	44.5	10
DI Claimants	48.7	24.2	19.8	7.3	17
Total N	157	154	213	220	744
Female					
Takers	19.7	15.6	27.1	43.2	207
Postponers	14.6	15.1	27.1	43.2	225
Spousal benefits:					
Takers	33.5	36.0	12.9	17.6	26
Postponers	21.3	12.6	30.7	35.4	32
Ineligibles	12.5	27.7	33.6	26.1	13
DI Claimants	28.3	25.0	5.1	41.6	13
Total N	94	91	136	195	516

Note: Weighted row percentages. Unweighted respondent counts in "Total N" rows and column.

Male and female Postponers are about twice as likely to be in management positions than Takers, and more likely to be professionals (Table 3.9). This is also true for individuals who claim spousal benefits. To the extent that they continue working after claiming early Social Security benefits, the distribution of occupation is about the same for Takers before and after they claimed benefits (Table 3.10). Among women, however, Takers that continue working appear to be disproportionately professionals, whereas those in clerical occupations more often stop working.

Table 3.9. Job Occupation Before 63rd Birthday, by Claimant Type and Sex

	Mana-gerial	Profess-ional	Sales	Clerical	Service: h'hold	Service: Protection	Service: Food	Health Services	Personal Services	Farming	Mechanics	Construc-tion	Precision Prod.	Operator-Machine	Operator-transp.	Operator-Handler	Total N
Male																	
Takers	13.0	12.5	14.5	4.5	0.0	5.1	0.0	0.0	5.9	8.1	5.4	4.3	6.5	7.7	9.8	2.7	267
Postponers	25.5	16.7	11.0	5.2	0.0	1.9	0.5	0.4	4.4	5.7	5.1	3.0	4.3	7.4	7.0	1.9	431
Spousal:																	
Takers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1
Postponers	46.1	5.1	0.0	17.4	0.0	0.0	0.0	0.0	6.0	3.0	3.8	4.3	0.0	5.5	6.1	2.7	20
Ineligibles	15.0	46.3	0.0	12.0	0.0	0.0	0.0	0.0	0.0	5.0	0.0	0.0	8.9	0.0	12.8	0.0	10
DI Claimants	13.1	10.4	11.4	0.0	0.0	0.0	3.2	0.0	8.2	0.0	15.5	18.6	13.6	6.0	0.0	0.0	16
Total N	146	105	83	38	0	21	3	2	44	52	42	28	39	56	68	18	745
Female																	
Takers	8.2	14.4	12.9	29.4	2.8	0.8	11.3	4.2	8.9	0.0	0.0	0.0	1.4	2.2	1.6	1.9	206
Postponers	17.9	18.4	5.1	34.8	0.2	0.0	4.3	4.7	6.6	0.0	0.0	0.0	1.9	5.2	0.5	0.4	224
Spousal:																	
Takers	3.7	0.0	12.8	20.2	17.6	0.0	8.3	0.0	11.9	15.5	0.0	0.0	7.6	0.0	0.0	2.5	27
Postponers	8.9	30.0	6.5	25.6	3.4	0.0	0.0	0.0	9.2	3.1	0.0	0.0	3.2	10.2	0.0	0.0	32
Ineligibles	19.4	26.3	15.0	8.2	9.0	0.0	0.0	4.5	0.0	0.0	0.0	0.0	5.2	0.0	12.5	0.0	13
DI Claimants	11.7	23.5	0.0	19.3	10.0	0.0	0.0	5.8	10.2	0.0	0.0	0.0	0.0	19.6	0.0	0.0	13
Total N	60	86	45	146	20	2	34	24	44	5	0	0	13	25	5	6	515

Note: Weighted row percentages. Unweighted respondent counts in "Total N" rows and column.

Table 3.10. Job Occupation After 63rd Birthday, by Claimant Type and Sex

	Mana-gerial	Profess-ional	Sales	Clerical	Service: h'hold	Service: Protection	Service: Food	Health Services	Personal Services	Farming	Mechanics	Construc-tion	Precision Prod.	Operator-Machine	Operator-transp.	Operator-Handler	Total N
Male																	
Takers	12.3	10.2	15.1	3.1	0.0	5.9	0.7	0.0	6.6	9.9	6.5	6.2	6.2	3.4	10.8	3.2	159
Postponers	22.7	15.2	13.0	6.1	0.1	2.1	0.5	0.6	5.4	4.9	4.7	3.7	3.7	6.8	8.3	2.3	335
Spousal:																	
Takers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
Postponers	43.6	13.4	0.0	17.3	0.0	0.0	0.0	0.0	6.5	3.2	0.0	9.3	0.0	0.0	6.7	0.0	17
Ineligibles	16.6	40.7	0.0	13.3	0.0	0.0	0.0	0.0	0.0	5.5	0.0	0.0	9.8	0.0	14.2	0.0	9
DI Claimants	32.4	0.0	25.1	0.0	15.2	0.0	0.0	0.0	20.3	7.0	0.0	0.0	0.0	0.0	0.0	0.0	8
Total N	96	70	67	29	2	16	3	2	35	37	26	24	24	29	55	13	528
Female																	
Takers	7.2	17.7	13.7	23.6	3.0	1.1	14.2	6.2	8.5	0.0	0.0	0.0	1.3	2.1	1.5	0.0	108
Postponers	17.6	16.9	5.2	37.4	0.3	0.0	3.9	3.4	5.7	0.0	0.0	0.0	2.2	6.1	0.7	0.6	162
Spousal:																	
Takers	0.0	7.3	11.2	11.6	6.1	0.0	5.2	0.0	33.4	0.0	0.0	0.0	5.2	0.0	0.0	3.7	18
Postponers	12.9	13.5	12.3	23.6	3.7	0.0	0.0	2.8	13.45	0.0	0.0	0.0	4.6	13.2	0.0	0.0	25
Ineligibles	39.3	21.2	9.2	0.0	10.9	0.0	0.0	9.0	0.0	0.0	0.0	0.0	10.4	0.0	0.0	0.0	7
DI Claimants	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1
Total N	39	52	30	89	9	1	22	16	30	3	0	0	9	16	3	2	321

Note: Weighted row percentages. Unweighted respondent counts in "Total N" rows and column.

Our results are consistent with Uccello (1998) and CBO (1999), who found that early takers are more likely to work in blue-collar occupations. The Bureau of Labor Statistics projected that growth in less physically demanding white-collar jobs will outpace growth of blue-collar jobs over the next several decades (CBO, 1999).

A relatively high proportion of Takers left their job involuntarily. Uccello (1998) found that nearly 30 percent of individuals age 62-63 in Wave 2 in the HRS reported leaving their last job involuntarily. Although age discrimination is illegal in hiring for most occupations, there is some evidence that it is particularly difficult for displaced older workers to find a new job (CBO 1993; Straka 1994). The search process may be even more difficult for workers who left their last job for health-related reasons. These factors add to the likelihood that an increase in the EEA will result in a greater DI caseload.

Table 3.11. Distribution of Workers with Employer Provided Retiree Health Insurance, by Claimant Type and Sex

	Male	Female
Takers	51.2	48.2
Postponers	38.8	34.3
Spousal benefits:		
Takers	0.3	2.5
Postponers	3.4	8.0
Ineligibles	2.0	2.8
DI claimants	4.4	4.2
Total	100.0	100.0

The availability of employer provided retiree health insurance may induce individuals to retire before qualifying for Medicare at age 65. Whether they claim early and reduced Social Security benefits will depend in part if they are liquidity constrained. Retiree health insurance can reduce (the risk of) high levels of medical expenditures and thus acts as an increase in wealth. Covered individuals are therefore more likely to finance consumption out of bequeathable wealth and delay claiming benefits. Table 3.11 shows the distribution of workers with employer provided retiree health insurance. Generally workers with retiree health insurance are less likely to delay than claim early. Only women who claim spousal benefits are more likely to delay claiming than claim early. Among men with employer provide retiree health insurance, 51.2 percent claim early Social Security benefits compared to 38.8 percent who delay claiming. Similarly for women, 48.2 percent claim early benefits while 34.4 percent delay. Overall, few workers with employer provide retiree health insurance claim spousal benefits or DI benefits.

3.3.4. Wealth and Pensions

Male Takers have slightly lower "median" household wealth (excluding housing, business, and pension wealth) before their 63rd birthday than Postponers but about the same amount of wealth after their 63rd birthday (Table 3.12). This reversal is perhaps the result of differential occurrences of pension lump sum distributions.[5] At the mean, male Takers and male spousal Takers have lower wealth than Postponers. This is consistent with liquidity constraints inducing early claiming behavior. The differences are small, though, and neither before nor after the 63rd birthday are the means significantly different from each other. The difference is even less pronounced at the 25th percentile. The wealth of male Takers is slightly lower than Postponers before age 63 and slightly higher after age 63 at the 25th percentile.

Table 3.12. Non-Housing, Non-Business, Non-Pensions Assets Before and After 63rd Birthday, by Claimant Type (Males)

	Freq	10th	25th	"Median"	75th	Mean	Std.Dev.
Before Age 63							
Takers	518	3,029	17,987	70,051	186,000	193,404	386,853
Postponers	477	1,797	18,100	78,571	217,550	226,347	483,198
Spousal:							
Takers	7	0	894	4,650	67,065	282,350	621,084
Postponers	35	95	6,000	54,449	165,000	177,673	368,214
Ineligibles	15	1,798	4,560	44,202	119,283	79,212	105,229
DI claimants	116	0	505	8,935	61,644	104,408	538,175
After Age 63							
Takers	518	1,684	16,851	72,020	213,463	214,702	522,709
Postponers	474	1,431	16,440	71,192	244,117	274,321	313,091
Spousal:							
Takers	7	-24,530	-1,721	8,177	84,352	93,901	492,887
Postponers	35	1,183	8,607	54,860	165,059	188,063	387,483
Ineligibles	15	179	7,153	30,185	112,669	91,133	160,088
DI claimants	116	-621	85	8,103	58,570	107,853	485,850

Note: In 1992 dollars; "Median" is mean of 45th to 55th percentile; weighted means and standard deviations.

[5] This wealth measure excludes pension wealth but includes Individual Retirement Accounts (IRAs). Pension lump sum distributions thus enter this measure whether they are rolled over into an IRA or cashed-out.

Among women, Takers have higher "median" household financial wealth than Postponers, both before and after their 63rd birthday (Table 3.13). This is also true at the 25th and 75th percentiles the difference is smaller prior to turning 63 than after. Generally, the differences are larger among women than those among men. Women that take spousal early benefits also have slightly higher median household wealth than women who delay taking spousal benefits before at 63 and slightly lower after age 63.

Table 3.13. Non-Housing, Non-Business, Non-Pensions Assets Before and After 63rd Birthday, by Claimant Type (Females)

	Freq.	10th	25th	"Median"	75th	Mean	Std.Dev.
Before Age 63							
Takers	490	2,208	16,094	73,568	191,232	194,012	580,908
Postponers	277	852	11,200	49,018	165,671	170,028	761,218
Spousal:							
Takers	147	0	12,307	68,070	213,006	213,953	187,680
Postponers	110	1183	12,307	62,389	260,341	226,413	320,189
Ineligibles	36	0	221	16,872	114,802	208,347	402,037
DI claimants	102	-2,236	0	587	15,291	25,012	62,307
After Age 63							
Takers	490	1757	16,990	72,736	200,552	200,193	433,944
Postponers	275	757	8,607	45,463	158,490	181,796	375,344
Spousal:							
Takers	147	268	10,490	61,267	216,396	224,220	489,664
Postponers	109	537	4,992	67,714	209,243	321,089	834,268
Ineligibles	36	0	282	21,776	126,147	201,444	365,222
DI claimants	101	-1,977	0	1,020	10,736	31,999	77,519

Note: In 1992 dollars; "Median" is mean of 45th to 55th percentile; weighted means and standard deviations.

We present several tables summarizing pension information. The data used in the tables describing the distribution of plan type and pension wealth are from the restricted Employer Pension Benefits data file. The information on this file was collected in Wave 1 only. Because not all respondents with a pension have a matched Employer Pension Benefits record, we combine this restricted data with information from the self-reports in reporting whether a claimant has a pension plan on either a current or past job (Table 3.14).

Eighty percent of male Takers have a pension plan on their current job or a past job. Postponers are less likely to be covered by a pension plan: 72.7 percent have pension coverage (Table 3.15). Approximately one half of male DI claimants have a pension. Fewer women than men have a pension plan on a current or past job. Just over one half of Takers have a pension plan. Women who delay claiming benefits past age 63 are more likely to have a pension plan: 68.4 percent. Among women who claim spousal benefits, even fewer have a pension plan. Only 7.5 percent of Takers and 26 percent of Postponers who claim spousal benefits have a pension plan. Rates are also low among women DI claimants. Many men and women Ineligibles have pension coverage. This likely reflects the fact that the Ineligibles groups contain many government employees who have pension plans.

Table 3.14. Percentage with a Pension Plan, by Claimant Type and Sex

	Male		Female	
	Freq.	Percent	Freq.	Percent
Takers	518	80.2	490	56.5
Postponers	477	72.7	277	68.4
Spousal benefits:				
Takers	7	24.1	147	7.5
Postponers	35	77.6	110	26.0
Ineligibles	15	75.0	36	45.8
DI claimants	116	53.1	102	32.5
Total N	1168		1162	

Note: Weighted row percentages; unweighted respondent counts in “Total N” rows and column.

Table 3.15 shows the distribution of pension plan type, on a current or past job, among those who had a record on the Employer Pension Benefits data file. Among men, about one-half of Takers, Postponers, and DI claimants have a defined benefit (DB) pension plan. Takers are slightly more likely to have both a DB and a defined contribution (DC) pension plan than Postponers. The distribution is similar among women. Notably, among women who claim spousal benefits, approximately 75 percent have a DB plan on a current or past job. Ineligibles are most likely to have a DB plan, perhaps because many of them are government employees.

Table 3.15. Distribution of Pension Types on Current Job in 1992, by Claimant Type and Sex

	DC	DB	DB and DC	Total N
Male				
Takers	18.7	50.2	31.1	266
Postponers	23.4	52.8	23.8	186
Spousal benefits:				
Takers	0.0	100.0	0.0	2
Postponers	11.5	85.6	2.9	22
Ineligibles	0.0	100.0	0.0	8
DI Claimants	22.8	52.0	25.1	34
Total N	102	277	139	518
Female				
Takers	22.9	49.1	28.0	158
Postponers	25.5	46.1	28.4	115
Spousal benefits:				
Takers	24.9	75.1	0.0	5
Postponers	2.3	73.2	24.5	23
Ineligibles	4.4	85.5	10.1	13
DI Claimants	25.8	51.9	22.3	18
Total N	73	170	89	332

Note: Weighted row percentages; unweighted respondent counts in “Total N” rows and column.

Table 3.16 shows summary statistics on pension wealth (conditional on being positive). Pension wealth is computed as the expected present discounted value of pension benefits at age 62, including plans from the current and up to two former employers.[6] Conditional on being positive, “median” pension wealth at age 62 in Wave 1 is about 31 percent higher for the male Takers than for the male Postponers. At the 25th quantile, a male Taker’s pension wealth at age 62 is almost twice as large, but at the 75th quantile, only

[6] For respondents who were working at the time of the 1992 interview, we include plans at the 1992 employer and at the previous job that lasted five years or longer. For respondents who were not working at the time of the 1992 interview, we include plans at the most recent job and at the job before the most recent job that lasted five years or longer.

11 percent higher. Mean pension wealth is substantially higher than median pension wealth for both Postponers and Takers demonstrating the skewed nature of pension wealth. Postponers have slightly less wealth than Takers at the mean. Among women, pension wealth differences between Takers and Postponers are smaller than among men. Female Takers have 12 percent higher pension wealth at age 62 at the 'median'. Few men and women who claim spousal benefits, have pension wealth. Both men and women that are ineligible for Social Security benefits have substantially higher pension wealth than Takers and Postponers. Again, this likely reflects the fact that the Ineligibles groups contain many government employees with generous pension plans.

Table 3.16. Pension Wealth at Age 62, Measured at Wave 1, by Claimant Type and Sex

	N	25th	"Median"	75th	Mean	Std.Dev.
Male						
Takers	261	93,917	190,701	386,252	286,376	283,742
Postponers	180	48,386	131,996	343,220	261,654	304,283
Spousal benefits:						
Takers	2	10,374	103,938	197,501	93,916	131,558
Postponers	21	237,755	323,953	473,158	305,310	191,967
Ineligibles	8	369,346	602,080	823,175	562,440	286,331
DI claimants	33	66,693	98,839	150,715	141,440	128,235
	N	25th	"Median"	75th	Mean	Std.Dev.
Female						
Takers	150	14392	86,975	192379	125,942	124,377
Postponers	106	30250	76,389	160914	122,874	151,661
Spousal benefits:						
Takers	4	7140	39,966	129154	50,098	74,870
Postponers	21	170702	213,706	271186	228,596	113,233
Ineligibles	12	186,794	261,849	359,905	300,665	151,425
DI claimants	17	37,974	57,164	108,769	94,252	72,253

Note: Pension wealth in current and last jobs. In nominal dollars as of the year the individual turns age 62; "Median" is mean of 45^{th} to 55^{th} percentile; weighted means and standard deviations.

Social Security wealth, projected to ages 62, is about the same for male Takers and Postponers (Table 3.17).[7] Among women, Takers enjoyed slightly higher Social Security wealth than Postponers. Among women who claim spousal benefits, Takers also have slightly higher Social Security Wealth. Naturally, the same patterns are borne out in Average Indexed Monthly Earnings (AIME) and Primary Insurance Amounts (PIAs).

[7] Social Security wealth at age 65 is computed under the assumption of continued work through age 65. For Takers and DI Claimants, this assumption is obviously incorrect. We therefore do not report Social Security wealth at age 65.

Table 3.17. Social Security Wealth at Age 62 and Age 65, by Claimant Type and Sex

		Age 62		
	N	"Median"	Mean	Std.Dev.
Male				
Takers	401	180,458	166,432	51,871
Postponers	407	184,590	168,957	49,814
Spousal benefits:				
Takers	2	57,872	60,410	62,098
Postponers	19	75,107	85,221	42,014
Ineligibles	4	73,209	65,451	44,406
DI claimants	69	144,908	142,351	58,700
Female				
Takers	366	186,467	175,136	57,668
Postponers	230	173,903	160,445	66,927
Spousal benefits:				
Takers	102	192,733	183,484	47,665
Postponers	82	179,450	166,520	59,123
Ineligibles	6	89,075	103,183	60,675
DI claimants	53	116,228	126,949	59,821

Note: In nominal dollars as of the year the individual turns age 62 (65); "Median" is mean of 45^{th} to 55^{th} percentile; weighted means and standard deviations.

3.4. Principal Components Analysis

While insightful, the tabulations above do not account for correlations among variables that characterize workers who take early Social Security retirement benefits. Here we summarize the characteristics of Takers by principal component analysis. Principal component analysis involves a mathematical procedure that transforms a number of (possibly) correlated variables into a (smaller) number of uncorrelated variables called principal components. The first principal component accounts for as much of the variation in the data as possible, and each succeeding component accounts for as much of the remaining variation as possible. The greater the fraction variation that is explained by the first component, the better the data may be summarized on a single univariate scale. Conversely, the less is explained by the first component, the greater is the diversity of the data.

We jointly examine education, health, aspects of work, earnings, availability of retiree health insurance, financial wealth, pension plan, pension wealth and Social Security wealth. For male Takers, the first principal component accounts for 16.2 percent of the variation in characteristics; the second component accounts for almost as much (14.9 percent). Altogether, the first four principal components account for 51.2 percent of the variation. In principal components analysis, these fractions are fairly low. By comparison, the first principal component of characteristics of both Takers and Postponers accounts for 17.4 percent of their variation and the first four components jointly account for 50.9 percent. Takers are thus about as diverse as OASI claimants as a whole.

The diversity results for women are similar to those of men. The first and first four components account for 17.0 and 51.5 percent, respectively. (The corresponding fractions among female Takers and Postponers together are 18.8 and 51.7 percent, respectively.)

Table 3.18 and Table 3.19 show the first four principal components by sex. For men (Table 3.18), the first principal component scale reflects the heterogeneity among Takers along a distinct dimension: those that are healthy and wealthy (and typically retired before age 63) and those that are not. Good health and high wealth are reflected in large positive loadings on college educated, excellent or very good health, retiree health insurance, pension ownership and pension wealth. Poor health and low wealth are captured by large negative loadings on high school drop-out, fair or poor health, and physically demanding job. The interpretation becomes more tentative with subsequent components. The second principal component shows large positive loadings on working before turning 63, high earnings, a physically demanding job, and professional occupations; a negative loading applies to having a health condition that limits work. This scale thus captures Takers that are working directly before turning 63 years old and are healthy high-earners.

To clarify, each component reflects a *dimension* along which individuals may be characterized. It does not summarize the characteristics of a subset of individuals. For example, the first principal component for men captures healthy/wealthy/retired Takers as much as unhealthy/poor/working Takers.

While female takers show about as much diversity as their male counterparts, their diversity shows up in different dimensions (Table 3.19). Like men, their first component captures good health, retiree health insurance, and pension coverage. However, unlike men, the first component correlates positively with working for pay prior to turning 63 years old and with having a physically demanding or professional job. This first component thus sums up healthy women that were working in jobs with good benefits until just before they claimed benefits versus those with opposite characteristics. Women’s second component is more akin to men’s first component.

In sum, for both male and female Takers, we see two distinct group emerging: healthy, relatively wealthy individuals versus those in poor health and with little wealth. These two groups are the focus of the next section.

Table 3.18. Eigenvectors for First Four Principal Components: Males

	Principal Components			
	1	2	3	4
High school dropout	-0.337	-0.045	-0.141	0.001
High school graduate	0.108	-0.067	-0.289	-0.416
College	0.224	0.108	0.418	0.403
Health excellent/very good	0.302	0.192	0.267	-0.469
Health good	-0.134	-0.093	-0.316	0.394
Health fair/poor	-0.242	-0.143	0.034	0.143
Health limits work	-0.170	-0.198	0.048	0.272
Working for Pay	-0.186	0.542	-0.082	0.049
Annual earnings	0.121	0.266	-0.065	0.108
Has physically demanding job	-0.260	0.296	-0.153	-0.095
— missing indicator	0.179	-0.545	0.082	-0.048
Professional or Manager	0.031	0.327	0.188	0.212
Has retiree health insurance	0.353	0.022	-0.420	0.127
— missing indicator	-0.345	-0.094	0.428	-0.129
Financial wealth	0.132	0.043	0.278	0.029
Has pension	0.347	0.028	-0.144	0.167
Pension wealth age 62	0.264	-0.031	0.110	0.243
Social Security wealth at age 62	0.163	0.089	-0.021	-0.069

Table 3.19. Eigenvectors for First Four Principal Components: Females

	Principal Components			
	1	2	3	4
High school dropout	-0.179	-0.242	0.258	0.31
High school graduate	-0.076	-0.021	-0.310	-0.64
College	0.246	0.249	0.083	0.38
Health excellent/very good	0.188	0.126	-0.520	0.27
Health good	-0.094	-0.014	0.277	-0.41
Health fair/poor	-0.143	-0.156	0.373	0.14
Health limits work	-0.154	-0.062	0.331	-0.03
Working for Pay	0.350	-0.442	-0.051	-0.05
Annual earnings	0.322	-0.093	0.133	-0.04
Has physically demanding job	0.221	-0.326	-0.016	-0.02
— missing indicator	-0.350	0.445	0.049	0.05
Professional or Manager	0.301	-0.148	0.052	0.07
Has retiree health insurance	0.306	0.275	0.219	-0.16
— missing indicator	-0.347	-0.212	-0.263	0.17
Financial wealth	0.024	0.116	-0.075	0.09
Has pension	0.232	0.254	0.129	-0.12
Pension wealth age 62	0.235	0.309	0.122	0.01
Social Security wealth at age 62	0.022	0.104	-0.232	-0.01

3.5. Well-being by Health and Employer Pension Status

The effect of an increase in the EEA will depend in part on Takers' ability to continue working and accumulate additional retirement savings. To identify these vulnerable groups and to assess the extent to which these potentially vulnerable Takers will be able to continue working, we further disaggregate Takers and Postponers into categories by whether health limits work before age 63 and pension wealth. We use self-reported data on pension plans to determine whether a claimant has pension wealth. We dichotomize pension wealth into two groups: those that have positive pension wealth at age 62 and those who do not.

Table 3.20. Distribution of Persons by Claimant Type, Self-Reported Health Status, and Pension Entitlement

Claimant	Health Limitation	Pension	Males		Females		Total	
			Freq.	Percent	Freq.	Percent	Freq.	Percent
Taker	No	Yes	348	33.6	226	22.1	574	27.9
		No	88	8.5	263	25.7	351	17.1
	Yes	Yes	64	6.2	58	5.7	122	5.9
		No	24	2.3	89	8.7	113	5.5
Postponer	No	Yes	324	31.3	191	18.7	515	25.0
		No	118	11.4	133	13.0	251	12.2
	Yes	Yes	45	4.4	26	2.5	71	3.5
		No	24	2.3	37	3.6	61	3.0
Total			1035	100.0	1023	100.0	2058	100.0

Table 3.20 shows the distribution of individuals by claimant status, health and pension wealth. One-in-five Takers ((5.5+5.9)/(27.9+17.1+5.5+5.9)), corresponding to 11.4 percent of the sample, has a work-limiting health condition. About half of them, 5.5 percent of the sample, do not have any pension and are most vulnerable to an increase in the EEA. Men are less likely to be in this group (2.3 percent) than women (8.7 percent).

Table 3.20 does not distinguish claimants on the basis of own or spousal earnings history, because the cell sizes would become very small. Table 3.21 shows a similar distribution with that distinction, but not by sex. The majority of Spouse Takers have no health limitation and no pension wealth. Among all Takers, 4 percent are Spouse Takers with a health limitation and no wealth. This group may be particularly vulnerable to an increase in the EEA because of limited work opportunities based on both health and past labor supply.

Table 3.21. Distribution of Persons by Claimant Type, Including Spousal Claimants, Self-Reported Health Status, and Pension Entitlement

Claimant	Health limitation	Pension	Total Freq.	Total Percent
Taker	No	Yes	566	27.5
		No	256	12.4
	Yes	Yes	118	5.7
		No	66	3.2
Spouse taker	No	Yes	8	0.4
		No	95	4.6
	Yes	Yes	4	0.2
		No	47	2.3
Postponer	No	Yes	469	22.8
		No	190	9.2
	Yes	Yes	62	3.0
		No	32	1.6
Spouse postponer	No	Yes	46	2.2
		No	61	3.0
	Yes	Yes	9	0.4
		No	29	1.4

We focus on the physically demanding nature of jobs across these potentially vulnerable groups. Due to the small sample size, we do not break down Takers and Postponers by whether they claimed spouse benefits throughout this part of the analysis. The HRS asks respondents whether their jobs require physical effort and whether they require heavy lifting. The answers may be “all or almost all the time,” “most of the time,” “some of the time,” and “none or almost none of the time.” For parsimony, we only distinguish the two most stringent from the two least stringent categories.

We document the potential vulnerability of workers with physically demanding jobs in two ways. First, Table 3.22 shows the distribution of workers with physically demanding jobs over person types (Taker/Postponer by health status and pension entitlement). Second, for each person type, Table 3.23 and Table 3.24 show the fractions that are in physically demanding jobs.

Table 3.22. Distribution of Workers With Physically Demanding Jobs

			Males		Females	
			Physical Effort	Heavy Lifting	Physical Effort	Heavy Lifting
Claimant	Health Limitation	Pension	Percent	Percent	Percent	Percent
Taker	No	Yes	21.4	22.5	16.7	21.9
		No	10.5	14.0	26.1	29.5
	Yes	Yes	6.2	5.4	8.6	7.8
		No	1.1	1.1	2.4	1.9
Postponer	No	Yes	33.3	31.9	25.3	27.5
		No	18.2	18.4	17.9	7.7
	Yes	Yes	6.5	2.8	1.4	1.0
		No	2.7	3.9	1.6	2.7
Total			100.0	100.0	100.0	100.0

Table 3.22 shows the distribution of workers in jobs requiring physical effort (all or most of the time) and jobs requiring heavy lifting (all or most of the time) across categories of claimant type, health limitation, and pension entitlement. (Table 3.23 and Table 3.24 below present this information from a different perspective, namely the fractions of workers with tough jobs, by claimant type, health status, pension coverage, and sex.) Among men whose job requires a lot of physical effort most or all of the time, only 1.1 percent had a work-limiting health condition, had no pension entitlement, and took early and reduced Social Security benefits. Similarly, 2.7 percent of men with a job that requires a lot of physical effort most or all of the time had a work-limiting health condition, no pension, and postponed taking benefits. Put differently, just over one out of three men with a tough job, a health condition that limits work, and without a pension took early benefits. Among women with a tough job, a health condition that limits work, and without a pension, 67 percent took early benefits. Thirty seven percent of men and 60 percent of women in physically demanding jobs, without work-limiting health conditions and without pension, took early benefits; they, too, may become vulnerable to an increase in the EEA in case of a bad health shock. Another indicator of physically demanding jobs is whether the job entails heavy lifting. A similar picture emerges using that criterion (not shown).

Table 3.23. Fractions of Person Types in Physically Demanding Jobs

Claimant	Health Limitation	Pension	Males (Percent)	Females (Percent)
Taker	No	Yes	34.6	28.0
		No	56.2	48.4
	Yes	Yes	58.7	70.2
		No	40.4	21.3
Postponer	No	Yes	31.1	26.3
		No	47.9	41.4
	Yes	Yes	62.4	14.4
		No	45.7	41.1

Table 3.23 shows the percent in jobs that require physical effort row-by-row. Takers with a work-limiting health condition and jobs that require a lot of physical effort most or all of the time are the most likely to have a decreased ability to continue working. Among men (women) who took early and reduced Social Security benefits and have a work-limiting health condition and no pension wealth, 40.4 (21.3) percent have physically demanding jobs. Ignoring pension coverage, roughly one-half of Takers have a physically demanding job.

Table 3.24. Fractions of Person Types in Jobs That Require Heavy Lifting

Claimant	Health Limitation	Pension	Males (Percent)	Females (Percent)
Taker	No	Yes	13.9	11.3
		No	28.5	16.5
	Yes	Yes	19.7	19.3
		No	14.8	5.1
Postponer	No	Yes	11.4	8.7
		No	18.5	5.5
	Yes	Yes	10.1	3.3
		No	25.2	22.0

Table 3.24 is similar to Table 3.23, but reports fractions of workers in jobs that require heavy lifting. Among male Takers with a health limitation and no pension 14.8 percent have jobs that require heavy lifting all or most of the time among all groups. For females, this is lower: 5.1 percent of female Takers with a work-limiting health condition and without pension wealth have jobs entailing these duties. These women are particularly vulnerable to increases in the EEA.

3.6. Conclusion

More than half of workers eligible to claim early retirement benefits at age 62 do in fact begin receiving benefits in that year. Proposals to raise the EEA would directly affect this population. The magnitude of the impact depends in part on their ability to continue working and accumulate additional retirement savings. In a population whose health is generally declining there is real concern about the ability to continue working.

The total cost to society of an increase in the EEA consists of several components.

1. There is a financial effect on OASDI contributions and benefits. OASDI contributions are likely to increase because some workers will work longer; OASI benefits may increase or decrease, depending on the actuarial fairness of the early retirement penalty; DI benefits are likely to increase because a fraction of prospective Takers may successfully apply for DI.
2. Some prospective Takers may unsuccessfully apply for DI and incur lost earnings due to the five-month waiting period until DI benefits are payable.
3. Some Takers may be forced to work longer than they would like and experience potentially substantial welfare losses due a choice restriction.
4. Other financial resources permitting, they may also opt to retire early despite an EEA increase. This may limit their ability to smooth consumption, again implying a welfare loss.

The responses of Takers to an increase in the EEA is likely to depend largely on their health status and financial resources. While quite healthy on average, Takers are more likely to be in poor health than workers who postpone benefits. Workers who are ineligible for OASI benefits based on their own earnings history but claim spousal benefits are less healthy than other workers who claim OASI benefits, particularly if they are early spousal claimants. About one-in-five individuals who take early and reduced benefits have a work-limiting health condition. Among them,

- One-half, i.e., ten percent of Takers or the equivalent of roughly 1.8 million current beneficiaries, do not have any private pension. These workers are particularly likely to apply for DI benefits in case of an increase of the EEA. Almost half (42 percent) were ineligible for OASI on their own account and thus likely also ineligible for DI. The other half, i.e., ten percent of Takers or the equivalent of roughly 1.8 million current beneficiaries, have at least some form of pension. While they are in a better position to retire early despite an EEA increase, they, too, could experience substantial welfare losses because of a diminished ability to smooth consumption.
- Irrespective of pension coverage, also roughly one-half have a physically demanding job.

Chapter 5 quantifies the likely effects of an increase in the EEA on labor force participation, DI enrollment, and the financial status of the OASDI program. As pointed out before, however, additional welfare costs may be incurred due to the elimination of the option to claim OASI benefits at age 62.

4. Retirement Planning

Summary

This chapter is concerned with two issues. First, it describes when individuals near retirement age plan to retire and documents how their characteristics differ by planned retirement age. Second, it evaluates how accurately these individuals predict the timing of their retirement and documents how good planners differ from poor planners.

Among others, retirement planning is important because poor planning may make it even more difficult for workers to adjust to changes in Social Security policy. One objective of this chapter is therefore to identify opportunities for targeted retirement planning education.

The analysis is based on the Health and Retirement Study (HRS), a nationally representative survey of individuals age 51-61 at baseline in 1992. Respondents were re-interviewed at two-year intervals. We use the first four waves of the HRS.

Retirement Expectations

As shown in the table below, most individuals plan to retire at age 62 or 65. As individuals are re-interviewed at higher ages, their planned retirement ages increase somewhat. This is largely because workers that retire between waves are not asked to report their planned retirement age again, so that the sample increasingly consists of late retirees.

Table 4.1. Distribution of Expected Retirement Age, by Wave

	Wave 1	Wave 2	Wave 3	Wave 4
Age < 62	27.0	23.6	20.8	13.8
Age 62	44.2	42.4	37.5	34.4
Age 63-64	4.1	6.9	6.5	8.0
Age 65	23.2	24.8	28.8	28.2
Age > 65	1.6	2.3	6.3	15.6
Total	100.0	100.0	100.0	100.0
Sample size	1,379	1,325	1,151	864

Consistent with earlier studies of retirement expectations, we demonstrate that retirement expectations in the HRS are closely correlated with many of the standard determinants of actual retirement.

Broadly speaking, the following picture emerges. Workers who expect to retire young, before age 62, tend to be relatively wealthy and have generous pensions. Workers who plan on retiring at age 62 tend to be in poorer health and less wealthy; they may be motivated by Social Security law, which does not pay benefits until age 62. Workers who plan on retiring after age 62 are more diverse. They include individuals of limited means and small pensions. They also include wealthy individuals and individuals who are better able to adjust their workload.

More specifically, private pension incentives play an important role in determining retirement expectations. Individuals with private pensions are disproportionately represented among individuals expecting to retire early and, conditional on having a private pension, access to early pension benefits greatly increases the odds of planning an early retirement. Private pension wealth declines considerably with expected retirement age further suggesting that individuals are responsive to private pension plan incentives. Individuals who have been on their job for a long time tend to plan an earlier retirement than those who more recently started their job. This may be the result of incentives in private pensions, which often encourage early retirement for individuals with long tenure.

There is little correlation between Social Security wealth and expected retirement age.

Individuals who expect to retire at age 62 appear to have lower wealth, less desirable job characteristics, and may be in worse health than individuals expecting to retire before or after age 62. Age 62 may be the earliest these individuals can expect to retire, given the inability to borrow against future Social Security income.

The wealthiest and most educated individuals often plan a very early (before age 62) or very late (after age 65) retirement. Income effects may account for their disproportionate share among those expecting to retire early, while high tastes for work and perhaps access to more accommodating occupations may account for their disproportionate share among those expecting to retire late. Individuals with flexible work hours and the opportunity to perform less demanding work in the same job tend to plan to retire late. Individuals with higher expected retirement ages also appear to like their current job more than individuals who expect to retire early.

There is strong evidence that spouses coordinate their retirement plans. The simple correlation between the expected retirement ages of husbands and wives is 0.43. Perhaps somewhat surprisingly, though, only 14 percent of couples expect the husband and wife to retire in the same year. In 50 percent of cases, husbands report that they expect to retire after their wives retire.

Accuracy of Retirement Expectations

Based on our comparison of expected retirement age at Wave 1 and actual subsequent retirement age, individuals in the HRS form reasonable retirement expectations. Unfortunately, the HRS sample cannot be used to derive an unbiased estimate of the fractions of workers that retire earlier-than-planned, on-time, or later-than-planned. At baseline, many respondents have already retired or are very close to retirement, thus masking accelerated retirement by an unknown number of workers. By the last available survey wave, many respondents have not yet reached their planned retirement age, thus hiding what fraction will eventually retire on-time or later-than-planned. Based on all available information, roughly one-third of the sample retired within one year of their expected retirement date, one-third retired earlier-than-planned, and one-third later-than-planned, but the eventual counts may differ.

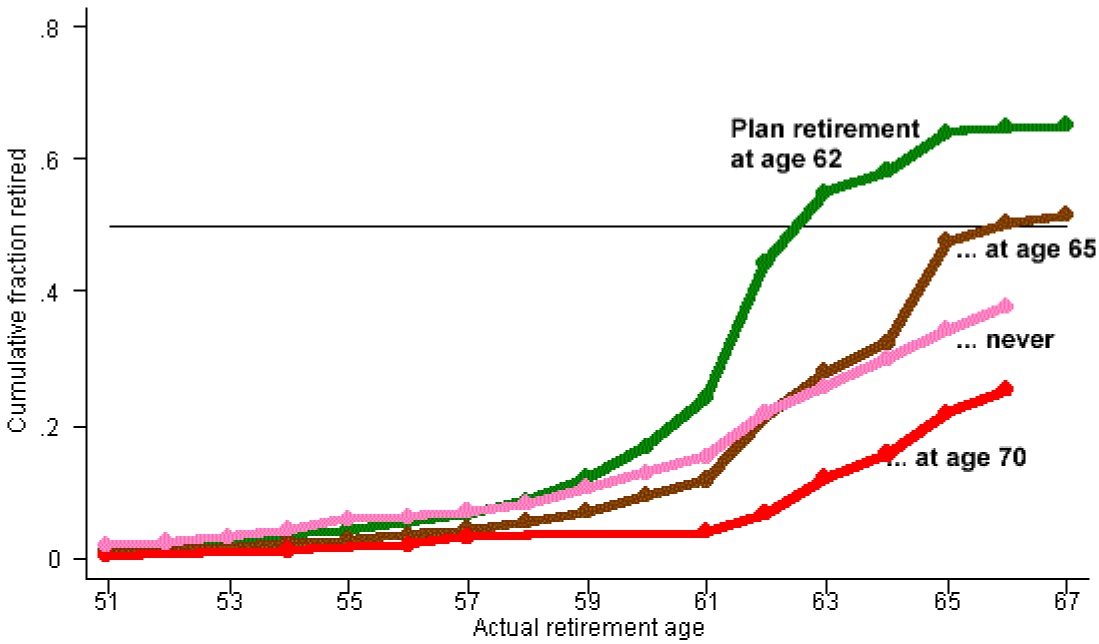

Figure 4.1. Cumulative Distribution of Actual Retirement Age, by Planned Retirement Age

The figure shows the total fraction of workers that has retired as they age, separately for workers that planned on retiring at age 62, 65, 70, or never. The patterns confirm that those who plan on retiring at a younger age indeed do so. The modal actual retirement age is 62 for those planning on retiring at age 62, and 65 for those who planned to retire at that age. The medians are close to planned ages. The curves are flatter for higher planned retirement ages, i.e., the prediction was less accurate for workers who expected their retirement to be far into the future.

Among those who retired earlier-than-expected, many felt forced to retire and/or experienced an adverse health event between Wave 1 (when they reported their expectation) and their actual retirement. If those health shocks are at least partly unanticipated, they help explain why some individuals retire earlier-than-planned. Also, workers whose spouse retired earlier-than-planned often accelerated their own retirement timing.

While forced retirement and unexpected declines in health help explain why many individuals retire earlier than expected, the evidence on reasons for delaying retirement is more mixed. Declining health and forced retirement predictably discouraged delayed retirement. Increased flexibility, such as through increased ability to reduce hours on the job, significantly delays retirement. Also, as expected, workers who lost retiree health insurance coverage were more likely to delay retirement. The effects of other changes in job characteristics, however, were counterintuitive.

As stated above, one objective of this analysis is to identify opportunities for targeted retirement planning education. However, the factors that explain why workers miss their intended retirement age do not lend themselves well to targeted education. An important lesson from the retirement accuracy analysis, however, is that about one-out-of-three workers retire at least one year later than planned. This suggests that these individuals may have underestimated the need for precautionary saving.

4.1. Introduction

Underlying most models of retirement behavior is the assumption that individuals are forward-looking in their labor force participation, consumption, and savings decisions. The life cycle hypothesis model suggests that individuals have a sense of when they will retire and make tradeoffs between consumption/leisure and savings/work today in order to accommodate a certain desired standard of living during retirement. This chapter is concerned with the issue whether individuals' retirement plans are realized and whether some individuals are better at planning for retirement than others. This is important for several reasons. First, poor planners are likely to be among those for whom the burden of a higher Social Security Early Entitlement Age (EEA) or Normal Retirement Age (NRA) would be particularly severe. Second, if individuals are poor planners, models that assume individuals make rational retirement decisions based on expected retirement wealth may perform poorly in predicting actual retirement timing.

Specifically, this chapter:

- Compares the characteristics of respondents who plan to retire at an age less than 62, 62, 63 to 64, 65, or over 65;
- Estimates several equations that explain target retirement ages;
- Simulates how a one-year increase in the EEA would influence predictions of the target retirement age;
- Determines the characteristics of respondents who fail to meet their retirement targets; and
- Estimates an equation to explain which respondents retire after their target retirement age.

The analyses rely on a characterization of retirement expectations derived from the Health and Retirement Study (HRS). Section 4.2, therefore, first compares and contrasts three different measures of retirement expectations available in the HRS. We use these measures in Section 4.3 to explore how individual characteristics like income, job characteristics, health, and expected retirement income vary with expected retirement ages. Section 4.3 also presents results from a regression model of retirement expectations. Section 4.4 exploits the longitudinal nature of the HRS to examine how the characteristics of individuals who retire earlier than expected compare with those who retire later than expected and those who meet their retirement expectations. We do this with both univariate and multivariate analyses.

A sizable empirical literature has explored the general determinants of retirement expectations and how well they accord with actual retirement using both the HRS and the earlier Retirement History Survey (RHS). Rather than summarize that literature here, we reserve discussion of prior studies on retirement expectations for relevant sections below.

4.2. Measuring Retirement Expectations

The HRS contains three sets of questions that address retirement expectations. The first set, asked in all waves of all individuals currently working for pay, starts by asking:

> *"Are you currently planning to stop working altogether or work fewer hours at a particular date or age, to change the kind of work you do when you reach a particular age, have you not given it much thought, or what?"*

Those who plan to stop work altogether are subsequently prompted for the age at which they plan to do so. We refer to this question below as the "stop work" question.

Table 4.2. Distribution of Expected Retirement Age, by Wave

	Wave 1 (age 51-61)	Wave 2 (age 53-63)	Wave 3 (age 55-65)	Wave 4 (age 57-67)
Stop work altogether at:				
Age < 62	27.0	23.6	20.8	13.8
Age 62	44.2	42.4	37.5	34.4
Age 63-64	4.1	6.9	6.5	8.0
Age 65	23.2	24.8	28.8	28.2
Age > 65	1.6	2.3	6.3	15.6
N	1,379	1,325	1,151	864
Combined retirement age:				
Age < 62	20.3	23.6	13.9	8.7
Age 62	27.8	42.4	29.1	25.7
Age 63-64	11.3	6.9	5.0	6.2
Age 65	23.8	24.8	34.5	32.1
Age > 65	16.8	2.3	17.7	27.4
N	5,212	1,325	2,305	1,722

The top panel of Table 4.2 presents the distribution of expected retirement ages using responses to the stop work question.[8] In this and all subsequent analyses, only age-eligible respondents are included, that is, respondents born in 1931-41. In Wave 1, about 27 percent of respondents expect to completely retire or stop work at age less than 62, 44 percent at age 62, 4 percent between age 63 and 64, 23 percent at age 65, and only 2 percent at ages 65 and above. This distribution shifts toward higher ages in later waves. In Wave 1, only 1,379 respondents provided an answer to the stop work question. The low response rate is due several factors. First, 3,161 respondents in Wave 1 were not currently working for pay and so were ineligible for the question. Second, 44 percent of those who responded to the question reported they had not given retirement much thought. Third, 27 percent reported they planned to change jobs or reduce hours instead

[8] All means and regression results are weighted by person-specific sampling weights unless otherwise noted.

of stop work altogether. Finally, 8 percent of the eligible sample reported they plan never to stop work.

The resulting Wave 1 sample of 1,379 valid responses is quite small. Fortunately, we can improve sample size substantially. In Wave 1, the HRS also asks of individuals who report they are not already completely retired whether they expect to completely retire and, if so, when (age or year) they expect to do so. We refer to this question as the "retirement" question. The bottom panel of Table 4.2 combines responses to the stop work and retirement questions, resulting in 5,212 responses.[9] The improvement in sample size is due to the fact that the retirement question is asked of all respondents who are not completely retired, not just those currently working for pay. Additionally, respondents to the retirement question were not given the option of responding that they planned to change jobs or reduce hours. Respondents to the retirement question were also much less likely to report that they had not thought much about retirement than respondents to the stop work question.

The retirement question was discontinued after Wave 1. However, the universe of the follow-up to the stop work question was widened in Waves 3 and 4. Unlike in Wave 1, the stop work question in Waves 3 and 4 asked all respondents who are currently working when they plan to or think they will stop work. This question was asked even if the respondent responded to the first question that they planned to reduce hours, change jobs, or never stop work rather than stop work altogether. The result is that the sample size of the combined measure falls considerably after Wave 1, but is still substantially higher than that for the stop work question alone in Waves 3 and 4. In Wave 2, the combined and stop work samples are the same since neither the retirement question nor the follow-up question were asked.

The combined expected age at retirement measure produces a somewhat different distribution of expected retirement ages (second panel of Table 4.2). In particular, the distribution is much less concentrated at age 62; in Wave 1, for example, 28 percent of the sample expects to retire at age 62 compared to 44 percent of the sample using just the response to the stop work question. More generally, the combined measure produces an older distribution of expected retirement ages.

Expected retirement ages using the retirement question are higher than those from the stop work question. This may be due to differences in the composition of the two universes. In Wave 1, for example, respondents who answered the retirement question but not the stop work question, are more likely to have been not working for pay, have answered that they expected to change jobs or reduce hours, or to have answered that

[9] Two issues arise. First, for individuals who respond to both the stop work and retirement question, we take their answer to the stop work question. This is relevant only for Wave 1. Second, respondents could report their expected retirement in the form of an age or a year. We converted years into ages using respondents' birth dates, which likely entails some rounding error. As a result, concentrations at specific ages (like age 62 and age 65) are less pronounced. This is further evidenced by the fact that in 34 percent of the Wave 1 cases in which a respondent answered both the stop work and retirement questions, the reported ages are one year apart (not shown). In the remaining 66 percent of cases, the ages are the same. Unfortunately, there is no way to address this rounding error problem.

they had not thought much about retirement. These tendencies may also make these individuals more likely to report a later retirement age. For example, someone who reports he plans to change jobs or reduce hours rather than stop work altogether may be more likely to report a later retirement age than someone who is certain he will stop work altogether.

A second set of questions in the HRS, asked of any respondent not currently receiving Social Security benefits, inquires:

> *"Do you expect to receive Social Security benefits at some time in the future?"*

and, if affirmative,

> *"At what age do you expect to start collecting these benefits?"*

The number of individuals responding to this set of questions was substantially higher than the number responding to the expected retirement age questions. As shown in Table 4.3, 7,562 individuals reported an expected benefit age in Wave 1. The larger sample size is due to the fact that the Social Security question was asked of all respondents who are not now receiving, but expect to receive Social Security benefits in the future regardless of their current work status. Expected ages of Social Security receipt are concentrated at ages 62 and 65. Only 10 percent of the sample in Wave 1 expected to receive Social Security benefits at some other age. As with expected retirement age, the age distribution of expected Social Security benefit receipt shifts toward older ages in subsequent waves.

Table 4.3. Distribution of Expected Age of Social Security Benefit Receipt, by Wave

	Wave 1 (age 51-61)	Wave 2 (age 53-63)	Wave 3 (age 55-65)	Wave 4 (age 57-67)
Age < 62	3.6	3.6	3.4	2.3
Age 62	53.1	53.7	48.7	49.8
Age 63-64	2.6	3.5	4.2	4.3
Age 65	37.0	34.8	36.9	36.3
Age > 65	3.7	4.4	6.7	7.4
N	7,562	5,977	5,146	5,086

A third set of questions in the HRS, asked of all individuals currently working for pay, prompted respondents to report the following likelihood:

> *"Thinking about work generally and not just your present job, what do you think are the chances that you will be working full-time after you reach age 62?"*

The same question is subsequently asked for work after reaching age 65. Previous research has found that these subjective retirement probabilities are internally consistent, correspond to observed retirement probabilities, and vary with factors that determine observed retirement ages (Chan and Stevens 2001a; Hurd 1999; Hurd and McGarry 1999; Honig 1996). For example, less than two percent of individuals report a lower probability of stopping work by age 65 than by age 62.

Table 4.4. Subjective Probability of Continuing Work after Age 62 and 65, by Wave

	Wave 1 (age 51-61)	Wave 2 (age 53-63)	Wave 3 (age 55-65)	Wave 4 (age 57-67)
Work After Age 62				
Mean	0.49	0.43	0.49	0.50
Fraction reporting:				
<0.25	36.8	43.1	37.3	37.3
0.25-0.75	27.9	29.1	28.2	25.7
>0.75	35.4	27.9	34.5	37.0
N	6,630	5,902	3,571	2,541
Work After Age 65				
Mean	0.27	0.23	0.27	0.27
Fraction reporting:				
<0.25	62.2	66.1	59.8	61.1
0.25-0.75	23.1	23.5	26.5	24.1
>0.75	14.8	10.4	13.7	14.9
N	6,617	6,067	3,619	2,569

Table 4.4 tabulates these subjective retirement probabilities across four waves of the HRS. The HRS population was more willing to report the likelihood of retirement than a specific retirement age: 6,630 currently working respondents reported a probability of continuing work after age 62 and 6,617 after age 65. The mean probability of continuing work after ages 62 and 65 is fairly constant across the waves at 49 and 27 percent respectively.[10] Over 65 percent of the responses in Wave 1 are bunched at the focal points of 0, 0.5, and 1 (not shown).

There is an error in the skip logic of the probability questions. The question about work after age 62 should only have been asked of respondents under age 62; the one about work after age 65 only of respondents under age 65. In Wave 1, when age-eligible respondents are at most 61 years old, the issue was irrelevant. However, in Waves 2, 3, and 4, some 62-year-olds were asked the question about work after 62. In Wave 2, for example, this applied to 259 respondents; of these, 202 reported a value of 0 or 1, while 57 people reported a range. Worse, the question about work after age 65 was never asked from 62, 63, and 64 year-olds due to a computer programming error. In Wave 4, one 65-year-old responded to both the age 62 and age 65 questions.

[10] These means are lower in Wave 2, perhaps because, unlike in the other waves, the subjective probability questions were asked of both the working and non-working in Wave 2.

Table 4.5. Pairwise Correlations Among Measures of Retirement Expectations

Correlation between:	Wave 1	Wave 2	Wave 3	Wave 4
Expected retirement age & expected SS age	0.43	0.51	0.46	0.46
Expected retirement age & probability work > 62	0.49	0.57	0.47	0.48
Expected retirement age & probability work > 65	0.44	0.33	0.50	0.57
Expected SS age & probability work > 62	0.38	0.39	0.39	0.45
Expected SS age & probability work > 65	0.34	0.36	0.36	0.41

There is a substantial degree of consistency across the three measures of retirement expectations. The simple pairwise correlations between the measures range from 0.33 to 0.57 (Table 4.5). Also, in Wave 1, 70 percent of individuals who report they expect to begin receiving Social Security benefits at age 62 also expect to retire at age 62 (not shown). Similarly, 45 percent of individuals who report they expect to retire after age 65 also report a high probability (between 0.75 and 1) of continuing work after age 65.

The three measures of retirement expectations each capture somewhat different concepts of retirement. The first set provides a precise expected age of retirement , but it suffers from low response rates. Far more individuals provide an expected age of Social Security benefit receipt, but receipt of Social Security benefits is not synonymous with retirement. In Wave 4, for example, 27 percent of individuals who receive Social Security benefits also work for pay. The subjective probability of continuing work questions are conceptually appealing in the sense that we often model individuals as behaving according to subjective probabilities, but less appealing in their focus on the particular ages of 62 and 65.

As argued extensively in Section 5.4 (page 117), we believe that retirement (withdrawal from the labor force) is a superior concept to Social Security benefit claiming age for assessing the effects of Social Security policy changes on OASDI contributions and benefits. The analyses presented below are therefore in terms of the combined expected retirement age measure summarized in the bottom panel of Table 4.2, unless indicated otherwise. However, we constructed a full set of companion tables for expected Social Security benefit claiming age (see Appendix 4.A). Whenever the text refers to a table by expected retirement age, it refers the corresponding appendix table by expected Social Security benefit claiming age in parentheses. Generally, the patterns are similar for the two outcome measures, and we therefore do not discuss the appendix tables in detail. Section 4.3.7 highlights noteworthy differences between patterns in expected retirement age and expected Social Security benefit claiming age. Similarly, 4.4.5 summarizes noteworthy differences between patterns of earlier-than-expected, on-time, and later-than-expected retirement and Social Security benefit claiming ages.

4.3. Variation in Characteristics by Retirement Expectations

An enormous body of research shows that individuals who retire relatively early differ in many ways from individuals who retire relatively late. In this section we show, consistent with the findings of this earlier research, that such differences also exist between individuals who expect to retire relatively early and relatively late. Throughout this section, we measure retirement expectations using data on expected retirement age (Social Security benefit claiming age) as given in Wave 1. We categorize individuals into seven mutually exclusive categories:

1. Those who expect to retire before age 62;
2. Those who expect to retire at age 62;
3. Those who expect to retire at age 63 or 64;
4. Those who expect to retire at age 65;
5. Those who expect to retire after age 65;
6. Those who expect to never retire; and
7. Those who report not having given retirement much thought (Don't know)

Sections 4.3.1 through 4.3.6 present univariate tabulations of respondent characteristics by expected age of retirement (Social Security benefit claiming) for demographics, job characteristics, health, wealth, spousal characteristics, and attitudes and expectations about retirement. Section 4.3.7 documents how respondent characteristics influence expected retirement age in a multivariate regression context.

4.3.1. Variation in Demographic Characteristics

We begin by tabulating and summarizing demographic characteristics age, gender, race, marital status, and education by expected retirement age. See Table 4.6 (Table A.1).

Table 4.6. Demographic Characteristics, by Expected Retirement Age

	Age	Male	White	Not married	Married/ partnered males	Married/ partnered females	College degree	Graduate school degree
Age < 62	54.1	0.50	0.86	0.20	0.42	0.39	0.19	0.12
Age 62	55.8	0.53	0.85	0.22	0.42	0.35	0.13	0.06
Age 63-64	55.5	0.50	0.87	0.20	0.44	0.37	0.13	0.07
Age 65	55.6	0.54	0.88	0.25	0.45	0.29	0.15	0.11
Age > 65	55.4	0.55	0.89	0.24	0.47	0.29	0.21	0.13
Never	55.3	0.53	0.90	0.25	0.43	0.31	0.19	0.09
Don't know	55.2	0.46	0.85	0.25	0.40	0.35	0.15	0.07
Total	55.3	0.52	0.87	0.23	0.43	0.34	0.16	0.09
N	7,416	7,416	7,416	7,413	7,413	7,413	7,416	7,416

The gradient in mean age from 54.1 to 55.4 over expected retirement ages reflects both updating of expectations with age as well as sample selection. On average, we should expect older individuals to report higher expected retirement ages by virtue of the fact that they are still in the work force. The proportion of respondents who are male or white also increases slightly with expected retirement age. The gender gradient most likely reflects greater attachment to the work force among males as well as the influence of coordinated retirement; husbands may expect to retire at approximately the same time as their wives, who are generally younger. (Also see Section 4.3.5). Whites expect to work longer than blacks. Currently married men represent 42 percent of individuals who expect to retire before age 62 and 47 percent of individuals who expect to retire on or after age 65. For women, these proportions move in the opposite direction: currently married females represent 39 percent of individuals who expect to retire before age 62 and 29 percent of individuals who expect to retire on or after age 65. Overall, individuals who expect to retire after age 65 are somewhat more likely to be single than those expecting to retire earlier.

The fraction of respondents with a college degree or more follows a U-shaped pattern, i.e., relatively high among individuals who expect to retire relatively early and late. College graduates represent about 19 percent of respondents who expect to retire before age 62, 13 percent who expect to retire between age 62 and 64, and 21 percent who expect to retire after age 65. This pattern is more pronounced among respondents with graduate degrees.

4.3.2. Variation in Job Characteristics

Previous research has demonstrated that certain job characteristics are correlated with age at retirement. For example, several studies show retirement ages are lower for individuals who work in physically demanding occupations (Holden 1988; Gustman and Steinmeier 1986; Hayward and Grady 1990). Job characteristics may also be correlated with retirement expectations. Hurd and McGarry (1999), for example, find that individuals who currently work in jobs where work hours can be reduced or their responsibilities can be lessened report a substantially higher subjective probability of working past age 62, even after controlling for a host of demographic, financial, and health characteristics. Expected retirement ages have also been shown to be correlated with current earnings and access to retiree health insurance and early pension benefits (Hurd and McGarry 1999; Honig 1998).

In Table 4.7 (Table A.2), we first present hourly wages and average annual income by expected age of retirement. Hourly wages in 1992 and average annual earnings between ages 22-50 follow a U-shaped pattern with expected age of retirement, i.e., high earners plan on retiring mostly early or late.[11] Individuals expecting to retire before age 62 earn an hourly wage of $25.30 and have average annual earnings of $7,800. These figures drop to $15.10 and $6,700 for those with an expected retirement age of 63-64. They then rise to $22.90 and $7,400 for individuals who expect to retire after age 65. A similar pattern was found in education; it may reflect the higher wealth accumulated by individuals with high current wages and average lifetime annual earnings. On the one hand, these individuals are less likely to face liquidity constraints and so are more likely to financially be able to retire before age 62 than low earners. Pure wealth effects would also lower expected retirement ages. On the other hand, high current earnings raises the

[11] Average annual earnings are derived from social security earnings records.

opportunity cost of leisure, which would raise expected retirement ages. High earnings may also proxy for other job characteristics that make the prospect of continuing to work at older ages more desirable.

Table 4.7. Wages, Labor Income and Tenure, by Expected Retirement Age

	1992 Hourly wage	Average annual earnings, age 22-50	Current job tenure (years)
Age < 62	25.30	7,800	17.8
Age 62	21.50	7,200	15.4
Age 63-64	15.10	6,700	15.4
Age 65	14.20	7,700	12.3
Age > 65	22.90	7,400	11.9
Never plan to retire	15.90	6,100	11.9
Don't know	52.60	5,500	11.8
Total	23.70	7,049	13.8
N	6,066	5,621	6,591

In the final column of Table 4.7 (Table A.2), we show a strong negative correlation between tenure on the current job and expected retirement age. Average tenure for individuals expecting to retire before age 62 is 17.8 years compared with only 11.9 years for individuals expecting to retire after age 65. This pattern could reflect private pension rules, which typically condition eligibility for early retirement on tenure. Individuals with low tenure may not be eligible for early retirement, or their pension entitlement may be small.

Table 4.8. Occupation and Other Job Characteristics, by Expected Retirement Age

		Industry			Characteristics of current job			
	Professional occupation	Prof.	Manufacturing	Retail	Lots of physical effort	Lifting heavy loads	A lot of stooping, kneeling, crouching	A lot of stress
Age < 62	0.40	0.29	0.19	0.08	0.34	0.12	0.24	0.66
Age 62	0.26	0.24	0.26	0.10	0.44	0.19	0.29	0.63
Age 63-64	0.30	0.28	0.21	0.10	0.37	0.13	0.25	0.64
Age 65	0.32	0.27	0.20	0.12	0.39	0.17	0.25	0.63
Age > 65	0.41	0.30	0.18	0.10	0.34	0.13	0.21	0.62
Never	0.34	0.23	0.13	0.13	0.41	0.19	0.29	0.58
Don't know	0.28	0.22	0.12	0.14	0.41	0.19	0.30	0.61
Total	0.33	0.26	0.19	0.11	0.39	0.16	0.26	0.62
N	6,605	6,578	6,578	6,578	6,578	6,580	6,574	6,547

Table 4.8 (Table A.3) and Table 4.9 (Table A.4) show variation in non-pecuniary job characteristics by expected retirement age. Individuals working in professional occupations represent a disproportionate share of respondents expecting to retire before age 62 and after age 65. This may reflect higher wealth levels or non-pecuniary aspects of professional occupations, which make work at older ages relatively attractive. There is little variation across retirement ages in the share of individuals working in various industries. The one exception is in the age-62 category where a disproportionate share of these individuals work in manufacturing. Perhaps surprisingly, there is little variation in the physical characteristics of jobs across expected retirement age categories. Those who expect to retire after age 65 are only somewhat less likely to hold jobs that involve a lot of physical effort than individuals who expect to retire earlier.

Table 4.9. Job Flexibility and Satisfaction, by Expected Retirement Age

	Can reduce hours	Can increase hours	Could move to a less demanding job	Wouldn't accept similar job because likes current job
Age < 62	0.25	0.41	0.31	0.65
Age 62	0.24	0.36	0.33	0.65
Age 63-64	0.24	0.34	0.31	0.72
Age 65	0.28	0.41	0.35	0.74
Age > 65	0.33	0.45	0.39	0.82
Never plan to retire	0.37	0.44	0.36	0.81
Don't know	0.32	0.39	0.31	0.77
Total	0.28	0.40	0.34	0.72
N	5,378	5,392	5,225	3,751

Consistent with Hurd and McGarry (1999), we show in Table 4.9 (Table A.4) that job flexibility is correlated with expected retirement age. The HRS asks non self-employed respondents whether their employer would allow them to decrease or increases hours on their current job. While about 24 percent of individuals expecting to retire before age 65 report they could reduce hours if they wanted to, 33 percent of those expecting to retire after age 65 report they can decrease hours; 37 percent of those who plan never to retire can reduce hours on their current job. This pattern is less evident when looking at the fraction of respondents who report they can increase hours. The HRS also asks respondents whether they think their employer would allow an older worker to move to a less demanding job if so desired. Again, those who expect to retire after age 65 are more likely to report they have this kind of potential flexibility than those who expect to retire earlier. Finally, we show that respondents who expect to retire relatively late are more satisfied with their current employment than those who expect to retire early; 65 percent of respondents who expect to retire before age 62 said they would not accept a similar job if offered because they like their current job compared to 82 percent of respondents who expect to retire after age 65.

Many studies have shown that access to retiree health insurance and early retirement benefits through private pension plans have a substantial effect on age of retirement. Hurd and McGarry (1999), Hurd (1999), and Honig (1998) also show that these job characteristics are correlated with subjective retirement probabilities. Table 4.10 (Table A.5) first shows that access to health insurance via a current employer or spouse is essentially uncorrelated with expected retirement ages, except with expected age < 62. However, access to health insurance is clearly lower for those who report they expect never to retire or have not thought about retirement. As expected, access to health insurance in retirement via an employer is significantly correlated with expected retirement ages. For example, 81 percent of individuals who expect to retire before age 65, when most individuals qualify for Medicare coverage, report having access to paid retiree health insurance via their current employer. Only 71 percent of those expecting to retire at age 65 or older, however, report having access to paid retiree health insurance benefits.

Table 4.10. Access to Health Insurance and Early Retirement Pension Benefits, by Expected Retirement Age

	Health insurance on job or through spouse	Retiree health insurance	No Pension	DB Plan	Eligible for DB benefits at age <62	DC Plan	Eligible for DC benefits at age <62
Age < 62	0.87	0.85	0.18	0.62	0.92	0.19	0.89
Age 62	0.82	0.76	0.27	0.49	0.58	0.23	0.56
Age 63-64	0.81	0.78	0.24	0.49	0.60	0.27	0.64
Age 65	0.80	0.69	0.31	0.42	0.48	0.27	0.48
Age > 65	0.80	0.71	0.33	0.37	0.48	0.29	0.48
Never plan to retire	0.63	0.73	0.53	0.28	0.55	0.19	0.52
Don't know	0.64	0.74	0.53	0.28	0.61	0.18	0.57
Mean	0.77	0.75	0.33	0.44	0.64	0.23	0.58
N	7,320	3,553	5,463	5,463	2,258	5,463	735

Access to private pension benefits prior to age 62 may also significantly affect expected retirement ages by easing liquidity constraints and/or increasing wealth. Table 4.10 (Table A.5) shows that the fraction of individuals without access to private pension benefits increases with expected retirement age: 18 percent of individuals who expect to retire before age 62 report having no private pension plan while 33 and 53 percent of those who expect to retire after age 65 or never to retire report having no private pension plan. Age of eligibility also matters. Conditional on having access to a DB plan, for example, 92 percent of all individuals who expect to retire before age 62 report being eligible for pension benefits before age 62. This percentage drops off sharply for those expecting to retire at age 65 or later. A comparatively low 48 percent of individuals who expect to retire at age 65 or later, for example, report having access to early DB pension benefits. We see a similar pattern if we look at those individuals with access to DC pension plans.

4.3.3. Variation in Health

A large literature documents that health is an important determinant of withdrawal from the labor force. There is some concern that self-reported health status is subject to endogeneity, i.e., some individuals may report their health status as poor in order to justify the fact that they do not work (Benitez-Silva, et al. 2000; Bound, et al. 1998). This reporting bias may also be at play when individuals report expected retirement ages. Consequently, Table 4.11 (Table A.6) reports a variety of measures of current health beginning with an individual's own assessment of his or her current health status. There is a slight U-shaped pattern with individuals expecting to retire relatively early or late somewhat more likely to report being in excellent or very good health. These results are consistent with the positive correlation between subjective health status and probability of working past age 62 reported in Hurd (1999) and Hurd and McGarry (1999). The correlation between wealth and health may explain why some healthy individuals expect to retire early, while the likely positive correlation between current health and an individual's expectation regarding ability to work in the future could help explain why other healthy individuals expect to retire relatively late. The proportion of individuals with a mean subjective probability of living to age 85 greater than or equal to 0.75 also exhibits a weakly U-shaped pattern with expected retirement ages. There is little variation in the fraction of respondents who report having a work-limiting disability, although there is a slight concentration among those expecting to retire at age 62.

Table 4.11. Health Status, by Expected Retirement Age

	Excellent or very good health	Subjective probability of living to age 85 is >=0.75	Health limits work	Total number of conditions (note a)	Any difficulties with ADLs	Some difficulties with mobility	Some mental cognition difficulties
Age < 62	0.62	0.86	0.11	0.91	0.07	0.27	0.13
Age 62	0.51	0.81	0.13	1.04	0.10	0.43	0.18
Age 63-64	0.58	0.82	0.12	1.10	0.11	0.39	0.15
Age 65	0.62	0.86	0.09	0.93	0.06	0.32	0.11
Age > 65	0.66	0.88	0.09	0.85	0.05	0.25	0.12
Never	0.62	0.84	0.13	0.97	0.08	0.31	0.13
Don't know	0.54	0.87	0.17	0.95	0.10	0.41	0.18
Total	0.59	0.85	0.12	0.96	0.08	0.34	0.14
N	7,416	7,416	7,397	7,416	7,416	7,415	7,324

[a] These conditions include ever having high blood pressure, diabetes, cancer, lung disease, heart problems, stroke, psychological problems, and arthritis.

The final four columns of Table 4.11 (Table A.6) report variation in potentially more objective measures of health status. The first, "Total number of conditions," shows the mean number of health conditions individuals had experienced as of Wave 1 by expected retirement age. This health measure follows an inverse-U-shaped pattern like seen in the subjective health measure (larger numbers here imply poorer health). Individuals who expect to retire either relatively early or late report having had fewer health conditions than those who expect to retire between ages 62 and 65. The next column shows the fraction of individuals experiencing difficulty with any Activity of Daily Living (ADL).[12] The pattern is again an inverse-U. Similarly, individuals who expect to retire relatively early or late were less likely to experience difficulties with mobility[13] and less likely to exhibit signs of diminished mental cognition.[14] The spike in the proportion of individuals experiencing mobility and mental cognition difficulties at expected retirement age of 62 is pronounced.

4.3.4. Variation in Wealth

Wealth figures prominently in the modeling of retirement decisions. Recent research has also examined how wealth affects retirement expectations (Hurd 1999; Hurd and McGarry 1999; Honig 1998) and the results presented here are broadly consistent with this work. Gustman and Steinmeier (2001) delve further into the question of retirement expectations by investigating how variation in expectations about retirement wealth affect retirement expectations. They find some evidence that individuals who underestimate their retirement wealth tend to report higher expected ages of retirement. Similarly, those who overestimate their retirement wealth tend to report lower expected ages of retirement.

We examine variation in wealth levels by expected age of retirement for three broad classes of wealth: non-pension household wealth, own Social Security wealth, and own private pension wealth on the current job. We discuss spousal pension wealth in the following section. We begin with non-pension household wealth in Table 4.12 (Table A.7). As with labor income, education, and health we see a U-shaped pattern in non-pension household wealth with individuals expecting to retire relatively early or late having higher average wealth than those who expect to retire between ages 62 and 65. The U-shaped pattern is perhaps more pronounced with wealth than with education, health, and labor income; the total non-pension wealth of individuals who expect to retire before age 62 or after age 65 is 28 percent higher than the wealth of those who expect to retire between ages 62 and 65. The difference in non-housing wealth between these two groups is 32 percent. As noted above with education, health, and labor income, this may be explained by both the negative impact of wealth on retirement age through pure wealth effects and the possibility that wealthier individuals have more taste for work and perhaps access to jobs with attributes conducive to work at older ages.

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[12] ADLs in this summary measure include bathing, dressing, eating, getting in and out of bed, and walking across a room.

[13] This summary measure includes difficulty walking several blocks or less or climbing several flights of stairs or less.

[14] Mental cognition is measured in waves 1 and 2 using several tests involving maps, simple calculations, and memory.

Table 4.12. Household and Own Pension Wealth, by Expected Retirement Age (in $1,000)

	Household non-pension wealth		Own Social Security wealth				Own private pension wealth		
	Total	Non-housing	In 1992	At age 62	At age 65	Expected annual benefit	1992	At age 62	At age 65
Age < 62	288.6	203.0	138.1	153.0	167.4	8,800	229.0	274.5	262.9
Age 62	206.9	146.2	141.1	152.0	163.6	9,100	127.5	155.1	152.5
Age 63-64	223.5	154.9	141.6	153.8	166.9	8,900	176.5	202.7	197.7
Age 65	204.8	141.5	146.3	158.5	171.2	9,500	111.9	143.9	146.8
Age > 65	255.7	186.7	144.7	158.2	171.9	9,900	128.4	175.1	180.1
Never	331.3	257.7	138.4	149.0	160.6	8,900	113.5	146.1	145.6
Don't know	290.4	219.7	133.0	142.8	154.2	8,300	91.7	130.8	129.7
Total	256.6	186.7	141.1	153.1	165.6	9,200	151.1	187.2	184.2
N	7,416	7,416	2,580	2,601	2,607	1,550	1,281	1,282	1,282

This U-shaped pattern is not evident in Social Security or pension wealth. Social Security wealth, whether measured as of 1992 or projected at ages 62 or 65, is approximately constant across expected retirement ages. This is perhaps the result of caps on Social Security benefits and the progressive nature of the Social Security benefit formula. Private pension wealth is far greater for individuals who expect to retire before age 62 than for individuals who expect to retire at or after age 62. This is true whether we measure pension wealth in 1992 or at age 62 or 65. Measured in 1992, the private pension wealth of individuals who expect to retire before age 62 is 70 percent higher than that of individuals who expect to retire at ages 62 or later.

One possible explanation for the pattern in pension wealth in Table 4.12 (Table A.7) is the fact that individuals who expect to retire relatively late have low average tenure on their current job (Table 4.7, Table A.2). These individuals may have accumulated less pension wealth, especially on their current job, than those who have higher tenure. Low tenure individuals also may have more to gain by working additional years. In fact, we see that average private pension wealth grows by 32 percent between 1992 and age 65 for those who expect to retire after age 65. For individuals expecting to retire before age 62, average private pension wealth grows considerably less (14 percent) over that time.[15] This finding is consistent with the theoretical and empirical literature arguing that individuals do not base their retirement expectations just on current or expected wealth levels, but are influenced by how the opportunity cost of retiring changes across different retirement ages (e.g., Coile and Gruber 2000).

[15] This is not only a function of age differences between individuals who expect to retire early or late (see Table 4.6).

4.3.5. Variation in Spousal Characteristics

Over three quarters of the HRS sample is married in 1992. For them, retirement expectations may be influenced by both their own and their spouses' characteristics. Both men and women are much more likely to remain in the workforce if their spouse is also working, for example. This is also evident if we look at retirement expectations. Here we restrict the sample to husbands and wives who are both working in Wave 1 and so both respond to the question of expected retirement age. The simple correlation in expected retirement ages between husbands and wives is a statistically significant 0.43. Husbands generally expect to retire at a later age than their wives, which most likely reflects the fact that husbands are on average older than their wives. The mean age at which wives expect to stop working is 62.7 compared to 63.4 for husbands. Despite the positive correlation in retirement ages, only 14 percent of couples expect to retire in the same year. In 50 percent of the cases, husbands expect to retire after their wives and in 36 percent of the cases, wives expect to retire after their husbands.

Table 4.13. Spousal Private Pension Wealth, by Own Expected Retirement Age

	For men: Wife's private pension wealth			For women: Husband's private pension wealth		
	Current	At age 62	At age 65	Current	At age 62	At age 65
Age < 62	88.6	157.0	156.1	181.5	208.8	207.2
Age 62	60.0	103.9	106.1	132.2	157.1	154.3
Age 63-64	53.4	97.3	98.9	139.3	173.8	173.3
Age 65	56.9	122.7	123.9	100.3	132.4	133.4
Age > 65	41.0	86.6	91.5	158.5	181.9	178.1
Never	69.4	114.7	118.0	139.3	169.1	162.6
Don't know	49.2	92.0	93.0	135.6	155.6	154.1
Total	60.6	113.1	114.9	144.6	171.7	169.5
N	727	730	730	583	582	584

Table 4.13 (Table A.8) presents evidence of how private pension wealth of husbands and wives varies with own retirement expectations. The first set of columns show how the private pension wealth of wives vary with their husbands' expected retirement age. The average private pension wealth of wives falls with husbands' expected retirement age. For example, the average 1992 pension wealth of the spouses of men who expect to retire before age 62 is $88,600 compared to $41,000 for men who expect to retire after age 65. By contrast, the second set of columns indicates that husbands' private pension wealth does not fall monotonically with wives' expected retirement age. Instead it has a U-shaped pattern as we saw with total household non-pension wealth in Table 4.12 (Table A.7). The average 1992 pension wealth of the spouses of women who expect to retire before age 62 or after age 65, is 37 percent higher than for women who expect to retire between ages 62 and 65. Both men and women, then, appear to base their retirement expectations at least in part on the expected pension wealth of their spouses. Men are more likely to delay retirement if their wives have low current pension wealth. Women,

on the other hand, may expect to retire relatively early or late if their husbands have high current pension wealth.

4.3.6. Variation in Other Expectations About Retirement

The HRS asks respondents a number of other questions about what they expect their lives to be like in retirement. We summarize responses to several of these questions by expected age of retirement in Table 4.14 (Table A.9). It is clear that individuals who express concern about retirement are more likely to expect retiring relatively late than those who seem confident about their prospects in retirement. For example, the first column of Table 4.14 (Table A.9) shows that individuals who are looking forward to retirement are much more likely to expect retiring at age 62 or earlier than individuals who do not expect to retire until age 65 or later. The converse is true if we look at individuals who feel uneasy about retirement; 11 percent of individuals who expect to retire before age 62 feel uneasy about retirement compared to 29 percent of those who expect to retire after age 65. Uneasiness about retirement is perhaps related to concerns about having enough income in retirement. The third column of Table 4.14 (Table A.9) indicates that those who plan to retire before age 62 are less likely to be worried today about having enough income in retirement than those who expect to retire at ages 62 and above. Individuals who expect to retire relatively early are more optimistic about their standard of living in retirement than those who expect to retire relatively late; 63 percent of individuals who expect to retire before age 62 expect their standard of living in retirement to be the same or higher than today's compared with 52 percent of those who expect to retire after age 65. Also note that individuals who expect to retire early are much more likely to report having given retirement a great deal of thought. The final columns of Table 4.14 (Table A.9) shows that while 49 percent of individuals who expect to retire before age 62 report having thought a lot about retirement, only 20 percent of individuals expecting to retire after age 65 have done so.

Table 4.14. Expectations about Retirement by Expected Retirement Age

	Looking forward to retirement	Uneasy about retirement	Worried a lot about enough income in retirement	Expected retirement standard of living >= current	Thought about retirement a lot	Thought about retirement hardly at all
Age < 62	0.80	0.11	0.19	0.63	0.49	0.12
Age 62	0.78	0.13	0.26	0.59	0.40	0.18
Age 63-64	0.70	0.19	0.29	0.58	0.29	0.23
Age 65	0.62	0.23	0.31	0.57	0.23	0.27
Age > 65	0.53	0.29	0.33	0.52	0.20	0.37
Never	0.34	0.34	0.38	0.60	0.10	0.64
Don't know	0.39	0.36	0.40	0.57	0.15	0.55
Total	0.65	0.21	0.29	0.58	0.30	0.28
N	5,939	5,939	6,060	6,029	6,065	6,065

4.3.7. Differences by Expected Retirement vs. Social Security Benefit Claiming Age

Table A.1 through Table A.9 tabulate characteristics by expected Social Security benefit claiming age and are companion tables to the above Table 4.6 through Table 4.14, which center on expected retirement age. The main noteworthy feature is that workers who expect to claim Social Security benefits prior to age 62 are very different from individuals who do not. They are far more likely to be female, unmarried, have less than a college level education, have a work limiting health condition, and difficulty with at least one ADL. They also tend to have low wealth but, curiously, not particularly low current wages. It is not clear why these individuals expect to receive Social Security benefits prior to age 62. Perhaps some expect to enroll in DI or receive widowhood benefits, as suggested by the large fraction who report having a work-limiting health condition or are female. It may also be the case that a fraction of those who expect to claim Social Security benefits before age 62 do not fully understand Social Security program rules.

The U-shaped patterns in many of the results by expected retirement age do not show up by expected Social Security benefit claiming age. Individuals who expect to retire either very early or very late tend to be more educated and have higher wealth. Evaluating characteristics by Social Security benefit claiming age, we find a monotonic gradient in many characteristics. The fractions with a college education, in professional occupations, have access to flexible hours, enjoy their work, and are in good health increase fairly steadily as expected claiming age increases. The wealth of individuals expecting to claim after age 65 is also higher than individuals expecting to claim earlier. Hurd, Smith, and Zissimopoulos (2002) found that 73 percent of individuals who retired before age 62 take early and reduced benefits within 3 months of turning 62 and 88 percent claim by the time they turn 63. The group that expects to claim Social Security benefits at age 62 thus consists of a mix of the healthy and wealthy who expect to retire prior to age 62 and the less fortunate who expect to retire at age 62. Put differently, the favorable characteristics of those who expect to retire before age 62 affect the age-62 claiming category, not the prior-to-age-62 claiming category. This may explain why there are no U-shaped patterns by Social Security benefit claiming age.

Also worth noting is that the fraction eligible for retiree health insurance and DB benefits before age 62 is considerably higher among individuals expecting to claim benefits at age 62. Their job tenure and current wage are also substantially higher. Individuals expecting to claim benefits at age 62 are also much more likely to report that they are looking forward to retirement.

4.3.8. A Multivariate Analysis of Retirement Expectations

While the preceding tabulations show that many individual characteristics are correlated with retirement expectations, they do not reveal whether any one of these characteristics independently influences retirement expectations. For example, we see U-shaped patterns in retirement expectations by education, health, and wealth. Clearly, these three characteristics are highly correlated and the extent to which any one of these characteristics drive retirement expectations must be tested in a multivariate framework. Of course, even then we must be careful how we interpret these correlations given the likelihood that all of these characteristics are correlated with other (unobserved) characteristics of individuals that may also influence retirement expectations.

Several recent papers that have implemented multivariate regressions of this sort have employed subjective retirement probabilities as the dependent variable (Chan and Stevens 2001a; Hurd and McGarry 1999; Honig 1998). The Chan and Stevens paper is notable for its use of multiple waves of HRS data to test whether subjective retirement probabilities vary with changes in individual characteristics controlling for individual fixed effects. This is an important innovation since, as just noted, it is likely that cross-sectional variation in wealth and health, for example, is correlated with other unobserved differences between individuals. We do not employ a fixed effects approach here since our goal is merely to describe the correlates of expected retirement age rather than attribute causal significance to particular individual characteristics.

We estimate an ordered probit using Wave 1 data only. We remove individuals who answered "don't know" to the expected retirement age question from the analysis sample and combine responses "65" and ">65". We thus distinguish five expected retirement age categories: <62, 62, 63-64, 65 and above, and never. The ordered probit explains expected retirement age as a function of a subset of the variables analyzed above including age, gender, race, education, marital status, income, occupation, physical nature of job, job flexibility, access to retiree health insurance, private pension eligibility, subjective health status, non-pension and pension wealth. We choose the ordered probit because of the high concentrations of responses at age 62 and 65 and in order to include individuals who report they plan never to retire. A linear regression with expected age as the dependent variable produced qualitatively similar results.

We include indicator variables for missing data for covariates which exhibit a substantial amount of missing data. If the reference variable is dichotomous, we set missing values equal to zero; missing continuous variables are set equal to the mean over nonmissing observations.[16]

Table 4.15 defines the regression variables and presents their sample means. The sample size is 6,319 observations.

[16] The latter provides a test for whether the variable is missing at random. If the variable is missing randomly, the expected value of the coefficient on the missing dummy is zero. Departure from zero thus implies something systematic about the missing pattern.

Table 4.15. Variable Definitions and Sample Means

Variable	**Definition**	**Mean**
Age	Current age	55.28
Male	=1 if male	0.5234
Black	=1 if black	0.1063
College	=1 if college degree or more	0.1592
Excellent health	=1 if rate subjective health as excellent or very good	0.5896
Log-income	Log 1992 labor income (zero if income is zero)	8.9811
Tenure	Tenure on current job	14.24
Service or sales	=1 if working in service or sales occupation	0.3468
Blue collar	=1 if working in blue collar occupation	0.3556
Physical	=1 if working in job that is physically demanding	0.3939
Can reduce hours	=1 if can reduce hours on current job	0.2805
Less demanding	=1 if employer allows older workers to move to less demanding jobs	0.3380
Retiree health insurance	=1 if have access to retiree health insurance	0.4253
Private pension <62	=1 if eligible for private pension benefits before age 62	0.6223
— missing indicator	=1 if pension eligibility missing	0.5491
Log-Social Security wealth	Log total SS wealth at age 62; mean log SS wealth if missing	11.82
— missing indicator	=1 if Social Security wealth missing	0.2890
Log-private pension wealth	Log total pension wealth age 62; mean log pension wealth if missing and has pension; 0 if no pension reported	10.92
Log-non-pension wealth	Log total household non-pension assets	11.00

The first column of Table 4.16 (Table A.10) reports the results of estimation of an ordered probit model and confirms many of the correlations we observe in the simple univariate tabulations of Table 4.6 (Table A.1) through Table 4.14 (Table A.9). All else equal, men are more likely to report a later expected retirement age than women. Blacks tend to report lower expected retirement ages than non-blacks. College educated individuals and those who are in excellent health are more likely to expect a higher retirement age. Current tenure is negatively correlated with expected retirement age.

Table 4.16. Two Models of Retirement Expectations

Variable	**Ordered probit of expected retirement age**	**OLS of probability of full time work after age 62**
Age	-0.269	-0.133 **
	(0.168)	(0.060)
Age-squared	0.003 *	0.001 **
	(0.002)	(0.001)
Male	0.255 ***	0.123 ***
	(0.032)	(0.011)
Black	-0.184 ***	-0.060 ***
	(0.040)	(0.014)
College	0.086 **	0.022
	(0.043)	(0.014)
Excellent health	0.161 ***	0.074 ***
	(0.030)	(0.010)
Log-income	-0.035 ***	0.000
	(0.006)	(0.002)
Tenure	-0.007 ***	-0.001 **
	(0.002)	(0.001)
Service or sales	-0.085 **	-0.069 ***
	(0.039)	(0.013)
Blue collar	-0.166 ***	-0.079 ***
	(0.043)	(0.014)
Physical	-0.011	-0.009
	(0.033)	(0.011)
Can reduce hours	0.076 **	-0.008
	(0.038)	(0.012)
Less demanding	0.007	0.040 ***
	(0.034)	(0.012)
Retiree health insurance	-0.099 ***	-0.019
	(0.034)	(0.012)
Private pension <62	-0.521 ***	-0.144 ***
	(0.040)	(0.015)
— missing indicator	0.418 ***	0.050 ***
	(0.034)	(0.012)

Variable	Ordered probit of expected retirement age	OLS of probability of full time work after age 62
Log-Social Security wealth	-0.029	-0.054 ***
	(0.039)	(0.013)
— missing indicator	0.060 *	0.014
	(0.032)	(0.011)
Log-private pension wealth	-0.099 ***	-0.035 ***
	(0.020)	(0.007)
Log-non-pension wealth	-0.027 ***	-0.013 ***
	(0.005)	(0.002)
Constant		5.066 ***
		(1.675)
N	6,319	6,630

Asymptotic standard errors in parentheses;
Significance: '*'=10%; '**'=5%; '***'=1%.

Table 4.16 (Table A.10) further shows that some job characteristics exert a statistically significant effect on expected retirement ages. Individuals in sales or service and blue collar occupations expect to retire earlier than the omitted category, professional workers. Individuals who report they can reduce hours on their current job are more likely to report a later expected retirement age than those who cannot. Having retiree health insurance is associated with younger planned retirement. Private pensions, both eligibility before age 62 and wealth, exert a strong negative and statistically significant effect on expected retirement ages.

As we saw in the univariate analyses above, higher private pension and non-pension wealth levels are correlated with earlier expected retirement ages. Social Security wealth at age 62, however, does not have a statistically significant effect on expected retirement ages. Non-pension wealth, finally, has a significantly negative effect on planned retirement age. However, the effect is far smaller than the effect of pension wealth.

The results for expected Social Security benefit claiming age are qualitatively the same, except for the effect of labor income. Higher labor income in 1992 is associated with slightly earlier expected retirement age but has no effect on expected Social Security benefit claiming age.

For purposes of comparison, we also report in Table 4.16 (but not Table A.10) the results of a linear regression in which the dependent variable is the subjective probability of working after age 62. The results are qualitatively consistent with those of the ordered probit on expected retirement ages.

4.3.9. Effect of Increasing the EEA on Planned Retirement Age

We are interested in the extent to which workers would change their expected retirement age if the EEA were increased by one year. While the multivariate analysis of Section 4.3.7 shows the net effects of various respondent characteristics on planned retirement age, it does not support a simulation of an increase in the EEA. Instead, we borrow from the literature on (actual) retirement timing to determine the effects of financial incentives in the Social Security program on retirement planning. Specifically, we estimate a peak value (PV) model of expected retirement age and use this model to simulate how a one-year increase in the EEA affects these retirement expectations. The model we estimate here is identical in structure to the peak value model estimated in Chapter 5; for details see Section 5.3.2 (page 113) in particular. Briefly, we estimate the following probit model in which the dichotomous outcome is whether an individual expects to retire at age *t*, conditional on planning to retire at or after age *t* (*t*=55 to 70):

$$\Pr(R_{it}=1)=\Phi(\beta_1 SSW_{it}+\beta_2 PV_{it}+\beta_3 X_{it}+\beta_4 AGE_{it}+\beta_5 YEAR_{it}) \qquad (4.1)$$

where $\Phi(.)$ is the cumulative normal density, R_{it} is an indicator variable for expected retirement of individual *i* at age *t*, SSW_{it} is current Social Security wealth, PV_{it} is the peak value measure of Social Security incentives discussed below and in Chapter 5, AGE_{it} includes a linear age term and separate age-62 and age-65 indicator variables, and $YEAR_{it}$ is a linear year term controlling for potential cohort effects. We model the planned retirement age as reported in 1992. Similar to the specification in Coile and Gruber (2000), covariates X_{it} include current and lifetime earnings, marital status in 1992, age difference between spouses, spousal current and lifetime earnings, controls for education, race, veteran status, U.S. birth, current region of residence, labor market experience and its square, current tenure and its square, 13 industry indicators, and 17 occupation indicators. Chapter 5 provides a more detailed description of these covariates. Each individual contributes *r*-54 probit equations, where *r* is the planned retirement age. We recognize that the implied probit residuals may be correlated within individuals over time and apply the Huber correction to standard errors to adjust for clustering around individuals in the data (Huber 1967).

The key variables for our purposes here are current Social Security wealth and peak value. Social Security measures wealth effects and the peak value measure is a forward looking measure of Social Security incentives. Peak value is defined as the difference between the present discounted value of Social Security wealth at age *t* and Social Security wealth at its maximum value for retirement between ages 55 and 70. Please refer to Chapter 5 for detailed discussion of this forward-looking measure of Social Security incentives.

We use the estimated model parameters to simulate the effect of a one-year increase in the EEA on expected retirement ages. We do this using the simulation method described in Chapter 5. As discussed there, one problem with the peak value model of retirement is its inability to replicate spikes in retirement at ages 62 and 65, perhaps due to uncaptured liquidity effects and social norms. This is particularly a problem for simulations of changes in the EEA. Economists have long hypothesized that the large peak in retirement at age 62 reflects the pent-up demand to retire of individuals who would have retired before age 62 had they been able to borrow against their future Social Security wealth—the so-called liquidity constrained. It is likely that individuals who face such a constraint would delay retirement an additional year were the EEA to increase to age 63. As we show below, though, our peak value simulations of changes in the EEA do not move the age-62 peak. Consequently, we present additional simulation estimates that employ an ad-hoc method of adjusting expected retirement probabilities under our EEA simulation. Recall that we capture the effect of age as linear plus indicator variables at ages 62 and 65. Those indicators pick up everything that is correlated with age 62/65 but not captured in the (financial) incentives of the model, such as social norms. In the adjusted simulation, we assign the estimated coefficient on the age-62 indicator to age-63, the new EEA. The resulting change may be interpreted as an upper bound on the effect of one year increase in the EEA on expected retirement ages.

Table 4.17. Peak Value Model of Expected Retirement Age

	Baseline Model	**Parsimonious Model**
A. Males		
PV ($100k)	-0.192	-0.805 ***
	(0.287	(0.275)
	[-0.019]	[-0.064]
SSW($100k)	0.116	0.032
	(0.116)	(0.055)
	[0.011]	[0.003]
N	12,185	15,082
B. Females		
PV ($100k)	0.029	0.050
	(0.342)	(0.299)
	[0.003]	[0.004]
SSW($100k)	0.100	0.088 **
	(0.077)	(0.036)
	[0.011]	[0.008]
N	10,725	13,278

Notes: The baseline model includes the same covariates as the baseline peak value model of Chapter 5 and mentioned in the text above. The parsimonious model includes current wages, AIME, education, race, wealth, age, and year. Standard errors in parentheses are adjusted for clustering at the individual level. Significance levels: ‘*’ = 10%, ‘**’=5%; ‘***’=1%. Marginal effects are in brackets.

Table 4.17 presents estimates of β_1 and β_2. In the baseline model, neither coefficient is statistically significant at conventional levels for males or females. For males, a more parsimonious model of expected retirement ages generates a statistically significant coefficient on peak value of –0.805 indicating that, consistent with theory, workers plan on working longer the further they are away from attaining maximum Social Security wealth. The estimated marginal effect of peak value in this particular model is comparable to that estimated using actual retirement behavior in Chapter 5 (Table 5.10 on page 136). The parsimonious peak value model for females yields statistically insignificant coefficients on peak value. In general, the results of Table 4.17 are not nearly as robust as those found using actual retirement behavior in Chapter 5, where the coefficient on peak value is negative and statistically significant in a variety of models for both males and females, including the baseline model. It is unclear why this is the case. In the simulations below, we use the parameters estimated of the parsimonious model.

As explained in Chapter 5, the magnitude of the peak value coefficient has little bearing on simulations of changes in the EEA. This is because increasing the EEA has little effect on Social Security wealth or the age at which it is maximized. Table 4.18 presents the results of our simulations. The distribution of expected retirement ages is virtually identical under the baseline and NRA 65-67/EEA 63 scenarios. The last column of Table 4.18 shows that, as expected, shifting the estimated age-62 effect to age 63 shifts the peak in expected retirement ages from age 62 to age 63. However, this effect cannot be attributed to financial incentives.

Table 4.18. Simulation of Expected Retirement Age Assuming One Year Increase in the EEA

	Men			Women		
		NRA 65-67; EEA 63			NRA 65-67; EEA 63	
Age	Baseline	Age-62 effect held constant	Age-62 effect shifted to age 63	Baseline	Age-62 effect held constant	Age-62 effect shifted to age 63
55	0.01	0.01	0.01	0.01	0.01	0.01
56	0.01	0.01	0.01	0.02	0.02	0.01
57	0.02	0.02	0.02	0.02	0.02	0.02
58	0.03	0.03	0.02	0.03	0.03	0.03
59	0.04	0.03	0.04	0.05	0.04	0.04
60	0.13	0.14	0.14	0.14	0.14	0.14
61	0.12	0.12	0.12	0.13	0.13	0.13
62	0.29	0.28	0.13	0.27	0.28	0.13
63	0.07	0.08	0.24	0.07	0.08	0.24
64	0.07	0.07	0.06	0.07	0.07	0.07
65	0.15	0.15	0.14	0.12	0.12	0.11
66	0.02	0.03	0.02	0.03	0.03	0.03
67	0.02	0.02	0.02	0.02	0.02	0.02
68	0.01	0.01	0.01	0.01	0.01	0.01
69	0.01	0.01	0.01	0.01	0.01	0.01
70	0.00	0.00	0.00	0.00	0.00	0.00

4.4. Variation in Characteristics by Accuracy of Retirement Plans

It is widely assumed in the retirement literature that individuals anticipate a particular retirement date and plan accordingly. The success of individuals in meeting retirement expectations depends on how well they use current information to develop expectations of future outcomes. Of course, circumstances change in sometimes unpredictable ways and we should thus not be surprised if individuals do not always accurately predict their actual date of retirement. Nonetheless, a life-cycle theory of economic behavior assumes that individuals are capable of forming reasonable expectations about the likelihood of future events given what they know today and that they update those expectations in a manner that is consistent with the availability of new information. The aim of the analyses discussed in this section is to provide evidence on how successful individuals are in forming correct retirement expectations and how individuals who do and do not ultimately meet their retirement expectations differ from one another.

We are aware of only three published studies that examine the correlation between expected and actual retirement dates.[17] Two studies—Anderson, Burkhauser, and Quinn (1986) and Bernheim (1989)—used the Retirement History Survey (RHS) to compare expected retirement ages as reported in earlier waves of the survey with actual retirement realizations in later waves. A third study by Hurd (1999) uses Wave 2 retirement realization in the HRS to evaluate the accuracy of subjective probabilities of retirement made in Wave 1. All three studies suggest that, overall, individuals are reasonably successful in forming retirement expectations. Anderson, Burkhauser, and Quinn (1986), for example, find that 57 percent of RHS respondents retired within one year of the expected date they reported when they were between the ages of 58-63 in 1969. Of those who did not, 24 percent retired earlier-than-planned and 19 percent reported later than planned. They found further that positive changes in Social Security wealth after 1969 induced by changes in program rules as well as negative changes in health and labor market conditions were significantly correlated with earlier than expected retirement. Individuals who in 1969 were subject to mandatory retirement and had access to an employer pension were also more likely to retire earlier than expected according to the study results. The authors suggest this is because mandatory retirement and private pension rules place constraints on delaying retirement.

Bernheim (1989) also uses RHS data to compare retirement expectations and realizations. As in Anderson, Burkhauser, and Quinn (1986), Bernheim concludes that individuals are reasonably competent in forming correct retirement expectations. Bernheim also finds that the accuracy of retirement expectations varies systematically with population characteristics. He finds that men are more likely to accurately predict their retirement date than women. Wealthier individuals are also more likely to form accurate retirement expectations. Education appears to have no effect on planning accuracy. Finally, he finds that individuals subject to mandatory retirement appear to retire earlier than

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[17] We are aware of two additional studies—Bernheim (1988) and Gustman and Steinmeier (2001)—which examine the accuracy of expectations regarding Social Security wealth.

expected.[18] In the only published study that uses HRS data, Hurd (1999) also concludes that individuals' subjective probabilities of retirement are reasonably consistent with retirement realizations. Expectations and realizations were more likely to diverge for women, less wealthy individuals, those with health insurance, and individuals in fair or poor health.

In the following sections we first describe how we compare retirement expectations with actual retirement outcomes using four waves of the HRS (Section 4.4.1). We then compare the characteristics of individuals who retire earlier than expected, as expected, and later than expected with univariate tabulations. In Section 4.4.2 we examine characteristics that may be correlated with the ability to form accurate expectations and in Section 4.4.3 we focus on how changes in individual circumstances affect the accuracy of retirement expectations. Finally, Section 4.4.4 assesses the correlation of individual characteristics and the accuracy of retirement expectations in a multinomial logistic regression framework.

4.4.1. Comparing Retirement Expectations and Realizations

As described in Section 4.2, the HRS provides several ways to measure retirement expectations. Likewise, there are several ways to measure actual retirement in the HRS. Consequently, there are many possibilities for comparing retirement expectations with retirement realizations in the HRS. We compare respondents' expected date of complete retirement in Wave 1 with their self-reported date of complete retirement in subsequent waves.

Our first objective is to derive the distribution of accuracy of retirement expectations. There are two issues with this distribution, related to age censoring of the sample at both the low and the high end. First, ideally, the question about planned retirement is asked at an early age, say, age 50, so that very few respondents have already retired. However, the earliest retirement planning information in the HRS is from 1992, when respondents are 51-61 years old. Many have already retired, so that our analysis misses the accuracy of plans by individuals who retire relatively young. For respondents that have not yet retired, the analysis will overestimate the fraction of workers that retire later than planned, because the older respondents are close to retirement and have little opportunity to retire earlier-than-planned. If we restrict the sample to, say, 51-year-olds, a second issue arises. The most recent year in which we observe actual retirement is 1998, when respondents are 57-67 year old. At that time, many have not yet reached their planned retirement age, so that it is impossible to determine whether they will eventually retire earlier-than-planned, on-time, or later than planned.

Put differently, by 1992, some HRS respondents are already fairly old, so that we miss an unknown number of individuals who retire earlier-than-planned. By 1998, many HRS

[18] An important implication of Bernheim's work is that individuals may report the most likely date of retirement rather than the mean expected date of retirement. Bernheim claims this tendency draws into question the finding of Anderson, Burkhauser, and Quinn (1986) that unanticipated changes in Social Security wealth in the early 1970s induced individuals to retire earlier than expected.

respondents are still fairly young, so that we miss an unknown number of individuals who retire later than planned. It is not possible to derive an unbiased distribution of the accuracy of retirement planning from the HRS.

Consider some illustrations. Figure 4.2 (on the next page) shows the cumulative distribution of actual retirement age for individuals who, in Wave 1, reported that they planned to retire at age 62. We graphed this distribution by age at the time of reporting. Several features are noteworthy. First, distributions of younger respondents generally lie above those of older respondents. In other words, the young, who are still many years away from age 62, have a higher chance of retiring earlier-than-planned than the old. Similarly, a 61-year old who plans to retire at age 62 has very limited opportunity to retire earlier-than-planned. Second, the distributions are flatter for the young than for the old, indicating a lower degree of accuracy. (If everyone predicted one's retirement age perfectly, the cumulative distribution would be zero until age 61 and jump to one at age 62.) This reflects the greater ability of individuals who are close to retirement to accurately predict their retirement timing. Third, with the exception of the curve for 55-56 year-olds, the curves cross probability 0.5 shortly after age 62, i.e., the median retirement age is about 62.

Now consider Figure 4.3, which depicts the cumulative distributions of actual retirement age for respondents who planned on retiring at age 62, at age 65, at age 70, and never. Unlike in the previous figure, these distributions pool respondents of all baseline ages (ages 51-61). Note, first, that the distribution for planned retirement age 70 is more disperse than for ages 65 and 62, which is consistent with the finding above that the accuracy of retirement planning is lower for respondents who are many years from retirement. Second, the curve for respondents who indicated that they did not ever plan on retiring is flatter than the others, indicating a lower level of accuracy. (Mortality censors work, i.e., does not count as retirement.) Third, the steepest section of the curve for planned retirement age 62 is between ages 61 and 62, i.e., the modal retirement age is 62. Similarly, the modal age for respondents who plan to retire at age 65 is 65.

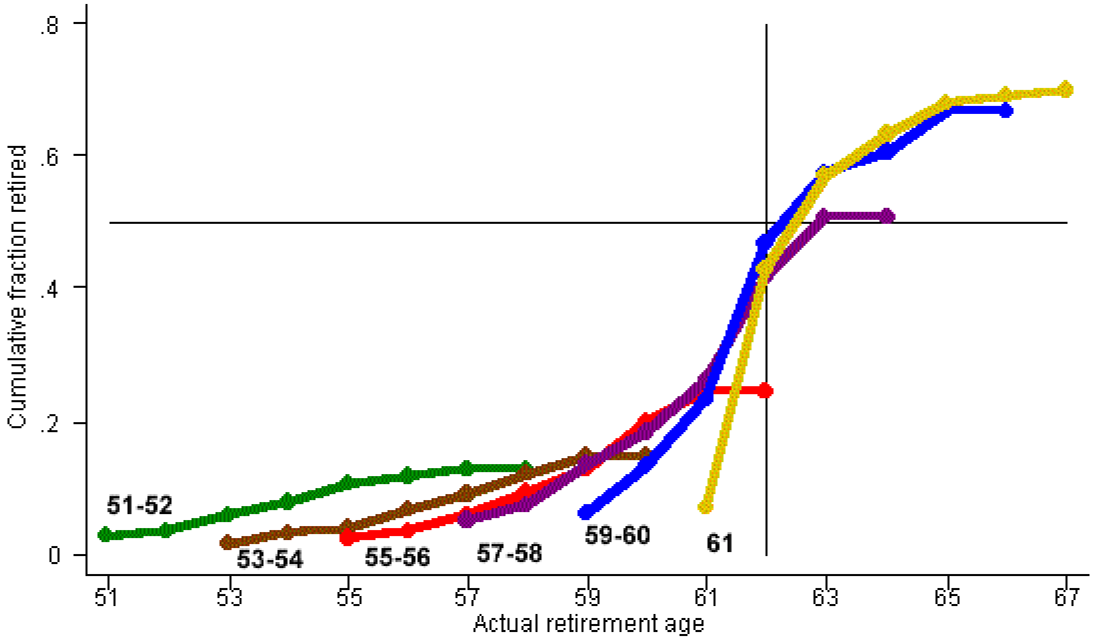

Figure 4.2. Cumulative Distribution of Actual Retirement Age for Individuals Who Planned to Retire at Age 62, by Age at the Time of Reporting

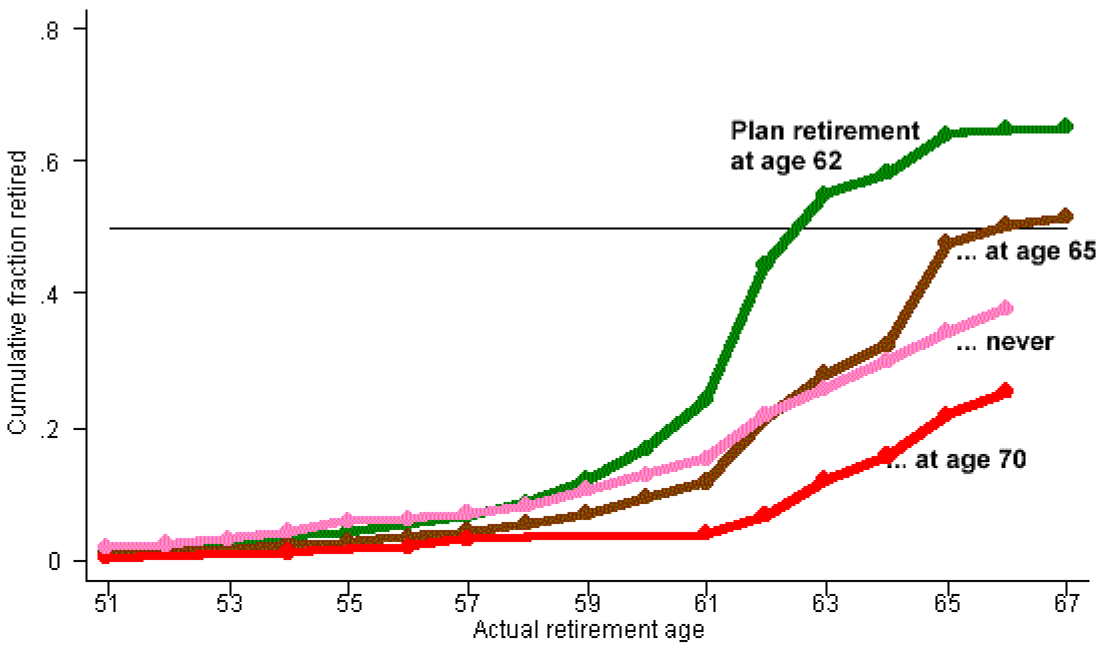

Figure 4.3. Cumulative Distribution of Actual Retirement Age, by Planned Retirement Age

As explained above, the distributions in Figure 4.2 and Figure 4.3 do not reflect the true distributions due to double age censoring in the HRS. To address the problem arising from the fact that, by 1998, many HRS respondents have not yet reached their planned retirement age, we now only keep respondents whose planned retirement year was before 1998. How accurately did they predict their retirement timing? We define three categories of retirees: early retirees, on-time retirees, and late retirees. Early retirees are individuals who retire prior to the expected year of retirement given in Wave 1, on-time retirees are those who retire in the year of expected retirement, and late retiree are those who retire after their expected year of retirement. Table 4.19 presents the distribution of relative retirement timing of respondents whose planned retirement year was before 1998. The first column shows that only 19.2 percent of the sample retired on-time in the same year they expected, while 18.9 percent retired earlier than expected and 61.9 percent retired later than expected.

Table 4.19. Distribution of Retirement Timing (Relative to Wave 1 Plans) Among Respondents That Planned on Retiring Before 1998

	Freq.	Percent
Early	337	19.2
On-Time	331	18.9
Late	1084	61.9
Total	1,752	100.00

By keeping only respondents whose planned retirement year was before 1998, we systematically eliminated respondents who planned to work until relatively advanced ages, including those who indicated that they did not expect to ever completely retire. It is unlikely that these individuals' relative retirement timing is similar to the distribution in Table 4.19. In particular, (1) individuals that expect to continue working through a high age are more likely to retire earlier-than-planned, and (2) the accuracy of predicting one's retirement year is probably greater for respondents who are close to retiring than for those who expect to work many more years. The fractions that retired on-time (18.9 percent) and later than planned (61.9 percent) are therefore estimates of the upper bounds, and the fraction that retired earlier-than-planned (19.2 percent) is a lower bound.[19]

To provide additional insight, Table 4.20 shows the distribution of relative retirement timing for respondents whose planned retirement year was 1998 or later. The large majority had indeed not yet retired by the Wave 4 interview in 1998, but it is too early to tell whether they will eventually retire earlier-than-planned, on-time, or later than planned. As many as 593 had already retired in or before 1997 and 31 retired in 1998.

[19] Anderson, Burkhauser, and Quinn (1986) estimated that 57 percent of RHS respondents retired in the year they expected, i.e., many more than the 18.9 percent that we find. The relatively young age of the HRS population when asked when they expect to retire may account for their comparatively low success rate in meeting retirement expectations. The HRS population in 1992 was between ages 51 and 61. When surveyed in 1969, the RHS population employed by Anderson, Burkhauser, and Quinn was between ages 58 and 63. Older populations are closer to retirement and may make more accurate predictions of eventual retirement dates than younger populations.

Table 4.20. Distribution of Retirement Timing (Relative to Wave 1 Plans) Among Respondents That Planned on Retiring After 1997

	Freq.	Percent
Early	593	13.6
On-Time	31	0.7
Late	0	0.0
To-be-determined	3,727	85.7
Total	4,351	100.0

We consider two alternative definitions of “on time” retirement. The first column of Table 4.21 repeats the distribution shown in Table 4.19, i.e., for respondents who planned on retiring before 1998. It reports only percentages, no frequencies. The second column relaxes the definition of on-time retirement to include individuals who retire within one year of their planned retirement year, and the third column allows for a two-year margin. Naturally, the fraction that retired on-time increases with comprehensiveness of its definition from 18.9 to 40.6 and 54.4 percent. Sample sizes drop because the sample is restricted to individuals with planned retirement years before 1997 (second column) and 1996 (third column). The fraction that retired earlier-than-planned falls sharply due to the less inclusive definition of early retirement and sample restriction. For example, the third column only includes respondents who planned to retire in 1992, 1993, 1994, or 1995. Only respondents who planned to retire in 1995 could retire more than two years earlier, namely in 1992.

Table 4.21. Distribution of Relative Retirement Timing Using Three Definitions

	Definition of “on-time” retirement:		
	Same year	Within one year	Within two years
Early	19.2	7.7	0.5
On-Time	18.9	40.6	54.4
Late	61.9	51.8	45.2
N	1,752	1,314	885

For the analyses below, we define on-time retirement as retirement within one year of the expected retirement date. We define the sample to include all individuals who had retired by Wave 4, even if they expected to retire after 1997 or to never retire. We further include respondents who had not yet retired by Wave 4, but who had already passed their planned retirement year. In this sample of 2,125 respondents, 35.1 percent retired earlier-than-planned, 32.8 percent retired on-time, and 32.1 percent delayed retirement. While the resulting distribution remains biased, the sample selection criteria do not necessarily affect our comparison of characteristics of early, on-time, and late retirees, which is the primary focus of the analyses below.

Table 4.22 shows the distribution of actual versus planned Social Security benefit claiming age. Similar to the second column of Table 4.21, on-time is defined as claiming within one year of the planned age. We were able to categorize 2,771 individuals as early, on-time, or late claimers. About 23 percent of the sample had not yet achieved the age they reported expecting to claim Social Security benefits in Wave 1 by Wave 5. We dropped 18 percent of the age-eligible sample because they expected to or reported claiming Social Security benefits prior to age 62. We dropped these individuals because we do not know whether these expected and actual claiming ages were reported without error. Another 30 percent of the age-eligible sample was missing an expected or actual claiming age.

Table 4.22. Distribution of Social Security Benefit Actual Versus Expected Claiming

	Freq.	Percent
Early	855	30.9
On-Time	1,311	47.3
Late	605	21.8
Total	2,771	100.0

The distribution in Table 4.22 is biased for the same reasons as discussed above for relative timing of retirement. A large fraction of the sample had not yet achieved their expected claiming age as of Wave 5. We can at best classify these individuals as early claimers. Thus, the completed distribution of claiming timing is likely to have higher fraction of late and on-time claimers than reported in Table 4.22. Nonetheless, it is noteworthy that a large fraction of the sample (47 percent) claimed benefits in the year they expected to in Wave 1, greater than for retirement planning (41 percent).

4.4.2. Correlates of Accurate and Inaccurate Retirement Planning

The first set of tables describes the Wave 1 characteristics of individuals who retire earlier-than-planned, on-time, or later-than-planned. Table 4.23 (Table A.12) shows that individuals who retire on-time are older than those who retire early or late. The average age of on-time retirees is 58.3, compared to 56.8 for early retirees and 57.5 for late retirees. This is consistent with the notion, seen above, that individuals nearer to retirement are better able to predict their retirement date accurately than those whose retirement is further away. Table 4.23 (Table A.12) also indicates that males and married individuals are somewhat more likely to accurately predict their retirement timing than females and single individuals. Blacks disproportionately retire later than expected; Hispanics tend to be on-time. Individuals with a college education or better are somewhat more likely to retire on-time than those without a college education. With the exception of age, however, the magnitude of these differences in the characteristics of early, on-time, and late retirees is small.

Table 4.23. Variation in Demographic Characteristics by Retirement Timing

	Age	Male	Married	Black	Hispanic	College	Graduate
Early	56.8	0.50	0.75	0.08	0.03	0.20	0.11
On Time	58.3	0.55	0.80	0.09	0.05	0.22	0.14
Late	57.5	0.52	0.78	0.12	0.04	0.21	0.11
Total	57.5	0.52	0.77	0.10	0.04	0.21	0.12
N	2,125	2,125	2,124	2,125	2,125	2,125	2,125

Table 4.24. Variation in Wealth by Retirement Timing

	Wave 1 wealth: mean	Wave 1 wealth: median
Early	216,362	110,500
On Time	264,064	148,600
Late	276,062	136,000
Total	250,930	130,000
N	2,125	2,125

Table 4.24 (Table A.13) shows variation in Wave 1 total household non-pension wealth for individuals who retire early, on-time, or late. Early retirees are less well-off than the others. Mean wealth of late retirees is higher than that of on-time retirees, while the medians show the reverse pattern.

Individuals who reported in Wave 1 that they had hardly thought about retirement were disproportionately represented among those who retire early (Table 4.25 and Table A.14). While 18 percent of early retirees had hardly thought about retirement, only 10 percent of on-time retirees reported having hardly thought about retirement. Late retirees were only slightly more likely to have reported having hardly thought about retirement than on-time retirees. The fraction of the population with a short planning horizon exhibits little variation by relative retirement timing. Early retirees were substantially more likely to report worrying a lot about having enough income in retirement in Wave 1 than on-time or late retirees. It may be that those who worried a lot about income in retirement were overly pessimistic and realized at a later date that they could afford to retire earlier than anticipated. The mean expected retirement age of early retirees exceeds that of on-time retirees by 2.7 years and exceeds that late retirees by 4.0 years. This pattern reflects a regression toward the mean: One is more likely to retire earlier than a remote expected retirement date than an early expected retirement date, and vice versa. Finally, Table 4.25 (Table A.14) shows that on-time retirees are much less likely to express ex-post dissatisfaction in retirement than those who retire early or late.

Table 4.25. Variation in Retirement Planning by Retirement Timing

Timing	Hardly thought about retirement	Planning horizon ≤ one year	Worried a lot about income in retirement	Expected retirement age	Unsatisfied in Retirement
Early	0.18	0.24	0.28	64.1	0.15
On Time	0.10	0.24	0.17	61.4	0.04
Late	0.12	0.26	0.21	60.1	0.11
Total	0.13	0.25	0.22	61.8	0.10
N	1,952	2,075	1,952	1,970	1,130

4.4.3. Unanticipated Events and Retirement Timing

Unanticipated events can lead to changes in retirement plans that may cause individuals to retire earlier or later than they initially expected. This section evaluates the extent to which retirement timing is correlated with changes in health, job characteristics, marital circumstances, and spousal characteristics between Wave 1 and the wave in which a respondent first reports being completely retired. In many cases, respondents may have anticipated changes in health and other circumstances and incorporated these likelihoods in their Wave 1 retirement expectations. For this reason, the effect of such changes on retirement timing may be attenuated. Nonetheless, the analyses below indicate a substantial correlation between changes in health and other circumstances and retirement timing suggesting that individuals do adjust their retirement behavior when circumstances change unexpectedly.

Changes in health have strong effects on retirement timing. Table 4.26 (Table A.15) indicates that 32 percent of early retirees reported a decline in subjective health between Wave 1 and retirement, compared with only 18 percent of on-time retirees and 17 percent of late retirees.[20] Early retirees also reported a larger decline in their subjective probability of living to age 75 than on-time retirees. Relative to other individuals their age, early retirees reported a decline in their subjective probability of living to age 75 of eight percentage points, compared with two and four percentage points among on-time and late retirees. The last column of Table 4.26 (Table A.15) flags a strikingly large difference in the onset of a health condition that limits the amount or type of work that one can do. Fully 34 percent of early retirees reported the onset of such a condition between Wave 1 and the wave immediately following retirement, compared with only 19 percent among on-time retirees and 15 percent among late retirees.

[20] Late retirees include individuals that had stated that they planned on retiring before 1998, but that had not yet retired by Wave 4. For them, covariates that measure changes (in health status or job characteristics) compare Wave 1 to Wave 4, rather than Wave 1 to the first wave after retirement.

Table 4.26. Changes in Health Status by Retirement Timing

	Declining subjective health	Change in probability live to age 75	Onset of work-limiting health condition
Early	0.32	-0.08	0.34
On-time	0.18	-0.02	0.19
Late	0.17	-0.04	0.15
Total	0.23	-0.05	0.23
N	1,969	1,597	2,125

Table 4.27. Changes in Health Conditions by Retirement Timing

	Onset of health condition:					
	Cancer	Heart disease	Lung disease	Stroke	Arthritis	Diabetes
Early	0.06	0.08	0.04	0.04	0.13	0.05
On-time	0.04	0.07	0.03	0.01	0.13	0.03
Late	0.04	0.06	0.04	0.01	0.17	0.05
Total	0.04	0.07	0.04	0.02	0.14	0.04
N	2,125	2,125	2,125	2,125	2,125	2,125

Table 4.27 (Table A.16) attempts to relate health changes to the incidence of specific diseases and conditions (cancer, heart disease, lung disease, stroke, arthritis, and diabetes) between Wave 1 and retirement. Overall, there appears to be a slightly higher incidence of new disease among early retirees, but the magnitude of these differences is small.

Table 4.28. Reason for Retirement by Retirement Timing

	Forced to retire	Retired because of:		
		Health	Family	Didn’t like work
Early	0.34	0.23	0.22	0.04
On-time	0.13	0.10	0.31	0.04
Late	0.04	0.02	0.06	0.01
Total	0.18	0.12	0.20	0.03
N	2,125	2,125	2,125	2,125

Table 4.28 (Table A.17) illustrates differences by reason for retirement. Approximately one-third of workers that retired earlier-than-planned felt that they were forced to retire, compared with only 13 percent among on-time retirees and 4 percent among those that delayed retirement. Early retirees were also much more likely to cite health as a very important reason for retiring than on-time or late retirees. However, early retirees are no more likely to report having retired because they did not like work and are actually less likely to have retired because of family obligations. About half of early retirees who felt

they were forced to retire also cited health as being a very important reason for their retirement (not shown).

Table 4.29. Changes in Job Characteristics and Retirement Timing

	Laid-off from work	Job characteristics changed							
		Less flexible	More flexible	More physical	Less physical	More stressful	Less stressful	More difficult	Lost retiree health insurance
Early	0.08	0.19	0.17	0.08	0.11	0.26	0.24	0.50	0.14
On-time	0.05	0.17	0.15	0.06	0.08	0.21	0.27	0.54	0.12
Late	0.05	0.28	0.32	0.04	0.11	0.19	0.20	0.44	0.24
Total	0.06	0.20	0.20	0.07	0.10	0.23	0.25	0.51	0.15
N	2,125	1,452	1,452	862	862	861	861	812	1,316

Unexpected changes in job circumstances may also influence retirement timing. Table 4.29 (Table A.18) explores some of these changes, beginning with being laid-off from work between Wave 1 and retirement. We observe a higher fraction of early retirees (8 percent) experiencing an unexpected job termination between Wave 1 and retirement than on-time and late retirees (5 percent). This is consistent with evidence that older workers who lose their jobs have a more difficult time reentering the labor force than younger workers (Chan and Stevens 2001b). The evidence with respect to changes in job characteristics is mixed. Both increased and reduced job flexibility, measured by workers' ability to reduce and/or increase hours on the job, are much more common among late retirees than among early or on-time retirees. Similarly, there is no consistent pattern with respect to physical demands on the job, stress level, or level of difficulty. Loss of retiree health insurance, however, is far more common among individuals who delayed retirement (24 percent) than among early retirees (14 percent) and on-time retirees (12 percent).

Married individuals may form retirement expectations at least in part based on their spouse's current condition and retirement expectations. Table 4.30 (Table A.19) shows how changes in marital status and spousal characteristics vary across early, on-time, and late retirees. There is very little variation in the fraction of individuals who were widowed or divorced between Wave 1 and retirement across early, on-time, and late retirees. The presence of a spouse whose health declined is far less prevalent among individuals who delayed retirement than among those who retired early or on-time. There is also large variation in the fraction retirees whose spouse retired early or late. For example, 53 percent of early retirees had a spouse who also retired early, far more than on-time retirees (21 percent) and late retirees (20 percent). Similarly, 42 percent of late retirees had a spouse who also retired late compared to 20 and 30 percent among early and on-time retirees.

Table 4.30. Changes in Marital Status and Spousal Characteristics and Retirement Timing

	Widowed	Divorced	Declining subjective health of spouse	Spouse retired early	Spouse retired late
Early	0.04	0.02	0.20	0.53	0.20
On-time	0.05	0.02	0.16	0.21	0.30
Late	0.03	0.01	0.04	0.20	0.42
Total	0.04	0.02	0.06	0.31	0.31
N	2,077	2,077	1,408	402	402

4.4.4. A Multivariate Analysis of Retirement Timing

In order to explore the independent effect of individual characteristics and changes in health and other circumstances on retirement timing, we estimate a multinomial logistic regression model comparing early and late retirees to on-time retirees. The model assumes that the three outcomes (earlier-than-planned, on-time, and later-than-planned retirement) are unordered. Several key explanatory covariates measure changes in job characteristics or health between Wave 1 and the retirement date. For individuals who did not yet retire in Wave 4, but who are known to have delayed retirement, we measure these changes as of Wave 4. The sample size is 2,125 observations; of these, seven observations had zero weight, so that the effective sample size is 2,118 observations. Table 4.31 defines the explanatory variables and presents their means.

Table 4.31. Definitions and Sample Means

Variable	Definition	Mean
Age	Current age	57.5
Male	=1 if male	0.5247
Black	=1 if black	0.0959
Hispanic	=1 if Hispanic	0.0395
College	=1 if college degree or more	0.2110
Log-Wealth	Logarithm of non-pension wealth in Wave 1; zero for 4.4 percent of cases with negative or zero wealth	11.2853
Hardly thought about retirement	=1 if hardly thought about retirement	0.1192
Worried about income in retirement	=1 if worried a lot about income in retirement	0.2163
— missing indicator	=1 if worried is missing	0.0805
Declining subjective health	=1 if subjective health between Wave 1 and retirement declined	0.2144
Spouse in declining subjective health	=1 if spouse's subjective health between Wave 1 and retirement declined	0.1240
Onset of work-limiting health	=1 if health condition that limits work arose between Wave 1 and retirement	0.2307
Forced to retire	=1 if forced to retire	0.1787
Laid off	=1 if laid off after Wave 1	0.0604
Job characteristics changes:		
Increased flexibility	=1 if job flexibility increased (based on ability to reduce/increase hours)	0.1385
Less physical	=1 if job physicality declined	0.0411
Less stressful	=1 if stress on the job declined	0.1033
More difficult	=1 if job became more difficult	0.2016
Lost retiree health insurance	=1 if lost retiree health insurance	0.0966
Spouse retires early	=1 if spouse retires earlier-than-planned	0.0598
Spouse retires late	=1 if spouse retires later than planned	0.0598

Table 4.32. Multinomial Logit for Early and Late Retirement (Omitted category: on-time retirement;

	Early Coef.	Late Coef.
Age	1.2362	-2.2010 ***
	(0.8659)	(0.8388)
Age-squared	-0.0127 *	0.0185 **
	(0.0076)	(0.0074)
Male	-0.1578	-0.1245
	(0.1311)	(0.1265)
Black	-0.4479 **	0.0590
	(0.1857)	(0.1792)
Hispanic	-1.0637 ***	-0.3778
	(0.3034)	(0.2634)
College	0.1264	-0.0452
	(0.1659)	(0.1590)
Log-Wealth	-0.0717 ***	-0.0406
	(0.0270)	(0.0285)
Hardly thought about retirement	0.5152 ***	0.2717
	(0.1886)	(0.2022)
Worried about income in retirement	0.3975 **	0.3259 **
	(0.1635)	(0.1642)
— missing indicator	3.8821 ***	0.7823
	(0.4960)	(0.6038)
Declining subjective health	0.2022	-0.3768 **
	(0.1626)	(0.1810)
Spouse in declining subjective health	-0.0056	-0.0110
	(0.1979)	(0.1940)
Onset of work-limiting health condition	0.4965 ***	-0.2117
	(0.1601)	(0.1750)
Forced to retire	0.8451 ***	-1.0197 ***
	(0.1772)	(0.2756)
Laid off	0.4877 *	0.3911
	(0.2684)	(0.2939)
Job characteristics changes:		
Increased flexibility	-0.1002	0.7864 ***
	(0.2004)	(0.1887)
Less physical	0.1671	-1.1360 ***
	(0.3058)	(0.4373)
Less stressful	-0.3073	-1.8270 ***
	(0.1892)	(0.3137)
More difficult	-0.4086 ***	-2.0345 ***
	(0.1495)	(0.2317)
Lost retiree health insurance	-0.2353	0.5171 **
	(0.2196)	(0.2078)
Spouse retires early	0.6612 **	-0.0482
	(0.2622)	(0.2983)
Spouse retires late	-0.3645	0.1939
	(0.2921)	(0.2477)
Constant	-28.5035	66.0109 ***
	(24.5071)	(23.8406)

Asymptotic standard errors in parentheses;
Significance: ‘*’=10%; ‘**’=5%; ‘***’=1%.

The regression results (Table 4.32 and Table A.20) confirm most of the correlations evident in Table 4.23 (Table A.12) through Table 4.30 (Table A.19), albeit often without reaching statistical significance. Men are slightly less likely to accelerate or delay retirement than women, but the differences are not statistically significant. Blacks and Hispanics are less likely to retire early than non-blacks and non-Hispanics, respectively. Education has no significant net effect. Richer individuals are less likely to accelerate retirement than those at lower wealth levels. Individuals who had hardly thought about retirement or who worried a lot about having enough income in retirement were significantly more likely to retire early than others. Those who worried a lot were also more likely to delay retirement.

The reasons for retiring earlier-than-planned are generally intuitive. Individuals who, between Wave 1 and retirement, experienced the onset of a health condition that limits work capabilities retired earlier-than-planned. The same holds for individuals that were laid off or, for any reason, felt forced to retire. Furthermore, respondents whose spouse retired earlier-than-planned are also more likely to accelerate their retirement timing.

As also seen in univariate distributions, changes in job characteristics between Wave 1 and retirement are not intuitively correlated with accuracy of retirement planning. With one exception, no change significantly predicts accelerated retirement. The one exception poses the counterintuitive result that workers whose job became more difficult were less likely to accelerate retirement.

The reasons for retiring later-than-planned are somewhat mixed. As expected, individuals whose subjective health declined and those who felt forced into retirement were less likely to delay retirement. The effects of changes in job characteristics are mixed. Increased flexibility, such as through increased ability to reduce hours, significantly predicts delayed retirement. Counter to intuition, changes that made the job less physical or less stressful were associated with a higher probability on-time retirement. As expected, increased job difficulty is associated with more on-time retirement. Also as expected, workers who lost retiree health insurance coverage were more likely to delay retirement.

4.4.5. Differences by Expected Retirement vs. Social Security Benefit Claiming Age

As with retirement timing, we did not find many particularly strong predictors of early, on-time, or late Social Security benefit claiming behavior (Table A.12 to Table A.20). Among those who claimed earlier-than-expected, many were laid off or otherwise felt forced to retire and/or experienced the onset of a work-limiting health condition between Wave 1 (when they reported their expectation) and their actual claiming age. If those health shocks are at least partly unanticipated, they help explain why some individuals claim earlier-than-planned. There were only a few statistically significant predictors of late versus early claiming. Blacks were more likely to claim later-than-planned. Counter to intuition, individuals whose jobs became more difficult were less likely to claim benefits later-than-expected. The coefficient on losing retiree health insurance is correlated with late claiming, but the effect is not statistically significant.

4.5. Conclusion

Consistent with earlier studies of retirement expectations, this chapter demonstrates that retirement expectations in the HRS are closely correlated with many of the standard determinants of actual retirement.

Private pension incentives appear to play an important role in determining retirement expectations. Individuals with private pensions are disproportionately represented among individuals expecting to retire early and, conditional on having a private pension, access to early pension benefits greatly increases the odds of planning an early retirement. Private pension wealth declines considerably with expected retirement age further suggesting that individuals are responsive to private pension plan incentives. Individuals who have been on their job for a long time tend to plan an earlier retirement than those who more recently started their job. This may be the result of incentives in private pensions which often encourage early retirement for individuals with long tenure.

There is little correlation between Social Security wealth and expected retirement age.

Individuals who expect to retire at age 62 appear to have lower wealth, less desirable job characteristics, and may be in worse health than individuals expecting to retire before or after age 62. Age 62 may be the earliest these individuals can expect to retire without the ability to borrow against future Social Security income. In future work, we will carefully model the effect of Social Security incentives on expected retirement ages.

The wealthiest and most educated individuals often plan a very early (before age 62) or very late (after age 65) retirement. Income effects may account for their disproportionate share among those expecting to retire early, while high tastes for work and perhaps access to more accommodating occupations may account for their disproportionate share among those expecting to retire late. Individuals with flexible work hours and the opportunity to perform less demanding work in the same job tend to plan to retire late. Individuals with higher expected retirement ages also appear to like their current job more than individuals who expect to retire early.

There is strong evidence that spouses coordinate their retirement plans. The simple correlation between the expected retirement ages of husbands and wives is 0.43. Perhaps somewhat surprisingly, though, only 14 percent of couples expect the husband and wife to retire in the same year. In 50 percent of cases, husbands report that they expect to retire after their wives retire.

The patterns are broadly similar by expected age of Social Security benefit claiming age. There are two main differences. First, individual who plan on claiming benefits before age 62 are more likely to be female, unmarried, have less than a college level education, have a work limiting health condition, and difficulty with at least one ADL. They may be expecting to claim DI benefits or perhaps widowhood benefits. Second, the U-shaped patterns in health, education, and wealth that we observed by planned retirement age does not show up by planned benefit claiming age. There is external evidence that workers who retire before age 62 overwhelmingly claim early OASI benefits at age 62. The good health/high wealth characteristics of workers who plan on retiring before age 62 are mixed with less advantageous characteristics of workers who plan on retiring at age 62, thus erasing the U-shaped patterns in health, education, and wealth that we observed by planned retirement age.

Based on our comparison of expected retirement age at Wave 1 and actual subsequent retirement age, individuals in the HRS form reasonable retirement expectations. Unfortunately, the HRS sample cannot be used to derive an unbiased estimate of the fractions of workers that retire earlier-than-planned, on-time, or later-than-planned. At baseline, many respondents have already retired or are very close to retirement, thus masking accelerated retirement by an unknown number of workers. By the last available survey wave, many respondents have not yet reached their planned retirement age, thus hiding what fraction will eventually retire on-time or later-than-planned. Based on all available information, roughly one-third of the sample retired within one year of their expected retirement date, one-third retired earlier-than-planned, and one-third later-than-planned. This is broadly consistent with Benítez-Silva and Dwyer (2002), who find that on average people correctly form expectations over uncertain events when planning for retirement.

Among those who retired earlier-than-expected, many felt forced to retire and/or experienced an adverse health event between Wave 1 (when they reported their expectation) and their actual retirement. If those health shocks are at least partly unanticipated, they help explain why some individuals retire earlier-than-planned. Also, workers whose spouse retired earlier-than-planned often accelerated their own retirement timing.

While forced retirement and unexpected declines in health help explain why many workers retire earlier than expected, the evidence on reasons for delayed retirement is more mixed. Declining health and forced retirement predictably discouraged delayed retirement. Increased flexibility, such as through increased ability to reduce hours, significantly delays retirement. Also as expected, workers who lost retiree health insurance coverage were more likely to delay retirement. The effects of other changes in job characteristics, however, were counterintuitive. The accuracy of planned Social Security benefit claiming age showed very similar patterns to that of planned retirement age.

Appendix 4.A. Tabulations for Expected Social Security Benefit Claiming Age

This appendix contains tables that are similar to those in the main text, but with expected Social Security benefit claiming age instead of retirement age as primary categorical variable. The main text highlights noteworthy differences.

Table A.1. Demographic Characteristics, by Expected Social Security Benefit Claiming Age

	Age	Male	White	Not married	Married/ partnered males	Married/ partnered females	College degree	Graduate school degree
Age < 62	55.4	0.34	0.84	0.52	0.26	0.22	0.07	0.04
Age 62	55.6	0.51	0.86	0.20	0.42	0.38	0.13	0.06
Age 63-64	56.8	0.46	0.89	0.13	0.42	0.45	0.18	0.06
Age 65	55.2	0.50	0.89	0.23	0.42	0.35	0.18	0.10
Age > 65	55.5	0.49	0.93	0.21	0.40	0.39	0.25	0.19
Total	55.5	0.50	0.88	0.22	0.42	0.36	0.15	0.08
N	7,562	7,562	7,562	7,560	7,560	7,560	7,562	7,562

Table A.2. Wages, Labor Income and Tenure, by Expected Social Security Benefit Claiming Age

	1992 Hourly wage	Average annual earnings, age 22-50	Current job tenure (years)
Age < 62	15.38	5,266	12.5
Age 62	29.28	6,926	15.5
Age 63-64	15.46	5,719	15.6
Age 65	18.17	6,706	12.6
Age > 65	16.75	6,651	11.1
Total	23.51	6,740	14.1
N	5,180	5,770	5,598

Table A.3. Occupation and Other Job Characteristics, by Expected Social Security Benefit Claiming Age

	Professional occupation	Industry			Characteristics of current job			
		Prof.	Manufacturing	Retail	Lots of physical effort	Lifting heavy loads	A lot of stooping, kneeling, crouching	A lot of stress
Age < 62	0.18	0.25	0.27	0.19	0.45	0.22	0.35	0.57
Age 62	0.28	0.22	0.22	0.11	0.40	0.17	0.28	0.62
Age 63-64	0.38	0.23	0.27	0.08	0.34	0.12	0.22	0.64
Age 65	0.37	0.29	0.17	0.11	0.37	0.16	0.26	0.65
Age > 65	0.48	0.32	0.13	0.10	0.31	0.14	0.22	0.63
Total	0.33	0.25	0.20	0.11	0.39	0.17	0.27	0.63
N	5,605	5,581	5,581	5,581	5,587	5,589	5,586	5,564

Table A.4. Job Flexibility and Satisfaction, by Expected Retirement Age

	Can reduce hours	Can increase hours	Could move to a less demanding job	Wouldn't accept similar job because likes current job
Age < 62	0.32	0.37	0.41	0.60
Age 62	0.39	0.25	0.32	0.69
Age 63-64	0.41	0.30	0.33	0.65
Age 65	0.41	0.31	0.35	0.76
Age > 65	0.50	0.30	0.38	0.80
Total	0.40	0.28	0.34	0.72
N	4,605	4,593	4,473	3,161

Table A.5. Access to Health Insurance and Early Retirement Pension Benefits, by Expected Social Security Benefit Claiming Age

	Health insurance on job or through spouse	Retiree health insurance	No pension	DB plan	Eligible for DB benefits at age <62	DC plan	Eligible for DC benefits at age <62
Age < 62	0.52	0.79	0.51	0.29	0.79	0.20	0.76
Age 62	0.77	0.83	0.29	0.49	0.72	0.22	0.62
Age 63-64	0.86	0.74	0.24	0.45	0.50	0.31	0.48
Age 65	0.76	0.71	0.33	0.39	0.51	0.27	0.52
Age > 65	0.78	0.70	0.37	0.39	0.53	0.24	0.35
Total	0.76	0.78	0.31	0.44	0.63	0.24	0.56
N	7,510	3,364	4,671	4,671	1,957	4,671	673

Table A.6. Health Status, by Expected Social Security Benefit Claiming Age

	Excellent or very good health	Subjective probability of living to age 85 is >=0.75	Health limits work	Total number of conditions	Any difficulties with ADLs	Some difficulties with mobility	Some mental cognition difficulties
Age < 62	0.33	0.72	0.43	1.55	0.53	1.10	0.33
Age 62	0.53	0.83	0.19	1.10	0.14	0.45	0.18
Age 63-64	0.59	0.79	0.14	1.22	0.09	0.43	0.11
Age 65	0.62	0.87	0.12	0.91	0.09	0.34	0.13
Age > 65	0.69	0.93	0.09	0.86	0.05	0.30	0.15
Total	0.56	0.84	0.17	1.04	0.13	0.43	0.16
N	7,562	7,562	7,560	7,562	7,562	7,560	7,456

Table A.7. Household and Own Pension Wealth, by Expected Social Security Benefit Claiming Age (in $1,000)

	Household non-pension wealth		Own Social Security wealth				Own private pension wealth		
	Total	Non-housing	In 1992	At age 62	At age 65	Expected benefit	In 1992	At age 62	At age 65
Age < 62	142.0	83.5	126.7	137.3	147.8	9.4	86.2	124.6	114.9
Age 62	227.1	160.3	144.5	156.0	168.2	8.6	151.7	185.9	182.0
Age 63-64	310.4	235.9	165.8	171.8	183.5	9.4	113.7	146.4	148.5
Age 65	292.9	223.5	140.2	152.8	165.4	9.6	131.4	166.7	167.3
Age > 65	367.2	283.6	136.6	150.3	163.2	9.7	108.9	173.5	178.4
Total	256.4	188.1	142.7	154.5	166.9	9.0	141.0	176.8	174.9
N	7,562	7,562	2,584	2,598	2,601	1,764	1,151	1,152	1,152

Table A.8. Spousal Private Pension Wealth, by Own Expected Social Security Benefit Claiming Age

	For men: Wife's private pension wealth			For women: Husband's private pension wealth		
	Current	At age 62	At age 65	Current	At age 62	At age 65
Age < 62	66.1	93.1	84.9	93.5	121.7	116.9
Age 62	164.7	192.9	188.0	59.3	109.1	110.6
Age 63-64	102.6	124.5	125.9	43.4	101.5	105.3
Age 65	135.4	163.8	167.5	48.9	100.4	103.8
Age > 65	143.2	176.5	193.1	53.5	111.5	116.1
Total	148.9	177.1	176.5	55.1	105.7	108.0
N	694	694	694	745	748	748

Table A.9. Expectations about Retirement by Expected Social Security Benefit Claiming Age

	Looking forward to retirement	Uneasy about retirement	Worried a lot about enough income in retirement	Expected retirement standard of living >= current	Thought about retirement a lot	Thought about retirement hardly at all
Age < 62	0.59	0.26	0.43	0.63	0.36	0.31
Age 62	0.70	0.18	0.26	0.60	0.38	0.23
Age 63-64	0.72	0.16	0.16	0.59	0.39	0.19
Age 65	0.59	0.24	0.33	0.54	0.22	0.33
Age > 65	0.41	0.36	0.31	0.54	0.16	0.42
Total	0.64	0.21	0.29	0.58	0.31	0.28
N	5,626	5,626	5,748	5,707	5,754	5,754

Table A.10. Ordered Probit Model of Social Security Benefit Claiming Expectations

Variable	Ordered probit of expected retirement age
Age	-0.084
	(0.164)
Age-squared	0.001
	(0.001)
Male	0.114***
	(0.031)
Black	-0.180***
	(0.039)
College	0.146***
	(0.041)
Excellent health	0.192***
	(0.029)
Log-income	0.006
	(0.004)
Tenure	-0.007***
	(0.002)
Service or sales	-0.245***
	(0.040)
Blue collar	-0.481***
	(0.042)
Physical	0.018
	(0.034)
Can reduce hours	-0.002
	(0.041)
Less demanding	0.012
	(0.038)
Retiree health insurance	-0.180***
	(0.034)
Private pension <62	-0.372***
	(0.047)
— missing indicator	0.003
	(0.035)
Log-Social Security wealth	0.007
	(0.039)
— missing indicator	-0.055**
	(0.032)
Log-private pension wealth	-0.059***
	(0.019)
Log-non-pension wealth	-0.0004
	(0.005)
N	7,562

Asymptotic standard errors in parentheses;
Significance: ‘*’=10%; ‘**’=5%; ‘***’=1%.

Table A.12. Variation in Demographic Characteristics by Social Security Benefit Timing

	Age	Male	Married	Black	Hispanic	College	Graduate
Early	58.4	0.46	0.11	0.07	0.80	0.20	0.09
On Time	58.4	0.52	0.14	0.06	0.81	0.14	0.07
Late	58.6	0.55	0.17	0.08	0.77	0.24	0.13
Total	58.4	0.51	0.14	0.07	0.79	0.18	0.09
N	2,465	2,465	2,465	2,465	2,465	2,465	2,465

Table A.13. Variation in Wealth by Social Security Benefit Timing ($1,000)

	Wave 1 wealth: mean	Wave 1 wealth: median
Early	283	321
On Time	234	272
Late	319	309
Total	269	296
N	2,465	2,375

Table A.14. Variation in Retirement Planning by Social Security Benefit Timing

Timing	Hardly thought about retirement	Planning horizon ≤ one year	Worried a lot about income in retirement	Unsatisfied in Retirement
Early	0.31	0.26	0.28	0.09
On Time	0.19	0.28	0.21	0.05
Late	0.24	0.28	0.27	0.06
Total	0.24	0.27	0.25	0.07
N	2,072	2,311	2,069	785

Table A.15. Changes in Health Status by Social Security Benefit Timing

	Declining subjective health	Change in probability live to age 75	Onset of work-limiting health condition
Early	0.19	-0.07	0.21
On-time	0.19	-0.04	0.21
Late	0.18	-0.05	0.16
Total	0.19	-0.05	0.20
N	2,373	1,714	2,372

Table A.16. Changes in Health Conditions by Social Security Benefit Timing

	Onset of health condition:					
	Cancer	Heart disease	Lung disease	Stroke	Arthritis	Diabetes
Early	0.03	0.06	0.03	0.01	0.17	0.04
On-time	0.03	0.05	0.03	0.01	0.15	0.03
Late	0.05	0.06	0.02	0.02	0.18	0.05
Total	0.04	0.06	0.03	0.01	0.16	0.04
N	2,465	2,465	2,465	2,465	2,465	2,465

Table A.17. Reason for Retirement by Social Security Benefit Timing

	Forced to retire	Retired because of:		
		Health	Family	Didn't like work
Early	0.13	0.06	0.02	0.12
On-time	0.09	0.05	0.02	0.14
Late	0.08	0.04	0.01	0.09
Total	0.10	0.05	0.02	0.12
N	2,465	2,465	2,465	2,465

Table A.18. Changes in Job Characteristics and Social Security Benefit Timing

	Laid-off from work	Job characteristics changed							
		Less flexible	More flexible	More physical	Less physical	More stressful	Less stressful	More difficult	Lost retiree health insurance
Early	0.10	0.21	0.18	0.06	0.13	0.26	0.24	0.47	0.22
On-time	0.07	0.16	0.17	0.08	0.10	0.20	0.26	0.49	0.19
Late	0.08	0.27	0.19	0.05	0.11	0.18	0.30	0.49	0.26
Total	0.08	0.20	0.18	0.07	0.11	0.22	0.26	0.48	0.22
N	2,465	1,711	1,711	558	558	557	557	505	1,359

Table A.19. Changes in Marital Status and Spousal Characteristics and Social Security Benefit Timing

	Widowed	Divorced	Declining subjective health of spouse
Early	0.03	0.02	0.20
On-time	0.02	0.02	0.17
Late	0.03	0.02	0.19
Total	0.03	0.02	0.18
N	2,457	2,457	1,785

Table A.20. Multinomial Logit for Early and Late Social Security Benefit Claiming (Omitted category: on-time Social Security Benefit claiming

	Early Coef.	Late Coef.
Age	0.622	4.280**
	(1.478)	(1.690)
Age-squared	-0.005	-0.036**
	(0.013)	(0.014)
Male	-0.307***	0.063
	(0.103)	(0.116)
Black	-0.224	0.426**
	(0.164)	(0.168)
Hispanic	0.028	0.425*
	(0.219)	(0.230)
College	0.615***	0.803***
	(0.137)	(0.146)
Log-Wealth	-0.016	-0.001
	(0.020)	(0.023)
Hardly thought about retirement	0.560***	0.140
	(0.131)	(0.150)
Worried about income in retirement	0.366***	0.357**
	(0.133)	(0.147)
— missing indicator	0.499***	0.040
	(0.142)	(0.164)
Declining subjective health	-0.126	-0.197
	(0.135)	(0.158)
Spouse in declining subjective health	0.226	0.055
	(0.149)	(0.170)
Onset of work-limiting health condition	0.070	-0.146
	(0.136)	(0.159)
Forced to retire	0.295*	-0.091
	(0.172)	(0.216)
Laid off	0.379**	0.272
	(0.191)	(0.224
Job characteristics changes:		
Increased flexibility	0.068	0.076
	(0.156)	(0.172)
Less physical	0.406	-0.231
	(0.313)	(0.404)
Less stressful	-0.025	-0.262
	(0.220)	(0.265)
More difficult	-0.029	-0.446**
	(0.172)	(0.209)
Lost retiree health insurance	0.058	0.287
	(0.159)	(0.176)
Constant	-18.812	-127.050*
	(43.052)	(49.224)
N	2,458	

Asymptotic standard errors in parentheses;
Significance: '*'=10%; '**'=5%; '***'=1%.

5. The Effects of the Social Security Retirement Ages on Retirement and Disability Claiming

Summary

The objective of this chapter is to determine the financial consequences for the OASDI program of increases in the EEA, NRA, or early retirement penalty (ERP). The approach is as follows. We first develop several models that explain when workers retire and whether and when they enroll in DI. Key explanatory factors, insofar as relevant for Social Security policy, are the EEA, NRA, ERP, and the generosity of benefits. We apply model estimates to alternative policy scenarios and simulate how workers will change their behavior. We apply Social Security rules on contributions and benefits to determine how this changed behavior affects OASDI contributions and benefits.

The models we estimate include option value (OV) and peak value (PV) models of retirement, as well as a reduced form joint option value model of retirement timing and DI claiming. We encountered some difficulty in estimation, particularly of the utility parameters in option value models.

Focusing first on a hypothetical increase in the EEA, we computed lower and upper bound effects on the OASDI trust funds. A one-year increase in the EEA will only affect individuals who, under current law, apply for OASI benefits at age 62. They will be forced to claim at age 63 or to claim DI instead. Some will retire later and contribute additional payroll taxes; others will retire early anyway and finance their consumption from other resources. We find that labor force responses have virtually no effect on the OASI program. While forced postponement saves the Social Security Administration one year of benefits, this gain is almost exactly offset by higher annual benefits due to the diminished early retirement penalty. As an upper bound on the effect of additional DI enrollment, we assume that at most one-out-of-five early OASI claimants will convert to DI. This would cost approximately 2 percent of OASDI liabilities. A more realistic estimate is that about 10 percent of early OASI claimants will qualify for DI, thus increasing OASDI liabilities by about 1 percent. Whatever the exact figure, it is clear that increasing the EEA will not generate any savings. The results were confirmed in model-based simulations of behavioral change.

An increase of the NRA is essentially a benefit reduction. We find that the behavioral response to this benefit reduction is very mild. As a result, the average level of benefits decreases and total OASI liabilities decrease substantially. Roughly speaking, each year of NRA increase saves approximately 5 percent in benefits. Some of this will be lost due to increased DI enrollment, but the vast majority is likely to remain saved. Similarly, we calculated large savings in case of an increase of the ERP—approximately 12 percent for an increase from the current 5/9 of one percent to one percent for each month before the NRA. The behavioral response to this increase is likely to be mild again. A small

portion of savings will be lost to additional DI liabilities, but both increases in the NRA and ERP are likely to result in substantially lower OASDI liabilities.

The mild expected behavioral responses to Social security policy change may surprise some. It is testimony, however, to a well-designed public retirement system with few incentives that distort workers' behavior.

5.1. Introduction

This chapter concerns behavioral responses of workers to changes in Social Security policy and their implications for OASDI contributions and benefits. The policy changes that we explore are increases of the EEA, increases of the NRA, combinations of EEA and NRA increases, and an increase of the early retirement penalty (ERP).

We approach the issue through econometric model estimation and simulation. The central outcome is workers' labor force status. We allow workers to be:

1. Working;
2. Retired but not yet claiming OASDI benefits;
3. Claiming DI benefits; or
4. Claiming OASI benefits.

In each state, we calculate OASDI contributions or benefits. We carry out this calculation for both current law (baseline scenario) and various policy scenarios. The difference measures the effects of various policy scenarios on the OASDI trust funds.

This chapter is organized as follows. First, in Section 5.2, we review the literature on retirement, OASI claiming, and DI claiming behavior. Section 5.3 develops our empirical models. We will estimate several versions, with and without account of DI. Section 5.4 discusses the outcome variables. The main issue is whether the key transition is to retirement (withdrawal from the labor force) or OASI claiming. Section 5.5 describes our construction of key explanatory factors, namely the financial incentives that are embedded in the Social Security program and private pensions. Section 5.6 discusses estimation issues and presents parameter estimates. Section 5.7 describes the simulation method and summarizes the financial consequences of various policy scenarios for the OASDI program. Section 5.8 concludes.

5.2. Literature

For our purposes, there are two important strands of literature. The first attempts to explain when workers retire, the second when workers apply for and/or are awarded DI benefits. We discuss each in turn.

Retirement

There is a large literature on the timing of retirement, summarized among others by Hurd (1990) and Leonesio (1996). In the very early literature, retirement was typically viewed as an involuntary transition, forced by poor health or termination of employment. By about the mid-1970s, the literature started recognizing that workers are not always forced into retirement, but often willingly choose the timing of their retirement. This behavioral approach offers potential for studying the impact of changes in the EEA and NRA.

Publications from around 1980 develop reduced-form models of labor force withdrawal as a function of Social Security and pension wealth levels. (The potential effect of private assets was recognized but difficult to assess because of poor wealth data.) The central issue in that period—and arguably the most distinguishing labor force phenomenon of the 20th century—was the sharp decline in labor force participation among elderly males. For example, Boskin (1977) showed that labor force participation among males age 65 and over fell from 47 percent in 1948 to 22 percent in 1974 and argued that much of the decline was due to the income effect of increased wages. Changes in Social Security law between 1968 and 1979 increased benefits by over 50 percent in real terms, which may plausibly have lowered retirement ages. Several authors demonstrated a significant link between Social Security wealth and retirement hazards at age 62 (e.g., Hurd and Boskin, 1984). However, the consensus from this literature is that the effect of Social Security wealth on retirement timing is substantial and statistically significant but not large enough to explain the strong decrease in observed elderly labor force participation.

Starting in the mid-1980s, reduced-form models made way for structural models of retirement timing. Unlike the reduced-form approach, the structural approach provides direct estimates of the effects of altering details of the Social Security program by seeking to uncover workers' utility function parameters and modeling the details of the decision making process.

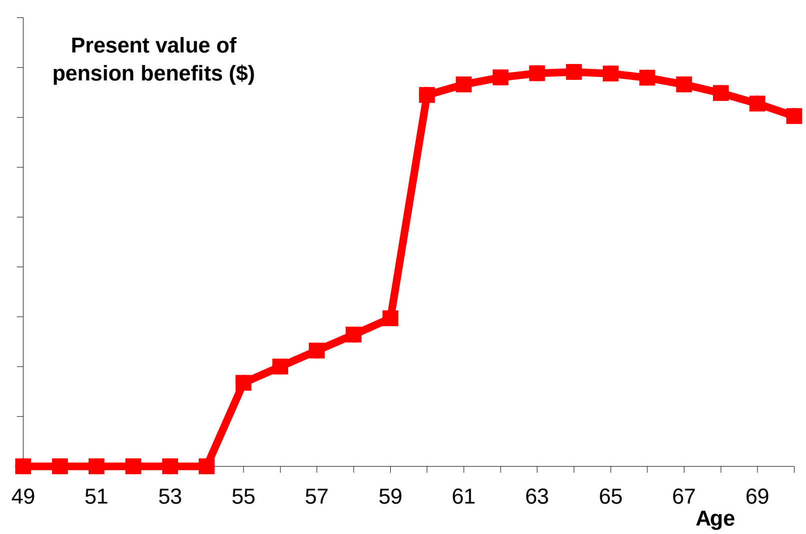

Figure 5.1. Illustrative Pension Wealth Accrual

The key insight that prompted the development of structural models is that current Social Security wealth and the accrual from an additional year of work inadequately capture workers' incentives. Instead, the entire time path of Social Security and pension wealth accrual plays a central role. Figure 5.1 illustrates this point. It shows the accrual of pension wealth (present discounted value of future pension benefits) as a function of a worker's age, conditional on remaining employed by the plan sponsor.[21] This worker started working for his employer at age 49. The first five years, he is not vested in his pension rights and pension wealth is zero. (The OASI counterpart is the requirement that workers have 40 quarters of coverage, i.e., at least ten years of covered labor force participation.) His pension wealth increases steadily thereafter until age 60. If the worker stays with the firm until his 60th birthday, he becomes eligible for benefits that are far higher than if he were to leave before age 60. After age 60, continued years of service and wage growth increase annual benefits but decrease the number of years that a pension will be drawn. These factors combine to first increase and then decrease pension wealth modestly. The striking feature of the figure is the sharp increase at age 60, creating a strong incentive to remain on the job until age 60. Only by taking the entire future accrual path into account can a model capture this incentive.

Estimation of structural retirement models is extraordinarily complex and has only been feasible to date with strong simplifying restrictions on the utility function. Fields and Mitchell (1984), Burtless and Moffitt (1984, 1985), Gustman and Steinmeier (1985, 1986), Rust (1989, 1990), Phelan and Rust (1991), Rust and Phelan (1997), Berkovic and Stern (1991), and Daula and Moffitt (1995) all estimated complex structural retirement models. While most models point at a statistically significant role for Social Security incentives, structural models have not yet been capable of fully explaining the observed retirement spikes at ages 62 and 65. An important reason for this failure may be lack of good data. Most structural retirement models have used the 1969-79 Retirement History Survey (RHS). It contains high-quality matched Social Security earnings records, but lacks good information on private pensions.

Stock and Wise (1990a, 1990b) developed a simpler structural retirement model in which (indirect) utility is a function of income (from work or Social Security/pensions), leisure, and risk aversion. The key to their model is that work has dual effects: it increases utility by generating current income and accruing Social Security/pension wealth, and it decreases utility through taste for leisure. The optimal retirement date is the date at which the disutility of work exceeds utility gains from work. They define the "option value" (OV) of continuing to work as the difference between indirect utility from retirement at the optimal date and from retirement today. Lumsdaine, Stock, and Wise (1992) evaluated a reduced form model, a structural dynamic programming model, and the simpler OV model on their out-of-sample predictive merits. They concluded that the OV model performed about equally well as compared to a dynamic programming model, and far better than the reduced form model. As pointed out by Leonesio (1996), though, the dynamic programming model that they benchmarked was substantially less complex than the Rust models.

Coile and Gruber (2000) built on the OV model and developed the concept of "peak value" (PV), the difference between Social Security wealth at its maximum expected

[21] The worker is an actual HRS respondent. The pictured pension wealth path is calculated by the HRS pension calculator (Curtin, Lamkin, Peticolas, and Steinmeier, 1998). Dollar values are suppressed to preserve confidentiality.

value and Social Security wealth today. This peak value thus measures the incentive to continue to work. An important difference with the OV model is that OV is measured in utility units and PV in dollars. This has the advantage that the PV model does not require a parameterization of the utility function but the disadvantage that the PV model does not incorporate the disutility of work. We elaborate on limitations of the PV model below. Coile and Gruber (2000) further advance the literature by carefully addressing identification of the incentives of additional work from Social Security wealth as separate from earnings.

The peak value is identical to the Cost of Leaving (COL) measure developed earlier by Warner (1978). Cost-of-Leaving models have been used to study retirement and retention behavior of military personnel (Warner, 1978; Warner and Goldberg, 1984; Smith, Sylwester, and Villa, 1991) and federal civil service workers (Black, Moffitt, and Warner, 1990; Asch and Warner, 1999). In some implementations, the cost of leaving is adjusted for the length of time over which the costs and benefits are realized, resulting in Annualized Cost of Leaving (ACOL) models.

Disability Insurance

In recent years, there has been an increasing awareness among researchers and policymakers that individuals take diverse paths into retirement (Herz 1995; Blau 1994; Ruhm 1990). An abrupt transition from fulltime work into retirement is by no means the norm; more typically, workers reduce hours on an existing job or leave a career job for part-time employment elsewhere before retiring fully. A substantial fraction of workers exits the labor force via a period of DI receipt. Between 80 and 90 percent of individuals in the Health and Retirement Study (HRS) who are qualified to receive Social Security retirement benefits are also eligible to receive DI provided they can convince SSA of a sufficiently serious work-limiting disability (Mitchell and Phillips 2000). Disability benefits are equal to an individual’s Primary Insurance Amount (PIA) as calculated at the time of application, and thus exceed retirement benefits taken before the NRA.[22] Mitchell and Phillips (2000) find that about 4 percent of disability or retirement-eligible individuals age 57-61 in the first wave of the HRS ultimately take disability benefits prior to age 65, when they qualify for normal retirement benefits.[23]

The empirical literature on DI has focused largely on the determinants of DI application and whether DI creates disincentives to work, especially among older males. Early articles attempted to explain the level of DI applications in terms of benefit levels and macroeconomic conditions. They generally found that DI application rates are positively correlated with DI benefit levels, although to what extent is disputed (e.g., Parsons 1980; Haveman and Wolfe 1984). A strand of the literature beginning with Halpern and Hausman (1986) takes a more structural approach to DI applications, considering not only the effect of benefit levels but also the effect of uncertainty in award decisions.

---

[22] DI recipients are also entitled to Medicare coverage two years after the date of successful application, even if they are younger than age 65.

[23] Starting in the year 2000, the NRA is no longer 65 years.

Kreider (1999) and Kreider and Riphahn (2000) emphasized the importance of controlling for the foregone earnings of DI applicants. Individuals with different anticipated future earnings paths but otherwise observationally identical may be expected to make different decisions with regard to DI application. SSA requires applicants to demonstrate their disability by remaining virtually unattached to the labor force following the claimed onset of disability. The period between claimed onset and receipt of benefits must be at least five months and in practice can extend well beyond one year (Kreider 1999). Kreider and Riphahn's (2000) structural model of DI applications predicts substantial effects of benefit levels, acceptance rates, and waiting periods on DI application rates. Kreider (1999), Burkhauser et al. (1999), and Gruber and Kubik (1997) derive similar results.

Another strand of the literature focuses on cross-sectional correlates of application propensities. Bound et al, (1998), for example, showed that individuals in declining health (controlling for long-term health) are more likely to exit the labor force in general and more likely to apply for disability in particular. Benítez-Silva et al. (1998) found that contemporaneous health and self-reported disability status are strong predictors of disability application. Burkhauser et al. (1999) showed that employer accommodation of individuals with disabilities significantly delays application for DI.

Mitchell and Phillips (2000) provide the only empirical estimates of how changes in Social Security retirement benefits affect the relative propensity to select disability, early, or normal retirement. Using HRS data on individuals age 57-61 in 1992 who were not receiving a Social Security benefit but who by 1998 had elected one of the three retirement paths, they estimated a multinomial logit model with the three retirement pathways as outcomes. The choice of retirement path is conditioned on the present discounted value of each retirement path at that age and various covariates like health and job characteristics. They found that reductions in early retirement benefits have relatively small impacts on the probability of early retirement. They also found that completely eliminating early retirement benefits would increase the probability of normal retirement by about twice as much as it would the probability of taking disability benefits.

5.3. Model Specification of Social Security Incentives

Economic theory suggests that workers' decisions on work and retirement are motivated, at least in part, by financial considerations and by a positive valuation of leisure time. Financial considerations are a function of current and future earnings, prospective payments from Social Security and pensions, accumulated wealth, etc. Prospective payments from Social Security and pensions often are a highly nonlinear function of future work status and earnings (e.g., Figure 5.1 above). Models that account for only current financial variables (wealth, wages, pension and Social Security entitlements), or for pension and Social Security accrual from a single year of additional work, may therefore miss important accruals farther into the future. We therefore restrict ourselves to models that account for the entire future accrual path. We make the simplifying assumption that individuals, once retired, do not re-enter the labor market, i.e., that retirement is an absorbing state.

We will discuss three models, each with several variations. The first is the standard option value (OV) model (Stock and Wise, 1990a). The second is the peak value (PV) model (Warner, 1978; Coile and Gruber, 2000). The third is a newly developed OV model that explains the decision to retire, claim DI, or continue working.

5.3.1. Option Value Model

The option value model of Stock and Wise (1990a) begins with the assumption that individuals evaluate the benefit of retirement at any given age, *r*:

$$V_t(r) = \sum_{s=t}^{r-1} \beta^{s-t} U_w(Y_s) + \sum_{s=r}^{T} \beta^{s-t} U_r\left(B_s(r)\right), \quad (1)$$

where $U_w(Y)$ is the indirect utility of earnings and $U_r(B)$ is the indirect utility of retirement benefits. Future indirect utilities are discounted by a factor β and all individuals live to age *T*.[24] This calculation is made in every year for all future possible retirement ages. Thus, a 55 year old will evaluate the expected benefits of retiring at every age 55 to *T*. If he continues working one more year, he will then perform this calculation once again for every age 56 to *T* , presumably incorporating any new information he may have at that time. The model predicts that individuals will work in period *t* (age *t*) so long as the expected value of retiring at the optimal age, r^* (defined below), exceeds the expected value of retiring in period *t*:

$$\text{if } G_t(r^*) = E_t V_t(r^*) - E_t V_t(t) > 0, \text{ then work in period } t. \quad (2)$$

$G_t(r^*)$ is the "option value" of retiring in a future period, i.e., the option value of continued work in period *t*. It is the utility equivalent of wages foregone and benefits gained by retiring in period *t* versus a later period, r^*, when the expected value of future utility flows is maximized.

Empirical implementation of the option value model requires a parameterization of the indirect utility functions in $V_t(r)$ and assumptions regarding how individuals form expectations of future earnings and retirement benefits. Stock and Wise (1990a) assume a utility function with constant relative risk aversion and additive disturbances:

$$\begin{aligned} U_w(Y_s) &= Y_s^\gamma + \omega_s \\ U_r(B_s) &= [kB_s(r)]^\gamma + \xi_s \end{aligned} \quad (3)$$

where ω_s and ξ_s are individual-specific random effects that vary over time. Relative risk aversion is $1-\gamma$. The marginal utility of leisure is captured by *k*; it states that one dollar received while enjoying leisure is valued the same as *k* dollars while working. Following Stock and Wise (1990a), we assume that ω_s and ξ_s follow Markovian (first-order autoregressive) processes:

[24] In our empirical application, *T* is 110 years.

$$\begin{aligned} \omega_s &= \rho\omega_{s-1} + \varepsilon_{\omega s}, \quad E_{s-1}\left(\varepsilon_{\omega s}\right) = 0, \\ \xi_s &= \rho\xi_{s-1} + \varepsilon_{\xi s}, \quad E_{s-1}\left(\varepsilon_{\xi s}\right) = 0. \end{aligned} \tag{4}$$

Again following Stock and Wise (1990a), we assume that $\rho = 1$, so that the utility disturbances follow a random walk.

In each period (say, every year), workers form expectations about future wages Y_s, *s*>*t*. Following Coile and Gruber (2000) and others, we assume that workers expect their real wages to grow by one percent annually. Workers are assumed to know the structure of the Social Security program and their pension plan, if any, so that there is no uncertainty about future retirement benefits.

Given a utility function, current status, and future wages and benefits, workers determine the expected indirect utility of retiring in all future periods *r*, *r*>*t*. The period (age) that yields the highest expected utility is the optimal retirement age, r^*. Note that $G_t(r)$ may be written as:

$$G_t(r) = E_tV_t(r) - E_tV_t(t) = g\left(r\right) + \phi_t\left(r\right), \tag{5}$$

$$\begin{aligned} g_t\left(r\right) = \quad & \sum\nolimits_{s=t}^{r-1}\beta^{s-t}\pi\left(s\,|\,t\right)E_t\left(Y_s^{\gamma}\right) + \sum\nolimits_{s=r}^{T}\beta^{s-t}\pi\left(s\,|\,t\right)E_t\left(\left[kB_s\left(r\right)\right]^{\gamma}\right) \\ & -\sum\nolimits_{s=t}^{T}\beta^{s-t}\pi\left(s\,|\,t\right)E_t\left(\left[kB_s\left(t\right)\right]^{\gamma}\right) \\ \phi_t\left(r\right) = \quad & \sum_{s=t}^{T}\beta^{s-t}\pi\left(s\,|\,t\right)E_t\left(\omega_s - \xi_s\right) = \\ & \sum_{s=t}^{T}\beta^{s-t}\pi\left(s\,|\,t\right)\rho^{s-t}\left(\omega_t - \xi_t\right) = \\ & K_t\left(r\right)\nu_t, \end{aligned}$$

where $\pi\left(s\,|\,t\right)$ is the probability of surviving to age *s*, conditional on being alive at age *t*, $K_t\left(r\right) = \beta^{s-t}\pi\left(s\,|\,t\right)\rho^{s-t}$, and $\nu_t = \omega_t - \xi_t$. In other words,

$$G_t(r) = g\left(r\right) + K_t\left(r\right)\nu_t. \tag{6}$$

If the worker is to retire in period *t*, $G_t(r)$ must be less than zero for every potential retirement age *r*, *r*>*t*. Let $r^\dagger$ be the *r* that maximizes $g\left(r\right)/K_t\left(r\right)$, then the probability of retiring at *t* is:

$$P\left(\text{retire in period } t\right) = P\left(g_t\left(r^\dagger\right)/K_t\left(r^\dagger\right) < \nu_t\right). \tag{7}$$

We wish to estimate this equation for all HRS person-years from age 55 to 70, i.e., up to 16 equations per individuals. Their residuals ν_t are correlated, requiring the evaluation of cumulative normal probability functions up to 16-variate. This is extraordinarily computationally burdensome. Stock and Wise (1990a) evaluated three-year histories and found the results to be very close to three independent single-year decisions. We adopt the same simplification, i.e., we assume that all person-years are independent. In that case, Equation (7) is all that is needed. We apply the Huber correction to standard errors to adjust for clustering around individuals in the data (Huber 1967).

Estimation

We found the estimation of (7) to be numerically very unstable. Other authors that attempted estimating this OV model reported similar difficulties (Harris 2001; Samwick 1998). To some extent, this was due to model features that are inconsistent with observed behavior.

1. First, the data contain individuals with zero wages who report continued work. In the framework of the model, this can only occur when the individual is risk-seeking, i.e., $\gamma \geq 1$, which is generally ruled out by empirical estimates of risk aversion. It follows that risk-averse individuals with zero wages should retire immediately. The presence of non-retiring zero-wage workers in the data will therefore disrupt estimation of the utility parameters. We dropped zero-wage workers from the estimation sample.
2. Second, the model predicts that no-one retires until his/her benefits are strictly positive. Benefits of zero namely imply that the marginal utility of income is infinitely large, so that it is always optimal to continue working another period. In the data, however, we observe individuals that retire with zero benefits. For example, some individuals without pensions retire before age 62, when they become eligible for OASI benefits. The explanation, of course, lies in determinants that are omitted from the model, notably spousal income and the ability to consume by dissaving. We addressed this issue by assuming that individuals, when retired, may always consume at least the annuity equivalence of their wealth. In other words, the benefit flow includes annuitized wealth.
3. The previous observation also implies that it is critical to account for private pensions. A model in which benefits are only from OASI has no hope of explaining why many workers retire before the EEA. We relied on earnings and benefit data from SSA that were matched to the HRS for OASI benefit calculations, and on matched employer pension plan data for pension calculations. Individuals without matched SSA data were dropped. Individuals who reported that they were covered by a pension plan, but for whom no matched employer pension data were available for also dropped. (Individuals who reported that they were not covered by a pension plan remain in the sample.) We also required information on wealth holdings, so that person-years outside the HRS sample (before 1992) were dropped.

Even after these data exclusions, the estimation remained numerically unstable. One reason lies in the asymmetry around zero of the estimation problem. Individuals are assumed to continue working if the option value of continued work is positive. Can it ever become negative? If the optimal retirement age r^* is allowed to include the current age, t, then the option value can be zero but never negative. If we restrict the decision problem to evaluate future retirement ages only, i.e., we restrict $r^*>t$, then the option value can be negative. It will rarely be very strongly negative, though, because if the true optimal retirement age is t, $r^* = t+1$, and the utility of retiring one year later than optimal is not very much smaller than the utility of retiring at the right time. The implication is that $g_t\left(r^\dagger\right)/K_t\left(r^\dagger\right)$ in (7) tends to be large and positive when t is far from $r^\dagger$ and small and negative when t is close to $r^\dagger$. We found that the estimation was more stable when we allowed an intercept in (7), so that the estimation equation becomes:

$$P\left(\text{retire in period } t\right) = P\left(\alpha + g_t\left(r^\dagger\right)/K_t\left(r^\dagger\right) < \nu_t\right). \tag{8}$$

If shocks to the utility function (ω_t, θ_t) do not have mean zero, an intercept is justified.

While estimation of (8) converged under specific circumstances, it still did not amount to a model specification that was able to explain the data in a robust manner.

Stock and Wise (1990a) estimated, approximately, $\hat{\gamma} = 0.7$ and $\hat{k} = 1.5$. This implies a relative risk aversion of $1-\gamma = 0.3$, substantially below estimates from others. Hurd (1990), for example, found a relative risk aversion of 1.12. The Stock and Wise (1990a) utility specification, $U\left(Y_t\right) = Y_t^\gamma + \omega_t$, does not permit levels of risk aversion above unity. We therefore re-parameterized the utility function to the more commonly used form:

$$U\left(Y_t\right) = \frac{Y_t^{1-\theta}}{1-\theta} + \omega_t . \tag{9}$$

This parameterization is a generalization of (3) that permits higher levels of relative risk aversion. It behaves smoothly around $\theta = 1$, where $U\left(Y_t\right) = \ln\left(Y_t\right) + \omega_t$. This formulation proved to be far more stable in estimation. Section 5.6.1 presents estimates.

5.3.2. Peak Value Model

Perhaps because of difficulty in estimating the OV model outlined above, several authors have used the option value concept heuristically in a reduced form framework (Gruber and Wise 1999; Coile and Gruber 2000). In such models, the option value, $G_t\left(r^*\right)$, is used as explanatory covariate along with other controls in a probit regression equation to explain retirement. Typically, those authors assumed the utility parameters of Stock and Wise (1990a) to compute $G_t\left(r^*\right)$, i.e., they were not estimated.

Coile and Gruber (2000) further simplified this reduced form OV framework by assuming $k = \gamma = 1$. This implies risk-neutrality and the absence of any appreciation of leisure time. In addition, they omitted current and future wage earnings from the calculations. The resulting quantity is thus the difference between the present value of retirement benefits if retirement commences at the optimal age, r^*, and the present value of retirement benefits if the worker would retire in the current period, t. They labeled this quantity the peak value (PV). The peak value is identical to the Cost of Leaving (COL) measure developed by Warner (1978).

There are three major differences between the approach of Coile and Gruber and that of Stock and Wise. First, current earnings are not incorporated in the peak value measure. Instead, they include current earnings as separate regressors in the model. Second, they assume individuals are risk neutral and indifferent between labor and retirement income. That is, there is no disutility to work. Finally, under the particular assumptions of Stock and Wise, the stochastic term, ν_t, reflects unanticipated shocks to utility. In the peak value model, the stochastic term is not a structural parameter from the model itself, but captures everything the researcher does not observe about the retirement decision.

Thus, the peak value measure is intended to focus solely on the financial incentives imbedded in the Social Security and pension systems. It incorporates forward-looking behavior in the sense that it assumes individuals examine the entire future stream of benefits when making retirement decisions in the present period. Coile and Gruber acknowledge that a full option value model is appealing in that it incorporates earnings directly and captures other aspects of utility like risk aversion and the marginal value of leisure. However, an option value model requires a specific functional form of utility, which may be overly stylized. Moreover, Coile and Gruber note that along with a set of age dummies, current earnings explain 74 percent of the variation in the option value in their sample which is problematic if current earnings are correlated with other unobserved correlates of retirement behavior. As we show below (Section 5.5.1), the peak value measure is less correlated with current earnings and more correlated with overall earnings histories which in turn may arguably be less related to unobserved propensities to retire. We do not take a stand on whether variation in the peak value provides a better source of identification than variation in option value, but reason that it does provide a comparatively simple and straightforward means of capturing the retirement incentives of the Social Security system.

5.3.3. Option Value Model of Joint Retirement and DI Claiming Behavior

We generalize the option value model of retirement to account for the exit route from the labor force via Disability Insurance (DI). Retirement and DI claiming are treated as mutually exclusive. In each period, workers evaluate all possible future exit decisions and their associated expected discounted utility. They also evaluate the utility associated with retiring in the current period and with claiming DI in the current period. In the absence of utility shocks, the worker would select the option with the highest expected utility. In the presence of bivariate normally distributed shocks, the problem becomes a multinomial probit.

An issue remains with the “decision to claim DI.” Workers cannot decide to claim DI; they can only decide to apply for DI. We assume that workers know whether they are eligible for DI, i.e., they know with certainty whether SSA would award DI, should they apply.[25] The econometrician does not have this knowledge. Instead, the econometrician estimates an eligibility probability and computes the likelihood as the probability-weighted average of the likelihood if the worker were not eligible and the likelihood if the worker were eligible.

Specifically, define the indirect utilities of income from work, retirement, and DI enrollment as:

$$\begin{aligned} U_w(Y_t) &= \frac{Y_t^{1-\theta}}{1-\theta} + \omega_t \\ U_r(B_t) &= \frac{\left(\kappa^r B_t\right)^{1-\theta}}{1-\theta} + \xi_t^r \\ U_d(B_t) &= \frac{\left(\kappa^d B_t\right)^{1-\theta}}{1-\theta} + \xi_t^d \end{aligned} \qquad (10)$$

For work and retirement, these utilities are identical to those defined above (with κ^r instead of κ in the retirement equation to allow for potentially different valuation of benefits during retirement and while on DI). The utility for DI benefits is analogous.

As before, the expected present discounted value of utility if the respondent retires at age r is:

$$V_t(r) = \sum_{s=t}^{r-1} \beta^{s-t}\pi(s\,|\,t)U_w(Y_s) + \sum_{s=r}^{T} \beta^{s-t}\pi(s\,|\,t)U_r(B_s(r)). \qquad (11)$$

Analogously, the expected present discounted value of utility if the respondent claims DI at age d is:[26]

$$V_t(d) = \sum_{s=t}^{d-1} \beta^{s-t}\pi(s\,|\,t)U_w(Y_s) + \sum_{s=d}^{T} \beta^{s-t}\pi(s\,|\,t)U_d(B_s(d)) \qquad (12)$$

Let r^* be the age at which $V_t(r)$ is highest, and d^* the age that maximizes $V_t(d)$. If the worker is ineligible for DI, the problem reduces to that standard OV model (also see above):

$$\begin{aligned} P(\text{retire}) &= P\left(V_t(\text{retire}) > V_t(r^*)\right) \\ P(\text{claim DI}) &= 0 \\ P(\text{work}) &= 1 - P(\text{retire}) \end{aligned} \qquad (13)$$

[25] Our use of "eligibility" is broad: the worker must be insured, pass a test of substantial recent covered work, and be unable to engage in any substantial gainful activity by reason of any medically determinable physical or mental impairment that can be expected to result in death or that has lasted or can be expected to last for a continuous period of not less than 12 months.

[26] Equation (12) indicates that the worker receives wages until age *d*-1 and DI benefits from age *d*, i.e., it ignores the five month waiting period before DI benefits are paid. Accounting for the waiting period is problematic in the context of a model without alternative financial resources, because the marginal utility of income would be infinity during the waiting period. This would make it very difficult for DI to be optimal as exit route from the labor force.

If the worker is eligible for DI, the likelihood is:

$$
\begin{aligned}
P(\text{retire}) &= P\left(V_t(\text{retire}) > \max\left[V_t(r^*), V_t(d^*)\right]\right) \\
P(\text{claim DI}) &= P\left(V_t(\text{claim DI}) > \max\left[V_t(r^*), V_t(d^*)\right]\right) \\
P(\text{work}) &= 1 - P(\text{retire}) - P(\text{claim DI})
\end{aligned}
\tag{14}
$$

Since the econometrician does not know whether the worker is eligible for DI, the overall likelihood is a probability-weighted average:

$$
\begin{aligned}
P(\text{retire}) &= \left[1 - p_{\text{elig}}\right] P\left(V_t(\text{retire}) > V_t(r^*)\right) + p_{\text{elig}} P\left(V_t(\text{retire}) > \max\left[V_t(r^*), V_t(d^*)\right]\right) \\
P(\text{claim DI}) &= \left[1 - p_{\text{elig}}\right] \bullet 0 + p_{\text{elig}} P\left(V_t(\text{claim DI}) > \max\left[V_t(r^*), V_t(d^*)\right]\right) \\
P(\text{work}) &= 1 - P(\text{retire}) - P(\text{claim DI})
\end{aligned}
\tag{15}
$$

We parameterize the probability of being eligible for DI as a cumulative normal transformation of a linear combination of predictor variables:

$$
p_{\text{elig}} = \Phi(\eta' X), \tag{16}
$$

where X may include (a noisy measure of) insured status, health status, education, etc.

We simplify the residual structure in Equation (10) such that all residuals are distributed normally, but allow for correlation across the three residual terms. This reduces the likelihood to a probability-weighted average of a probit (if ineligible for DI) and a binomial probit (if eligible for DI). We label this model a reduced form joint option value model of retirement and DI claiming. Section 5.6.3 presents parameter estimates.

Option value models require that the exit state is absorbing. In other words, option value models do not allow for the possibility that a retiree or a DI claimant return to work. This feature is at odds with reality. The extent to which the model simplification affects the results of policy simulations is an empirical issue that can only be addressed by estimating and simulating more complex and more realistic models. The most promising class of models that account for re-entry into the labor force and for multiple DI spells are dynamic programming models. These are extraordinarily complex and well beyond the scope of our project. Ultimately, our interest is in consequences of EEA/NRA increases for the inflows and outflows of the OASDI program. OASI claimants that continue to work often have sharply reduced earnings, so that re-entry into the workforce tends to have very small effects on OASDI contributions. More substantial earnings would result in more substantial contributions and reduced benefits, but the OASI benefit would eventually be re-computed such that the overall effect is again small. The vast majority of DI benefits terminate due to mortality or conversion to OASI upon reaching age 65, not due to newly found substantial gainful activity (Annual Statistical Supplement 2001). The practical implications of our simplification are therefore likely mild. However, for evaluations of policies that encourage DI recipients to return to work, such as the Ticket to Work program, the richer choice set of a dynamic programming model is essential.

5.4. The Retirement Outcome Variable

There are many ways to measure retirement. For example, Gustman and Steinmeier (2000) distinguish five different measures based on (1) self reports; (2) time at work; (3) reported job transitions; (4) changes in wages; and (5) benefit claiming. The appropriate measure of retirement depends on the purpose of the analysis. Ultimately, we are interested in implications for the Social Security program. It may therefore seem attractive to model OASI (and/or DI) claiming behavior. However, this measure accurately captures Social Security outlays only. Many people stop working before they claim OASI, so that it is difficult to relate the claiming age to payroll contributions in counterfactual simulations.

Ideally, we would model the level of taxable wage earnings at all ages in combination with the OASI (or DI) claim date. With some loss of precision, the model of taxable wage earnings may be simplified to a discrete choice model of stopping work for pay (or "retiring completely"). However, it may not be needed to model both retirement and OASI claiming ages. Hurd, Smith, and Zissimopoulos (2002) found that 73 percent of individuals who retired before age 62 take early and reduced benefits within 3 months of turning 62 and 88 percent claim by the time they turn 63. Similarly, 81 percent of workers who retired after age 62 claim OASI benefits within twelve months. Predicting OASI claiming age conditional on retirement age is therefore straightforward.

Table 5.1. Additional Lifetime OASI Benefits if All Age-62 Claimants Would Claim at Age 63, As a Percent of Current OASI Benefits

	Difference in PDV of lifetime benefits
Men	-0.57%
Women	0.88%

We simulated the effect on lifetime OASI benefits under the assumption that all age-62 claimants postpone claiming by one year. At age 62, the early retirement penalty is 20 percent, that is, age-62 claimants receive benefits equal to 80 percent of their Primary Insurance Amount (PIA). At age 63, the early retirement penalty is 13.3 percent. Delaying claiming from age 62 to age 63 thus increases annual benefits by 8.3 percent (from 80 to 86.7 percent of PIA). The number of years over which retirement benefits are paid decreases by one year. Table 5.1 summarizes the combined effect on OASI benefits. For men, the present discounted value (PDV) of lifetime OASI benefits when claiming at age 63 is 0.57 percent lower than when claiming at age 62. For women, the difference is 0.88 percent. Women fare better under the assumed postponement, because their life expectancy is higher, so that the 8.3 percent increase in annual benefit more than offsets the loss of one year of benefits. The main point of Table 5.1, however, is that the differences are small and that, averaged over men and women, *forced postponement has virtually no effect on OASI liabilities*. Put differently, the early retirement penalty is roughly actuarially fair. For the purpose of calculating lifetime OASI benefits, the exact claiming age is thus of little consequence.[27]

Given (1) that OASI claiming age follows readily from retirement age in the vast majority of cases and (2) that inaccuracies in the OASI claiming translate into only minimal inaccuracies on OASI liabilities, we model the age at which individuals report becoming "completely retired." This permits calculating OASDI contributions. For computing OASI benefit payments, we assume that individuals claim OASI upon retirement or age 62, whichever comes later. In models of the joint decision to retire or claim DI, we assume that worker who claim DI have one year of zero earnings prior to their DI start date.

Coile and Gruber (2000) used a mixed outcome measure. For years after age 55 and before the first survey in 1992, they measured retirement based on Social Security earnings data. They assumed that a worker retired in year *t* if earnings are positive in year *t* and zero in year *t*+1. For years 1992 and beyond, where no matched Social Security earnings records are available, they switched to a measure based on a combination of self-reported retirement status and current labor force participation. In our peak value model estimates, below, we instead use self-reported "complete" retirement, both before and after 1992.[28] Respondents reported when they completely retired, including if this occurred prior to 1992. This avoids the potential problem that a year of zero earnings was not indicative of retirement, but due to unemployment, non-covered employment, or other reason. It also maintains consistency in definition before and after 1992. Coile and Gruber note that, in the aggregate, their earnings-based and self-report measures produce similar retirement hazards.

In the remainder of this subsection, we provide descriptive statistics of our retirement measure and of related measures and discuss sample inclusion criteria.

Each wave of the HRS asks respondents whether they consider themselves to be partially retired, completely retired, or not retired at all. Respondents who respond that they are either partially or completely retired are then asked to report the month and year in which they retired. We assume individuals were working in all years prior to their reported retirement date. We follow Coile and Gruber in taking the first reported retirement date. Once an individual reports being retired, we do not allow that individual to re-enter the labor force. About two percent of the ever-completely retired sample report being not retired in a wave following their initial year of complete retirement.

Retirement dates provided in Wave 1 are frequently at odds with retirement dates provided in Wave 2. Slightly over 40 percent of the age-eligible sample with a valid

---

[27] This insight permits a preview of our simulations of the effect of increasing the EEA. Increasing the EEA will do little to OASI liabilities; any saving to the OASI program must thus come from additional contributions due to delayed retirement. However, these additional contributions will increase annual benefits even further. The total effect on OASI will thus be small. Meanwhile, a fraction of early retirees will claim DI benefits, thus increasing the cost of the DI program. See Section 5.7.

[28] We estimate retirement models that account for pension information on post-1992 data only.

retirement year provided in Wave 1 and Wave 2 report different retirement years in those waves. The mean value of the difference is 4.4 years and the median value 2 years. In later waves, around ten percent of the sample with valid retirement years in consecutive waves report different retirement years. The median difference in later waves is 2 years as well.

All individuals who reported being retired in Wave 2 were asked to report a retirement year, regardless of whether they reported being retired in Wave 1. In Waves 3-5, individuals were only asked to provide a retirement year if their retirement status changed from the previous wave (e.g., from partly to completely retired). Thus, fewer individuals in Waves 3-5 were given the opportunity to change their retirement year from that reported in a previous wave. For consistency, therefore, we take the first valid retirement year provided after Wave 1. If a respondent only provided a retirement year in Wave 1, we use that value.

Using this definition of retirement we can construct at least a partial work/retirement sequence for 92 percent of age-eligible males in the HRS. About half of the sample with an entirely missing sequence (377 individuals) reported being partially or completely retired in at least one wave but did not provide a retirement date. The other half of the sample reported working in some waves and that the question was “not relevant” in other waves. The skip pattern for a “not relevant” answer in Wave 1 is that the individual does not work for pay, is a homemaker, or has not worked in 10 or more years. In subsequent waves, the “not relevant” sample is switched to those who do not work for pay, is a homemaker, or has not worked for one or more years. This skip pattern is hard to understand given that most people who report being completely retired also report not working for pay and many individuals report retirement years between waves of the HRS. Gustman and Steinmeier (2000) argue that a large segment of this population is probably completely retired. For our purposes, however, they must be dropped from the sample.

For 82 percent of the remaining sample, we have a complete work/retirement history through Wave 5. Individuals with incomplete work/retirement histories are those who reported being not retired in Wave 1 and possibly subsequent waves, but eventually dropped from the sample, were skipped for some reason, or provided a “not relevant” answer. For these individuals we can verify work status through fewer than five waves. As just noted, it seems likely that a significant fraction of the individuals who report “not relevant” actually retired. We retain individuals with incomplete work/retirement histories in our analysis, although it should be noted that doing so will cause us to underestimate aggregate retirement hazards at most ages. Including these individuals will not bias our simulations, however.

Figure 5.2 graphs complete and complete/partial retirement hazards for men who were working at age 49. The hazards display prominent spikes at ages 62 and 65. For example, 7.8 percent of males working at age 60 completely retired at age 61. That retirement hazard jumps to 23.5 percent at age 62, then declines 13.4 and 14.4 percent at ages 63 and 64, jumps back up to 22.2 percent at age 65, and then drops to 12.4 percent at age 66. There is a slight peak in the retirement hazard at age 55 as well. The partial/complete retirement hazard is higher at all ages, but follows the same pattern. By age 67, the unretired population has fallen to fewer than 100 males in our sample and by age 68 it has fallen to just 29. Age 68 is the last age for which we can calculate a hazard in our sample, since the oldest individuals in Wave 5 are 69. The retirement hazards depicted in Figure 5.2 compare well to those calculated by Coile and Gruber, though our hazards show a more prominent peak at age 62.

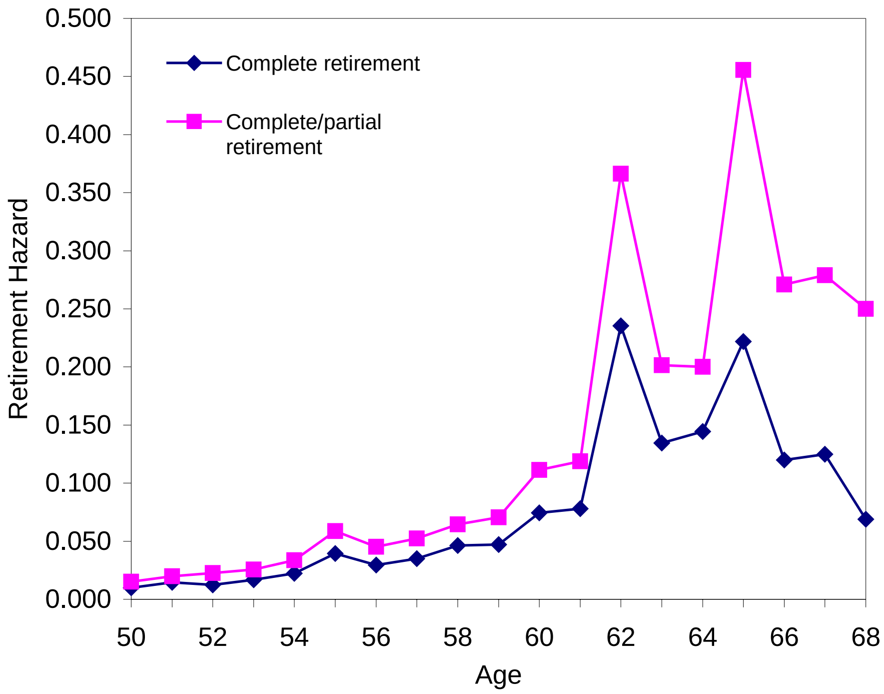

Figure 5.2. Male Retirement Hazard, by Age

Table 5.2 provides further evidence on the validity of the self-reported retirement measure. Fewer than ten percent of individuals who were completely retired reported working for pay and those that did work for pay worked less than half-time and had only been in their current job for a few years. Curiously, the fraction of completely retired individual working for pay increased across waves (from 3 to 7 percent). This may be due to sample selection or reflect a changing concept of retirement as individuals age. In contrast, about 95 percent of "not retired" individuals report working for pay. They tend to work full-time and have long tenure on their current job. The complete/partial retirees have high rates of labor force participation and tend to work part-time. Tenure on the current job for these individuals is low, however, indicating that they have most likely have made a significant job change in the recent past. Note that the "not relevant" group has very low labor force participation in all but Wave 2. It is not clear why the fraction of the "not relevant" group working for pay in Wave 2 is so high (30 percent).

Table 5.2. Self-Reported Retirement Status and Current Labor Force Participation

	Wave				
	1	2	3	4	5
A. Complete retirement					
Average age	57.5	59.3	61.4	62.8	64.5
Med. yrs retired	3	3	3	4	5
Work for pay	0.03	0.04	0.07	0.08	0.07
Median hrs/wk*	16	12	12	15	12
Median tenure*	5	3	3	3	3
B. Complete/partial retirement					
Average age	56.7	58.7	60.6	62.4	63.8
Med. yrs retired	2	3	3	4	4
Work for pay	0.77	0.64	0.75	0.77	0.76
Median hrs/wk	30	30	25	25	25
Median tenure	4	4	5	5	6
C. Not retired					
Average age	55.2	56.8	58.4	59.9	61.5
Work for pay	0.94	0.95	0.96	0.96	0.95
Median hrs/week	40	40	40	40	40
Median tenure	15	15	13	13	13
D. Irrelevant					
Average age	55.5	57.7	59.6	62.2	63.6
Work for pay	0.02	0.30	0.03	0.02	0.01
Median hrs/wk	40	40	40	40	5
Median tenure	2	10	4	16	2

*Conditional on working for pay. Sample conditional on working at age 49.

It is not straightforward to determine when individuals first claimed Social Security benefits, what type of benefits were received, and whether benefits were claimed on the basis of own or spousal earnings history. The benefit receipt question is asked in different ways in different waves. Among those who reported claiming OASI benefits, 10 percent of men and 14 percent of women reported first receiving them before age 62 (60 if ever widowed). *We assumed that OASI claiming before age 62 (60 if ever widowed) was in fact DI claiming and that DI claiming after age 65 was in fact OASI claiming (0.3 percent of claimants). We are exploring whether to keep altered responses in the estimation sample.*

Figure 5.3 graphs the post age-61 OASI benefit claiming hazards for the 1,807 males with at least a partial claiming history. Most individuals without claiming history have yet to reach age 62 or dropped out of the sample prior to age 62. In addition, there is a small fraction with missing data because they did not answer the benefit question or did not provide a claiming date. As with the retirement hazards, a large fraction of the sample has an incomplete claiming history because they have yet to claim benefits and have not reached age 70. There are only a few individuals remaining in the hazards beyond age 66.

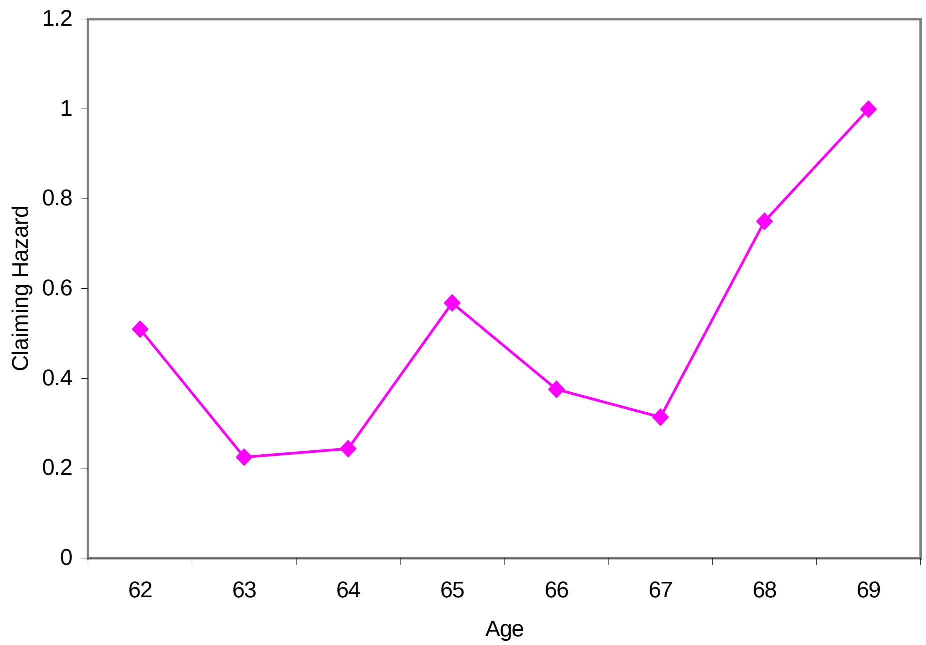

Figure 5.3. Male OASI Benefit Claiming Hazard, by Age

Over half of the eligible male sample claims retirement benefits at age 62. The hazard drops to around 25 percent at age 63 and 64 and then jumps back up to 57 percent at age 65. About of a third of the remaining sample claims retirement benefits at ages 66 and 67. The hazards increase sharply at age 68 and 69, but only a few individuals remain in the sample at those ages.

5.5. Social Security and Pension Benefits

In this section we discuss the construction of the two key determinants of retirement behavior: Social Security benefits and pension benefits. Social Security benefits are derived from SSA earnings records that were matched to HRS data; pension benefits follow from self-reports on whether the respondent was covered by a pension plan and, if affirmative, employer pension records that were matched to the HRS.

5.5.1. Social Security Benefits and Wealth

We first describe how we use the matched Social Security earnings records to generate Social Security benefits, by retirement year for each eligible individual in the HRS sample.[29] We then discuss how we translate this quantity into variables that capture Social Security incentives, including Coile and Gruber's peak value measure.

[29] We thank Courtney Coile for providing us with her programs for calculating SSW. These are the same programs as used in Coile and Gruber (2000a; 2000b).

The first step in calculating SS benefits is to generate a complete earnings history for each individual. We do this using Social Security earnings records between 1951 and 1991 which were matched to the original HRS sample. In the sample of age-eligible men and women, 74 percent had valid Social Security earnings records.

In order to project Social Security benefits under the assumption of continued work until all future ages (through age 69), we need to project Social Security earnings. There are several ways this could be done. Coile and Gruber grow real Social Security earnings as reported in 1991 by one percent annually. We choose a similar approach, with one difference. Instead of using 1991 earnings as the basis, we use Social Security earnings reported in the year prior to complete or partial retirement. We do this so that projected Social Security earnings reflect potential earnings were that individual to continue working until age 69.[30] In our sample, the median change in earnings between the year before retirement and the year of retirement is –32 percent for males retiring between 1977 and 1991 (about 20 percent of the sample) and a large fraction of these individuals have no earnings following their reported retirement year. We use the actual CPI to inflate nominal earnings through 2001 and assume an annual inflation rate of 4 percent thereafter. For consistency, we use 1991 Social Security earnings as the base amount for individuals who retire after 1991 rather than using self-reported earnings in the HRS.[31]

The next step is to calculate average indexed monthly earnings (AIME) for each individual at each age 55-69. For most individuals, AIME is the sum of the highest 35 years of Social Security earnings divided by years×12.[32] For individuals born before 1929, the maximum years over which AIME is calculated is equal to 35-(1929-birthyr). All earnings are inflated to nominal dollars at age 60 using average wage growth as calculated by the Social Security Administration (reference). Although we constrain our analysis sample to individuals born between 1931 and 1941, we must calculate SSW for individuals born outside those years because our final measure of SSW incorporates spousal benefits. We do not calculate SSW for individuals born before 1922, though, since program rules for these individuals are substantially different.

Our programs next take AIME and convert it to a primary insurance amount (PIA). The PIA is the result of applying a progressive piecewise-linear schedule to an individual's AIME. Individuals born after 1928 with fewer than 40 quarters of coverage are ineligible to receive benefits and their PIA is set equal to zero.[33] The PIA is then adjusted for the age at which benefits are first claimed. There is no adjustment for individuals who retire at age 65, the normal retirement age. The PIA for individuals claiming benefits between ages 62 and age 65 is reduced by 5/9ths of 1 percent per month. Thus, an individual who

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[30] Arguably, earnings forecasts should be conditional on the year in which the forecast is made. Individuals presumably update their forecast as new information on earnings becomes available. Our approach effectively assumes individuals perfectly forecast future earnings up until the year before actual retirement or the last year of data.

[31] Individuals with a missing work/retirement history are assigned a base year of 1991.

[32] Earnings before age 60 are inflated to age 60 dollars using average wage growth as detailed in SSA (19??). Earnings after age 60 are left in nominal terms.

[33] In 1992, one quarter of coverage required $570 in earnings. Quarters of coverage requirements are less for individuals born before 1929.

claims benefits at age 62 receives 80 percent of the PIA at age 65. Individuals who retire after age 65 receive a delayed retirement credit (DRC). For individuals reaching age 65 in 1999, the DRC adds an additional 5.5 percent to the PIA for each year benefit receipt is delayed between ages 65 and 70. Although in reality some individuals do not claim benefits in the same year that they retire, our retirement model assumes that individuals claim benefits in the year of their retirement or, if they retire prior to age 62, at age 62.

Our calculations of Social Security benefits incorporate currently legislated changes in the NRA, DRC, and early retirement penalty. The NRA will rise by 2 months for each birth cohort between 1938 and 1950 (the increase is 12 months for both the 1943 and 1944 cohorts) reaching age 67 for the 1950 and later cohorts. At the same time, the DRC is scheduled to gradually increase to 8 percent for individuals reaching age 65 in 2008. Finally, if an individual claims benefits more than 36 months before the NRA (which is possible for 1938 and later cohorts), benefits are reduced by 5/12ths of one percent for each month in excess of 36 months. The 5/9ths reduction applies to the first 36 months.

Option value models convert benefits into utility equivalents and discount these as part of the model estimation. Only own benefits enter into OV models because spousal survival issues would add too much complexity. In peak value models, we account for own and spousal benefits.

The final step is to generate the present discounted value of future retirement benefits, Social Security wealth (SSW), based on an individual's PIA at each retirement age and the PIA of his spouse.[34] SSW is effectively a household measure of Social Security retirement wealth. The stream of benefits while both spouses are alive and over age 62 is the maximum of 1.5 times the highest earner's benefit and the sum of both earner's benefits. Once one spouse dies, the stream of benefits is equal to the highest earner's benefits.[35] The model assumes spouses retire at age 62 and there is only one spouse eligible to receive dependent spouse benefits (the spouse they have in 1992).[36] In present value calculations, we assume a discount rate of 3 percent and use conditional joint survival probabilities. SSW for each individual is discounted back to the year in which the individual turns age 55 and then expressed in 1992 dollars. Thus, two individuals identical in all respects but the year in which they turn age 55 will have the same SSW at all ages (assuming they are both subject to the same program rules).

Sample Selection

Table 5.3 lists the criteria we used to create the estimation sample of male HRS respondents for this analysis. (We also estimate models for women; their sample sizes are not shown in the table.) There are 4,806 age-eligible males in the HRS (born 1931-1941). Of these men, 3,321 have matched Social Security earnings records from which

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[34] We assume the real value of the PIA is constant between age of retirement and death.
[35] The actuarial reduction for early retirement is somewhat higher for surving spousal benefits (0.006944 per month between ages 62 and 65)
[36] We set the PIA of spouses with missing Social Security earnings data equal to zero.

we can calculate SSW. This leaves us with 27,593 person-year observations on men ages 55 to 69 between 1986-2000. 1986 is the earliest year an individual in the sample turns age 55 and 2000 is the last year for which we can construct a retirement indicator. Of these, 2,616 have at least a partially complete work/retirement history and were still working at age 54. Eliminating person-year observations with missing retirement data and observations following retirement yields a final sample with 2,606 persons and 16,844 person-year observations.

Table 5.3. Sample Selection

Sample Restriction	Persons	Person-years
Age-eligible males (born 1931-1941)	4,806	—
Non-missing Social Security earnings data	3,321	—
Age 55-68 between 1986-1999	3,321	27,593
Not retired at age 54	2,616	22,953
Non-missing retirement status, non-missing veteran status, place of birth, and race data.	2,606	16,844

Variation in SSW with Age

Table 5.4 lists median SSW and its accrual and peak value by age for men. Accrual is the difference between SSW in year t+1 and year t and thus measures the increase in SSW by working one additional year. Peak value is the difference between SSW in the year in which it is at its maximum value, r^*, and year t. In years after r^*, we follow Coile and Gruber by measuring peak value as the accrual. Thus, once an individual is past his peak value age, the incentive to keep working is related to how much he wins or loses by working one additional year.

Median SSW increases steadily between age 55 and age 65 in our sample from $145,353 to $163,238. These levels are about 10 percent below those reported in Coile and Gruber (2000). These differences are most likely due to differences in how we project Social Security earnings, calculate retirement, and select our final analysis sample. The trend in SSW with age, however, is quite similar. SSW in Table 5.4 increases by 7.6 percent between ages 55 and 62 and by 11.4 percent between ages 55 and 65. This compares favorably to growth in median SSW between those same ages reported in Coile and Gruber of 7.8 and 14.5 percent.

Table 5.4. Median Male Social Security Wealth by Age ($1992)

Age	SSW	Accrual	Peak Value
55	145,353	1,643	14,218
56	147,612	1,430	12,280
57	149,724	1,241	10,737
58	150,908	1,072	9,312
59	153,404	954	8,364
60	154,686	856	7,359
61	155,354	1,206	6,526
62	157,538	1,851	5,139
63	159,645	1,686	2,846
64	162,181	652	864
65	163,238	-194	0
66	163,093	-763	-557
67	162,509	-1,287	-1,214
68	161,524	-1,695	-1,674
69	159,580	-1,894	-1,893

Notes: Sample defined as in Table 5.3, except individuals are not excluded after retirement. *N*=2,604

Median accrual falls between ages 55 and 60 from $1,643 to $856 and then jumps sharply to $1,206 at age 61 and $1,851 at age 62. This reflects the fact that we assume individuals who retire before age 62 claim benefits at age 62 and then in the year of retirement thereafter. Between ages 62 and 65, Social Security benefits increase by about 6.7 percent per year. At age 65, however, the median accrual becomes increasingly negative. The delayed retirement credit, which is around 5.5 percent for most of this sample apparently does not increase SSW sufficiently to offset lost benefits in earlier years. Again, the pattern we observe in accruals in Table 5.4 most likely reflects sample selection as well.

The final column of Table 5.4 reports peak value by age. Peak value is substantially larger than the accrual amounts reflecting the fact that this measure is a more forward-looking measure of Social Security incentives. At age 55, the median peak value is $14,218. Peak value declines steadily in the sample reaching zero at age 65 and turning negative in years thereafter. Both median accrual and peak value reported in Table 5.4 are smaller in magnitude than reported in Coile and Gruber. As a percentage of SSW, however, they are quite similar.

The peak values in the last column of Table 5.4 illustrate the median gains that workers can obtain by postponing retirement. It is important to note their magnitude. At the median, the gain from postponing retirement from age 62 to age 65 is about $5,000, or 3 percent of SSW. At the expense of three years additional work, this is not very much money. The estimates of peak value model parameters in Section 5.6.2 are statistically significant and consistent with theory, but the simulations of Section 5.7.4 will indicate that the peak values have little economic significance, i.e., that their influence over behavior is small. This should not surprise given the magnitude of the peaks.

The modal age for men at which SSW reaches its peak is age 65, where 17 percent of the sample peaks (Table 5.5). Maximum SSW is achieved at ages before age 65 for about 38 percent of the sample and after age 65 for 45 percent, with 12 percent reaching maximum SSW at age 70. Seven percent of the sample reaches its maximum before age 62; for these individuals, additional earnings are not sufficient to warrant delaying benefit receipt after age 62 even with the 6 percent annual gain in annual benefits individuals earn as a result of delaying claiming. SSW is maximized at ages 63 and 64 for another 9 and 15 percent of the sample. The effect of the scheduled increase in the delayed retirement credit after age 65 (from 5.5 to 8 percent) can be seen in the final two sets of columns in Table 5.5. Almost half of individuals who turned age 55 in 1986 achieve maximum SSW at age 65 compared to only 7 percent of individuals who turned age 55 in 1996. SSW will reach its maximum at age 70 for 28 percent of this younger cohort.

Table 5.5. Distribution of Peak Value Ages (Men)

	Sample					
	All		Age 55 in 1986		Age 55 in 1996	
Age	Pct.	Cum.	Pct.	Cum.	Pct.	Cum.
55	0.06	0.06	0.03	0.03	0.08	0.08
56	0.00	0.06	0.00	0.03	0.00	0.08
57	0.00	0.06	0.00	0.03	0.00	0.08
58	0.00	0.06	0.00	0.03	0.00	0.08
59	0.00	0.06	0.00	0.03	0.00	0.08
60	0.00	0.06	0.00	0.03	0.00	0.08
61	0.01	0.07	0.00	0.03	0.01	0.09
62	0.06	0.14	0.03	0.05	0.02	0.11
63	0.09	0.22	0.06	0.11	0.04	0.15
64	0.15	0.38	0.08	0.18	0.05	0.20
65	0.17	0.55	0.53	0.71	0.07	0.27
66	0.12	0.67	0.08	0.79	0.10	0.37
67	0.10	0.77	0.08	0.87	0.15	0.52
68	0.08	0.85	0.04	0.92	0.14	0.66
69	0.04	0.88	0.03	0.94	0.07	0.72
70	0.12	1.00	0.06	1.00	0.28	1.00

Sample as in Table 5.4.

Table 5.6 and Table 5.7 present median SSW by age and the distribution of peak value age for women. Female SSW tends to be roughly 20 percent lower than for men. The highest median SSW is obtained at age 65, but the median accruals and peak values are small. Median peak values are also smaller than for men, even as a percent of SSW. The median peak value is essentially zero at ages 62, 63, and 64, earlier than for men. Table 5.7 confirms this. Where the modal age at which SSW reaches its peak is 65 for men, it is 62 for women. (Strictly speaking, the modal age is 55, after which there is no financial Social Security incentive to continue working for 23 percent of women. However, this group represents women with little or no earnings history and is of limited relevance to the issues under study.) Social Security wealth thus peaks at lower ages for women than for men.

Table 5.6. Median Female Social Security Wealth by Age ($1992)

Age	SSW	Accrual	Peak Value
55	116,960	437	4,933
56	118,347	470	4,186
57	120,157	517	3,476
58	121,200	516	2,914
59	122,407	517	2,194
60	123,682	527	1,480
61	124,483	307	931
62	125,896	0	74
63	127,315	0	0
64	128,698	-375	0
65	128,965	-880	-522
66	127,714	-1,231	-1,129
67	127,021	-1,577	-1,488
68	126,120	-1,834	-1,798
69	124,637	-2,045	-2,044

Sample defined as in Table 5.3 except sample is female and individuals are not excluded after retirement. *N*=2,748.

Table 5.7. Distribution of Peak Value Ages (Women)

Age	Pct.	Cum.
55	0.23	0.23
56	0.00	0.23
57	0.00	0.23
58	0.00	0.23
59	0.00	0.24
60	0.00	0.24
61	0.11	0.35
62	0.15	0.50
63	0.03	0.53
64	0.07	0.60
65	0.10	0.70
66	0.06	0.77
67	0.07	0.83
68	0.06	0.89
69	0.02	0.91
70	0.09	1.00

Sample as in Table 5.3.

5.5.2. Pension Benefits and Wealth

In 1992, the HRS asked its respondents whether they were covered by any pension plans from the current or a former employer. If they responded affirmatively, they were asked about various characteristics of the plan and for contact information of the plan sponsor(s). An attempt was subsequently made to obtain pension plan descriptions from all plan sponsors, resulting in the Employer Pension File (EPF). The plan descriptions were applied to respondents' characteristics (years of service, wage, contribution rates, etc.) to obtain estimates of pension benefits and their present value at potential future years of retirement. These calculations are performed by the so-called pension calculator (Curtin, Lamkin, Peticolas, Steinmeier, 1998).

We distinguish three types of respondents:

1) Respondents who reported no pension coverage. These remain in the sample with, of course, zero pension benefits and wealth.
2) Respondents who reported pension coverage and for whom there are matching Employer Pension File records. These also remain in the sample. Their benefits and wealth follow from the pension calculator. We applied the same economic assumptions as for the Social Security benefit and wealth calculations, described above.
3) Respondents who reported pension coverage, but did not have a matching Employer Pension File record. There were 1,769 such respondents; they were eliminated from the estimation and simulations (though included in PV models without control for pension wealth).

In estimation, we assume that pension benefits are adjusted for inflation during retirement.

5.6. Model Estimates

This section presents empirical model estimates for the option value model of retirement (Section 5.6.1), the peak value model of retirement (Section 5.6.2), and the reduced form joint Option Value model of retirement and DI claiming (Section 5.6.3). Section 5.7 presents the results of policy simulations.

5.6.1. Option Value Model

As explained above, our outcome is the transition from not completely retired to completely retired. The sample consists of individuals who were not completely retired in 1992 or at age 55, whichever comes later. The unit of observation is a person-year. Each individual contributes a person-year for every year that he is not completely retired, plus possibly one for the year in which he/she completely retired. The last person-year is the year of retirement or the year before the last interview (if still not retired by that last interview).

Table 5.8. OV Model of Retirement Estimates

	Men		Women	
	$\kappa = \kappa_0$	$\kappa = \kappa_0 + \kappa_1(\text{age} - 55)$	$\kappa = \kappa_0$	$\kappa = \kappa_0 + \kappa_1(\text{age} - 55)$
β	0.6526 ***	0.4445 **	0.6738 ***	0.5537 ***
	(0.0950)	(0.1972)	(0.0787)	(0.1288)
θ	0.8274 ***	0.8289 ***	0.6529 ***	0.6766 ***
	(0.0332)	(0.0265)	(0.0343)	(0.0281)
κ_0	18.8114	0.7359	146.0710	3.5435
	(29.7964)	(1.2846)	(299.8833)	(8.9853)
κ_1		9.3022		55.4133
		(14.2388)		(128.5210)
α	105.8920 **	110.8164 ***	1689.7056	1345.4393
	(43.4733)	(41.0108)	(1418.0341)	(1091.0624)
σ_ν	61.9184 ***	60.2300 ***	964.6644	735.0135
	(24.0109)	(20.7194)	(791.2797)	(575.6053)
ln-L	-3046.99	-2971.83	-3028.81	-2962.38

Huber-corrected (robust) asymptotic standard errors in parentheses;
Significance: '*'=10%; '**'=5%; '***'=1%.

Table 5.8 presents parameter estimates of the OV model of complete retirement. The numbers in parentheses are robust standard errors, Huber-corrected for clustering of observations (person-years) within individuals. All specifications account for both Social Security and pension incentives. The two sources of retirement income are treated in the same manner; the sum of Social Security and pension income enters the model. The first and third columns contain estimates of the model outlined in Section 5.3.1 above. As a reminder of notation, the key equations are:

$$
\begin{aligned}
V_t(r) &= \sum_{s=t}^{r-1} \beta^{s-t} U_w(Y_s) + \sum_{s=r}^{T} \beta^{s-t} U_r\left(B_s(r)\right) \\
G_t(r) &= E_t V_t(r) - E_t V_t(t) = g\left(r\right) + K_t\left(r\right) \nu_t \\
U_w(Y_s) &= \frac{Y_s^{1-\theta}}{1-\theta} + \omega_s \\
U_r(B_s) &= \frac{\left(\kappa B_s\right)^{1-\theta}}{1-\theta} + \xi_s
\end{aligned}
\qquad (17)
$$

Several features are noteworthy. First, the discount factors are much smaller (discount rates are much larger) than typically expected. For men, the discount factor is $\hat{\beta} = 0.6526$, corresponding to a discount rate of 53 percent. For women, the discount factor implies a discount rate of 48 percent.

Second, individuals are far more risk averse than as found by Stock and Wise (1990a). For their sample of men, they estimated a relative risk aversion of around $1-\hat{\gamma}=0.3$; we find 0.8. Using the Retirement History Survey, Hurd (1990) found relative risk aversion of 1.12. Further, we find that women appear to be less risk-averse than men.

Third, our estimate of κ (multiple on retirement benefits to reflect the value of leisure) is much higher than Stock and Wise (1990a) found ($\hat{\kappa}=1.5$). Our values seem much too high ($\hat{\kappa}=18.8$ for men, $\hat{\kappa}=146$ for women). Note, however, that our estimates have large standard errors, large enough to be consistent with Stock and Wise. Also see below.

In the Stock and Wise formulation, the marginal utility of leisure is constant and does not vary with health or age. However, it seems plausible that leisure is valued more highly when the individual is in poor health. We therefore estimated an alternative specification in which $\kappa=\kappa_0+\kappa_1(\text{age}-55)$. See the second and fourth columns of Table 5.8. The estimates imply a marginal utility of leisure that increases with age, as expected. The point estimates remain implausibly large and insignificant, though.

Figure 5.4 through Figure 5.8 show the how the likelihood function behaves around estimated parameter values (indicated by a vertical line). These plots are for men, with constant κ (first column in Table 5.8). They are all univariate plots, i.e., while holding the other parameters constant. While the estimated β is very small, the likelihood is virtually constant over a wide range. This may explain why other authors have had trouble identifying β in OV (and dynamic programming) models. Only above approximately $\beta=0.8$ does the likelihood decrease substantially. The maximum likelihood as a function of parameter θ appears to be well-defined (Figure 5.5), but its wide flat surface above unity may make it difficult for standard maximization routines to find the optimum. Parameters κ (Figure 5.6), α (Figure 5.7), and σ_ν (Figure 5.8) have well-defined maximum likelihoods.

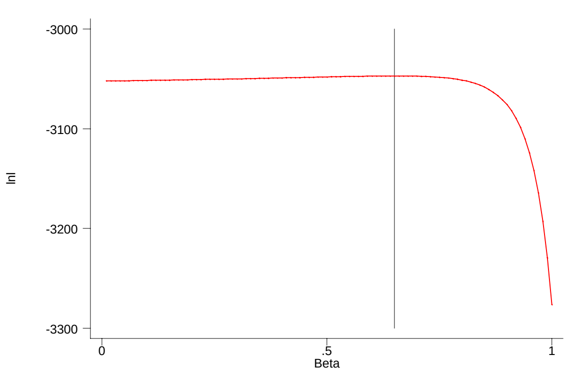

Figure 5.4. Grid Plot of Beta

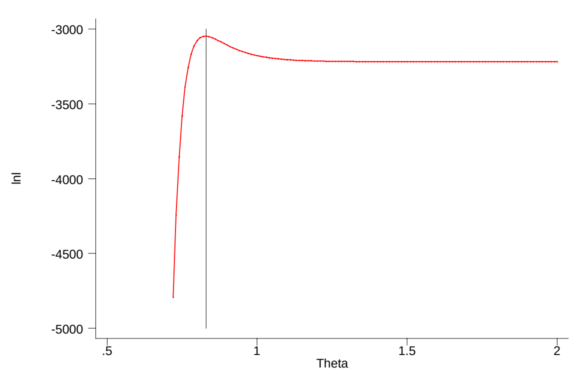

Figure 5.5. Grid Plot of Theta

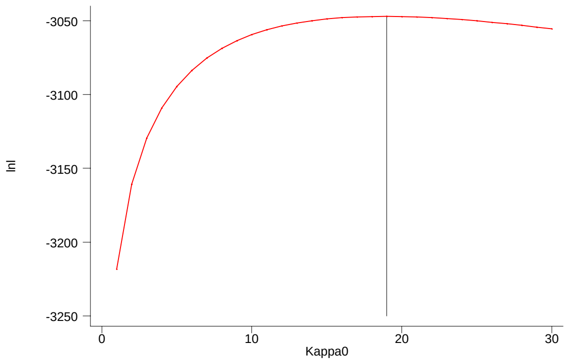

Figure 5.6. Grid Plot of Kappa

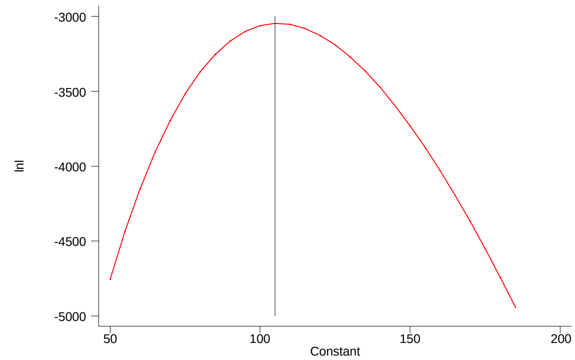

Figure 5.7. Grid Plot of Alpha

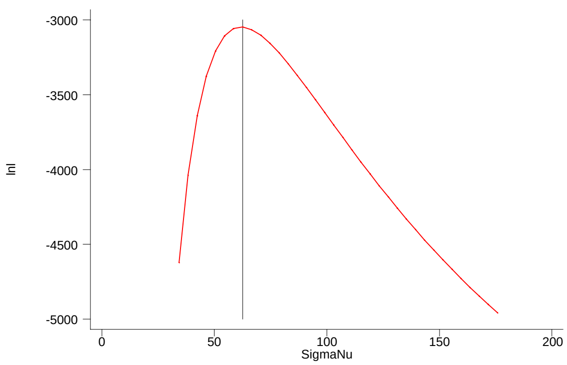

Figure 5.8. Grid Plot of Sigma(Nu)

5.6.2. Peak Value Model

As explained in detail in Section 5.3.2, we model the effect of Social Security incentives on retirement propensities using the following probit specification:

$$\Pr(R_{it} = 1) = \Phi(\beta_1 SSW_{it} + \beta_2 PV_{it} + \beta_3 X_{it} + \beta_4 AGE_{it} + \beta_5 YEAR_{it}), \quad (18)$$

where $\Phi(.)$ is the cumulative normal density, R_{it} is an indicator variable for retirement of individual i in year t, SSW_{it} is current Social Security wealth, and PV_{it} is the peak value measure of Social Security incentives. Alternative model specifications, detailed below, also control for pension wealth and the corresponding peak value. AGE_{it} includes a linear age term and two indicators to capture spikes in the retirement hazard at ages 62 and 65, and $YEAR_{it}$ is a linear time trend controlling for potential cohort effects. The covariates included in X_{it} vary by specification. Initially, we include in X_{it} the same variables used by Coile and Gruber (2000). These include (fourth-order polynomials in) current and lifetime earnings[37], marital status in 1992[38], age difference between spouses, and spousal

[37] For current earnings we use Social Security earnings prior to 1991 and labor income reported in the HRS for years after 1991 capped at the Social Security maximum. We approximate between-wave earnings with

current and lifetime earnings.[39] X_{it} also includes controls for education, race, veteran status, U.S. birth, current region of residence, labor market experience and its square, current tenure and its square, 13 industry dummies, and 17 occupation dummies.[40] The stochastic element, ε_{it}, captures unobservable determinants of retirement that may vary over individuals and time. We recognize these unobservables may be correlated within individuals over time and adjust the estimated standard errors accordingly. Table 5.9 provides definitions of these and other variables used in the analyses with sample means and standard deviations.

Table 5.9. Variable Definitions, Sample Means, and Standard Deviations

Variable	Definition	Mean	Std. Dev.
RET_C[1]	Self-reported complete retirement	0.062	0.242
RET_SS[2]	Self-reported Social Security claiming	0.344	0.475
SSW($100K)	Present discounted value of Social Security benefits	1.405	0.569
PV($100K)	Peak value	0.117	0.122
EARN($000)	Current labor earnings	274.288	187.611
AIME($000)	Annualized Indexed Monthly Earnings	20.484	9.383
AGE	Current age	58.442	2.796
AGE==62	Age62	0.057	0.232
AGE==65	Age 65	0.017	0.129
MARRIED	Married in 1992	0.844	0.363
MARRIED 10+	Ever married at least ten years in 1992	0.927	0.260
S_EARN($000)	Spouse’s current labor earnings	106.354	134.387
S_AIME($(000)	Spouse’s AIME	5.098	5.927
EXPER	Labor market experience	39.964	4.328
TENURE	Current job tenure	16.853	11.282
TENURE_M	Tenure missing	0.157	0.364
EDUCATION 1			
EDCAT_11	<12 years education	0.248	0.432
EDCAT_12	12 years education	0.319	0.466
EDCAT_13	13-15 years education	0.184	0.388
EDCAT_14	≥16 years education	0.248	0.432
EDUCATION 2			
EDCAT_21	No high school degree	0.222	0.416

inflation-adjusted earnings from the prior year. For individuals retiring in year *t*, we estimate $EARN_{it}$ with prior-year earnings.

[38] We hold marital status constant at its 1992 value since marital status in 1992 is used to compute SSW.

[39] Spousal variables are set equal to zero for individual who are single in 1992.

[40] Education is held constant at its 1992 value. Tenure is missing for pre-1992 observations for individuals whose tenure in 1992 is less than the difference between their current age and age 55. Industry and occupation are for the job with the longest reported tenure. We approximate between-wave tenure with tenure from the prior year. For individuals retiring in year t, we estimate tenure with prior-year tenure. Tenure before 1992 is estimated as tenure in 1992 minus t years. Tenure must be positive or else is set to missing.

Variable	Definition	Mean	Std. Dev.
EDCAT_22	High school degree	0.499	0.500
EDCAT_23	Associates degree	0.042	0.200
EDCAT_24	College (Bachelor's) degree or more	0.237	0.425
RACE 1			
RACE_11	Black	0.118	0.322
RACE_12	Other non-white	0.035	0.183
RACE_13	White	0.848	0.359
RACE 2			
RACE_21	Black	0.116	0.321
RACE_22	Hispanic	0.080	0.271
RACE_23	Other	0.804	0.397
AGEDIFF	Difference between own and spouse's age (years)	3.954	4.999
AGEDIFF_M	Age difference missing	0.129	0.335
VETERAN	Military veteran	0.582	0.493
U.S. BORN	Born in the United States	0.897	0.304
OCCUPATION	Occupation on job with longest reported tenure		
MANAGERIAL		0.192	0.384
PROF. SPECIALTY		0.137	0.336
SALES		0.087	0.276
CLERICAL		0.055	0.223
SERVICE: PROTECTION		0.022	0.142
SERVICE: FOOD PREP		0.009	0.093
SERVICE: PERSONAL		0.029	0.164
FARMING		0.053	0.220
MECHANICS		0.065	0.240
CONSTRUCTION		0.059	0.229
PRECISION PROD.		0.067	0.244
OPERATOR: MACHINE		0.080	0.264
OPERATOR: TRANS.		0.080	0.263
OPERATOR: HANDLER		0.035	0.179
ARMED FORCES		0.028	0.160
MISSING		0.050	0.218
INDUSTRY	Industry of job with longest reported tenure		
AGRICULTURE		0.057	0.225
MINING AND CONSTR.		0.107	0.300
MNFG: NON-DURABLE		0.097	0.288
MNFG: DURABLE		0.187	0.380
TRANSPORTATION		0.097	0.288

Variable	Definition	Mean	Std. Dev.
WHOLESALE		0.048	0.208
RETAIL		0.087	0.274
FINANCIAL		0.044	0.200
REPAIR		0.039	0.187
SERVICE: PERSONAL		0.015	0.118
ENTERTAINMENT		0.007	0.079
PROFESSIONAL		0.132	0.331
PUBLIC ADMIN.		0.084	0.269
MISSING		0.053	0.223
REGION	Census region		
NEW ENGLAND		0.046	0.210
MID ATLANTIC		0.119	0.324
EN CENTRAL		0.163	0.370
WN CENTRAL		0.106	0.308
S ATLANTIC		0.235	0.424
ES CENTRAL		0.060	0.238
WS CENTRAL		0.098	0.297
MOUNTAIN		0.043	0.202
PACIFIC		0.129	0.335
POOR[3]	Poor or fair subjective health	0.146	0.347
POOR_M		0.024	0.153
MORT85[3]	Subjective probability live to age 85	42.794	28.465
MORT85_M		0.133	0.340
S_POOR[3]	Poor or fair subjective health of spouse	0.168	0.336
S_POOR_M		0.178	0.383
S_MORT85[3]	Subjective probability spouse lives to age 85	48.559	26.041
S_MORT85_M		0.268	0.443

Notes: [1]16,844 obs. [2]2,431 obs. [3]13,581 obs.

Basic economics predict that current earnings are an important determinant of retirement. Individuals trade the benefit of one more year of earnings off against the benefit of an additional year of retirement pay. In the standard option value specification, this trade-off is summarized in a single index, the option value. In the peak value model, we allow Social Security wealth and current earnings to have separate effects on retirement. The estimated coefficient on PV, $\hat{\beta}_2$, isolates the effect of Social Security incentives. In our baseline specification, we follow Coile and Gruber in allowing the effect of current and lifetime earnings to be non-linear by fitting a fourth-order polynomial in these variables. An interaction between EARN and AIME is also included.

We experiment with several additional specifications. These include different specifications of the education, race, and marital status variables (see Table 5.9) and controls for health and functional ability. Current health could affect retirement decisions in a number of ways and their omission could lead to biased estimates of β1 and β2. First, current health affects the disutility of work in the sense that individuals in poorer health are likely to attach higher value to leisure. Second, health affects mortality risk and thus the discounting of future income flows. Third, health affects expenditures on health care and may thus have a wealth effect.

We do not integrate health status into our calculations of Social Security wealth, that is, we do not apply differential lifetables by health status. Instead, we include several measures of current health status additively in the regression specification. The HRS includes a variety of subjective and objective health measures. From these measures, we choose to employ subjective health status as a summary measure of current health condition. This measure generally has stronger predictive power than objective health status measures like diagnosed chronic and acute health conditions and functional limitations. As a measure of subjective long-term health prospects and hence the potential value of future Social Security wealth, we use the subjective probability an individual will live to age 85. We also include spousal values for these same variables. We have no information on health status prior to 1992, so the sample employed in these specifications excludes pre-1992 observations. We fill in between wave health status with health status from the previous wave.

In order to maintain sample size we set missing data equal to variable means and include dummy variables for missing data in the regressions. The most commonly missing variable is current job tenure (missing in about 16 percent of all observations). Occupation and industry type and own health status is missing for less than five percent of all observations. Own subjective mortality is missing for 13 percent of observations. We drop a small number of observations (10 individuals, 83 observations) with missing veteran status, country of birth, and race information and two age-69 observations.

Baseline Peak Value Results

The first two columns of Table 5.10 present the results of our baseline peak value model estimated for males. The dependent variable is complete retirement and the set of covariates is the same as those employed by Coile and Gruber in their baseline model. Consistent with the theory outlined in Section 5.3, the coefficient on the peak value measure is negative and statistically significant; individuals who are further away from the peak value of Social Security wealth are less likely to retire than those who are closer to their peak value. We defer interpreting the magnitude of this coefficient to later in this section.

Table 5.10. Baseline Peak Value Regression Results (Men)

	(1)		(2)	
Variable	Coef.	Std. Err.	Coef.	Std. Err.
PV($100K)	-0.755	0.233	-1.321	0.217
SSW($100K)	0.031	0.100	0.121	0.060
EARN	-2.2E-06	1.7E-05	1.1E-05	3.3E-06
$EARN^2$	6.2E-10	1.4E-09	-1.3E-10	5.8E-11

	(1)		(2)	
Variable	Coef.	Std. Err.	Coef.	Std. Err.
$EARN^3$	-8.1E-15	3.7E-14		
$EARN^4$	-4.9E-21	3.2E-19		
AIME	1.5E-04	4.4E-04	-3.0E-04	8.8E-05
$AIME^2$	-4.4E-07	4.3E-07	7.4E-08	2.1E-08
$AIME^3$	2.4E-10	1.6E-10		
$AIME^4$	-3.6E-14	2.1E-14		
AGE	0.087	0.019	0.065	0.008
AGE==62	0.466	0.059	0.435	0.057
AGE==65	0.076	0.108	0.090	0.105
YEAR	0.030	0.007	-0.003	0.007
MARRIED	0.164	0.110	-0.092	0.057
S_EARN	1.6E-06	1.5E-05		
S_EARN^2	6.0E-11	1.5E-09		
S_EARN^3	-3.7E-15	4.5E-14		
S_EARN^4	3.7E-20	4.3E-19		
S_AIME	-2.6E-05	3.1E-04		
S_AIME^2	-4.3E-08	4.8E-07		
S_AIME^3	6.0E-11	2.7E-10		
S_AIME^4	-9.0E-15	4.9E-14		
EXPER	-0.125	0.074		
$EXPER^2$	0.001	0.001		
TENURE	0.015	0.006		
$TENURE^2$	0.000	0.000		
TENURE_M	0.640	0.053		
EDCAT_11	0.308	0.144		
EDCAT_12	0.187	0.104		
EDCAT_13	-0.009	0.083		
RACE_11	-0.068	0.059		
RACE_12	0.068	0.110		
AGEDIFF	-0.005	0.004		
AGEDIFF_M	0.201	0.124		
VETERAN	0.019	0.039		
U.S. BORN	0.183	0.077		
OCCUPATION				
PROF. SPECIALTY	-0.018	0.074		
SALES	0.042	0.089		
CLERICAL	-0.025	0.097		
SERVICE: protection	0.275	0.132		
SERVICE: FOOD PREP	0.119	0.213		
SERVICE: PERSONAL	0.050	0.134		
FARMING	0.062	0.193		
MECHANICS	0.124	0.079		
CONSTRUCTION	0.137	0.094		

	(1)		(2)	
Variable	Coef.	Std. Err.	Coef.	Std. Err.
PRECISION PROD.	0.118	0.094		
OPERATOR: MACHINE	0.030	0.084		
OPERATOR: TRANS.	0.144	0.081		
OPERATOR: HANDLER	0.156	0.122		
ARMED FORCES	0.173	0.137		
MISSING	-0.201	0.287		
INDUSTRY				
AGRICULTURE	-0.306	0.191		
MINING AND CONSTR.	-0.043	0.081		
MNFG: NON-DURABLE	-0.031	0.067		
TRANSPORTATION	0.142	0.074		
WHOLESALE	-0.189	0.104		
RETAIL	-0.156	0.097		
FINANCIAL	-0.102	0.119		
REPAIR	-0.103	0.120		
SERVICE: PERSONAL	-0.093	0.174		
ENTERTAINMENT	-0.063	0.262		
PROFESSIONAL	0.008	0.083		
PUBLIC ADMIN.	0.167	0.100		
MISSING	0.082	0.275		
REGION				
NEW ENGLAND	-0.036	0.090		
MID ATLANTIC	0.092	0.075		
EN CENTRAL	0.035	0.066		
WN CENTRAL	-0.085	0.080		
S ATLANTIC	0.096	0.066		
ES CENTRAL	0.114	0.087		
WS CENTRAL	0.007	0.078		
MOUNTAIN	0.024	0.095		
INTERCEPT	-65.281	13.822	0.135	13.162
PSEUDO-R^2	0.124		0.062	

Dependent variable is retirement. Regressions use respondent-level sampling weights. Standard errors are corrected for clustering at the individual level. Excluded categories in (1) include EDCAT_14, RACE_13, MANAGERIAL, MNFG: DURABLE, and PACIFIC. Specification in (1) includes interaction terms between EARN and AIME and S_EARN and S_AIME. N=16,808.

The baseline controls in the first model of Table 5.10 generally have the expected sign but are frequently statistically insignificant. The coefficient on Social Security wealth, for example, is small and statistically insignificant as are the coefficients (individually and jointly) on current and lifetime earnings. Individuals with higher current job tenure and less education are more likely to retire in a given year as are those born in the United

States.[41] Blacks appear to be marginally more likely to retire in a given year. Occupation and industry are jointly significant, but individually, few professions or industries have a statistically significant effect on retirement. Individuals in personal protection occupations and those in the durable manufacturing and wholesale industries are more likely to retire than others. The age indicators follow the expected pattern with spikes in the coefficients at ages 62 and 65. The linear time trend shows a small increase in secular retirement hazards between 1986 and 1999.

The second set of columns in Table 5.10 reports parameter estimates from a more parsimonious peak value model in which only Social Security wealth, quadratics in own current and lifetime earnings, marital status, and age and year controls are included as additional covariates. The coefficient on peak value increases in magnitude (from –0.754 to –1.132) as do the coefficients on Social Security wealth and current and lifetime earnings. Note that the coefficient on MARRIED switches signs from positive to negative (0.164 to –0.092). This probably reflects the fact that MARRIED is highly correlated with the missing data indicator for AGEDIFF as well as the spousal earnings variables (set equal to zero for single individuals).

Alternative Peak Value Specifications

The coefficients reported in the first column of Table 5.10 accord well with those reported in Coile and Gruber. The baseline probit coefficient on peak value is somewhat larger in absolute value (-0.754 v. –0.630) and the coefficient on Social Security wealth, while statistically insignificant as in Coile and Gruber, is much smaller in magnitude (0.031 v 0.197). Table 5.11 reports the marginal effects of peak value and Social Security wealth on complete retirement probabilities for four different model specifications. In the baseline model, a $1,000 increase in peak value lowers the probability of complete retirement by 0.0007. This implies a standard deviation change in peak value leads to a 14 percent change in baseline retirement hazards. The more parsimonious model reported in the second column of Table 5.11 implies a much larger role for Social Security incentives. A standard deviation change in peak value leads to a 28 percent change in baseline retirement hazards under this specification. The effect of Social Security wealth is now positive and statistically significant.

[41] The missing tenure indicator enters positively and significantly which most likely indicates that individuals are likely to have missing tenure data in the years surrounding their actual retirement.

Table 5.11. Alternative Peak Value Specifications

	Specification			
Variable	(1)	(2)	(3)	(4)
PV($100K)	-0.754	-1.321	-0.773	-0.744
	(0.233)	(0.217)	(0.236)	(0.272)
	[-0.069]	[-0.143]	[-0.070]	[0.079]
SSW($100K)	0.031	0.121	0.036	0.060
	(0.100)	(0.060)	(0.101)	(0.109)
	[0.003]	[0.013]	[0.003]	[0.006]
Education and race variables				
EDCAT_21			0.022	
			(0.113)	
EDCAT_22			-0.015	
			(0.078)	
EDCAT_23			-0.037	
			(0.105)	
RACE_21			-0.090	
			(0.061)	
RACE_22			-0.138	
			(0.090)	
MAR_TEN			0.002	
			(0.083)	
Health variables				
POOR				0.381
				(0.055)
POOR_M				-0.241
				(0.162)
MORT85				-0.001
				(0.001)
MORT85_M				0.131
				(0.060)
S_POOR				-0.001
				(0.060)
S_POOR_M				-0.023
				(0.114)
S_MORT85				0.001
				(0.001)
S_MORT85_M				0.064
				(0.072)
N	16,808	16,808	16,808	12,482
R^2	0.124	0.062	0.123	0.115

Dependent variable=RET_C. Specification (1): same as first column Table 5.10; specification (2): same as third column Table 5.10; specification (3): same as (1) with Education 2 and Race 2 variables substituted for Education 1 and Race 1 variables and MAR_TEN added; specification (4): same as (1) with health variables added and sample restricted to 1992 and later. Standard errors in parentheses and marginal effects in brackets.

The third specification reported in Table 5.11 measures educational categories in terms of highest degree attained as opposed to years of education and redefines the race categories to explicitly account for Hispanics. Curiously, the education categories become statistically insignificant in this model. We have no good explanation for this. The coefficients on race suggest that both Hispanics and black non-Hispanics have lower retirement hazards than other non-Hispanics. The third specification also includes an indicator variable for marriage duration of 10 or more years (*MAR_TEN*). This variable is meant to capture the possibility that divorced individuals may consider divorced spousal benefits in making retirement decisions. Divorced spouses married more than ten years can claim their ex-spouse's benefits. *MAR_TEN*, however, enters with a small and statistically insignificant coefficient. The explanatory power of the regressions in specifications (1) and (3) is the same and the coefficients on peak value and Social Security wealth are virtually identical.

In the fourth specification reported in Table 5.11, we add controls for respondent and spousal health. These controls have the expected signs. Respondents who report being in poor or fair health have a higher probability of retiring than other respondents. The probability of retiring falls with subjective probability of living to age 85. Spousal health has no effect on retirement hazards, however. Importantly, the coefficients on peak value and Social Security wealth change little in this fourth specification, despite the inclusion of these health status variables and the fact that the model is estimated on post-1992 observations only.

In Table 5.12 we report the peak value and Social Security wealth coefficients from models in which the dependent variable measures Social Security benefits claiming. Peak value appears to have a strong effect on Social Security benefit claiming. A $1,000 increase in peak value lowers the probability of Social Security benefit claiming by 0.007. Thus, a standard deviation change in peak value lowers baseline claiming hazards by 121 percent. Social Security wealth also has a strong effect on claiming behavior. An increases in Social Security wealth by $1,000 increases the probability of claiming by 0.002. It should be noted that these estimates are based on relatively small sample (2,430 person-years) of individuals age 62 and older since no one can claim before that age.[42]

[42] Some individuals do report claiming Social Security benefits before age 62 in the HRS. We exclude these individuals from the analysis.

Table 5.12. Alternative Outcome Variables (Men)

	Specification			
Variable	(1)	(2)	(3)	(4)
PV($100K)	-2.401	-2.307	-2.403	-2.400
	(0.726)	(0.627)	(0.720)	(0.724)
	[-0.845]	[-0.825]	[-0.846]	[-0.843]
SSW($100K)	0.479	-0.286	0.469	0.432
	(0.160)	(0.104)	(0.162)	(0.160)
	[0.169]	[0.102]	[0.165]	[0.152]
N	2,491	2,491	2,491	2,491
R^2	0.121	0.066	0.118	0.124

Specifications are the same as in Table 5.11. The sample is restricted to individuals age 62 and older. Standard errors are in parentheses and marginal effects in brackets.

Peak value results for women are very similar to those for men. As shown in Table 5.13 the coefficients on peak value and SSW and their implied marginal probabilities are slightly higher than those for men.

Table 5.13. Peak Value Model of Retirement and Social Security Benefit Claiming (Women)

	Specification			
Variable	(1)	(2)	(3)	(4)
	PANEL A: COMPLETE RETIREMENT			
PV($100K)	-0.921	-1.115	-0.914	-0.771
	(0.269)	(0.244)	(0.270)	(0.299)
	[-0.093]	[-0.124]	[-0.092]	[-0.090]
SSW($100K)	-0.081	-0.044	-0.070	-0.017
	(0.071)	(0.033)	(0.071)	(0.071)
	[-0.008]	[-0.005]	[-0.007]	[-0.002]
N	17,107	17,107	17,107	12,608
R^2	0.097	0.063	0.096	0.098
	PANEL B: SOCIAL SECURITY BENEFIT CLAIMING			
PV($100K)	-1.224	-1.653	-1.351	-1.194
	(0.605)	(0.709)	(0.615)	(0.599)
	[-0.462]	[-0.628]	[-0.510]	[-0.450]
SSW($100K)	0.320	0.192	0.313	0.311
	(0.115)	(0.059)	(0.115)	(0.115)
	[0.121]	[0.073]	[0.118]	[0.117]
N	2,381	2,381	2,381	2,381
R^2	0.148	0.091	0.148	0.155

Specifications are the same as in Table 5.11. The sample in Panel B is restricted to females age 62 and older. Standard errors are in parentheses and marginal effects in brackets.

Peak Value Estimates With Control for Pension Incentives

The models discussed above control for Social Security but not private pension incentives. Table 5.14 shows estimates that incorporate pensions. Since we require information on private pensions, we restrict the estimation sample to retirement transitions after 1992 only. Specifications (1) are identical to the baseline discussed above (Table 5.10), without pensions, but now estimated on post-1992 data only. This sample restriction does not affect the estimates to any important degree. These and all other specifications in Table 5.14 control for the many characteristics of Table 5.10.

Table 5.14. Peak Value Model Estimates With Pension Incentives
(Standard errors in parentheses; marginal effects in brackets)

	Men			Women		
	(1)	(2)	(3)	(1)	(2)	(3)
PV(SSW) ($100K)	-0.756 (0.325) [-0.083]		-0.754 (0.330) [-0.080]	-0.871 (0.348) [-0.105]		-0.855 (0.349) [-0.103]
SSW ($100K)	0.098 (0.126) [0.011]		0.123 (0.126) [0.013]	-0.075 (0.082) [-0.010]		-0.069 (0.081) [-0.008]
PV(Pensions) ($100K)			0.030 (0.108) [-0.003]			0.008 (0.096) [0.001]
Pension wealth ($100K)			0.085 (0.014) [0.009]			0.075 (0.025) [0.009]
PV(Total) ($100K)		-0.028 (0.105) [-0.003]			-0.079 (0.113) [-0.010]	
Total wealth (SSW+pensions) ($100K)		0.085 (0.014) [0.009]			0.066 (0.023) [0.008]	

Specifications (2) combine incentives from Social Security and pensions. In other words, Social Security and pension benefits are added up and the peak value measure is based on combined Social Security and pension wealth. The peak value of total retirement wealth does not have a statistically significant effect on retirement. We do not have a good explanation for this. Specifications (3) control for Social Security and pension incentives separately. The effects of Social Security incentives are similar to those under (1), i.e., control for pensions does not substantially affect the effects of Social Security incentives. Surprisingly, the peak value of private pensions does not have any significant effect on retirement. Pension wealth itself, however, operates in the expected direction for both men and women.

5.6.3. Reduced Form Joint Option Value Model of Retirement and DI Claiming

Table 5.15 presents empirical estimates of our reduced form joint option value model of retirement and DI claiming. The standard errors are Huber-corrected for clustering of observations (person-years) in the data. The two sources of retirement income are treated in the same manner; the sum of Social Security and pension income enters the model.

Table 5.15. Parameter Estimates of Reduced Form Joint Option Value Model of Retirement and DI Claiming

	Men	Women
DI eligibility probability:		
Constant	-3.8361 ***	-3.8448 ***
	(0.3146)	(0.2804)
Work-limiting health condition	1.4971 ***	1.5730 ***
	(0.2913)	(0.3116)
ADL>0	0.2004	0.7550 ***
	(0.2079)	(0.1740)
High school drop-out	0.5861 ***	0.3117 *
	(0.1894)	(0.1821)
Retirement probability:		
Constant	-1.3520 ***	-1.3549 ***
	(0.0213)	(0.0211)
OV(r^*)	-0.0342 *	-0.0075 ***
	(0.0190)	(0.0024)
OV(d^*)	2.0275	0.2401
	(2.4605)	(0.2716)
DI claiming probability:		
Constant	7.7158	7.5598
	(7.7256)	(9.8419)
OV(r^*)	-0.3267	-0.0903
	(0.2934)	(0.1100)
OV(d^*)	1.5806	0.2265
	(1.9615)	(0.2733)
Utility parameters:		
θ	0.9368 ***	0.8044 ***
	(0.0544)	(0.0360)
β (fixed)	0.9000	0.9000
κ^r (fixed)	1.5000	1.5000
κ^d (fixed)	1.5000	1.5000
ln-L	-2712.72	-2757.59

Huber-corrected (robust) asymptotic standard errors in parentheses;
Significance: '*'=10%; '**'=5%; '***'=1%.

As indicated in the table, we successfully estimated the probability of being eligible for DI, the effects of the option values of postponing retirement and DI claiming on the transitions into retirement and onto DI rolls, and the relative risk aversion parameter, θ. Prior literature on reduced form option value models of retirement always fix all utility parameters at pre-selected values (e.g., Gruber and Wise 1998; Coile and Gruber 2000). We improved on that literature by estimating relative risk aversion, but were unable to jointly also estimate the discount rate and leisure parameter. While not reported in the table, for men, the correlation between unobservables in the retirement and DI claiming equation was estimated at 0.6735 with a standard error of 0.8218. Freeing up the correlation did not substantially affect any other parameter. We were unable to estimate the correlation for women.

Our estimates of risk aversion in the joint model are very close those estimated in the option value model of retirement only. The effect of the option value of retirement on the probability of retiring is negative and significant, as expected. Higher option values imply greater opportunities for utility maximization by continuing work, and the effects of both option value measures on both outcomes should thus be negative. The effect of the option value of postponing retirement on DI claiming is indeed negative, but insignificant. However, the effects of the option value of postponing DI claiming are inexplicably positive for men and women, albeit insignificantly.

The predictors of the probability of being eligible for DI—assumed known to the worker but not the econometrician—are in line with our expectations. A health condition that limits the ability to work strongly and significantly increases the eligibility probability. Having one or more limitation of an Activity of Daily Living (ADL) also increases the probability. Similarly, high school drop-outs have higher probabilities of being eligible, presumably because they have fewer alternative employment opportunities than well-educated individuals.

5.7. Social Security Policy Simulations

This section presents the results of simulations of the effects of the following policy scenarios:

1) Increases in the NRA, holding the EEA constant at age 62;
2) Increases in the EEA, holding the NRA constant at age 65;
3) Increases in both the NRA and EEA; and
4) An increase in the early retirement penalty to one percent per month, up from the current 5/9 percent.

There are several ways in which the NRA could be raised. We assume that the currently legislated increase in the NRA to age 67 would remain in effect and that the early retirement penalty for individuals retiring before the NRA will change in a manner consistent with currently legislation.[43] We also assume there will be no change in the delayed retirement credit beyond what is already legislated and no change in the way survivor benefits are calculated. Given these assumptions, we simulate the effect of raising the NRA immediately to age 66, 67, 68, 69, and 70 holding the EEA constant at age 62.

Before simulating labor force responses based on the models estimated above, we conduct scenario-based simulations to determine the lower and upper bounds of the effects of increasing the EEA on the OASDI trust funds. These simulations do not exploit the retirement and DI claiming models.

The scenario-based simulations of increasing the EEA imply that increasing the EEA is more likely to worsen than improve the solvency of the OASDI program.

Simulations of increasing the NRA or ERP require behavioral models. While our estimates of utility parameters in option value models are subject to criticism, we show below that PV and OV models generate very similar results.

Section 5.7.1 presents results of scenario-based simulations. Section 5.7.2 details how each policy change affects Social Security wealth. Section 5.7.3 discusses our method for simulating the effects on retirement timing, benefit claiming, and the OASDI trust funds. Section 5.7.4 presents the results.

5.7.1. Lower and Upper Bounds of the Effects of EEA Increases

For workers who, under current law, retire and claim OASI benefits after age 62, the EEA is not binding. Increasing the EEA will thus only affect individuals who currently claim benefits at age 62. They will be forced to postpone claiming until the new EEA. Some of them will remain in the workforce longer; others will retire as early as they do under current law and finance their consumption with other sources. In Section 5.7.4 we will simulate to what extent workers adjust their retirement age in response to a change in the EEA. Before doing so, we assume several extreme responses and simulate their impact on the OASDI program. These assumptions and their simulated consequences for OASDI are not based on any behavioral model.

Specifically, we conduct the following scenario-based simulations. All are inspired by an increase of the EEA by one year.

1. All workers who claim OASI benefits at age 62 under current law will delay claiming until age 63. There is no labor force response, i.e., everyone retires at the same age as under current law and there is no effect on DI enrollment.

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[43] We assume there is no change in the early retirement penalty for dependent spouse benefits (currently 0.006944 per month for the first 36 months before the NRA and 5/12ths of one percent thereafter).

2. All workers who claim OASI benefits at age 62 under current law will delay claiming until age 63. They all also delay retirement by one year, but there is no effect on DI enrollment.
3. All workers who claim OASI benefits at age 62 under current law will delay claiming until age 63. Chapter 3 indicated that about one-in-five early Takers have a work-limiting health condition. We assume that 80 percent of early Takers delay retirement by one year and that 20 percent claim DI.

Section 5.4 already showed the results of the first scenario. Its Table 5.1 is replicated below as Table 5.16. Workers that claim OASI benefits at age 63 receive annual benefits that are 8.3 percent higher than if they had claimed at age 62. For men, this increase in annual benefits almost offsets the loss of one year of benefits when they are age 62: the difference in lifetime benefits is only 0.57 percent. For women, whose life expectancy is greater, the higher annual benefit more than offsets the loss of one year of benefits: they gain 0.88 percent in lifetime benefits. Averaged over men and women, the effect on total OASI liabilities is very close to zero. The effect on total OASI contributions is, by assumption, zero. Put differently, the early retirement penalty between age 62 and 63 is approximately actuarially fair.

Table 5.16. Additional Lifetime OASI Benefits if All Age-62 Claimants Would Claim at Age 63
(Percent of Current OASI Benefits)

	Difference in PDV of lifetime benefits
Men	-0.57%
Women	0.88%

Table 5.17. Additional Lifetime OASI Benefits and Contributions if All Age-62 Claimants Would Claim at Age 63 and Continue Working One Additional Year
(Percent of Current OASI Benefits)

	Benefits	Contributions	Total
Men	-0.16	0.66	-0.82
Women	1.20	0.40	0.80

Table 5.17 shows the results of the second scenario. If all age-62 claimants would work one additional year, the OASI program would receive 0.66 percent higher contributions (payroll taxes) from men and 0.40 percent from women. (The combined effect is an average, not a sum, because the differences are expressed as percentages of lifetime benefits for men and women separately.) However, continued work implies that the AIME and PIA of many beneficiaries increases, thus leading to higher annual benefits. For men, the higher annual benefits almost outweigh the loss of one year of benefits: they lose 0.16 percent of lifetime benefits. For women, the higher benefit more than offsets the lost year of benefits: they gain 1.20 percent of lifetime benefits. The combined effect is a loss of 0.82 percent for men and a gain of 0.80 percent for women. Averaged over men and women, the overall effect on the OASI trust fund is again very close to zero.

Table 5.18. Additional Lifetime OASDI Benefits and Contributions if All Age-62 Claimants Would Claim at Age 63, Four-in-Five Continue Working One Year, and One-in-Five Claim DI
(Percent of Current OASDI Benefits)

	Benefits	Contributions	Total
Men	1.88	0.52	1.36
Women	3.04	0.32	2.72

Table 5.18 shows the results on the combined OASI and DI trust funds if one-in-five early Taker would move onto DI rolls. The additional contributions from an additional year of work are smaller than in Table 5.17, because only four-in-five are assumed to continue working. Since DI benefits are not subject to the early retirement penalty, DI benefits are higher: men would receive 1.88 percent more in lifetime OASDI benefits and men 3.04 percent. The total result is an additional liability to the OASDI program of 1.36 percent for men and 2.72 percent for women. Averaged over men and women, an increase of the EEA by one year may cost as much as 2 percent of OASDI liabilities.[44]

In summary, the best case scenario predicts that increasing the EEA by one year will not change the financial position of the OASDI program. In the worst case, it will increase liabilities by about 2 percent.

The scenario-based simulations ignore two possible relevant issues. First, the lifetables that we applied are based on tables all Americans age 62 and older (National Center for Health Statistics 1997). Early claimants may be self-selected and face higher-than-average mortality risks. This would work in favor of strengthening the financial status of the OASDI program. Second, our present discounted value calculations are based on individuals' lifetables and ignore spousal benefits. Spousal benefits would increase by the same fraction as worker benefits and would not be subject to a one-year loss of benefits (unless the worker-beneficiary dies at age 62). This would worsen the financial status of the OASDI program.

5.7.2. The Effect of Policy Changes on SSW and PV

Keeping claiming age constant, an increase in the NRA lowers annual benefits and thus their present discounted value, Social Security wealth. It thus amounts to a benefit reduction. Being the difference between today's SSW and the maximum attainable SSW, an increase in the NRA also decreases the peak value. An increase in the EEA should have virtually no effect on Social Security wealth or peak value since the early retirement penalty is approximately actuarially fair. The increase in annual benefits more or less offsets lost years of earnings for most individuals. Savings to the trust fund will therefore

[44] As shown in Chapter 3, approximately half of early OASI claimants with a work-limiting health condition used to work in a physically demanding job. A more realistic estimate of the upper bound may thus be that one-out-of-ten OASI claimants will convert to DI. Whatever the number, it is clear that increasing the EEA will cost, not save, money.

not arise from lower benefit payments, but from additional years of work and contributions.

These predictions are borne out in the data. Table 5.19 shows how SSW under selected policy scenarios differs from baseline SSW used in the peak value regressions of Section 5.6.1 and Table 5.20 shows how the distribution of peak value ages differ. Raising the NRA to age 66 and gradually to age 68 for later cohorts reduces the median present discounted value of Social Security wealth at all ages by between 5 and 6 percent. In general, we would expected this decline in wealth to increase the incentive for work at later ages. Raising the NRA to age 66 also increases the age at which Social Security wealth is maximized (Table 5.20). About 20 percent of the sample reaches peak value by age 62 under the NRA 66-68 scenario compared to about 9 percent under the baseline scenario. Raising the NRA to age 66-68 also reduces the fraction of individuals whose peak value is reached at ages 63 and 64 (2 v. 17 percent). As expected, the largest mass of peak values (22 percent) shifts from age 65 to age 66. While the distribution of peak value ages shifts, the magnitude of the change in peak value at any given age is small in absolute terms—only one or two thousand dollars (Table 5.19). SSW and PV are virtually identical under the NRA 66-68 and NRA 66-67 scenarios. This is because the age-eligible sample will not face an NRA above age 67 under either scenario.[45] Some spouses may face higher NRAs, but their effect on SSW and PV is minor since we assume they retire at age 62. We do not consider the NRA 66-67 scenario further in the analyses below.

Table 5.19. Male Median SSW and PV by Policy Scenario and Age ($000)

Age	Policy: Baseline		EEA 62/ NRA 66-68		EEA 63/ NRA 65		EEA 63/ NRA 66-68		ERP 0.01	
	SSW	PV	SSW	PV	SSW	PV	SSW	PV	SSW	PV
55	139	13	132	11	139	12	130	12	118	31
56	141	11	134	10	141	10	132	10	120	30
57	144	10	136	8	143	9	135	9	122	28
58	145	8	138	7	145	7	136	8	123	27
59	146	7	139	6	146	6	137	7	124	27
60	147	6	140	5	148	5	138	6	126	26
61	149	6	142	5	148	5	140	5	126	25
62	151	5	142	4	150	4	141	5	129	20
63	152	2	143	4	151	2	142	4	136	12
64	154	1	145	2	154	1	143	2	144	4
65	155	0	146	0	154	0	145	0	148	0
66	155	-1	147	0	154	0	146	0	148	0
67	154	-1	146	-1	152	-1	146	-1	148	-1
68	154	-2	146	-1	150	-1	145	-1	147	-2
69	152	-2	145	-2	149	-2	144	-2	146	-2

[45] Individuals born 1941 or earlier will face an increase in the NRA of at most 8 months under current law.

Table 5.20. Distribution of Peak Value Age by Policy (cumulative percentages)

	Policy									
	EEA 65/ NRA 65		EEA 62/ NRA 68		EEA 62/ NRA 69		EEA 66/ NRA 68		EEA 67/ NRA 69	
Age	SSW	PV	SSW	PV	SSW	PV	SSW	PV	SSW	PV
55	134	10	120	9	113	9	116	11	108	10
56	136	9	122	8	115	7	117	10	109	9
57	138	7	124	7	117	6	119	8	111	8
58	139	6	126	6	118	5	121	7	113	7
59	141	5	127	5	119	4	122	6	114	6
60	142	4	128	4	120	4	123	6	115	6
61	143	3	129	3	122	3	124	5	116	5
62	144	2	129	3	123	2	125	5	116	4
63	145	2	130	2	123	2	126	4	117	4
64	146	1	129	3	123	2	126	3	118	3
65	147	0	130	2	123	2	127	3	119	3
66	147	-1	131	1	123	2	129	1	119	2
67	147	-1	132	0	124	1	130	0	120	1
68	146	-2	133	0	125	0	130	0	121	0
69	144	-2	132	-1	125	0	130	-1	122	0

Raising the EEA to age 63 has practically no effect on SSW or PV. Individuals who retire before age 63 will receive a slightly higher annual benefit under the EEA 63 scenario due to the early retirement penalty, but they lose one year of benefits. On net, then, SSW before age 63 changes little for most individuals under the EEA 63 scenario. After age 63 there should be no change in own SSW. The slight deviation we do see in SSW between the baseline and EEA 63 scenarios is due to spousal interactions. In the fourth column of Table 5.19 we consider the effect of raising the EEA to age 63 and the NRA to age 66-68. The results here differ little from those of the NRA 66-68 scenario since raising the EEA to age 63 itself has little effect on SSW and PV.

Raising the early retirement penalty to one percent per month has a large effect on SSW and PV. Before age 65, median SSW falls by an average of 14 percent. As a consequence, only three percent of the sample now reaches peak Social Security wealth before age 65 compared to 26 percent under the baseline scenario. The magnitude of the change in PV before age 65 is also large. Median peak value at age 55, for example is $33,000 under the ERP 0.01 scenario compared to $15,000 under the baseline scenario. After age 65 there is little difference in SSW or PV. What differences do exist are the result of spousal benefits.

5.7.3. Simulation method

Our simulations determine, for every individual in the simulation sample, annual labor force status. Under various Social Security policy changes, individuals will change their retirement and OASDI benefit claiming ages. This may affect both OASDI contributions and benefits.

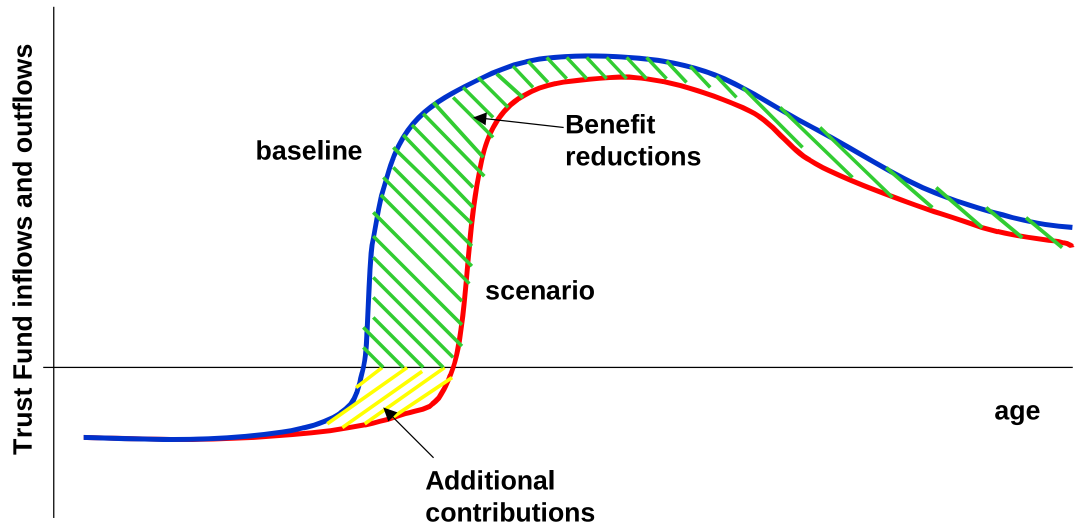

Figure 5.9. Illustrative Effects on OASDI Contributions and Benefits

Consider Figure 5.9. It serves to illustrate that policy changes induce both a change in contributions and in benefits; it is not based on actual data. On the vertical axis are OASDI contributions (negative) and benefits (positive); on the horizontal axis is age. Consider contributions and benefits paid as a cohort ages. The baseline curve starts in negative territory, illustrating that relatively young workers contribute more in OASDI payroll taxes than they claim in (DI) benefits. As the cohort ages, the net inflow to the program diminishes, reflecting an increasing number of DI claimants and a decreasing number of workers. At some age, probably close to age 62, the cohort's net effect reverses from net contributor to net beneficiary. The net benefits increase rapidly and then decrease due to mortality.

Now consider the effect of a policy change, say, an increase of the EEA to age 63. At least a subset of individuals remains at work later and early OASI claimants are forced to delay claiming, so that the age at which the cohort changes from net contributor to net beneficiary increases. Total outflows then first increase and subsequently decrease due to mortality. The increased labor force participation increases OASDI contributions by an amount represented by the shaded area between the curves below the horizontal axis. OASDI benefits reduce by an amount equal to the area between the curves above the horizontal axis.[46] The overall effect is the sum of the areas between the curves.

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[46] In the figure, annual outflows under the policy scenario never exceed those under the baseline, but this need not be the case. In particular, delayed claiming implies higher annual benefits for individuals and quite possibly higher annual outflows for the cohort. Compare Section 5.7.1.

Our simulations track changes in both contributions and benefits. The approach is as follows.

1. First, we simulate annual labor force status for every individual under current law. This is a microsimulation model in which we start all individuals at age 55 and end at retirement or DI claiming age.[47] This in-sample simulation should reproduce approximately the same distribution of labor force status as in the actual data. This is the baseline scenario.
2. We then calculate annual OASDI contributions and benefits for the baseline scenario and calculate total post-age-55 contributions and benefits using a 3 percent discount rate, expressed in 1992 dollars.
3. Next, we simulate annual labor force status for every individual under a specific policy scenario. We also calculate total OASDI contributions and benefits.
4. Finally, we express the differences in total contributions and benefits as percentages of total baseline benefits.

The bottom line figure is thus a change in net OASDI inflows and outflows, expressed as a fraction of current liabilities. This fraction measures the change for the cohort under simulation only, i.e., individuals born in 1937-41.[48] An extrapolation to the entire population that is covered by OASDI requires a careful evaluation of cohort differences.

Simulations of the option value model of retirement are based on the estimates in the first and third columns of Table 5.8. Peak value model simulations are based on the estimates in columns (3) of Table 5.14, i.e., with separate account of Social Security and pension incentives.

We do not simulate the reduced form joint option value model of retirement and DI claiming, because we are insufficiently confident of the estimation results. Specifically, consider the effects of option values of postponing retirement and DI claiming on retirement and DI claiming (Table 5.15). The policy changes under consideration would not affect DI benefits and thus not the option value of postponing DI claiming. Their positive effects is theoretically unsatisfactory, but inconsequential for our simulations. Changing the EEA would do very little to the option value of postponing retirement, by the same argument as above for the peak value. Increasing the NRA and ERP, however, will increase the option value of postponing retirement.[49] Higher option values imply delayed retirement and DI claiming. However, the absolute sizes of the effect are larger for the DI claiming equation than for retirement. The result is that the reduced form joint option model will generate lower DI enrollment rates, i.e., perverse effects. The estimates coefficients are insignificant in the DI equations, but simulations do not take this into account.

[47] Model estimation was analogously performed on person-years, starting at age 55 or in 1992, whichever was later. For the simulation, we only keep workers who turn age 55 in or after 1992. This prevents undersimulating retirement rates due to left-censoring of the data.

[48] The simulation sample excludes individuals who turned age 55 before 1992; see footnote 47.

[49] The intuition is as follows. While benefits are reduced and maximum attainable wealth decreases, individuals re-optimize their labor force participation and gain additional years of wages. These wages are excluded from peak value calculations, but included in option values.

One issue with the both the option value and the peak value model of retirement is their inability to replicate spikes in retirement at ages 62 and 65, perhaps due to liquidity constraints and social norms. Age enters option value models implicitly through its relationship to benefit levels; in peak value models it additionally enters explicitly. This explicit control in peak value models is theoretically unsatisfactory, but helps capture age-related factors that are otherwise inadequately captured. In our specification, age enters linearly, plus indicator variables for age 62 and age 65. In peak value models, we can therefore shift the age-62 indicator to the new EEA. Below we present simulation results with and without this shift. Without the shift represents a lower bound of the magnitude of labor force response; with the shift represents an upper bound. We do not make any ad-hoc adjustments to account for the age 65 peak in retirement for two reasons. First, as shown above, we estimate a small and statistically insignificant age-65 effect in our baseline model. Second, the age-65 peak may well be explained by economic factors, specifically by Medicare (Rust and Phelan 1997). We leave the age-65 peak at age-65 as we simulate increases in the NRA.

5.7.4. Simulations of Policy Alternatives

As intermediate results, Table 5.21 presents baseline and simulated labor force status, by age, for peak value models with and without the age-62 indicator shift discussed immediately above. Here we present the effects of only three policy changes: an increase in the EEA of one year, an increase in the NRA of one year, and an increase in the ERP to one percent per month. We only present these intermediate results for men.

Table 5.21. Percent Completely Retired by Age and Policy (Men)

Age	Baseline	Age-62 effect fixed			Age-62 effect shifted		
		EEA 62/ NRA 66-68	EEA 63/ NRA 65	ERP 0.01		EEA 63/ NRA 65	
55	3.0	3.3	2.9	2.3		3.1	
56	3.3	3.1	3.1	2.8		3.7	
57	3.9	4.0	3.7	3.0		4.2	
58	4.7	4.2	4.6	3.5		4.5	
59	5.1	5.4	5.2	3.9		5.5	
60	5.4	6.0	5.8	4.6		6.4	
61	6.6	6.6	6.4	5.8		6.3	
62	15.7	15.9	15.2	14.0		7.1	
63	6.3	5.7	5.9	6.2		15.2	
64	6.2	6.0	6.7	7.4		6.0	
65	8.2	8.5	8.3	9.4		8.0	
66	5.3	5.1	5.5	6.3		5.5	
67	4.8	4.8	5.5	6.8		4.8	
68	4.9	4.0	4.2	5.2		4.1	
69	16.6	17.5	16.9	19.0		15.6	

The age-62 peak clearly shows up.[50] As of terminal age 69, about one-in-six men is still not "completely retired." This is an out-of-sample prediction, as our simulation sample consists of men born in 1937-41; see above.

Consider the first set of effects of policy changes, without age-62 shift. The most noteworthy feature is that labor force responses are very small. The increase in the ERP induces many workers to remain at work longer, but changes in the EEA or NRA have only small effects. This is, in part, due to the relatively small magnitude of peak values; see page 126. The effects predicted by the option value model are similarly small (not shown).

Allowing the age-62 peak to shift in tandem with the EEA, we find that an increase in the EEA has a strong effect on labor force participation. As noted above, this is an upper bound effect that is not explained by financial incentives.

The results are similar for women and generalize predictably to larger shifts in the EEA and NRA (not shown).

[50] Note that the table contains fractions retired, not hazards.

Table 5.22. Percentage Change in OASI Liabilities by Policy (Men)

	Option value model			Peak value model Age-62 effect fixed			Peak value model Age-62 effect shifted with EEA		
Policy	Benefits	Contributions	Total	Benefits	Contributions	Total	Benefits	Contributions	Total
EEA 62/NRA 66-68	-5.4	0.0	-5.4	-5.6	-0.1	-5.5	-5.6	-0.1	-5.5
EEA 63/NRA 65	-0.8	0.0	-0.8	-0.6	0.1	-0.7	-0.7	-0.1	-0.6
EEA 63/NRA 66-68	-6.1	0.0	-6.1	-6.2	0.1	-6.3	-6.2	0.1	-6.4
ERP 0.01	-10.1	0.0	-10.1	-8.2	1.0	-9.2	-8.1	1.0	-9.1
EEA 62/NRA 67-68	-10.5	0.0	-10.5	-10.7	-0.1	-10.6	-10.7	-0.1	-10.6
EEA 65/NRA 65	-2.9	0.5	-3.5	-3.2	-0.2	-3.1	-3.1	0.0	-3.1
EEA 62/NRA 68	-13.6	0.0	-13.6	-14.0	-0.1	-13.9	-14.0	0.0	-14.0
EEA 62/NRA 69	-18.7	0.0	-18.7	-19.1	-0.1	-19.0	-19.2	-0.1	-19.1
EEA 62/NRA 70	-23.6	0.0	-23.6	-24.1	0.0	-24.1	-24.0	0.2	-24.2
EEA 64/NRA 67	-9.8	0.1	-9.9	-10.4	0.0	-10.4	-10.2	0.3	-10.5
EEA 65/NRA 68	-15.5	0.5	-16.1	-16.4	-0.1	-16.4	-16.3	0.4	-16.6
EEA 66/NRA 69	-21.3	0.7	-22.0	-22.1	0.1	-22.3	-22.1	0.3	-22.4
EEA 67/NRA 70	-22.6	0.8	-23.4	-23.4	-0.1	-23.4	-23.5	0.1	-23.6

Table 5.23. Percentage Change in OASI Liabilities by Policy (Women)

	Option value model			Peak value model Age-62 effect fixed			Peak value model Age-62 effect shifted with EEA		
Policy	Benefits	Contributions	Total	Benefits	Contributions	Total	Benefits	Contributions	Total
EEA 62/NRA 66-68	-5.3	0.0	-5.3	-5.5	-0.1	-5.4	-5.5	0.0	-5.5
EEA 63/NRA 65	1.1	0.0	1.1	0.8	0.0	0.8	0.8	0.0	0.7
EEA 63/NRA 66-68	-5.4	0.0	-5.4	-5.5	0.0	-5.5	-5.5	0.1	-5.6
ERP 0.01	-13.5	0.0	-13.5	-11.0	0.3	-11.2	-11.0	0.3	-11.3
EEA 62/NRA 67-68	-10.1	0.0	-10.1	-10.3	-0.1	-10.3	-10.3	0.0	-10.3
EEA 65/NRA 65	1.2	0.0	1.2	1.3	0.0	1.3	1.5	0.1	1.4
EEA 62/NRA 68	-14.2	0.0	-14.2	-14.6	-0.1	-14.5	-14.4	-0.1	-14.3
EEA 62/NRA 69	-21.7	0.0	-21.7	-22.2	0.2	-22.4	-22.2	0.2	-22.4
EEA 62/NRA 70	-25.0	0.0	-25.0	-25.5	-0.1	-25.4	-25.6	-0.2	-25.4
EEA 64/NRA 67	-10.6	0.0	-10.6	-11.2	0.0	-11.1	-11.1	0.0	-11.2
EEA 65/NRA 68	-3.5	0.5	-4.0	-3.7	-0.2	-3.4	-3.9	-0.1	-3.7
EEA 66/NRA 69	-19.8	0.6	-20.3	-20.5	0.0	-20.5	-20.5	0.0	-20.4
EEA 67/NRA 70	-18.4	0.6	-19.0	-19.1	-0.1	-19.0	-19.0	0.0	-18.9

Table 5.22 and Table 5.23 show the overall effects on OASI liabilities for 13 policy scenarios. Policies that increase the EEA but not the NRA have only small effects on program contributions and benefits. This is fully in line with the scenario-based simulations of Section 5.7.1, which showed that the early retirement penalty is approximately actuarially fair, so that delayed claiming has only a very small effect on lifetime OASI liabilities.

By contrast, the effects of increasing the NRA are much larger. Roughly speaking, OASI liabilities decrease by approximately 5 percent for every year that the NRA is increased. As shown in Table 5.21, the labor force responses to a change in the NRA are small, and the effects on OASI contributions are correspondingly small. However, an increase in the NRA amounts to a benefit reduction, which translate into robust savings for the OASI program.

An increase of the ERP to 1 percent per month also has a large effect. Table 5.21 indicated that it does not affect labor force participation by very much, thus leading to greatly reduced annual benefits for early retirees. We estimate that the ERP hike lowers total OASI liabilities by 10.1 percent for men and 13.5 percent for women. The greater effect for women is caused by their greater propensity to retire before the NRA.

Our simulations do not account for differential enrollment in DI. The results of Section 5.7.1 suggest that an increase in the EEA of one year may add as much as 2 percentage points to overall OASDI program liabilities. As is clear by now, increasing the EEA will not be fiscally prudent. In addition, as discussed in Section 3.6, increasing the EEA may be associated with substantial welfare costs because workers are more or less forced to behave in a certain way.

Account for DI will eliminate some of the savings associated with increasing the NRA or ERP. However, it is unlikely to reduce those savings by very much. In the scenario where all age-62 OASI claimants with a work-limiting health condition move onto DI rolls, the total cost to the OASDI program increases by about 2 percent. Increasing the NRA or ERP, however, is likely to have much milder effects on DI rolls. Unlike an increase in the EEA, an increase in the NRA or ERP does not create severe liquidity constraints. Given the magnitude of savings associated with increasing the NRA—about 5 percent per year of increase— or ERP—about 12 percent—,it is highly likely that increasing the NRA or ERP will lead to substantial strengthening of the financial position of the OASDI program.

5.8. Conclusion

In conclusion, we find that increasing the EEA will not lead to any savings for the OASDI program. At best, it will have no effect; more likely, it will cost the program additional money when workers who would normally claim early and reduced benefits instead claim unreduced DI benefits.

By contrast, increasing the NRA or ERP will generate substantial savings for the OASDI program.

6. Employer Response to Changes in the Social Security Retirement Ages

Summary

An underlying assumption of the simulations of retirement timing and DI claiming discussed in Chapter 5 is that determinants of behavior other than Social Security remain unchanged. Specifically, the simulations assume that employers do not alter their pension plans and their (retiree) health benefit offerings. However, employers have formulated their fringe benefits in the context of current public policies, including features of the Social Security program. If those features change, they may re-optimize their fringe benefit offerings. This chapter addresses likely responses by employers to changes in the EEA and/or NRA.

The current structure of fringe benefit plans, notably the presence of retiree health insurance and the early and normal retirement ages in defined benefit pension plans, indicates that many employers want older workers to separate from their firm. The fact that these incentives are in place indicates that employers desire a younger workforce than the workforce that would result from natural retirement patterns. Under current circumstances, a policy change that would induce workers to stay on the job longer is thus unlikely to meet with much enthusiasm among employers. They will likely absorb more older workers, but at the same time counteract with stronger incentives for early retirement. The literature has found that firms are effective at inducing workers to leave through pension plan and retiree health insurance incentives. The effects of changes in Social Security policy that were estimated in Chapter 5 may thus be overstatements.

The economics literature offers very little guidance on likely employer responses. There is no well-established model of the factors that determine whether employers offer pension or health benefits, let alone of the determinants of plans’ features. Further complicating matters, the past three decades show a trend away from traditional DB pensions to DC and cash balance plans. This indicates that employers are in the process of adjusting to something, making it even more difficult to predict how they would adjust to changes in Social Security policy.

Tabulations from the HRS provide some limited insight into the scope for employer responses. We found that around 12 percent of DB pension holders are formally integrated with the Social Security program through a benefit offset provision. All else equal, these plans will face greater liabilities when the EEA or NRA increase, thus providing an incentive for adjustment. More than half of the integrated plans reduce benefits at age 62 or 65. Employers with such tightly integrated pension plans may find additional incentive to adjust to increases in the EEA or NRA. Prior literature showed

that employers are more likely to respond by reducing the generosity of their compensation than by eliminating elements (such as pensions) altogether.

More than half of DB pension plan workers become eligible for full benefits at age 62 or 65. About nine percent become eligible for early benefits at age 62 and for full benefits at age 65. While not necessarily formally integrated, these pension plans appear otherwise coordinated with the Social Security program. Their sponsors may adjust the retirement ages in tandem with any changes in the EEA or NRA.

About two-out-of-three employees with health insurance on the job will remain covered after they retire. The prevalence of retiree health insurance has been decreasing over the 1990s. If workers are induced to retire later due to increases in the EEA or NRA, retiree health insurance will become less costly. All else equal, particularly including retiree health insurance premiums, this may lead to higher prevalence of retiree health insurance.

A little over half of older workers would like to gradually reduce hours, rather than retire at once. About one-in-three think that their employer will let them reduce their hours. The vast majority of older workers do not feel that their employers discriminate against older workers or that their co-workers exert pressure on them to retire.

Economic theory suggests that there is little reason for age-based retirement incentives if older workers were paid according to their marginal productivity. In order for employers to embrace increases in the EEA or NRA, it follows that they need to have greater flexibility in re-negotiating the terms of employment of older workers. In particular, greater flexibility would be needed in wage levels, health insurance, pension accumulation, and perhaps weekly hours and the nature of workers’ responsibilities. For example, it may be beneficial for workers and employers to agree that older workers do not accumulate further pension rights.

6.1. Introduction

This chapter is concerned with identifying employer responses to changes in the NRA and the EEA. Individuals respond to many incentives when choosing their retirement date and employers are responsible for a number of these incentives. For example, employer compensation schemes such as wages, pension, and (retiree) health insurance are powerful determinants of retirement behavior. If employers change incentives with changes in the NRA and EEA, and their responses are not considered, then changes in individual retirement behavior could be substantially different than otherwise predicted.

Section 6.2 starts with a review of the literature on employer behavior. Its main conclusion is that there exist no widely accepted model of employer behavior that may provide insights into employer responses to changes in the EEA or NRA. Section 6.3 surveys recent communications in the general interest press and the professional literature that targets managers in pension investments and human resources. The overriding conclusion is that changes in Social Security policy are not yet on the minds of benefits consultants and human resources managers. Section 6.4 exploits items in the HRS that provide some insight into the scope for employer responses. Section 6.5 concludes.

6.2. Prior Literature

This section reviews the literature that is relevant to understanding potential employer responses. We stress from the outset that, to our knowledge, there do not exist any studies that are directly relevant to the question of employer response. Previous changes in Social Security retirement age offer reasonable bases for comparisons, but we know of no studies that examined employer response to the introduction of the EEA or the impact of the very recent and modest NRA increase. General overview studies such as General Accounting Office (2000) and Samwick (2000) provide only qualitative indications of expected responses to Social Security reform. Moreover, we have not identified any studies that analyzed other systemic changes (policy or otherwise) that caused a widespread reduction in wealth to which employers could have responded. A few studies attempted to examine how Social Security reform will affect pension integration, but they were unable to provide solid underpinnings for their analyses.[51] Thus, this literature review can only reference marginally relevant studies.

Before we outline the relevant literature, consider why employers might respond to changes in the NRA and EEA. We have identified two primary reasons. The first rests with the fact that many employer-provided pension plans are explicitly integrated with Social Security payments.[52] For example, some employer-provided pension plans

[51] For example, as Slusher (1998) comments, “Even if one were armed with a complete history of pension integration, speculating on how integration will adapt to Social Security reform is a daunting task.”
[52] Throughout this chapter, we will use the term “integration” to directly refer to pensions that formally base benefits on Social Security benefits using offset or excess provisions. These provisions are regulated by the Internal Revenue Code. We will use the term “coordination” to refer to unregulated associations

include an explicit “offset” provision that reduces the pension by the amount of a retiree’s Social Security benefit. Employers with such explicit integration could face increased pension costs if employees are guaranteed a certain level of benefits at age 62 or 65. The second reason is indirect: employers may react to changes in worker behavior. At its core, an increase in the NRA reduces workers’ wealth. Standard models of labor supply suggest that individuals will want to work longer with such wealth reductions. To what extent will firms respond to individuals choosing to work longer? Importantly, any firm, not just those with integrated pensions, might respond to such a change.

6.2.1. Employer Behavior and Legal Restrictions on Behavior

Employers can influence employee decisions through many actions. For example, employers construct employee compensation packages by choosing wage, pension, and health insurance parameters. In addition, employers can engage in other activities to make it more or less attractive for an employee to remain at the firm or to retire. In this section, we briefly examine the basic theory of how employers make decisions and review the Age Discrimination in Employment Act (ADEA) and subsequent laws that limit the scope for employer responses.

Labor Demand

The theoretical and empirical literature on labor demand is very large. See Hamermesh (1993) for a review and Parsons (1996) for a discussion specifically relating labor demand to older workers. We briefly discuss select aspects of the theoretical literature to organize our discussion of the empirical literature that is most relevant to understanding potential employer response.

Consider a simple, static model of labor demand. In such a model, an employer would choose to hire workers in each period until the marginal productivity of the last worker hired equals the marginal cost of hiring that worker. Assuming that there are no training costs or transaction costs when hiring a worker, the marginal cost of the worker will be his entire compensation package, including wages, pension contributions, and health insurance.

Consider two extensions to this simple model. The first extension incorporates worker heterogeneity. The simple model outlined above assumes that all workers are identical. However, older workers may differ from younger workers in a number of dimensions. For example, a worker’s productivity may decline with age or there may be differential costs associated with employing older workers.[53] If employers could freely vary

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between pension benefits and Social Security rules. For example, employers may adopt Social Security (early) retirement ages or frontload pension benefits for early retirees.

[53] Parsons (1996) provides evidence of how health declines with age. Medoff and Abraham (1981) and Kotlikoff and Gokhale (1992) present evidence that supervisors believe that productivity declines with age. Levine (1988) questions whether these employer beliefs are correct. We discuss increased costs associated with health insurance in Section 2.3.

compensation packages, then such heterogeneity would not matter. However, there are many constraints on employer behavior. First, the Age Discrimination in Employment Act (ADEA) can make it costly to treat older workers differently and ERISA constrains the dimensions along which older workers can be treated differently. Moreover, employee morale and other factors can make it difficult to reduce the wages of older workers.

The second extension relaxes the assumption that the employer/employee relationship is a single-period relationship. Rather, these relationships are long-term and employers can design compensation schemes to alter the incentives over time. The primary method of altering the scheme is deferring compensation, most often through pensions. Importantly, compensation schemes that include pensions often imply that firms are not equating productivity and compensation in each period. For example, Gustman and Steinmeier (1989), using data from the 1983 Survey of Consumer Finance, show total compensation is discontinuous at various points in a worker's career. Compensation spikes upward when a worker is vested in his pension and when he attains early and normal retirement ages. Because it is unlikely that productivity also spikes at these moments, firms appear to structure compensation over an extended period. Gustman, Mitchell, and Steinmeier (1994b) developed an intertemporal profit-maximizing theory of the firm that is consistent with these observations.

Wages and Pensions

Because of legal constraints, employers have limited latitude in how they can encourage older workers to remain at or leave the firm. One of the primary mechanisms that firms have at their disposal, and one that has been the subject of much research, is compensation timing achieved through different packages of wages and pensions. In this section, we briefly review the literature on pensions and why they exist. For more extensive reviews see Parsons (1996) and Gustman, Mitchell, and Steinmeier (1994b). To the extent that pensions are used to encourage workers to stay at or leave a firm, employers can change pension plans to encourage workers to leave with changes in the NRA and EEA.

Herz, Meisenheimer, and Weinstein (2000) report that 66 percent of full-time, non-agricultural workers participate in employer-provided pension plans. They also find that 42 percent of full-time, non-agricultural workers have defined benefit (DB) plans and 39 percent have defined contribution (DC) plans. Importantly, compensation schemes that include pensions often imply that firms are not equating productivity and compensation in each period.

Regulate Retirement Flows. Many studies have examined whether pensions are used to regulate retirement flows. A firm's desire to regulate retirement flows is particularly relevant for understanding possible employer response to changes in the EEA and NRA under the assumption that these changes induce employees to retire later. One explanation for why firms may wish to control retirement patterns is that worker productivity may fall with age. If wages could be reduced to track productivity decline, there may be no need to induce retirement. However, reducing wages may diminish worker morale and diminish a firm's image. Empirically, earnings profiles do not turn down. Older workers may wish to continue working because the compensation of alternatives (leisure or other job) falls short of current compensation. A related theory suggests productivity becomes more difficult to assess as workers age and thus firms may wish to induce retirement (Parsons 1988). Lazear (1979) suggests that mandatory retirement provisions are a critical component of long-term incentive contracts and are necessary to induce high-wage workers to leave the firm. In a workplace environment regulated by ADEA, firing based on age is illegal.

Firms can use compensation schemes to induce retirement. Burkhauser (1979), Mitchell and Fields (1984), and Gustman and Steinmeier (1999) note the spike in pension accruals near retirement eligibility age. Gustman, Mitchell and Steinmeier (1994b) evaluate several empirical studies of pension effects on retirement behavior and conclude that pension affects retirement in three ways: (a) workers with generous benefits retire earlier than those with lower pension benefits, (b) employees offered money to delay retirement tend to do so, and (c) retirement models closely track retirement hazard rates given non-linear pension benefit accrual patterns.

The effects of pensions on retirement hazards may be overstated if pension plan characteristics are not exogenous to the retirement decision, i.e., if workers with a strong taste for leisure sort themselves into firms with generous early pensions. However, pension plans are altered fairly regularly, which suggest that endogeneity may not be a serious problem. The fraction of DB pension plans offering early retirement benefit eligibility at age 55 increased from 30 to 57 percent between 1960 and 1980. In the same time period the prevalence of actuarially subsidized benefits for early retirement increased from 10 to 95 percent and the fraction of plans offering full benefits for retirement at ages less than 65 increased from 0 to 69 percent (Ippolito 1990). Early retirement benefits are provided most often through DB plans and through so-called bridge benefits, which pay additional benefits until individual becomes eligible for Social Security benefits. Particularly well-suited for the task are DB plans where pension capital loss is the discounted difference between a worker's accrued pension, calculated using current earnings ('quit pension'), and the benefit using projected earnings upon retirement at a future age ('stay pension') (e.g., Ippolito 1985). Gustman and Steinmeier (1993) calculated that terminating employment before retirement costs the average worker more than half a year's pay in lost pension.

Regulate Turnover. Another explanation for the existence of pensions that is distinct from regulating retirement is regulating turnover. Such an explanation is distinct from regulating retirement because it only posits that pensions are used to encourage workers to stay at the firm.

Firms with substantial hiring and training costs may discourage turnover by deferring compensation. Both DB and DC plans can discourage short-run turnover by delaying vesting in the pension plans. In the longer run, DB plans are more likely to discourage turnover because of the significant costs they place on job mobility (Mehdizadeh and Luzadis, 1994). DC plans' accrual patterns tend to less backloaded and thus do not place significant costs on job changing.

Empirically, a negative correlation between pensions and job tenure has been found by many studies (e.g., Allen, Clark, and McDermed, 1993). The causality of this correlation is problematic given that both DB and DC plans have been found to deter mobility and that pension capital losses are offset in a new job by a small pay increase (Allen, Clark, and McDermed, 1993). Furthermore, Gustman and Steinmeier (1993) find pensions are often accompanied by compensation premiums.

Regulate Effort. Pensions could also be used to regulate effort on the job. This explanation rests with workers accepting compensation in early years below the value of their marginal product in exchange for implicit promises of future compensation that exceed the value of their marginal product; pensions are then considered to be the mechanism to deferring compensation. Thus, Pensions serve as a bonding mechanism because employees would forfeit the deferred compensation if they left the firm early, and employees have an incentive to work harder (Gustman, Mitchell, Steinmeier 1994b). While there is no direct evidence that workers provide more effort or are more productive in jobs with deferred pay via pensions, Hutchens (1986, 1987), find high pay and pensions are more prevalent in jobs that are difficult to supervise than in repetitive job tasks. Moreover, Lazear (1979) found above-average wages toward the end of a worklife in support of the delayed payment model. If the delayed payment model is correct, and delayed compensation is used to regulate turnover and effort, then the entry wage and compensation profile should vary with a worker's age of entry.

Tax Advantages. A final explanation for pensions that is consistent with both DB and DC plans is that there are tax advantages to offering pensions. In particular, employees do not pay income taxes on compensation that is offered through pension benefits.

Health Insurance

A substantial number of employers offers health insurance to employees as part of their compensation package. Herz, Meisenheimer and Weinstein (2000), using data from the CPS employee benefit supplement find that 70 percent of full-time wage and salary workers participated in employer-sponsored health plans in 1997.

Two health insurance issues are relevant to potential employer response to changes in the NRA and EEA. First, insurance is more expensive for older workers. For example, Hurd (1996) reports that the cost of medical insurance is over four times greater for a single male aged 60 to 64 as compared to a male who is under the age of 45. These cost differentials will remain important after age 65 because Medicare is the secondary payee and ERISA laws constrain the insurance package that must be provided to employees. Thus, if workers choose to work longer because of changes in the NRA and EEA, then employers will face increased costs for these workers. This suggests that firms will want to discourage workers from working longer at a constant wage, even if productivity did not decline.

Second, older workers value access to employer-provided health insurance. This consideration is the motivation behind the so-called “job-lock” literature (e.g., Madrian 1994b, Kapur 1998). The literature is largely in agreement that retirement decisions are affected by access to health insurance (Gustman and Steinmeier, 1994; Madrian 1994a; Karoly and Rogowski, 1994; Rogowski and Karoly, 2000), as well as retirement expectations (Hurd and McGarry, 1995). If older workers choose to work longer, employers may be more likely to offer health insurance coverage to encourage workers to retire. Gruber and Madrian (1995) examine the effect of “continuation of coverage” mandates for health insurance to infer the impact of health insurance on retirement. These mandates allow individuals to continue to purchase health insurance through a previous employer for a limited time after an individual leaves the firm (the so-called COBRA benefits). These mandates effectively serve to reduce the cost of health insurance for employees after they leave the firm, regardless if the employer provides retiree health benefits. The authors find that such insurance coverage has a large and significant impact on retirement.

Other Employer Behavior Regarding Older Workers

In addition to pensions and health insurance, employers use several other mechanisms to influence workers’ retirement timing. We discuss early-exit windows, worker accommodation, and age discrimination.

An early-exit window is an offer from an employer to an older worker that provides substantial incentives to leave at a date earlier than he/she would have under the normal retirement scheme at the firm. Several studies of single large employers find that early-exit windows are effective (Lumsdaine, Stock, and Wise (1990), Hogarth (1988), Mehay and Hogan, (1996)). Brown (1997) examined early-exit windows for the general population using the using Waves 1 and 2 of the HRS. He finds that approximately eight percent of respondents received an early-exit offer and 42 percent report having accepted the first offer they receive. Because the HRS cohort was still relatively young by Wave 2, more offers may be received. Brown finds some evidence that the rate of offering early-exit windows is increasing and that incentives matter.

Employers can also choose to accommodate special needs of older workers. Hurd and McGarry (1999) find that workplace flexibility and employer’s accommodation of older workers increased an older worker’s anticipated work-life. Furthermore, the authors find that ignoring these factors results in estimates of the effect of pensions and health insurance on retirement that are biased upward by over 50 percent.

Although age discrimination is illegal, anecdotal evidence of age discrimination is prevalent. Johnson and Neumark (1997) explore age discrimination in the workplace and find that age discrimination may be an important factor in determining job separations and the employment status of older workers. There is also some evidence that older workers have more difficulties with job mobility, by being laid off more frequently and having more difficulties finding a new job (Hutchens 1998). Haider and Stephens (2000) and Chan and Stevens (1998) find that older workers who are displaced have worse employment and earnings outcomes following the displacement.

The Age Discrimination in Employment Act (ADEA) of 1967

The ADEA limits the scope for response that employers could make to changes in the NRA and EEA. Specifically, the ADEA proscribes age discrimination for individuals over age 40. Since 1967, several amendments have extended the coverage of the ADEA. The 1974 amendments extended coverage to governmental employees. The 1978 amendments prohibited mandatory retirement and extended the upper limit of the protected age class from 65 to 70; the 1986 amendments eliminated the upper age limit of 70. Amendments in 1982 and 1984 attempted to reconcile ADEA obligations for employee benefits with employer obligations under Medicare and Medicaid. Important amendments in 1990 required age-based differences in benefit plans to be justified by their costs. Reducing life insurance coverage is permissible, but an exception is that health care benefits for employees and their spouses between ages 65 and 69 cannot be reduced upon reaching age 65. The amendments also clarified standards by which employees could be granted severance pay as part of early retirement programs and established standards for waiver of age discrimination claims.

The ADEA allowed for a few exceptions. Provisions in the 1986 amendments allowed states to retain age rules for hiring and retirement of police and fire fighters. Prior to 1994, ADEA permitted compulsory retirement for university professors at age 70. Beginning in 1994, professors were protected against compulsory retirement based on age. The ADEA also permits compulsory retirement at age 65 of executives and high-level policy makers that are entitled to benefits of at least $44,000.

Although the ADEA was passed in 1967, few resources were devoted toward its goal (Johnson and Neumark, 1997). Responsibility for its enforcement moved from the U.S. Department of Labor to the Equal Employment Opportunity Commission (EEOC) in 1979 and the number of complaints climbed from 1,000 in 1969 to 11,000 in 1982 and again to 43,532 in 1990 (Johnson and Neumark, 1997). We are not aware of any studies that examine the impact of ADEA on employer behavior beyond compliance with the law.

6.2.2. Pension Integration

Pensions are a form of tax-advantaged compensation. The optimal structure of pension plans and other compensation depends on other resources that are available to workers, both now and in future years when they are retired. Social Security features prominently among those resources. This implies that whenever Social Security changes, the optimal structure of pension plans changes (Samwick, 2000). Employers act on the structure of the Social Security program through both formal integration and informal coordination. This section discusses prior findings on formal integration. In Section 6.4.1 below, we tabulate pension plan features related to both integration and coordination, based on HRS data.

Internal Revenue Service (IRS) integration rules, as codified in the IRS Law on Pension Integration, permit defined benefit (DB) and defined contribution (DC) plans to explicitly base pension benefits on Social Security benefits (EBRI, 1982; Allen et al., 1997; Dyer 1977; Schulz and Leavitt, 1983). However, no rules govern the integration of early or normal benefit eligibility ages for benefits.

Congressional history points at several arguments for integration. First, employers co-pay Social Security premiums, so they should be able to design pension programs that recognize employer-financed Social Security benefits. Second, it should be possible to offer workers with equal years of service but different wage levels roughly equal replacement rates. Finally, each workers total retirement benefits from Social Security and employer pensions should not exceed his or her pre-retirement earnings.

Integration is generally achieved through one of two methods. First, pension plans with an offset formula reduce an retiree’s pension benefits by a portion of his or her (usually estimated) Social Security benefits. The 1986 Tax Reform Act prohibited employers from reducing low-wage employees’ pension benefits to zero with offset formulas and stipulated that the offset may not exceed half of the gross pension amount (Slusher, 1998). Second, benefits may be based on earnings in excess of some level set by the plan (EBRI 1982 and Munnell 1977). For example, a plan may offer a higher benefit schedule for earnings above the Social Security taxable limit. For DC plans, only excess provisions are applicable.

Schmitt (1974) finds that 60 percent of corporate style pension plans were integrated in 1974. These plans covered only 25 to 30 percent of workers, because small plans were more likely to be integrated. Relying on the Employee Benefit Survey (EBS), Slusher (1998) reports that the fraction of DB participants with integrated plans increased from 45 to 63 percent from 1980 to 1989, and subsequently decreased to 54 percent by 1993. He also found that offset integration accounted for close to two-thirds of integrated DB pension schemes, while excess rate integration became more prevalent in the 1990s. Using the 1992 HRS, which only covers workers aged 51-61, Bender (1999) found that 32 percent of all workers with a pension have an integrated plan. The rate was 38 percent for DB pension holders and 8 percent for workers with only DC plans. Among DB pension holders, 19 percent and 23 percent were subject to offset and excess provisions, respectively. Bureau of Labor Statistics (1999) figures indicate that offset provisions have recently become less prevalent, from 41 percent in 1989 to 19 percent 1991 and 13 percent in 1997.

Firms with offset plans could face increased costs in the short-run if individuals qualify for firm pension benefits at age 62 or 65. Because such individuals will receive no or reduced Social Security benefits until the higher EEA/NRA, firms will face a higher pension burden. Slusher (1998) and ERISA Industry Committee (1998) speculate how firms will respond to such Social Security reform. Whether a firm will reduce pension levels will depend on the relative costs of allowing an employee to work longer. Neither study speculates on the degree to which employers will actually respond. On a related note, the ERISA Industry Committee study points out that almost every pension plan is designed with Social Security in mind, i.e., is coordinated with Social Security. This suggests that employer response will likely not be limited to firms with formally integrated plans.

As stated above, pension integration is typically narrowly defined by offset or excess provisions. These provisions offer a basis for analyzing the consequences of an NRA increase because of the implied Social Security benefit reductions. Whether firms with integrated pension plans will adjust (early) pension benefit entitlement ages in response to EEA and/or NRA increases remains the subject of speculation only.

6.2.3. Employer Responses to Related Law Changes

In this section, we consider studies that examine employer responses to law changes that are somewhat related to Social Security reform proposals. Specifically, we review the 1974 federal Employee Retirement Income Security Act (ERISA) and two changes in health insurance laws: the mandate to offer maternity benefits in the 1970s and the mandate to offer uniform mental health benefits.

The Employee Retirement Income Security Act of 1974 (ERISA)

The federal Employee Retirement Income Security Act (ERISA) of 1974 sets minimum standards for pension plans in private industry. For example, the Act established new participation, vesting, funding, reporting, fiduciary and disclosure requirements and created the Pension Benefit Guaranty Corporation (PBGC) to provide plan termination insurance for DB plans. ERISA is enforced by the Pension and Welfare Benefits Administration of the Department of Labor and the Internal Revenue Service.

ERISA requires plans to provide participants information about plan features and funding. It sets minimum standards for participation, vesting, benefit accrual and funding and defines how long a person may be required to work before becoming eligible to participate (generally one year of service and age 21), and to accumulate benefits. ERISA establishes funding rules that require sponsors to provide adequate funding. In addition, ERISA requires accountability of plan fiduciaries and gives participants the right to sue for benefits and breaches of fiduciary duty. Moreover, it guarantees payment of certain DB benefits through a federally chartered corporation, the PBGC, and created Individual Retirement Account (IRA) plans.

ERISA does not cover all plans. Federal, state, or local government employee plans, some international organizations, some churches or church association plans are not covered, and neither are plans maintained to comply with state workers compensation, unemployment compensation or disability insurance laws. Furthermore, unfunded excess benefit plans, and plans maintained to provide benefits in excess of those allowable for tax-qualified plans, are not covered by ERISA.

Due to the nature of retirement benefits and the frequency of law changes, pension law and legislation are very complex areas. Indeed, the ERISA Industry Committee (ERIC), a membership organization representing employee benefit interests, states that "federal rules regarding the operation of pension plans have grown so complex and, in some instances, so contradictory, that it is impossible to operate a plan in total compliance with the law at all times" (Olsen and VanDerhei, 1997).

ERISA-related legislation constraining a firm's behavior include the following. Preceding ERISA, the Internal Revenue Code encouraged use of 403(b) tax-deferred annuities. Since ERISA, there have been at least 22 legislative acts that have added to administrative costs and complexity. Internal Revenue Code Section 401(k) created a means for employees to make before-tax contributions. Other IRC provisions increased the attractiveness of employee stock ownership plans (ESOP). In 1996, a new DC option for small businesses, called SIMPLE, was enacted with the passage of the Small Business Job Protection Act of 1996. This gave employers the alternative of matching employees' before-tax contributions dollar for dollar, up to 3 percent of compensation or providing a non-elective contribution of 2 percent of compensation.

Several studies examined the impact of ERISA on firm behavior. Phillips and Fletcher (1976) and Cummins et al (1980) found that ERISA increased the costs of administration. Olsen and VanDerhei (1997) note that much of the legislation on pensions after ERISA impacted DB and DC differently, generally increasing the costs associated with administering DB plans relative to DC plans. The Tax Equity and Fiscal Responsibility Act of 1982 imposed penalties on top-heavy DB plans covering only a small number of people that were thought to provide tax shelter for highly paid individuals and not serve as retirement plans. The Tax Reform Act of 1986 lowered income tax rates, imposed faster minimum vesting standards and eliminated the tax qualifications of some small DB plans (plans with the lesser of 50 employees or 40 percent of the work force). The funding flexibility of DB plans, defined as percentage of assets available to cover the plan liabilities, was mitigated by OBRA 1987 and further by the Retirement Protection Act of 1994. This legislation increased minimum contributions for underfunded DB plans by imposing requirements that plans have enough liquid assets to cover approximately three years of benefit payments. The authors argued that the shift in pension plan offerings over time and across firm size is consistent with the increased administrative costs associated with these legislative acts.

Cummins and Westerfield (1981) and Cummins et al (1980) find some evidence that ERISA caused pension fund managers to be more risk-averse in managing the funds.

Health Insurance Mandates

Gruber (1994) studied several state and federal mandates that stipulated that childbirth be covered comprehensively in health insurance plans, raising the relative cost of insuring women of childbearing age. He finds substantial shifting of the costs of these mandates to the wages of the beneficiary group. Correspondingly, he finds little effect on total labor input for the group. In other words, employers were able to pass on the cost of the mandate to the affected group.[54]

Before federal legislation created uniform rules, there was state-level variation in regulations concerning the provision of health insurance to cover mental illness. The Federal Mental Health Parity Act, effective January 1998, requires that employers that offer mental health coverage must offer dollar limits on mental health coverage to be equal to that on medical benefits. It does not require employers to offer mental health coverage nor to impose conditions on deductibles, co-payments or limits on number of days or visits, or require coverage for substance abuse. The law exempts plans if the application of the law would result in a cost increase of at least one percent of total medical costs and exempts small employers. Between 1991 and 1996, five states passed parity mandates and in 1997, 34 more did. Some legislation was symbolic, some was similar to federal legislation (anticipating it by a few months), and some legislation was more demanding than the Parity Act. Within-state coverage varied, because state regulations do not apply to self-insured plans, which are common among large corporations. In preliminary analysis of employer data, Sturm and Pacula (1999) and Pacula and Sturm (2000) report results that are consistent with firms restructuring benefits rather than providing increased benefits in response to the Parity legislation.

6.2.4. Conclusions of Literature Review

We reviewed the literature that is relevant to understanding potential employer response to changes in the NRA and EEA. Although no formal analysis is directly applicable to EEA and NRA changes, we have identified various studies that are informative. The main conclusions are:

- Approximately one-third of pension holders have a pension plan that is formally integrated with Social Security benefits. An increase in the NRA could affect employers that sponsor an integrated pension with an offset provision if they are required to pay pension benefits at age 65. The literature offers no direct analysis of the extent to which this holds (but see Section 6.4.1). Presumably, these firms would be the most likely to respond.
- There is evidence that employers can impact employee retirement decisions by offering particular pension windows, offering early-exit windows, and providing health insurance. To the extent that employers do not want workers to stay at the firm longer, it is likely that firms will further adopt such practices.

[54] Gruber and Krueger (1990) come to a similar conclusion: Employers are able to reduce wages to offset mandated benefits when examining variation in workers compensation programs for workplace injury.

- There is evidence that firms have been able to respond to other law changes. Generally, employers responded by restructuring wages and/or benefit parameters, rather than eliminating certain benefits altogether. This provides tentative guidance for the type of response they may give to changes in the NRA and EEA.

6.3. Recent Communications

To find out directly how employers are preparing for changes in Social Security policy, we monitored several prominent newspapers, magazines, and publications that target professionals in pension fund management, benefits consulting, and human resources.[55]

Over the past two years, there has been virtually no mention of measures taken by human resource managers in response to changes in Social Security policy or in anticipation of new changes. In particular and surprisingly, we found no noteworthy articles related to the on-going increase in the NRA.

One article discussed the implications of private accounts for workers with DB pensions that feature an offset integration provision (Institutional Investor, 2001). It claims that approximately 13 percent of DB plans currently feature such an offset provision. Pension liabilities could become dependent on the rate of return on workers' private accounts, and thus subject to more uncertainty. The article cites Sylvester Schieber, director of research at consulting firm Watson Wyatt Worldwide, who calculates that total Social Security benefits would increase (and pension liabilities decrease correspondingly) if the worker realizes a 5 percent rate of return. (It fails to point out that workers with such integrated plans face asymmetric risks, which may induce them to invest speculatively.) The article also cites Janice Gregory, legislative director at the ERISA Industry Committee, who considers it more likely that plans would be restructured such that the individual accounts portion of Social Security does not affect the pension offset. The article only presents the issue; it does not present evidence of any anticipatory corporate responses and does not make any recommendations.

We asked Sylvester Schieber whether he had observed employer responses to the ongoing increase of the NRA, and what Watson Wyatt Worldwide recommends to its clients (personal communication, 26 April 2002). He responded that the issue is moot, because virtually no DB plan features offset provisions anymore. (Current pensioners may well face offsets, but very few future pensioners do.)

In conclusion, changes in Social Security policy do not appear to feature prominently in the concerns of human resource professionals. Naturally, this may change when changes are written into law.

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[55] Notably *Institutional Investor* (a monthly publication) and *Pensions and Investments* (issued bi-weekly). We also closely monitored many general interest publications that are screened by Charlie Fiss at the Center for Demography of Health and Aging at the University of Wisconsin, Madison, and reported as *Current Awareness in Aging Research E-Clippings*.

6.4. HRS Tabulations

This section reports tabulations of HRS data that provide insight into the scope for employer responses and related issues. We show patterns over multiple waves of the HRS. Conclusions about trends over time need to be drawn with great caution, however, because many changes may be due to selective continuation in the workforce by those who remain in the sample. The sample consists of currently active employees, i.e., excluding self-employed persons. Respondents must be age-eligible, i.e., born in 1931-41.

Table 6.1. Sample Selection and Sample Size

Year	HRS sample size	Average age	Working for pay	Percent working for pay	Self-employed	Percent self-employed	Currently active employees
1992	9,825	55.5	6,697	68.2	1,213	18.1	5,483
1994	8,807	57.4	5,547	63.0	1,078	19.4	4,462
1996	8,335	59.4	4,720	56.6	989	21.0	3,726
1998	7,943	61.3	4,035	50.8	852	21.1	3,163
2000	7,492	63.2	3,321	44.3	735	22.1	2,570

Numbers of self-employed persons and currently active employees do not add up to numbers of persons who are working for pay due to small fractions of non-response to the self-employment question.

Table 6.1 shows sample sizes. In 1992, more than two out of three respondents was working. Of those who were working, 18.1 percent reported being self-employed, resulting in 5,483 currently active employees. By 2000, 2,570 respondents reported working for pay as employees. The fraction self-employed among the working sample increased from 18.1 percent in 1992 to 22.1 percent in 2000, suggesting that self-employed individuals retire later or that some workers move into self-employment toward the end of their career.

The following subsections discuss the extent to which DB pensions are formally integrated or informally coordinated with the Social Security program, the prevalence of retiree health insurance, and the workplace opportunities for and employer accommodation of older workers.

6.4.1. Integration and Coordination of Pensions with Social Security

Table 6.2 shows that pension coverage declined among currently active employees in the HRS from 66.8 percent in 1992 to 57.0 percent in 2000. Given that national pension coverage was virtually unchanged over the 1990s (Department of Labor, 2001), this indicates that workers who are covered by a pension tend to retire younger. DB pensions became less prevalent over the 1990s, from 69.4 percent in 1992 to 55.1 percent in the 2000 sample. Unlike DC pensions, DB pensions often have strong incentives for retirement before age 65. The reduced prevalence of DB pensions may therefore reflect disproportionate retirement among DB plan participants. It may also reflect an actual shift in the pension mix, as observed across all ages nationwide (Department of Labor, 2001).

Table 6.2. Pension Coverage and Type

Year	Age	Currently active employees	Percent with any pension	Among holders of any pension: Percent DC	Among holders of any pension: Percent DB	Total number of DB plans	Percent with offset provision
1992	51-61	5,483	66.8	55.0	69.4	2,884	12.4
1994	53-63	4,462	68.4	42.6	68.3	2,335	12.1
1996	55-65	3,726	66.5	49.6	61.6	1,740	13.4
1998	57-67	3,163	62.3	50.0	60.4	1,383	12.1
2000	59-69	2,570	57.0	55.2	55.1	1,052	10.2

Note: Percent DC and percent DB do not add up to 100 because workers may be covered by multiple pension plans (up to eight in 1992, up to five in 1994, up to four in 1996 and 1998, and up to three in 2000) and because a plan may be "both DB and DC."

The HRS asks "*Does the amount of your pension depend on Social Security benefits, in that when you start receiving Social Security benefits your pension benefits will be reduced?*" Approximately 97 percent of queried respondents was able to answer this question. As shown in Table 6.2, approximately 12-13 percent of DB plans contained an offset provision through 1996. This is closely consistent with Institutional Investor (2001), which quoted 13 percent integration, lower than the 19 percent offset integration rates reported by Slusher (1998) and Bender (1999),[56] and broadly consistent with the Bureau of Labor Statistics (1999) estimates of declining integration rates, from 19 percent in 1991 to 13 percent in 1997. There is some evidence that the prevalence of integration decreased, from about 12 percent in 1992 to 10 percent in 2000. However, the decrease is modest and may be in part be the result of selective retirement or smaller sample size in 2000. It does not corroborate the claim by Sylvester Schieber that pension integration is rare among current workers (personal communication, 26 April 2002).

If the respondent indicated that his pension plan contained an offset provision, he was asked "*When will this change take place: automatically at age 62, automatically at age 65, when you start receiving Social Security benefits, or at some other time?*" Table 6.3 tabulates the distribution of responses to this question. The most common response in all years except 2000 is "When Social Security begins." Offset provisions that start at age 62 became less prevalent, whereas start age 65 became more common. However, this pattern may well be due to the higher average age of remaining workers in the sample.

[56] The unit of observation in Slusher (1998) and Bender (1999) was the individual; we use the pension as unit of observation. Individuals may have multiple pension plans, resulting in a higher fraction of individuals with at least one plan with an offset provision.

Table 6.3. Timing of Pension Offset (Percent)

	1992	1994	1996	1998	2000
At age 62	31.4	31.9	33.1	33.5	27.4
At age 65	22.0	23.2	23.3	24.9	34.0
When SS begins	42.4	41.4	39.4	34.1	29.3
Some other time	4.3	3.4	4.2	7.5	9.4
Total	100.0	100.0	100.0	100.0	100.0
Sample size	328	263	236	173	106

To our knowledge, there is no external validation of these responses. If they are correct, Table 6.3 suggests that the majority of integrated pension plans account for not just the generosity of the Social Security program, but also its early and normal retirement ages. If the EEA and/or the NRA is increased, sponsors of such integrated plans may well adjust their plan characteristics accordingly.

Even if a pension plan is not formally integrated with Social Security through its benefit formula, it may be informally coordinated through other provisions, such as eligibility age. Table 6.4 shows the distributions of ages at which workers with DB pensions become eligible for full and early benefits. About 30 percent of workers with DB plans become eligible for full benefits at age 65; for about 28 percent the full retirement age is 62. The most common ages for early benefits are 55 and 62. (Later years show fewer respondents reporting an early retirement age of 55; this is probably due to selective retirement by workers with such young early entitlement ages.[57])

Table 6.4. Distributions of Full and Early Retirement Ages (DB Pensions)

	Full retirement age					Early retirement age				
Age	1992	1994	1996	1998	2000	1992	1994	1996	1998	2000
<55	4.8	4.4	4.2	4.3	4.2	11.4	11.2	11.1	10.1	9.7
55	14.6	13.1	12.7	11.1	10.6	30.3	28.8	26.5	22.6	22.6
56-59	9.4	9.9	10.2	10.0	9.2	12.7	13.1	13.8	13.8	12.3
60	8.3	8.1	8.3	8.4	8.2	8.0	7.6	8.2	8.9	8.6
61	1.2	1.1	1.2	1.1	0.8	1.2	1.2	1.3	1.2	1.0
62	26.6	27.7	26.9	27.3	28.0	26.1	27.2	25.8	27.7	28.5
63-64	2.4	2.3	2.8	2.5	3.0	1.7	1.8	2.3	2.5	2.4
65	29.8	30.1	29.6	30.2	30.1	7.6	8.4	9.7	11.2	11.8
>65	3.0	3.2	4.1	5.1	6.0	1.0	0.9	1.3	2.0	3.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
N	2,779	2,233	1,776	1,424	1,031	2,716	2,177	1,751	1,342	957

[57] The question that was posed is: "*What is the earliest age at which you could leave this employer and start to receive pension benefits from this plan?*" If the respondent reports that s/he is already eligible, the next question is: "*What is the earliest age at which you could have done so (that is, started to receive benefits from this plan)?*"

Table 6.5 shows the joint distribution of full and early retirement ages for DB pension holders in the 1992 HRS. The most common cases are those where the early and full eligibility ages are equal at 55 (12.8 percent) and 62 (15.0 percent). Also very common is an early retirement age of 62 and a full retirement age of 65 (9.5 percent). Those plans may be considered particularly closely coordinated with the Social Security program.

Table 6.5. Joint Distribution of Early and Full Retirement Ages in 1992

		Full retirement age						
		55	60	62	65	Other	Total	N
Early age	55	12.8	2.4	6.0	6.5	2.8	30.4	797
	60	0.2	4.2	1.3	1.8	0.5	8.0	209
	62	0.2	0.0	15.0	9.5	1.5	26.3	688
	65	0.1	0.0	0.0	7.1	0.2	7.6	198
	Other	1.8	1.5	4.2	4.4	16.0	27.8	727
	Total	15.0	8.2	26.5	29.4	20.9	100.0	2,619
	N	393	215	694	769	548	2,619	

Table 6.6 summarizes the fraction of pension plans with early and full retirement ages of 62 and 65, respectively, for all HRS waves. The fraction has remained approximately constant at around nine percent. Similar to before, the slightly lower fraction in 2000 (8.4 percent) may be due to selective retirement of eligible workers at age 62.

Table 6.6. Percent DB Plans With Early and Normal Retirement Ages of 62 and 65, Respectively

Year	Percent
1992	9.5
1994	10.3
1996	9.3
1998	9.2
2000	8.4

6.4.2. Retiree Health Insurance

Table 6.7 shows the prevalence of health insurance and retiree health insurance among currently active employees, i.e., excluding the self-employed. Health insurance coverage appears to have decreased somewhat, from 71 percent in 1992 to 65 percent in 2000. Workers with health insurance were asked whether their insurance plan was available to people who retire (1992, 1994) or whether the plan would continue covering the respondent if he/she were to leave the job before reaching age 65 (1996, 1998, 2000).[58]

[58] If a respondent reported health insurance in 1992, he/she was asked "*Is this health insurance plan available to people who retire?*" In 1994, the question is only asked if something changed about the respondent's health insurance as reported in 1992. Starting in 1996, the question universe and wording changed. The respondent is asked whether the plan would cover the respondent if he/she left the job before age 65 (if from current employer) or if the plan could be continued to age 65 (if from previous employer).

Among those with employer-sponsored health insurance, the fraction with retiree coverage decreased from 76 percent in 1992 to 62 percent in 2000. The overall result is that retiree health insurance coverage among current employees in the HRS decreased from 51 percent in 1992 to 36 percent in 2000.

Table 6.7. Health Insurance and Retiree Health Insurance Among Employees

	1992	1994	1996	1998	2000
Has health insurance	71.0	67.3	70.9	67.2	64.7
Percent with retiree health insurance among those with health insurance	76.2	65.6	60.0	62.5	61.5
Has retiree health insurance	50.9	43.6	41.0	39.4	36.2

Retiree health insurance is an important determinant of retirement behavior. Holding Medicare eligibility constant at age 65, if the EEA or NRA change and workers wish to work longer, the cost of retiree coverage decreases. Retiree health insurance may thus become relatively more attractive as a tool to dissuade employees from retiring later. Table 6.7 indicates that retiree health insurance is becoming less prevalent, so that there is increasing scope for re-introduction as an incentive for early retirement. Naturally, cost savings because of shorter time until Medicare eligibility may be wiped out by the current trend of rapidly increasing medical expenses, particularly for prescription drugs. In addition, the relative attractiveness of sponsoring retiree health insurance would disappear if the Medicare eligibility age were increased in tandem with the Social Security retirement ages.

6.4.3. Workplace Culture

The HRS contains a number of questions aimed at workplace opportunities for and employer accommodation of older workers. Table 6.8 summarizes the responses on the most relevant items.

This question is skipped if the respondent is already 65, or if the employer-provided health plan is not from either the current or previous employer (e.g., it is not asked if the plan source is a union, spouse's employer, or through self-employment).

Table 6.8. Workplace Opportunities and Accommodation

	1992	2000
(Not counting overtime hours,) Could you reduce the number of hours in your regular work schedule? (Percent stating "yes")	28.0	41.5
If you wanted to work half time or less on this job, would your employer allow you to do that? (Percent stating "yes")	5.7	19.7
How much do you agree or disagree with these statements?		
"My employer would let older workers move to a less demanding job with less pay if they wanted to."		
Strongly agree	2.5	3.0
Agree	30.5	34.0
Disagree	56.0	54.0
Strongly disagree	10.9	9.0
"As I get older, I would prefer to gradually reduce the hours I work on this job, keeping my pay per hour the same."		
Strongly agree		11.9
Agree		44.7
Disagree		38.5
Strongly disagree		5.0
"In decisions about promotion, my employer gives younger people preference over older people."		
Strongly agree	3.3	3.0
Agree	13.2	13.3
Disagree	68.2	69.8
Strongly disagree	15.3	13.9
"My co-workers make older workers feel that they ought to retire before age 65."		
Strongly agree	2.6	2.0
Agree	13.0	9.7
Disagree	67.2	72.1
Strongly disagree	17.2	16.3

A substantial fraction of workers felt that they could reduce their hours on the job. The increase from 1992 (28 percent) to 2000 (42 percent) may be due to disproportionately younger retirement among workers with less flexibility. The majority, however, stated that their employer would not let workers move to a less demanding job if they wanted to. The majority would also like to gradually reduce hours.

The vast majority of older workers did not feel discriminated by their employer or pressured to retire by their co-workers. Only about one in six older workers felt that their employer preferred to promote younger over older workers, and about the same fraction felt pressure from co-workers to retire.

6.5. Conclusion

The current structure of fringe benefit plans, notably the presence of retiree health insurance and the early and normal retirement ages in defined benefit pension plans, indicates that many employers want older workers to separate from their firm. The fact that these incentives are in place indicates that employers desire a younger workforce than the workforce that would result from natural retirement patterns. Under current circumstances, a policy change that would induce workers to stay on the job longer is thus unlikely to meet with much enthusiasm among employers. They will likely absorb more older workers, but at the same time counteract with stronger incentives for early retirement. The literature has found that firms are effective at inducing workers to leave through pension plan and retiree health insurance incentives. The effects of changes in Social Security policy that were estimated in Chapter 5 may thus be overstatements.

Tabulations from the HRS provide some limited insight into the scope for employer responses. We found that around 12 percent of DB pension holders are formally integrated with the Social Security program through a benefit offset provision. All else equal, these plans will face greater liabilities when the EEA or NRA increase, thus providing an incentive for adjustment. More than half of the integrated plans reduce benefits at age 62 or 65. Employers with such tightly integrated pension plans may find additional incentive to adjust to increases in the EEA or NRA. Prior literature showed that employers are more likely to respond by reducing the generosity of their compensation than by eliminating elements (such as pensions) altogether.

More than half of DB pension plan workers become eligible for full benefits at age 62 or 65. About nine percent become eligible for early benefits at age 62 and for full benefits at age 65. While not necessarily formally integrated, these pension plans appear otherwise coordinated with the Social Security program. Their sponsors may adjust the retirement ages in tandem with any changes in the EEA or NRA.

About two-out-of-three employees with health insurance on the job will remain covered after they retire. The prevalence of retiree health insurance has been decreasing over the 1990s. If workers are induced to retire later due to increases in the EEA or NRA, retiree health insurance will become less costly. All else equal, particularly including retiree health insurance premiums, this may lead to higher prevalence of retiree health insurance.

A little over half of older workers would like to gradually reduce hours, rather than retire at once. About one-in-three think that their employer will let them reduce their hours. The vast majority of older workers do not feel that their employers discriminate against older workers or that their co-workers exert pressure on them to retire.

Economic theory suggests that there is little reason for age-based retirement incentives if older workers were paid according to their marginal productivity. In order for employers to embrace increases in the EEA or NRA, it follows that they need to have greater flexibility in re-negotiating the terms of employment of older workers. In particular, greater flexibility would be needed in wage levels, health insurance, pension accumulation, and perhaps weekly hours and the nature of workers' responsibilities. For example, it may be beneficial for workers and employers to agree that older workers do not accumulate further pension rights.

7. References

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