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Abstract

Rising health care costs threaten many older Americans' financial security, perhaps leading people to delay retirement. For workers receiving health benefits from their employers, continued work reduces the risk of high out-of-pocket health care costs. Working longer also increases retirement incomes, making health care costs more affordable. This paper examines the impact of expected future out-of-pocket medical spending on retirement decisions. The results show that the premium costs associated with retirement before age 65 and expected out-of-pocket health care costs after 65 substantially delay retirement. A $1,000-increase in the own premium cost of retirement before age 65 lowers the likelihood that both men and women retire by about 0.1 percentage points, implying an elasticity of about –0.058 for both groups. The estimated elasticity of retirement with respect to the present discounted value of expected post-65 health care costs range from –0.16 to –0.20 for men, and from –0.14 to –0.16 for women. Men with expected post-65 health care costs equal to the 90th percentile of the overall distribution retire 11 months later than those with health care costs equal to the 10th percentile of the overall distribution. For women, the difference is 12 months.

Introduction

Rising health care costs threaten many older Americans' financial security. Health care costs have been increasing rapidly in recent decades, and much of these costs are paid by consumers of all ages. Medical expenses now consume a substantial share of household spending in retirement and that share is likely to rise in the future as costs continue to escalate. Cutbacks in employer-sponsored retiree health benefits add to the difficulty that many older Americans face paying for health care.

People may respond to these financial pressures by delaying retirement. For those receiving health benefits from their employers, continued work reduces the risk of high out-of-pocket health care costs. Working longer also increases retirement incomes—making health care costs more affordable—by raising people's earnings, boosting their Social Security and employer-sponsored pension wealth, and improving their ability to save, as well as by reducing the number of years over which retirement wealth must be spread (Butrica et al. 2004). Employment rates for older men, in fact, have been rising in recent years, after falling sharply for most of the last century (Purcell 2006). Future increases in health care costs could further delay retirement in coming years.

This paper examines the impact of expected future out-of-pocket medical spending on retirement decisions. We estimate retirement hazard models as functions of the increase in premium costs that result when retiring workers lose their employer health benefits and expected future health care costs after age 65, which we base on age, health insurance coverage, and health status while working. The results show that the premium costs associated with retirement before age 65 and expected out-of-pocket health care costs after age 65 substantially delay retirement.

Background

Health care costs have been soaring recently, with no end in sight (Ginsburg 2008). Per capita national health expenditures increased at an average rate of 3.6 percent per year in real terms over the past 16 years (Catlin et al. 2008). Health care spending now consumes 16 percent of the nation's gross domestic product, up from 7 percent in 1970. Current projections predict that real per capita health care spending will increase at an average annual rate of 3.6 percent through 2016, at which time health care spending will consume nearly one-fifth of the nation's output (Poisal et al. 2007).

Several factors appear to drive the surge in health care spending. Real income growth has increased the demand for health care services, as people choose to earmark part of their additional resources for better health care (Chernew, Hirth, and Cutler 2003; Reinhardt, Hussey, and Anderson 2004). Advances in medical technology have also contributed to rising spending levels (Newhouse 1993), by increasing the price of certain medical treatments and raising the demand for other procedures. Other explanations for high health care expenditures include increases in the prevalence of expensive medical conditions, the high administrative costs associated with a fragmented health care delivery and financing system, and the presence of a large number of highly paid medical specialists (Davis and Cooper 2003; Thorpe, Florence, and Joski 2004).

Medicare Provisions

Despite the preponderance of third-party payments, surging health care costs will likely raise older Americans' out-of-pocket health care spending. Although nearly all Americans age 65 and older are covered by Medicare, they face significant cost-sharing requirements. For example, in 2008 the Medicare deductible for hospital stays is $1,024, and the daily copay is

$256 for hospital days 61 to 90 (Centers for Medicare and Medicaid Services [CMS] 2007a). Medicare Part D, instituted in 2006, covers outpatient prescription drugs through private insurance plans. Although these plans offer a range of coverage options at different prices, they must provide the standard benefit defined in law, its actuarial equivalent, or an enhanced benefit. The standard benefit has a $275 deductible in 2008 and 25 percent coinsurance until total drug costs reach $2,510 (CMS 2007b). Once total drug costs exceed $2,510, coverage is suspended and beneficiaries must pay 100 percent of their drug costs until total out-of-pocket spending reaches $4,050. The plan then pays 95 percent of any additional costs, with beneficiaries responsible for only the remaining 5 percent. Although some plans cover beneficiaries in the standard benefit coverage gap, only 4 percent of Part D enrollees had coverage in the gap for brand-name drugs in 2006 (Cubanski and Neuman 2006).

Medicare premiums are substantial. Although most beneficiaries do not pay Medicare Part A premiums for inpatient services, most now pay monthly premiums of $96.40 for Medicare Part B, which covers outpatient services. Beginning in 2007, Part B premiums are somewhat higher for high-income enrollees (single adults with incomes over $82,000 and couples with incomes over $164,000 in 2008). Part D premiums vary depending on the particular plan that enrollees choose, but monthly premiums for the standard plan averaged $27 per month in 2007 (Medicare Trustees 2007). Low-income beneficiaries qualify for public assistance with premiums, deductibles, and copays for both Parts B and D, but there is concern that many eligible enrollees are not receiving help (Kaiser Family Foundation 2007; Moon, Brennan, and Segal 1998).

Additionally, Medicare does not cover all health care services received by older adults. Excluded services include dental care and dentures, routine vision care and eyeglasses, and hearing examinations and hearing aids, as well as most long-term care services.

Supplemental Coverage

Many older Americans obtain private supplemental insurance to fill some of the gaps in Medicare coverage, defraying the cost of Medicare deductibles and coinsurance and covering services excluded from the Medicare benefits package. In 2003, about 36 percent of noninstitutionalized Medicare enrollees age 65 and older obtained retiree health benefits from their former employers or their spouses' former employers, while another 34 percent purchased private supplemental coverage, known as Medigap, from insurance companies (Federal Interagency Forum on Aging Related Statistics 2006).

However, many employers are now cutting back on retiree health benefits, likely reducing employer coverage rates for future generations of Medicare beneficiaries. Between 1988 and 2006, the share of large private employers offering health benefits to retirees fell from 66 percent to 35 percent (Kaiser Family Foundation and Health Research and Educational Trust 2006). In 2003, only 25 percent of private-sector workers were employed at establishments that offered retiree health benefits, down from 32 percent in 1997 (Buchmueller, Johnson, and Lo Sasso 2006). Employers that continue to offer benefits are forcing retirees to bear much of the costs. From 1998 to 2004, the median amount that retirees age 65 and older paid in premiums for employer-provided health insurance more than quadrupled, after adjusting for inflation (Johnson 2007). Nonetheless, employer health plans still provide important benefits to retirees fortunate enough to participate in them. In 2004 the median Medicare-enrolled retiree with employer

health benefits paid less than half as much in premiums as the median Medigap enrollee (Johnson 2007).

Coverage Options Before Medicare Eligibility

Health insurance options are especially limited for people whose employers do not offer retiree health benefits and who retire before Medicare begins at age 65. Under federal law, former employees at firms with 20 or more workers are entitled to continuation coverage for up to 18 months. However, the worker is responsible for up to 102 percent of the employer's average premium cost during this period. After continuation coverage runs out, retirees are forced to turn to the private nongroup market if they are still too young to qualify for Medicare. Nongroup policies are generally expensive, especially for those with pre-existing medical conditions (Chollet and Kirk 1998). Out-of-pocket health care costs, then, may be particularly high for people without access to employer-sponsored retiree health benefits who retire early. In 2004, 49 percent of people age 55 to 64 who described themselves as retired received health benefits from their former employers, and another 21 percent received benefits from their spouse's employer (Johnson 2007). The remaining 30 percent were fairly evenly divided among those with private nongroup coverage, those with public insurance (from Medicaid, Medicare, or the military), and the uninsured.

Financial Burden of Health Care Costs

Older Americans devote a substantial share of their income to health care. Despite Medicare and various types of supplemental coverage, in 2004 Americans age 65 and older spent about three times as much on out-of-pocket health care costs as nonelderly adults (Hartman et al. 2007). Median out-of-pocket health care spending as a share of income totaled 14 percent for adults age 65 to 74 in 2003 and 22 percent for those age 85 and older (Neuman et al. 2007).

These figures are likely to increase in the future as health care costs rise, despite the 2006 introduction of Medicare Part D, which lowered out-of-pocket prescription drug costs for older adults (Lichtenberg and Sun 2007).[1] Premiums for Medicare Parts B and D will rise with total Medicare spending, because premiums are set to cover 25 percent of program costs. The Medicare Trustees (2007) project that real monthly Part D premiums will increase by about 70 percent by 2016, to about $46 in 2007 dollars. A typical older married couple could devote about 35 percent of its after-tax income to health care in 2030 (Johnson and Penner 2004).

Medicare reforms could further exacerbate the financial burden of health care costs for older Americans. Congress might deal with the system's looming bankruptcy by shifting costs to beneficiaries through higher premiums, deductibles, or coinsurance. Lawmakers might choose to raise Medicare's eligibility age, an option that may be more likely now that Social Security's normal retirement age is increasing from 65 to 67. Because government payments to Medicare Advantage plans appear to be overly generous (Medicare Payment Advisory Commission 2007), Congress has also recently debated reducing plan reimbursement rates. Participating health plans would likely respond to payment cuts by reducing enrollees' benefits or raising their premiums.

People likely react to increased health care costs by reducing their demand for all other goods and services, including leisure. The reduced demand for leisure could, in turn, manifest itself in later retirement. Employer-sponsored health insurance creates additional work incentives. People who receive employer-sponsored insurance when working but not when retired lose health benefits when they stop working, especially if they leave their employer before qualifying for Medicare at age 65. Those lost benefits raise the cost of early retirement

[1] Although the lack of prescription drug benefits in Medicare was an important gap in coverage, prescription drug costs accounted for only about 14 percent of Medicare beneficiaries' out-of-pocket health care spending in 2003 (Neuman et al. 2007), before Medicare Part D was introduced.

and appear to encourage people to remain at work. Several previous studies have found that access to employer-sponsored retiree health benefits is an important predictor of retirement (Blau and Gilleskie 2001; French and Jones 2004; Johnson, Davidoff, and Perese 2003; Rogowski and Karoly 2000; Rust and Phelan 1997). Access to government health benefits, such as those provided to veterans, also appears to encourage early retirement (Boyle and Lahey 2007).

Methods

To estimate the effects of health care costs on retirement, we use data from the Health and Retirement Study (HRS), a longitudinal survey of older Americans designed by the Survey Research Center at the University of Michigan with primary funding from the National Institute on Aging.[2] Respondents were first surveyed in 1992 and were reinterviewed every other year. The most recent data available when we began our study was collected in 2004. The survey gathers detailed information on work status, health insurance coverage and costs, health status, income, assets, and demographics.

Premium Cost of Retirement

We consider two types of out-of-pocket health care costs—real health insurance premium costs associated with retirement before age 65, and the expected stream of future real health care costs from age 65 until death (or from the observation period until death if the respondent is older than 65 and still working). The premium cost of retirement (PCR) is defined as the increase in health insurance premium expenses that workers would pay if they retired, relative to what they would pay if they remained at work. We compute the net present value of this stream of costs from the age at which workers are first observed until they reach the Medicare eligibility

[2] Whenever possible, we use the RAND HRS data file, a cleaned version of the raw HRS data. For more information about the HRS, visit http://hrsonline.isr.umich.edu/.

age of 65, because the premium savings associated with employer coverage is modest for those eligible for Medicare. (For workers who remain employed past age 65, the stream of costs is computed for only one year, under the assumption that the worker retires the next year.)

The net present value of the stream of costs, *PCR*, can be expressed as

$$PCR = \sum_{i=j+1}^{\min(65,\, j+1)} \left(R_i - W_i\right)\left(\frac{1+c}{1+r}\right)^{i-j} p_i \qquad \textbf{(1)}$$

where R_i is the annual out-of-pocket premium cost at age i when retired, W_i is the annual out-of-pocket premium cost when working, j is the worker's current age, c is the annual projected increase in premium costs from the current period until the worker reaches age 65, r is the annual real interest rate, and p_i is the probability that the worker will survive from current age j to age i.

PCR depends largely on insurance coverage when working. For workers without employer-sponsored health benefits, *PCR* is zero, because these workers face the same health insurance options when they are retired as when they are working. Workers with retiree health offers from their employers experience a modest increase in premium costs when they retire, because most employers require retirees to make larger premium contributions for their health benefits than workers. The HRS asks workers and retirees how much they contribute toward their employer-sponsored health insurance premiums, but it does not ask workers how much they would likely have to contribute when they retire. (Even if the survey did ask about future payments in retirement, it is unlikely that many respondents would be able to provide reliable answers.) We assume that workers' contributions to their employer health insurance premiums increase by 31.5 percent when they retire, the average differential in the HRS between workers and retirees.

PCR is especially large for workers with employer-sponsored health benefits that do not continue into retirement. Federal law generally requires employers to allow their employees to

continue in their health insurance plans for up to 18 months after they separate (or 36 months if the former employee is disabled), but most employers charge them 102 percent of average firm-wide premium costs, the maximum rate permitted by law. We set the cost of continuation coverage equal to this amount, assuming that the employer's total premium cost equals the median total cost of employer-provided health insurance within the region of the country in which the former employee resides, as reported annually in employer surveys conducted by the Kaiser Family Foundation and Health Research and Educational Trust (various years).[3]

After the 18-month continuation coverage runs out, retirees must purchase coverage in the private nongroup market if they are too young to qualify for Medicare and wish to maintain health insurance coverage. We impute nongroup premium costs for our sample from a 1991 Urban Institute survey of Blue Cross/Blue Shield plans. We inflate costs by the average change in per capita national health expenditures, and assign the mean premium cost within gender, age, and geographic region to all respondents in our sample. Because most nongroup plans are risk-rated (Chollet and Kirk 1998), we also inflate premiums by 50 percent for those with one medical condition (heart problems, cancer, diabetes, lung disease, arthritis, and high blood pressure), and by 100 percent for those with two or more conditions.[4]

We also compute the increase in spousal premium costs associated with retirement. About 51 percent of working men in our sample and 17 percent of working women provided employer health benefits to their spouses in 1994. The loss of these spousal benefits increases the premium cost of retiring. The spousal *PCR* computation is based on equation 1. As with own retiree health benefits, we assume that workers with employer retiree health benefit offers that

[3] The Kaiser surveys began in 1999. We base continuation costs in 1994 and 1996 on the 1999 estimates, assuming that employer costs grow at the same rate as per capita national health expenditures.

[4] See Johnson, Davidoff, and Perese (2003) for more details on the nongroup insurance premiums.

could cover their spouses (as reported by the HRS respondent) would have to pay an additional 31.5 percent in monthly premium contributions. If the worker's employer does not offer retiree health benefits, then the spouse switches (with the worker) to continuation coverage for 18 months after the worker retires, and then moves to nongroup coverage. If the worker has access to employer-sponsored retiree health benefits that would not cover the spouse, we assume the spouse purchases nongroup coverage when the worker retires. Spousal *PCR* is zero when the worker's employer health benefits do not cover the spouse.

Health Care Costs After Age 65

The lifetime stream of expected future out-of-pocket health care costs beginning at age 65 consists of Medicare premiums, premiums for supplemental private insurance, and direct payments to health care providers. If the respondent is older than 65 and still working, the out-of-pocket cost stream lasts from the current observation period until death. (For simplicity, however, we always refer to these streams as health care costs after age 65.) For married workers the cost stream also includes expected future out-of-pocket premiums and provider payments for the spouse.[5]

Expected Medicare premiums at time *t* equal the Part B rate in effect at time *t*, increased by workers' expectations of future real premium growth. Because our data predate the establishment of the Medicare prescription drug program and we assume that respondents did not foresee its creation, our estimates do not include Part D premiums.[6]

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[5] The correlation between expected future health care costs and current health problems prevents us from separately identifying the effects of post-65 health care costs for the worker and spouse. Health problems generally lead workers to retire early, despite high expected out-of-pocket costs. We can identify the combined effect, however, because spousal health problems increase the couple's expected future health care spending but do not independently influence the worker's retirement timing.

[6] Although Medicare Part D was not implemented until 2006, Congress passed the Medicare Modernization Act authorizing prescription drug coverage in November 2003, just before the last observation in the sample. Thus, expected future health care spending for respondents still working in 2004 might have been influenced by this legislation.

The computations assume that everyone offered retiree health benefits from their employer will participate in the plan, and that everyone without access to employer-sponsored retiree benefits will purchase Medigap coverage to supplement Medicare. We compute premiums for retiree health benefits based on the same algorithm we use in the *PCR* calculations. Medigap premiums come from Weiss Ratings, Inc., a firm in Jupiter, FL recently acquired by TheStreet.com that collects data on Medigap plans. Using the Weiss Ratings data, we set Medigap premiums equal to the median annual premium in the respondent's state of residence for Medigap Plan H, a moderate-cost supplemental insurance plan that provides prescription drug coverage.[7]

Expected out-of-pocket payments to health care providers after age 65 are based on data from the Medical Expenditure Panel Survey (MEPS), which collects reliable information on health care conditions and out-of-pocket health care spending for a nationally representative sample of Americans. Because the MEPS is a series of two-year panels, we are able to use the 1996 to 2004 surveys to measure the probability that respondents develop or recover from difficulties with performing basic activities of daily living and each of six medical conditions that have significant effects on health care spending (arthritis, cancer, diabetes, heart problems, high blood pressure, and lung problems). We compute these probabilities by age and the presence of the condition at baseline, and then use this Markov-type transition model to estimate the expected likelihood that workers develop different types of chronic health conditions in old age. Finally, we use the 2004 MEPS sample to estimate a regression of out-of-pocket payments to health care providers as functions of frailty, the medical conditions, age, gender, race, and education. Because the 2004 MEPS predates the creation of the Medicare prescription drug

[7] State identifiers are available in the restricted-access version of the HRS which the University of Michigan allowed us to use for this project.

program, we assume that people estimate out-of-pocket spending (including drug spending) as it would have been without Medicare Part D. The cost regressions are restricted to people age 65 and older with Medicare coverage and private supplemental coverage.[8] We use these results to impute expected future out-of-pocket payments to the HRS sample.

Expected Future Costs

The analysis assumes that people expect recent changes in health care costs to continue indefinitely. We thus set expected health care cost growth equal to the average actual change in real per capita national health expenditures over the past three years, and use these rates in calculations of *PCR* and the lifetime stream of expected future out-of-pocket health care costs beginning at age 65. These cost growth rates change over time as workers age and update their expectations.[9]

Because it is not clear how much workers discount future health care costs, we create two measures of each of the health cost variables based on different discount rates. The first measures of *PCR* and expected future health care payments assume that workers discount future costs at a rate of 3 percent per year, and the second assumes that workers discount the future more heavily, at 10 percent per year. Both measures are expressed in constant 2004 dollars, as adjusted by the change in the overall consumer price index.

Sample and Model Specification

We use probit equations to estimate discrete-time hazard models of the retirement decision. We first measure respondents' work status and other personal characteristics in 1994

[8] Results from the cost regressions and transition models of medical conditions are available from the authors upon request.

[9] In a related paper, we assumed that consumers expected future health care costs to follow the Medicare trustees' forecasts (Penner and Johnson 2006). The current assumption that people expect recent experience to continue seems more plausible.

and follow them up to 2004.[10] Respondents remain in the sample until they retire or drop out of the survey. Workers are classified as being retired when they first report that they are not working at all at the survey interview (or looking for work). The analysis restricts the sample to respondents age 52 to 63 in 1994 who were employed full time as wage and salary workers. We exclude respondents who work part-time or are self-employed in 1994 so we can focus on workers' decisions to leave the career job; many part-timers and self-employed workers may have already made the transition from career jobs into "post-retirement" jobs. Models are estimated separately for men and women. The final sample of men consists of 4,885 person-year observations on 1,564 individuals, and the final sample of women consists of 4,107 person-years on 1,289 individuals.

The models relate worker characteristics at interview wave *t* to retirement status at interview wave *t+1* (two years later). The dependent variable equals one if the worker is retired (not working) at the next interview, zero otherwise. In addition to *PCR* and expected lifetime out-of-pocket health care costs after age 65, the models control for self-reported health status, the presence of any health problems that limit the type or amount of work that people can do, participation in a defined benefit (DB) pension plan on the current job, participation in a defined contribution (DC) plan but not a DB plan on the current job, annual earnings, household net worth, race, education, marital status, and age. Household net worth includes the net value of housing, other real assets, and financial assets, but excludes the expected value of future payments from Social Security and any defined benefit employer-sponsored pension plans. Earnings and net worth are measured in constant 2004 dollars. Age enters the models as a linear spline, with kink points at ages 56, 61, 65, and 69, allowing the effect of age on retirement

[10] We do not use 1992 data because the health insurance questions changed substantially in 1994.

decisions to vary for different age groups. The models do not account for any interactions between the worker's and spouse's retirement decisions, which could be substantial (Blau 1998).

Results

Figure 1 shows the retirement survival curve for our combined sample of men and women age 52 to 63 in 1994 working full-time at wage and salary jobs. The median retirement age in our sample is about 63. Only about 12 percent of workers retire by age 58, while about another 10 percent remain at work beyond age 71. Retirement probabilities are quite similar for men and women, and thus are not reported in the figure.

Figure 2 reports the retirement hazard curve for the combined sample of working men and women. Retirement hazards are low through age 60, but then begin to increase sharply, exhibiting familiar spikes at age 62 (when workers first qualify for Social Security retirement benefits) and age 65 (when Medicare eligibility begins). About 17 percent of people still working at age 61 retire at age 62, and about 23 percent of those still working at age 64 retire at age 65. The hazard rate declines after age 65. Again, the retirement hazard curves are similar for men and women. The age-62 spike is somewhat more pronounced for women than men, while the age-65 spike is more pronounced for men.

Retirement patterns differ by health insurance coverage. Workers whose employers offer retiree health benefits are more likely to retire than workers with employer-sponsored health benefits that do not continue into retirement (figure 3). The median retirement age is about 62 for workers with retiree health insurance offers and 63 for workers with employer health benefits but not retiree health offers. Workers who do not receive any health benefits from their employers are more likely to remain in the labor force past age 65 than workers receiving employer health benefits. At nearly every age past 59, retirement hazard rates are higher for workers with retiree

health benefit offers than those who receive employer health benefits only when they are working (figure 4). In 1994, about 48 percent of older men and 34 percent of older women in our sample of full-time workers have retiree health insurance offers from their current employers, and another 36 percent of men and 40 percent of women have employer health benefits that do not continue into retirement.

Future Health Costs

Table 1 reports descriptive statistics for our measures of the premium cost of retirement in 1994, for our sample of full-time wage and salary workers age 52 to 63. When we use an annual discount rate of 3 percent, the mean value of own *PCR* is $11,983 (in 2004 dollars) for men and $13,512 for women. However, *PCR* varies widely across workers in the sample. Among men, for example, the premium cost of retirement before age 65 is only $957 at the 50th percentile of the distribution but rises to about $21,218 at the 75th percentile and to about $48,200 at the 95th percentile. The premium cost of retirement is especially high for workers without retiree health benefits. Among men, the median cost is about $27,582 for workers covered by employer-sponsored health insurance on the current job but who lack access to retiree health benefits, compared with only $302 for those with employer health benefits that would continue into retirement. Costs are lower when we use a discount rate of 10 percent, but still substantial for workers whose health benefits end when they retire. The premium cost of retirement before age 65 tends to be higher among working women than men because women face higher premiums in the nongroup insurance market and they are more likely than men to survive to age 65.

Because relatively few workers provide employer-sponsored health insurance coverage to their spouses, the spousal premium cost of retirement before age 65 is generally much lower than

own premium costs. With an annual discount rate of 3 percent, the mean spousal premium cost for men in 1994 is about $7,800, about one-third lower than mean own premium costs. The difference is even larger for women, who are less likely than men to provide employer-sponsored health insurance to their spouses. For example, the mean spousal premium cost for women in 1994 is only about $2,600 when future costs are discounted at 3 percent per year, about one-fifth the mean value of own premium costs. Average spousal costs are higher than own costs for men with access to retiree health benefits, however, because employers generally require higher premium contributions for spousal coverage than own coverage.

Table 2 reports descriptive statistics in 1994 for the present value of expected future out-of-pocket health care costs after age 65. The mean value when computed using a 3-percent discount rate is about $82,000 for men (in constant 2004 dollars) and about $66,000 for women. Average costs, which include spending by both spouses for married workers, are relatively low for women because 39 percent of women in the 1994 sample are single, compared with only 13 percent of men. Expected post-65 health care costs vary substantially, although somewhat less than the premium costs of retirement before age 65. Costs for men range from about $57,700 at the 25th percentile to about $103,300 at the 75th percentile. Mean costs are about $23,400 less for men with retiree health insurance offers from their employers than for men without employer retiree health benefits. The present value of future expected costs is much lower when we use a 10-percent discount rate instead of a 3-percent discount rate.

Model Estimates

Table 3 reports means of the dependent and independent variables in our retirement model. We observe about 62 percent of baseline male workers and 63 percent of baseline female workers moving into retirement over the course of the 10-year panel. (Some workers drop out of

the sample before we observe them retiring.) On average, 20 percent of workers (both male and female) retire in each two-year interview wave. More than one-half of men and women report excellent or very good health in 1994, and only about 7 percent report health problems that limit their work ability. About 54 percent of men and 48 percent of women participate in defined benefit pension plans on the 1994 job, while another 23 percent of men and 22 percent of women participate only in defined contribution plans. Mean annual earnings in 1994 total about $57,400 for men and $33,400 for women (measured in 2004 dollars), and mean household net worth is about $170,000 in 1994 for both men and women. Fewer than one-half of men and women in the sample attended college.

The own premium cost of retirement before age 65 significantly reduces retirement probabilities for both older men and older women (table 4). When calculated using a 3-percent discount rate, a $1,000-increase in the own premium cost of retirement lowers the likelihood that both men and women retire by about 0.1 percentage points, implying an elasticity of about –0.058 for both groups. Estimated elasticities rise slightly in absolute value, to –0.064 for men and to –0.060 for women, when we use a 10-percent discount rate.

The spousal premium cost of retirement before age 65 does not significantly affect retirement decisions for either men or women. Because few husbands rely on their wives for health insurance coverage, it is not surprising that women's retirement decisions do not respond much to spousal premium costs. The lack of a significant effect for men is more surprising, and may reflect the imprecision of our measure. We assume for example, that working spouses will remain employed until age 65, even though many retire at younger ages, and that spouses who are not employed will never work. Also, the true impact may depend on women's work histories, with men married to nonworking wives perhaps being more likely to consider how retirement

affects her insurance coverage than men married to working women with long employment histories.

The present discounted value of expected post-65 health care costs also reduces retirement probabilities. The effect is marginally significant for men and women ($p < .10$) when computed using a 10-percent discount rate, and marginally significant for men only when computed using a 3-percent discount rate. The effect is not significant for women with the 3-percent discount rate computation, although is approaches marginal significance ($p < .13$). The estimated elasticities range from –0.16 to –0.20 for men, and from –0.14 to –0.16 for women.

The estimated effects of other variables in the model are generally consistent with findings in the literature. Poor health, health problems that limit work ability, and defined benefit pension plan participation substantially increase retirement rates. College graduates retire later than workers who did not attend college. Retirement rates do not significantly vary with earnings or household net worth.

Simulations

To compare the size of the retirement effects of future health care costs to other factors, we simulate median retirement ages and retirement probabilities for men and women with certain characteristics. The baseline simulations use the probit model parameters reported in table 4 for the 3-percent discount rate computations to predict retirement for a worker who is age 60, married with some college education, in very good health with no health-related work limitations, and with earnings, household net worth, pre-65 premium costs of retirement, and expected post-65 health care costs equal to the median value for his or her gender. We then vary some characteristics and recompute the simulations to assess the relative impact of pre-65

premium costs, expected post-65 health care costs, pension coverage, and health status on retirement decisions.

The simulations show that men with relatively low premium costs of retirement before age 65—set equal to the median value among those with retiree health insurance offers from their current employers—retire about nine months earlier than men with relatively high premium costs—set equal to the median value among those with employer health benefits that do not continue into retirement (63 years, 6 months versus 64 years, 3 months). The predicted two-year retirement probability is about 21 percent for men with the higher premium costs, compared with about 18 percent for men with lower premium costs. Women facing premium costs typical of those with retiree health insurance offers retire about 11 months earlier than those with costs typical of those with health benefits that do not continue into retirement (62 years,10 months versus 63 years, 9 months).

Men with expected post-65 health care costs equal to the 90th percentile of the overall distribution retire 11 months later than those with health care costs equal to the 10th percentile of the overall distribution (64 years, 1 month versus 63 years, 0 months). For women, the difference is 12 months.

The estimated retirement effects of employer-sponsored pension coverage and overall health status are somewhat larger than expected future health care costs. The simulations show that men with defined benefit plan coverage on the current job retire about 2.5 years earlier than men participating in defined contribution plans (61 years versus 63 years, 6 months). For women, the differential is about 22 months. Women in poor health retire about two years and four months earlier than women in very good health, whereas men in poor health retire about one and one-half years earlier than men in very good health.

Conclusion

Out-of-pocket health care costs, which have been growing steadily in recent years, appear to have important effects on retirement decisions. Rising out-of-pocket medical expenses in later life can deplete retirement resources and may prompt workers to delay retirement, foregoing some leisure so they can consume more goods and services. Indeed, we find that men and women who are likely to face relatively high out-of-pocket medical expenses after age 65 tend to retire later than those who face relatively low costs. Our simulations indicate that workers with expected future costs equal to the 90th percentile of the cost distribution retire about one year later than those with costs equal to the 10th percentile of the distribution, when other factors are held constant. Although our estimated effects are substantial, they are only marginally statistically significant, perhaps because of the errors introduced in measuring future cost expectations. For women, expected future health care costs after age 65 are marginally significant in only certain specifications.

Additionally, many workers, especially those who receive health insurance from their employers but do not have access to employer-sponsored retiree health benefits, would face higher health insurance premiums before reaching the Medicare eligibility age if they retire than if they remain employed. Workers with employment-based health benefits who lack retiree health benefit offers must generally replace subsidized health benefits with unsubsidized continuation coverage and eventually with expensive nongroup health insurance. The premium costs associated with retirement significantly delay retirement. Our simulations show that men facing relatively high premium costs (equal to the median costs for those with employer health benefits that do not continue into retirement) retire about nine months later than men facing

relatively low premium costs (equal to the median cost for those with retiree health insurance offers), when other factors are held constant. For women, the difference is about 11 months.

Our results do not, however, support the hypothesis that workers respond to the possible increase in their spouse's pre-65 health insurance premium costs when they retire. Many older working men and some older working women provide employer health benefits to their spouses, who could face much higher premium costs when the workers retire if they do not have access to retiree health benefits. When our models hold constant own premium costs of retirement and other factors, we do not find that spousal premium costs significantly delay retirement decisions, perhaps because we have not properly specified spousal premium costs associated with retirement. It is likely, for example, that some people turn to alternative coverage sources that are less costly than nongroup coverage when they lose spousal health benefits, such as health benefits from their own employers, and our assumption that working spouses remain employed until age 65 does not hold in many cases. Our models do not capture the complex nature of joint retirement decisions made by husbands and wives, which could obscure the impact of spousal premium costs. The effects may also vary by the spouse's work history, with men perhaps unlikely to consider how retirement affects their wife's insurance coverage when she works and has a well-established career.

Out-of-pocket health care spending is likely to increase rapidly in coming years, especially at older ages, inducing more people to work longer and delay retirement. Rising incomes, medical advancements, physician payment incentives, and the increasing prevalence of expensive chronic conditions will propel health care spending at all ages. Additionally, employers will likely continue cutting retiree health benefits, further raising out-of-pocket costs for older adults. Medicare's growing financial problems will further boost costs for retirees. The

system already spends more on benefits than it collects in tax revenue, and the trust fund that finances hospital spending is projected to be depleted by 2017 (Medicare Trustees 2007). These financial pressures will likely lead to benefit reductions or higher-than-expected increases in premiums and copayment requirements, which in turn may keep some older people in the workforce or force some retirees to return to work.

Raising average retirement ages could benefit the economy by easing the pressures created by an aging population. Delaying retirement increases the number of workers per retiree and reduces the burden of supporting the retired population. It spurs productive activity and increases tax revenue that funds government services. According to one recent study, the federal government would raise about $180 billion in additional tax revenue in 2045 (measured in 2006 dollars) if all workers delayed retirement by one year, reducing the unified federal deficit by an amount equal to 28 percent of the Social Security deficit (Butrica, Smith, and Steuerle 2006). Our results suggest that raising the Medicare eligibility age, perhaps to age 67 to make it consistent with the eligibility age for full Social Security retirement benefits for people born in 1960 and later, could lead many workers to delay retirement. But enhanced protections for people with serious health problems should accompany any new restrictions on Medicare eligibility, because many people facing the steepest health care costs in later life are physically unable to extend their work lives.

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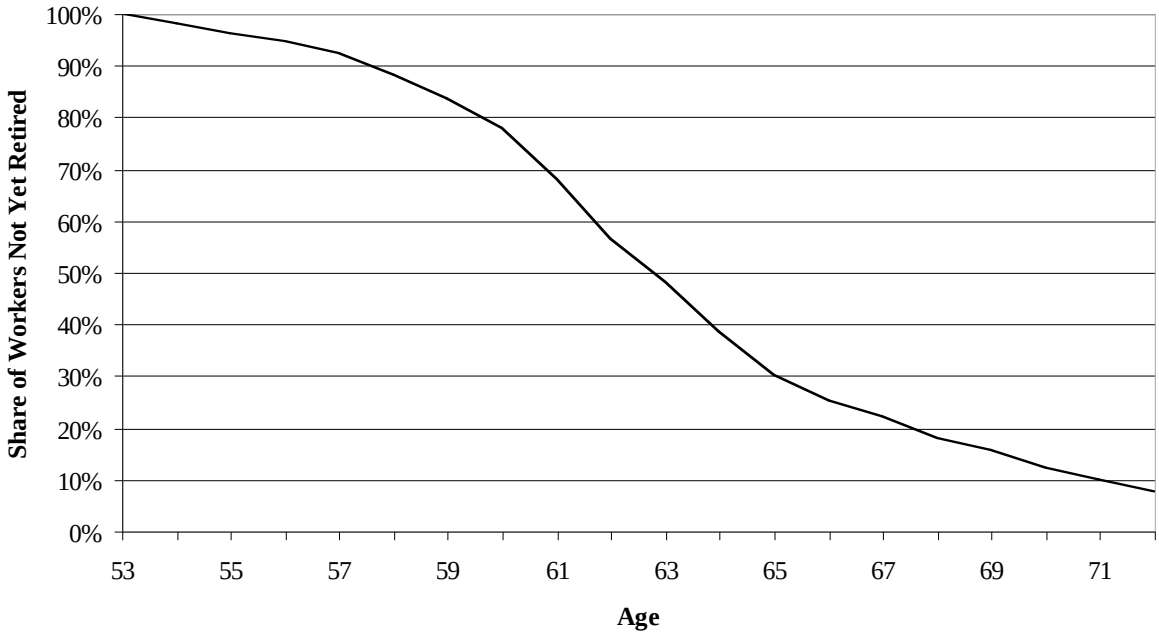
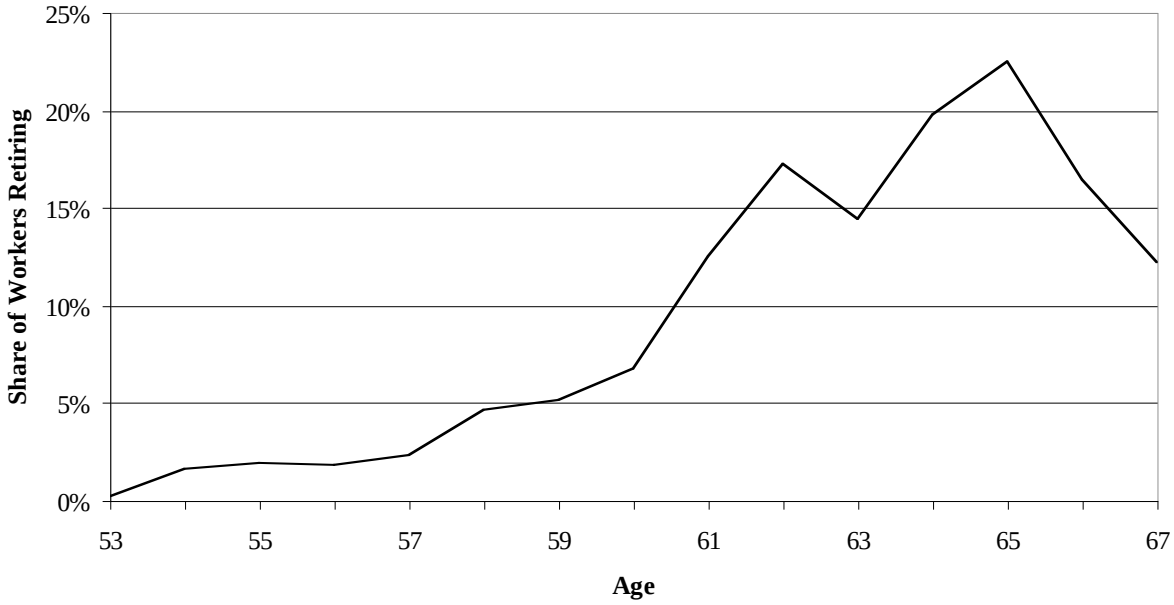
Figure 1. Percentage of Workers Not Yet Retired, by Age



Source: Authors' estimates from the 1994-2004 Health and Retirement Study (HRS).
Note: The sample is restricted to men and women age 52 to 63 working full-time in wage and salary jobs at study baseline (in 1994). The analysis assumes that respondents who retire stop working at the midpoint of the two-year observation period.

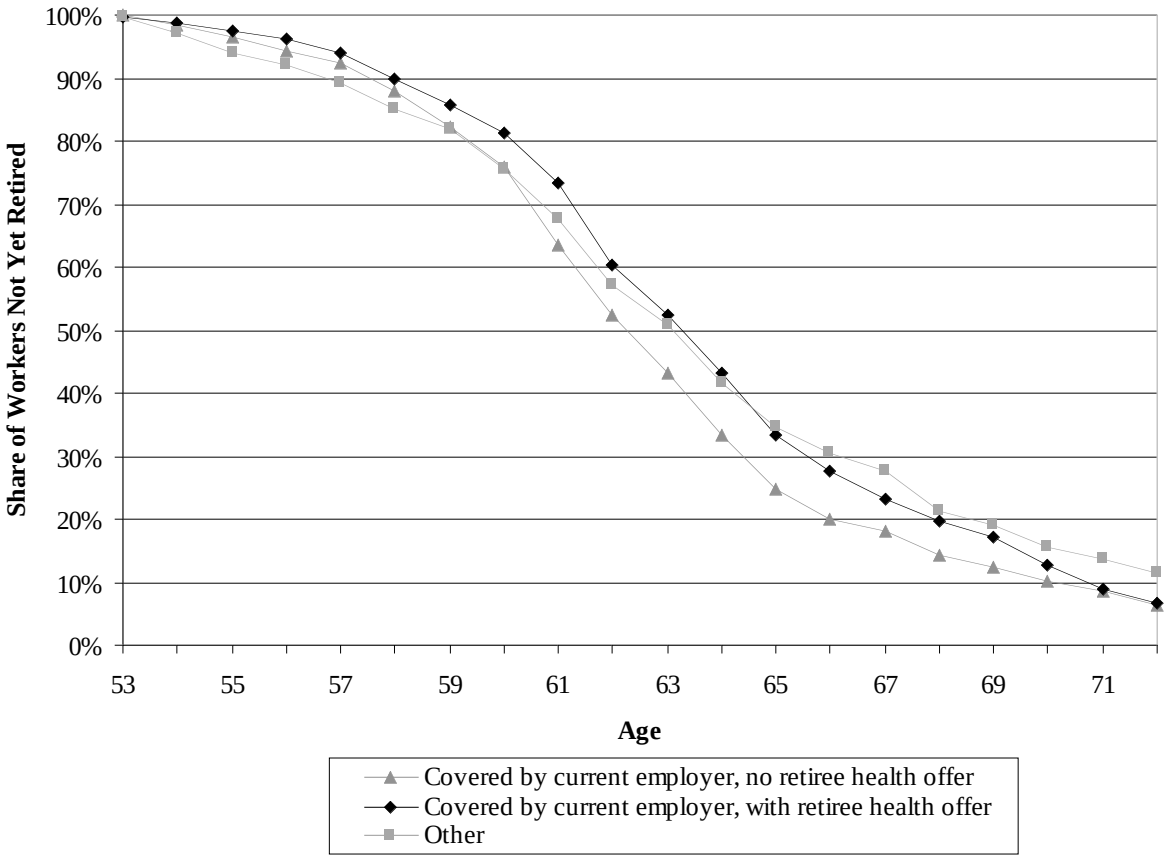
Figure 2. Retirement Hazard Rates



Source: Authors' estimates from the 1994-2004 Health and Retirement Study (HRS).

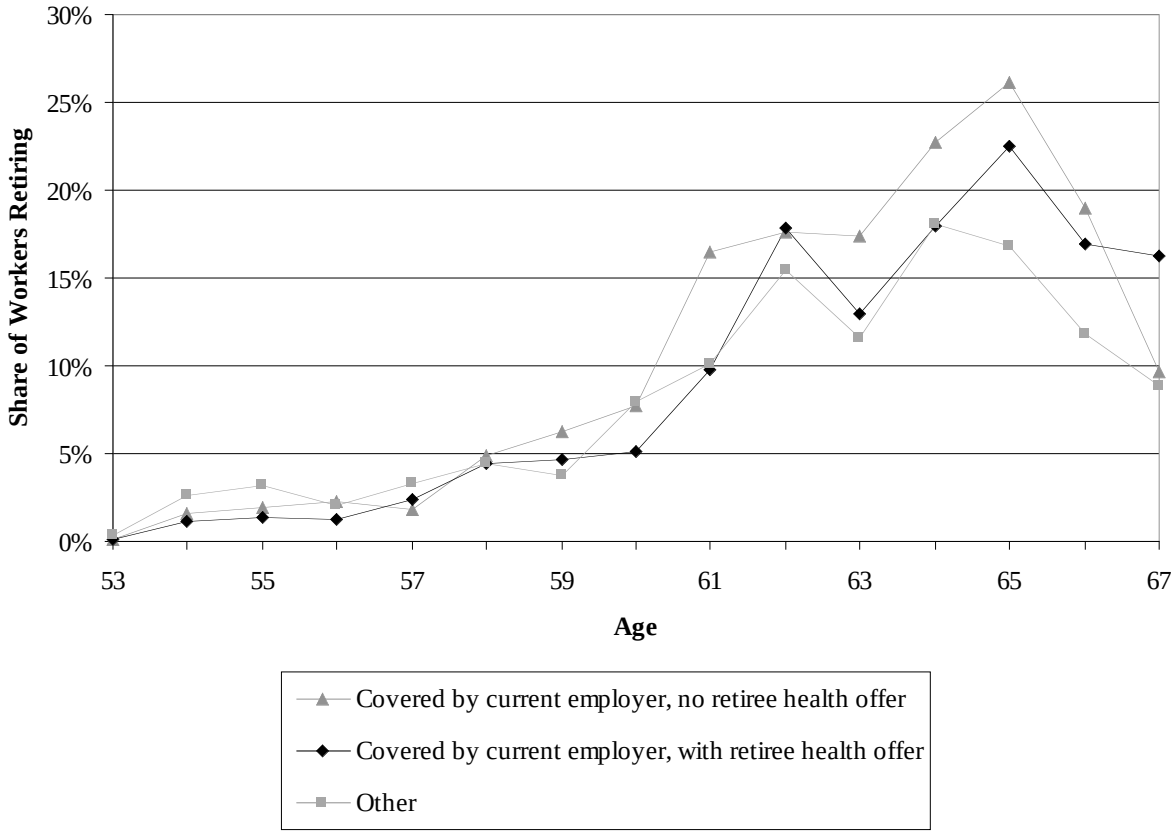
Note: The retirement hazard shows the share of workers who retire at the specified age, among those who have not already retired. The sample is restricted to men and women age 52 to 63 working full-time in wage and salary jobs at study baseline (in 1994). The analysis assumes that respondents who retire stop working at the midpoint of the two-year observation period.

Figure 3. Percentage of Workers Not Yet Retired, by Age and Insurance Coverage



Source: Authors' estimates from the 1994-2004 Health and Retirement Study (HRS).
Note: The sample is restricted to men and women age 52 to 63 working full-time in wage and salary jobs at study baseline (in 1994). Health insurance coverage is measured in 1994. The analysis assumes that respondents who retire stop working at the midpoint of the two-year observation period.

Figure 4. Retirement Hazard Rates, by Insurance Coverage



Source: Authors' estimates from the 1994-2004 Health and Retirement Study (HRS).
Note: The retirement hazard shows the share of workers who retire at the specified age, among those who have not already retired. The sample is restricted to men and women age 52 to 63 working full-time in wage and salary jobs at study baseline (in 1994). Health insurance coverage is measured in 1994. The analysis assumes that respondents who retire stop working at the midpoint of the two-year observation period.

Table 1. Descriptive Statistics of the Premium Cost of Retirement (PCR) in 1994 ($)

		Mean Value	Value at Given Percentile of the Distribution			
			25th	50th	75th	95th
Men						
3% Discount Rate						
All	Own costs	11,983	0	957	21,718	48,164
	Spouse costs	7,843	0	0	6,993	44,214
Covered by current employer without retiree health benefits	Own costs	31,135	18,861	27,582	40,162	64,430
	Spouse costs	17,014	0	11,192	28,127	55,553
Covered by current employer with retiree health benefits	Own costs	1,679	0	302	1,251	5,475
	Spouse costs	3,641	0	0	1,969	22,955
10% Discount Rate						
All	Own costs	9,042	0	784	17,468	35,589
	Spouse costs	5,985	0	0	5,670	33,467
Covered by current employer without retiree health benefits	Own costs	23,453	15,611	21,419	29,829	46,193
	Spouse costs	12,919	0	9,513	22,054	38,879
Covered by current employer with retiree health benefits	Own costs	1,297	0	242	990	3,912
	Spouse costs	2,827	0	0	1,492	17,709
Women						
3% Discount Rate						
All	Own costs	13,512	0	1,136	25,321	53,459
	Spouse costs	2,626	0	0	0	21,196
Covered by current employer without retiree health benefits	Own costs	32,637	20,343	29,871	43,671	64,259
	Spouse costs	5,389	0	0	1,405	31,439
Covered by current employer with retiree health benefits	Own costs	1,793	0	326	1,438	5,278
	Spouse costs	1,469	0	0	0	3,976
10% Discount Rate						
All	Own costs	10,190	0	881	19,732	38,452
	Spouse costs	2,078	0	0	0	18,277
Covered by current employer without retiree health benefits	Own costs	24,547	16,916	23,486	31,850	43,246
	Spouse costs	4,287	0	0	1,405	24,519
Covered by current employer with retiree health benefits	Own costs	1,430	0	297	1,087	3,930
	Spouse costs	1,137	0	0	0	3,264

Source: Authors' estimates from the Health and Retirement Study (HRS).

Note: The sample includes 1,564 men and 1,288 women in 1994, working full-time and age 52 to 63. Financial amounts are measured in 2004 constant dollars.

Table 2. Descriptive Statistics of the Present Value of Post-65 Health Care Costs in 1994 ($)

	Mean Value	Value at Given Percentile of the Distribution			
		25th	50th	75th	95th
Men					
3% Discount Rate					
All	81,970	57,684	82,474	103,290	134,742
Covered by retiree health insurance from any employer	69,697	53,912	65,052	88,163	118,907
Not covered by retiree health insurance	93,085	74,405	97,451	111,927	142,519
10% Discount Rate					
All	24,570	15,912	22,772	30,989	47,376
Covered by retiree health insurance from any employer	20,260	13,349	18,050	25,395	40,306
Not covered by retiree health insurance	28,475	20,285	26,710	35,233	51,339
Women					
3% Discount Rate					
All	65,993	51,455	60,037	84,164	102,972
Covered by retiree health insurance from any employer	51,144	33,502	47,447	63,960	89,058
Not covered by retiree health insurance	73,527	56,034	71,737	90,256	104,904
10% Discount Rate					
All	20,051	13,334	18,577	25,099	36,968
Covered by retiree health insurance from any employer	15,404	9,746	13,511	19,967	30,607
Not covered by retiree health insurance	22,408	15,499	20,903	27,445	39,867

Source: Authors' estimates from the Health and Retirement Study.

Note: The sample includes 1,564 men and 1,288 women in 1994, working full-time and age 52 to 63. Financial amounts are measured in 2004 constant dollars.

Table 3. Means of Variables in Probit Models

	1994		All	
	Male	**Female**	**Male**	**Female**
Ever Observed Retiring	0.624	0.633	…	…
Retire Before Next Interview Wave	0.156	0.169	0.200	0.200
Own Premium Cost of Retirement ($1,000)				
3% discount rate	11.983	13.512	9.054	9.415
10% discount rate	9.042	10.190	7.151	7.447
Spouse Premium Cost of Retirement ($1,000)				
3% discount rate	7.843	2.626	6.699	1.612
10% discount rate	5.985	2.078	5.364	1.326
Expected Health Care Costs After 65 ($1,000)				
3% discount rate	81.970	65.993	82.095	64.063
10% discount rate	24.570	20.051	29.770	23.764
Self-Reported Health Status				
Excellent	0.230	0.215	0.190	0.199
Very good	0.350	0.380	0.366	0.389
Good	0.310	0.295	0.324	0.300
Fair or poor	0.109	0.111	0.120	0.112
Health Problems Limits Work	0.074	0.073	0.081	0.074
Pension Plans from Current Employer				
Any defined benefit plan	0.537	0.476	0.455	0.433
Defined contribution plan only	0.227	0.224	0.269	0.251
Annual Earnings ($1,000)	57.373	33.433	55.555	34.251
Financial Assets ($100,000)	1.704	1.715	2.116	1.764
Race				
White or other	0.878	0.843	0.876	0.842
African American	0.061	0.106	0.061	0.107
Hispanic	0.061	0.051	0.063	0.051
Education				
High school or less	0.541	0.547	0.535	0.536
Some college	0.195	0.228	0.192	0.235
College graduate	0.264	0.224	0.273	0.230
Marital Status				
Married or partnered	0.867	0.609	0.862	0.565
Divorced	0.095	0.227	0.091	0.245
Widowed	0.009	0.117	0.016	0.145
Never married	0.029	0.047	0.032	0.045
Age	56.647	56.672	59.036	59.265
Number of Observations	1,564	1,288	4,884	4,106

Source: Authors' estimates from the Health and Retirement Study.

Note: Financial amounts are measured in constant 2004 dollars.

Table 4. Probit Estimates of the Retirement Decision (with standard errors in parentheses and marginal effects in brackets)

	3% Discount Rate		10% Discount Rate	
	Male	**Female**	**Male**	**Female**
Own Premium Cost of Retirement ($1,000)	-0.005**	-0.005**	-0.007***	-0.006**
	(0.002)	(0.002)	(0.003)	(0.003)
	[-0.001]	[-0.001]	[-0.002]	[-0.002]
Spouse Premium Cost of Retirement ($1,000)	0.003	-0.002	0.004	-0.002
	(0.002)	(0.005)	(0.003)	(0.006)
	[0.0007]	[-0.0005]	[0.001]	[-0.0006]
Present Value of Expected Health Care Costs After Age 65 ($1,000)	-0.001*	-0.002	-0.004*	-0.005*
	(0.001)	(0.001)	(0.002)	(0.003)
	[-0.0004]	[-0.0005]	[-0.001]	[-0.001]
Health Status				
[Reference: Excellent]	…	…	…	…
Very good	0.112	0.124*	0.112	0.125*
	(0.069)	(0.074)	(0.069)	(0.074)
	[0.029]	[0.033]	[0.030]	[0.033]
Good	0.178**	0.192**	0.179**	0.195**
	(0.071)	(0.078)	(0.071)	(0.078)
	[0.048]	[0.052]	[0.048]	[0.053]
Fair or poor	0.309***	0.431***	0.311***	0.437***
	(0.086)	(0.097)	(0.087)	(0.097)
	[0.089]	[0.130]	[0.089]	[0.132]
Health Limits Work	0.214***	0.392***	0.211***	0.391***
	(0.081)	(0.092)	(0.081)	(0.092)
	[0.060]	[0.118]	[0.059]	[0.118]
Currently Participating in a Defined Benefit Pension Plan	0.351***	0.243***	0.353***	0.244***
	(0.059)	(0.064)	(0.059)	(0.064)
	[0.092]	[0.065]	[0.093]	[0.065]
Currently Participating in Only a Defined Contribution Plan	-0.001	0.009	0.001	0.006
	(0.065)	(0.070)	(0.065)	(0.070)
	[-0.0004]	[0.001]	[0.0003]	[0.002]
Earnings ($1,000)	-0.0002	-0.002*	-0.0002	-0.002*
	(0.0005)	(0.001)	(0.0005)	(0.001)
	[-0.0001]	[-0.0006]	[-0.0001]	[-0.0006]

(Continued)

Table 4. (Continued)

	3% Discount Rate		10% Discount Rate	
	Male	**Female**	**Male**	**Female**
Financial Assets ($100,000)	0.0004	0.004	0.0004	0.004
	(0.003)	(0.004)	(0.003)	(0.004)
	[0.0001]	[0.001]	[0.0001]	[0.001]
Race				
[Reference: White or other]	…	…	…	…
African American	-0.094	0.050	-0.094	0.047
	(0.076)	(0.068)	(0.076)	(0.069)
	[-0.024]	[0.013]	[-0.024]	[0.013]
Hispanic	-0.002	0.150	-0.004	0.150
	(0.084)	(0.103)	(0.084)	(0.103)
	[-0.0005]	[0.042]	[-0.001]	[0.042]
Education				
[Reference: High school or less]	…	…	…	…
Some College	-0.041	-0.099	-0.043	-0.100
	(0.061)	(0.065)	(0.061)	(0.065)
	[-0.011]	[-0.026]	[-0.011]	[-0.026]
College Graduate	-0.219***	-0.036	-0.221***	-0.036
	(0.062)	(0.074)	(0.062)	(0.074)
	[-0.054]	[-0.010]	[-0.055]	[-0.009]
Marital Status				
[Reference: Married or Partnered]	…	…	…	…
Divorced	0.148*	-0.313***	0.162*	-0.324***
	(0.090)	(0.072)	(0.088)	(0.074)
	[0.040]	[-0.077]	[0.045]	[-0.079]
Widowed	0.116	-0.205**	0.124	-0.218**
	(0.178)	(0.085)	(0.178)	(0.087)
	[0.032]	[-0.051]	[0.034]	[-0.053]
Never married	-0.104	-0.094	-0.093	-0.105
	(0.154)	(0.131)	(0.154)	(0.132)
	[-0.026]	[-0.024]	[-0.023]	[-0.026]

(Continued)

Table 4. (continued)

	3% Discount Rate		10% Discount Rate	
	Male	**Female**	**Male**	**Female**
Age Splines				
52 – 55	-0.107**	-0.112**	-0.099*	-0.102*
	(0.055)	(0.055)	(0.055)	(0.055)
	[-0.028]	[-0.030]	[-0.026]	[-0.027]
56 – 60	0.182***	0.141***	0.186***	0.148***
	(0.019)	(0.020)	(0.019)	(0.021)
	[0.047]	[0.037]	[0.048]	[0.039]
61 – 64	0.073***	0.087***	0.079***	0.097***
	(0.022)	(0.025)	(0.024)	(0.027)
	[0.019]	[0.023]	[0.021]	[0.026]
65 – 68	-0.076*	-0.112**	-0.074	-0.107**
	(0.046)	(0.045)	(0.046)	(0.045)
	[-0.020]	[-0.029]	[-0.019]	[-0.028]
69 - 71	0.170	0.093	0.172	0.092
	(0.144)	(0.155)	(0.144)	(0.155)
	[0.044]	[0.025]	[0.045]	[0.024]
Intercept	-1.238***	-0.928***	-1.308***	-0.991***
	(0.214)	(0.223)	(0.208)	(0.212)
Number of Observations	4,884	4,106	4,884	4,106

Source: Authors' estimates from the Health and Retirement Study.

Note: Models are estimated on a sample of person-year observations age 52 to 71.

* significant at the 10-percent level
** significant at the 5-percent level
*** significant at the 1-percent level

Table 5. Retirement Simulations

	Median Retirement Age				Probability of Retiring in 2 Years	
	Men		Women			
	Year	Month	Year	Month	Men	Women
Premium Cost of Retirement						
Median value for those with retiree health insurance offers from current employer	63	6	62	10	20.7	20.4
Median value for those with employer health benefits that do not continue into retirement	64	3	63	9	18.1	17.8
Expected Health Care Costs After Age 65						
90th percentile overall	64	1	63	5	18.7	18.5
50th percentile overall	63	6	62	10	20.7	20.3
10th percentile overall	63	0	62	5	22.5	21.7
Pension Coverage						
Defined benefit plan	61	0	61	0	32.1	27.7
Defined contribution plan only	63	6	62	10	20.7	20.3
Health Status						
Very good	63	6	62	10	20.7	20.3
Good	63	0	62	3	22.6	22.3
Poor	62	1	60	6	26.7	30.0

Source: Authors' estimates from the Health and Retirement Study.

Note: Estimates are based on the probit model parameters reported in table 4 when using a 3-percent discount rate. Unless otherwise noted, the simulations predict retirement for a worker who is age 60, married with some college education, in very good health with no health-related work limitations, and with earnings, household net worth, and expected health care costs equal to the median value for his or her gender.

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