Planning for retirement: The accuracy of expected retirement dates and the role of health shocks

Author: Debra S. Dwyer

Chestnut Hill, Mass.: Center for Retirement Research at Boston College, 2001

Planning for Retirement: The Accuracy of Expected Retirement Dates and the Role of Health Shocks

Debra S. Dwyer*

CRR WP 2001-08
September 2001

Center for Retirement Research at Boston College
550 Fulton Hall
140 Commonwealth Ave.
Chestnut Hill, MA 02467
Tel: 617-552-1762 Fax: 617-552-1750
http://www.bc.edu/crr

*Debra S. Dwyer is an Assistant Professor of Economics at SUNY Stony Brook. The research reported herein was performed pursuant to a grant from the U.S. Social Security Administration (SSA) to the Center for Retirement Research at Boston College (CRR). This grant was awarded through the CRR's Steven H. Sandell Grant Program for Junior Scholars in Retirement Research. The opinions and conclusions are solely those of the author and should not be construed as representing the opinions or policy of SSA or any agency of the Federal Government or of the CRR.

About the Sandell Grant Program

This paper received funding from the *Steven H. Sandell Grant Program for Junior Scholars in Retirement Research*. Established in 1999, the Sandell program's purpose is to promote research on retirement issues by junior scholars in a wide variety of disciplines, including actuarial science, demography, economics, finance, gerontology, political science, psychology, public administration, public policy, sociology, social work, and statistics. The program is funded through a grant from the Social Security Administration (SSA). Each grant awarded is up to $25,000. In addition to submitting a paper, successful applicants also present their results to SSA in Washington, DC. For more information on the Sandell program, please visit our web site at *http://www.bc.edu/bc_org/avp/csom/executive/crr/sandellguidelines.shtml*, send e-mail to crr@bc.edu or call Elizabeth Lidstone at (617) 552-1677.

About the Center for Retirement Research

The *Center for Retirement Research at Boston College*, part of a consortium that includes a parallel center at the University of Michigan, was established in 1998 through a 5-year $5.25 million grant from the Social Security Administration. The goals of the Center are to promote research on retirement issues, to transmit new findings to the policy community and the public, to help train new scholars, and to broaden access to valuable data sources. Through these initiatives, the Center hopes to forge a strong link between the academic and policy communities around an issue of critical importance to the nation's future.

Center for Retirement Research at Boston College
550 Fulton Hall
140 Commonwealth Ave.
Chestnut Hill, MA 02467
phone: 617-552-1762 fax: 617-552-1750
e-mail: crr@bc.edu
http://www.bc.edu/crr

Affiliated Institutions:

Massachusetts Institute of Technology
Syracuse University
The Brookings Institution
National Academy of Social Insurance
Urban Institute

Abstract

This paper explores the relationship between expectations about retirement, realizations of retirement, and the role of health shocks. Using waves 1 through 4 of the Health and Retirement Study we follow people into retirement. We explore the factors that affect changes to plans that were made in wave 1 paying special attention to changes in health status. We find that health shocks since the planning horizon trigger earlier retirement than planned. Existing health problems have little impact on changes to retirement plans. Health insurance availability continues to be a significant predictor of retirement.

This paper explores the relationship between expectations about retirement, realizations of retirement, and the role of health shocks. We examine the rationality of retirement expectations. Rational behavior is defined here as decision-making that is based on an underlying model with both economic and health constraints. We look at the effect of changes in a wide range of economic and health status variables (for individuals and their spouses) on the realization of retirement as predicted in the first wave. We look at how accurately people predict retirement and we examine the determinants of changes in retirement expectations. It could be that the underlying determinants of the model have changed or new information became available. Conversely it could be that full information was not used in planning for retirement. In the latter case we would expect to find significance among factors that have not changed in explaining deviations from expectations.

Expectations are made under uncertainty about future health, labor force status, household characteristics, and economic variables; therefore plans are updated with new information. While many factors influence the decision to retire, we are specifically interested in the role of health shocks in the decision to alter one's plans to retire. A second goal of the analysis is to study the effect of poor health on labor force transitions conditional on whether that transition was planned. We ask the question "How much can the deviations from retirement expectations be explained by unexpected changes in the health of the respondent or another household member?".

We provide some background and motivation in Section 1 of this proposal. Section 2 presents the conceptual model followed by the empirical specification in Section 3. Data requirements will be discussed in Section 4.

I. Motivation and Background

Policymakers seek to maximize the well-being of individuals in a society. What may be of most interest to policymakers is how workers plan their retirement rather than what they actually do given changing constraints. If the goal of policy is to maximize the well-being of workers, then perhaps understanding their preferences for retirement may be more important than their outcomes.

Most studies focus on retirement outcomes. In this study we focus on retirement plans and preferences. Even though people who are in poor health would like to retire earlier, they may not be able to financially. Based on prior research, it is quite clear that there is a strong negative relationship between retirement age and poor health status (Dwyer & Mitchell, 1998; Bound et al., 1998, Blau, Gilleskie and Slusher, 1997; Anderson and Burkhauser, 1984). In other words, people in poor health plan to retire earlier and often (but not always) do. This is a reflection of people's preferences toward work based on health status. In examining the accuracy of expectations for retirement, we look at whether preferences are realized and if not, why? The contribution is two-fold. First, how reliable are expectations for retirement as a proxy for actual? Second, what drives changes to retirement plans.

One of our hypotheses is that people in poor health are more likely to plan earlier retirements without considering their financial ability to do so. We would then expect less accurate retirement expectations among those in poor health with lower socioeconomic status. Many of the social security reform proposals involve cuts to benefits. At the margin, these benefit cuts will further increase the gap between expectations (preferences) for retirement and the actual retirement date for people who do not qualify for disability.

When people report expectations about retirement, we assume this is the optimal choice given such factors as their current health, family, work, and accumulated economic status. This is consistent with the assumption prevalent in life-cycle retirement models that individuals form rational long-range plans. If this is the case, and assuming preferences for work and leisure remain unchanged, then ceteris paribus, any changes to expectations would be the result of changes to one or more of these factors. In addition, those who are closer to retirement should experience fewer changes to the factors determining their retirement plans and therefore report more accurate expectations. Bernheim tests the rationality of expectations and changes to them in his 1990 research using the Retirement History Survey (RHS). He finds that individuals do not form expectations based on all information currently available, but they do respond rationally (in altering their expectations) to new information in the period directly preceding retirement. He does not follow expectations into retirement as we do, but in an earlier work he finds that while individuals do not use full information in forming expectations,

the expectations are reliable indicators of actual retirement (Bernheim, 1987). Irelan (1976) uses the RHS as well and found that deviations from retirement expectations can be explained by unforeseeable changes to relevant circumstances.

Using retirement age expectations Dwyer and Mitchell (1998) find that health explains more of the differences in plans for retirement than do economic factors. Retirement age is unobserved, and observed expectations are made under uncertainty. Available information depends on how far into the future retirement is. We learn from that analysis that people form their expectations of retirement based on their current health status and health insurance available. Economic factors, while significant, play a much lesser role. This implies that there is inelastic demand for leisure in old age, or people are not using full information in forming expectations. Dwyer and Hu (1999) use the first two waves of the Health and Retirement Study (HRS) to analyze work status for those who have reached their expected ages of retirement.[1] They find that among men who planned to retire by wave 2, 45% actually do when they say they will. Health status is less important in explaining postponement of retirement. Economic factors (that have not changed in the two years between waves) play a bigger role there. This suggests that health explains the desire to retire earlier, but economic factors dictate the ability to do so. Further, economic factors were not fully utilized in planning for retirement. Sample sizes were very small so little can be concluded from that analysis. By wave 4 we observe these people reaching age 67, so that many of them have reached their predicted retirement age. Now that there are more waves of data available, we can better assess the accuracy of these expectations. Further we can see how these expectations change with more information.

Since health is such an important determinant of preferences for retirement, and since policies like raising the normal and early retirement ages may negatively impact those in poor health, we focus on the role of changes in health in explaining changes to retirement planning. There is concern over the health of the labor force affected by such changes. Has medical technology improved longevity for those who are not very healthy? In other words, are persons living longer with impairments? Policy goals may be to allow people to continue to retire early if they are troubled with health problems. This

[1] By wave 2 some of the respondents have reached ages 62 and 63. The modal expected retirement age among HRS age-eligible men is 62 (Dwyer and Mitchell, 1998).

paper indirectly addresses this issue by examining the role of poor health in labor force exits, both expected and unexpected. How big of a role do changes in the health status of individuals or family members have on unrealized expectations? Bound et al.(1997) look at the effects of health on labor force transitions of older men and women using the first two waves of the HRS and find that poor health is a very strong predictor of labor force exits. Changes in health between the two waves have the biggest effect on labor force transitions. There were no economic controls in that research.[2] Blau, Gilleskie, and Slusher (1997) focus on alternative measures of health and also conclude that health plays an important role in labor market transitions of older men. Health shocks impact labor market behavior in many ways. Using the HRS, both Gatti (1997) and Smith (1997) find that health shocks have an impact on asset accumulation among well-off families.

II. Framework and Hypotheses

The retirement age choice is a decision that is made over the life-cycle. The factors that underlie the formulation of the optimal retirement age, whether it is planning for retirement in advance, or the actual decision to retire, should be identical. The same factors that decide the retirement age would influence the age one expects to retire. The only difference is the amount of information available at the planning horizon. So if agents are behaving rationally, we would expect the expected retirement age to be the actual retirement age, if full information were available at the planning horizon. IN the presence of uncertainty, individuals maximize expected utility based on expectations about their health and economic factors at an given point in the planning horizon.

We incorporate health (taste shifters) into the static life cycle retirement model first developed by Fields and Mitchell (1984) that assumes individuals solve the following utility maximization problem[3]:

$$\text{Max } U(C, RET, Z)$$

$$\text{s.t. } C = PVY + W_0$$

[2] The authors argue that current earnings are endogenous to labor supply models.

[3] We do not examine transitions at each observable point in the HRS, but rather focus on the expected retirement date reported in wave 1 that is presumably a static question. Again we do allow for transitions in relevant factors over time. This model is fine for drawing the general hypothesis we pose.

where U is a concave function increasing in the present value of lifetime consumption, C, and leisure in the retirement period, RET. Z is an age-specific taste shifter that would include health (a large component of Z would be health). C is just equal to the present discounted value of income over the remainder of the worker's life (PVY, discounted by the rate of time preferences and survival probabilities) and wealth accumulated at the time of the retirement decision (W_0). PVY includes the discounted sum of lifetime earnings net of taxes and pension contributions, and the net income from pensions and social security.

$$PVY = PVE + PVP$$

Annual earnings ($E_t \geq 0, \forall t$), are summed and discounted over the planning period, 0, to the retirement age R as follows:

$$PVE = \int_0^R E_t e^{-rt} dt$$

And retirement income, from pensions and social security ($P_t \geq 0, \forall t$), begins at date R or retirement, and ends at the end of the planning horizon T:

$$PVP = \int_R^T P_t e^{-rt} dt$$

It is easy to show that the optimal retirement age is a function of PVE, PVP, and Z which we assume is mainly own health, spouse's health, marital status, and spouse's earnings, offer of early retirement incentives, and changes in net worth or permanent income.

Hypotheses

Our first hypothesis to test is the rationality of retirement plans. So we expect that the economic and health factors determine the expected retirement date. We check to see if this is consistent with the actual retirement date, holding everything else constant. Any discrepancies between expectations and outcomes should be explained by changes in some of the underlying factors that affect retirement. Our hypothesis is that only variables that have changed will result in a change of retirement plans. Having said this, we think it may be possible that economic factors that have not changed will be a driving force behind postponed retirement which would indicate poor planning.

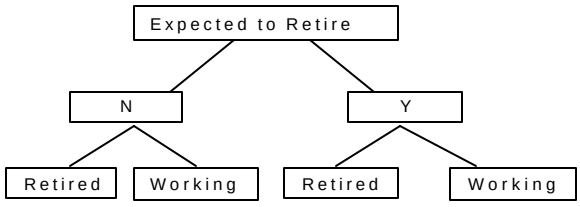
Dwyer and Mitchell (1998) find that health is one of the most important determinants of plans to early retire (second only to availability of health insurance). We,

therefore, do not necessarily expect poor health that is chronic and is not new beyond the planning horizon to play a big role in the decision to alter ones' plans to retire early for those who have already planned to do so. The subgroup that planned to retire before the age of 65 may be more homogenous in health. IN other words, health was an important determinant of planning to retire earlier. After conditioning on those plans, health becomes less important. However, a worsening of health conditions could reinforce the plan to retire ceteris paribus.

We do not expect existing health problems to alter retirement plans but we do expect health shocks to be the main cause of unexpected departures from the labor force. Incorporating health into this model is complex and its effects on retirement are ambiguous. Poor health can reduce productivity and earnings. This would have an ambiguous effect on work because of opposing income and substitution effects. The effect of poor health on preferences is also ambiguous. The relative utility of leisure can increase if the demand for non-work time to care for one's health increases. In addition, work can be more difficult and less rewarding. In this case theory predicts that the result would be earlier retirement. However, consumption demands increase with the additional need for health care services. This results in postponed retirement. If health insurance is tied to work, then the price of retirement is higher. Finally, health could shorten the time horizons over which we choose between work and leisure, resulting in less time for both. We expect the forces that result in earlier retirement to dominate.

3. Econometric Specification

The schematic model can be represented by the following two-level retirement decision tree:



We apply a nested logit model to account for the sequential nature of this problem which can be specified as follows:

$$Y_{ij} = \alpha' W_i + \beta' X_{ij} + e_{ij}, \quad i,j = 1,2;$$

Where i and j indicate the two stages or levels of the process. The first stage is the planning horizon and the second stage is the outcome period. Y_{ij}, the dependent variable, can take one of four values: did not expect to retire and did, did not expect to retire and did not, expected to retire and did, expected to retire and did not. W_i is a vector of attributes that are specific to stage 1 and X_{ij} are those attributes that vary with both stages. For example we will have health as it is observed in wave 1 and then new information about health in wave 2. α and β are vectors of unknown parameters to be estimated. One option for modeling the probability of falling into one of the four possible cells is to use the multinomial logit. This does not allow for the sequential nature of this process but rather treats the four choices as independent (when actually the outcome may not be independent of the expectation).

We can assume that those who expected to retire are selectively different from those who did not and allow for this by using the nested logit model. Then the probability that alternative P_{ij} will be chosen is as follows:

$$P_{ij} = P_{j|i} \cdot P_i$$

We do this using a two step method where the first stage estimates the probability of planning to retire by wave 4 as reported in wave 1. Step 2 estimates the probability of retiring conditional on the propensity to expect to from wave 1. We model[4]:

$$Y_1 = \alpha' W_1 + e_1$$

$$Y_2 = \beta' X_{12} + \lambda Y_1 + e_2$$

4. Data

We use waves 1 through 4 of the HRS.[5] We restrict the sample to include those age-eligible respondents who participated in sufficient waves of the study to determine retirement outcomes and who are either working, partially retired, or fully retired in the first wave. We exclude people who are disabled, unemployed, home-makers, and others

[4] The full information maximum likelihood version, or nested multinomial logit model uses the conditional logit model to identify effects. This is not appropriate for our purposes since we do the choices for each of the four cells depend on individual specific rather than choice specific characteristics.

[5] The HRS is described in detail in Juster and Suzman (1995).

who do not clearly fall into of the three work/retirement categories because of missing values. We end up with 5,102 respondents who meet all of our criteria for analysis.

Dependent Variable. We categorize people into three groups based on their work status defined as working, partially retired, and fully retired. We also classify people into two categories regarding their retirement plans. Those who planned to retire by wave 4 and those who did not. For some of the analysis we define retirement as a full departure from the labor force. For most of the analysis we report results including partial retirement in the definition of retirement.

We control on economic status at baseline, current health insurance availability, changes to health[6], changes to marital status, and if relevant, spouse's health and age. We also include demographic variables like age, gender, religion and education.

Empirical Specifications:

We use two types of sequential models. We split the sample into four groups: those who expected to retire and did, those who expected to retire and did not, those who did not expect to retire and did, and those who did not expect to retire and did not. The first sequential model we run are probits separately by expectations status for the four groups. This allows slope coefficients to differ, but treats the error terms as uncorrelated across the four equations. We also run probits for the entire sample, conditioning on their propensity to retire based on the report of expectations. This is the Heckman two step approach. In this way we allow the two sequential processes to be correlated and examine the importance of the expectation in the actual outcome. However, we restrict slope coefficients to be the same for planners and non-planners.

Finally we also run a multinomial logit which calculates the probability of being in each of the four cells based on the relevant characteristics (health, economic status…). This type of model is interesting but does not capture the sequential nature of the process. The nested logit model will report effects by expectation status, treating the process as sequential and allowing for correlations across the two steps.

Results

Table 1 reports information about the dependent variable. From Table 1a we see a majority of the sample is still working by wave 4 (56.9%). Roughly 20% of the sample moves from work to complete retirement and 11% move from work to partial retirement over the period. Very few were actually retired in wave 1 and those that were are still retired by wave 4 for the most part.

Table 1b reports current work status by reported expectations in wave 1. A majority of the sample did not expect to retire by wave 4 (roughly 60%). Of the 2,220 respondents who report they will retire by wave 4, only 992 actually do (38%), If you account for partial retirement in that period, 62% of those who expected to retire actually do. Because of the way the question was worded in wave 1, it is not clear how individuals define retirement.[7] The sample that does retire makes up a majority of the sample that expected to retire. A majority of the sample that did not expect to retire, in fact are still working (76.8%). Over 20% of that group do actually retire in some form (11% fully and 9% partially). They will be an interesting group to look at.

Table 2 looks at some descriptive statistics by work status. The results are very interesting. Comparing only those who expected to retire between waves 1 and 4 we see that those who do are older, more likely to be male, more likely to experience a worsening in functional status, more educated, and have higher pension benefits. The most striking difference between those that do and do not retire is in the availability of retiree health insurance. 39% of those who do retire have retiree health insurance compared to only 14% of those who do not. The income variables reported are for wave 1 when everyone was working. So household income and net worth are slightly lower for those who end up retiring, but differences are small. This is not surprising since we condition on expectation status. Wave 1 economic factors would be more relevant in the planning phase. Improvements in spouse's health lead to a postponement of retirement.

Comparing health and socioeconomic status of those who planned to continue working, by retirement outcome, we find that those who do retire are much more likely to be in worse health by wave 4. 22.6% of those who retired unexpectedly report a decline in functional status compared to only 9.8% of those who continue working. General

[6] We use a measure of functional status and chronic illness as defined in Dwyer and Mitchell, 1999.

health is worse for roughly 18% of retirees compared to only 13% of workers. And those who retired were two times more likely to have experienced a heart attack between waves 1 and 4. Workers were more likely to experience improvements in their general health and functional status. Based on these descriptive results, health shocks do seem to explain changes to work plans in the direction of earlier retirement.

Still comparing those who unexpectedly retire to those who keep their plans of working in wave 4, we see those who retire are better off financially. Their net worth is higher. Their pension and social security benefits are higher (private pensions are more important). They are much more likely to have retiree health insurance (30% compared to only 3%!). They are slightly older, more educated, more likely to be male, less likely to be divorced.

Comparing between groups we see that health shocks play a bigger role in inducing unplanned earlier retirement. Those who planned to retire are better off financially then those who retire unexpectedly. Differences in economic factors between retirees and non-retirees are bigger for those who expect to work. Spouse's health shocks play a bigger role in retirement behavior among those who planned to work. All of these findings are consistent with rational planning.

Now comparing across expectations we see that retiree health insurance seems to play the most significant role in determining who retires and who does not. Age is also a factor. Not surprising, the older respondents retire. Those who planned to retire and do are the oldest of the four groups. Worsening of health seems to trigger changes to retirement plans in both directions motivating the analysis on the role of health shocks on changes to retirement plans. This is true for all categories except for the work limitations variable (which may be more tied to work then a measure of general health - see Dwyer and Mitchell, 1999). Spouse's information is taken into account in planning one's retirement.

The results from the descriptive analysis motivate further multivariate investigation. Table 3 reports the results from probits that are conditional on expectation status.[8] While functional status changes are important in all specifications, it is more

[7] The question asks: "When do think you will retire (completely)?". But this was missing for many so we used when they plan to start taking up benefits or wave 2 reports of expected retirement.

[8] These models assume the error terms across the equations are independent. Future work will do a nested logit that allows for these errors to be uncorrelated.

important in the decision to retire for those whose retirement is not planned. This suggests that worsening health significantly alter one's plans to continue working. Those who experience a worsening of functional status by wave 4 are roughly 14 more likely to retire regardless of plans. The numbers are 9.4% and 17.7% for those who planned and didn't plan retirement respectively. Any change to health status seems to have a significant impact on the decision to retire unexpectedly. The health effects are larger for those who did not expect to retire which jives with what Dwyer and Hu (1999) find - that changes in health effect changes in plans. A new heart attack also changes plans for both groups although results are only mildly significant (probably because of offsetting effects of health status).

Of the economic factors, health insurance is the most important predictor of retirement for all. Again, magnitude of these effects are much bigger for those who did not plan to retire. Since the presence of retiree health insurance is a variable that is not as likely to change over the period, this is not surprising. For those who did not plan retirement, retirees were 60% more likely to have retiree health insurance than non-retirees compared to a difference of only 4% among those who planned retirement. Employer provided health insurance lowers the probability of keeping retirement plans by 9% and by changing work plans by 22%. On average, net worth is 2.2% lower for retirees.

The results from the two-step conditional sequential model are very similar in that the same factors explain earlier retirement. However, magnitudes are lower once we pool the sample and control for expectation status allowing for correlations across the two equations. The effect of lambda, the probability of having planned retirement, is positive and significant meaning those who planned to retire by wave 4 are significantly more likely to do so.

Multinomial logit results appear in Table 5. These allow for error terms to be correlated across equations and the influence of variables to differ for each state. The omitted category is planned to work and did in wave 4 so results are interpreted relative to that group. Worsening in functional status increases the probability of being in a retirement cell, with bigger differences between unplanned and planned. In other words, a worsening of functional status more significantly contributes to the probability of retiring unexpectedly than any of the other four cells. In other words, it still was a factor

in placing them in the "expected to retire" rather than "expected to work" cell. Here marital status plays a more important role. If you were newly married you are morel likely to be in the "continued working" group. Older people and females are more likely to keep plans to retire. Education is an important predictor of retirement as are spouse's age and health.

Conclusions:

Prior work has shown that poor health predicts earlier retirement (Dwyer and Mitchell, 1999; Blau et al., 1999; Bound et al., 1999). This work shows that once you control on plans for retirement, health continues to be an important predictor of retirements in that health shocks induce earlier retirement. Health was an important predictor of who planned to retire by wave 4 at wave 1. Health, while important, is a less important predictor of retirement in wave 4 once we condition on expectations status. Health shocks play a very important role in changes to plans for work. This implies that plans made based on health status are rational.[9]

The effects of economic factors like net worth, pensions, and social security are all significant predictors of retirement plans but magnitudes are small (Dwyer and Mitchell, 1999). Again, these factors do not play a big role in retirement outcomes conditional on plans. People with more generous retirement benefits (private inparticular) are better able to afford retirement by wave 4. The fact that the effects of economic factors are bigger for those who planned to work suggests that plans to retire were made rationally. Future work will interact some of the health and economic factors, since it is likely that a health shock induces preferences for an unplanned retirement and financial constraints determine the feasibility of that outcome. Availibility of health insurance in retirement is the single most important predictor of retirement. Employer-provided health insurance does keep people from leaving work. Both effects are bigger for those who did not plan to retire. Again, this should be interacted with health status particularly for this group who did not plan to retire since we see health shocks do trigger the change in plans.

This work is preliminary so that there are many areas for improvement. First, I plan to take advantage of the wealth of health data available in the HRS that I have not

[9] And health is measured with error and does not pick up severity. If we accurately measured differences in severity we would expect differences to be even larger.

used here. Second, I would interact health, health insurance, and the probability of having planned retirement. Third, I will request permission for access to the confidential earnings and benefit data available through the HRS to improve the quality of my economic variables.

Another approach would be to model the dynamic process of evolving plans to retirement using a dynamic programming model. This answers a different question. It allows us to fully understand how plans change with health status and economic factors in a dynamic way. This project is underway as well.

Table 1a. Frequency of Retirement Status in Wave 4, Given Work Status in Wave 1

	Wave 2		
Wave 1	Working	Partially Retired	Retired
Working	2,904 (56.9%)	579 (11.3%)	999 (19.6%)
Partially Retired	41 (0.8%)	56 (1.1%	60 (1.2%)
Retired	28 (0.5%)	43 (0.8%)	392 (7.7%)

Table 1b. Frequency of Retirement Status in Wave 4, Given Expectations of Retirement Status reported in Wave 1.

	Expected to Retire by Wave 4 N=2,600[10]	Did not expect to retire by Wave 4, n=3,300[11]
Working	852 (38.4%)	2,214 (76.8%)
Partially Retired	376 (16.9%)	302 (10.5%)
Fully Retired	992 (44.7%)	366 (12.7%)

[10] 380 missing values for work status in wave 4.
[11] 418 missing values for work status in wave 4.

Table 2. Descriptive Statistics, by Dependent Variable

Variables	Expected to Retire by Wave 4		Expected to Work in Wave 4	
	Did Retire	Did Not Retire	Did Retire	Did Not Retire
Health				
Work Limits better	2.8	3.4	2.5	2.9
Work Limits worse	18.1	13.6	22.6	9.8
General Health better	2.3	2.7	2.1	2.2
General Health worse	13.5	14.3	17.8	12.8
New Heart Attack	1.6	1.9	2.3	1.1
Economic Status				
HH income	56.2k	57.4	55.9k	55.4k
Net Worth	295.4k	331.4	278.0k	227.1k
Ann. Pension benefit	19.6k	19.3	17.8k	16.2
SS benefit	17.6k	17.7	17.4k	17.2
Retiree Health Ins.	39.0	13.5	29.5	3.3
Emp'er Health Ins.	62.3	66.3	60.6	77.5
Demographics				
Age	63.9	62.5	62.1	60.1
Female	46.4	49	44	48.8
Highest Education	12.7	12.4	13.0	12.6
Marital Status				
Married -w1	80.1	77.8	76.8	73.2
New marriage	0.4	0.6	0.7	1.2
Divorced -w1	10.2	11.7	14.4	17.1
Divorced -w4	0.5	0.5	0.7	1.3
Widowed -w1	6.6	6.3	5.5	5.1
Widowed -w4	0.7	0.6	0.1	0.3
Spouse's Age	56.7	56.1	55.7	54.7
Spouse's Income	26.4	25.3	24.8	25.2
Spouse's Health				
Limits Better	3.2	4.5	3.7	3.6
Limits Worse	18.6	18.4	20.3	18.8
General better	2.3	4.1	4.2	3.1
General worse	15.4	15.5	12.0	19.1

Table 3. Probit Results of Wave 4 Retirement Status by Expectation Status

	All		Planned to Retire		Planned to Work	
Variables	Parameter Estimate	Marginal Effect	Parameter Estimate	Marginal Effect	Parameter Estimate	Marginal Effect
Health						
Limits Worse	0.36 (0.06)**	14.0%	0.16 (0.09)**	9.4%	0.57 (0.09)**	17.7%
Limits Better	0.00 (0.12)	0.0	-0.04 (0.17)	3.6	0.00 (0.18)	0.1
General Worse	-0.00 (0.06)	-0.1	-0.03 (0.09)	-3.1	0.03 (0.09)	0.8
General Better	0.01 (0.14)	0.3	-0.10 (0.20)	8.0	0.07 (0.21)	1.8
Heart Attack	-0.03 (0.16)	-1.1	-0.25 (0.22)	4.8	0.34 (0.25)	10.5
Economic						
HH Income w1	0.16 (0.48)	6.0	0.75 (0.66)	-2.3	-0.89 (0.75)	-0.02
Net Worth w1	-0.00 (0.04)	0.0	-0.11 (0.06)**	2.2	0.08 (0.06)	0.02
Ann. Pension	0.04 (0.68)	1.4	-0.13 (0.71)	2.8	0.12 (0.14)	0.03
SS Benefit	0.14 (0.28)	5.2	-0.26 (0.39)	-4.2	0.45 (0.42)	1.2
Retiree HI	1.51 (0.06)**	54.2	1.13 (0.08)**	4.4	1.72 (0.10)**	60.0
Emp'er HI	-0.67 (0.05)**	-25.9	-0.54 (0.07)**	-8.5	-0.72 (0.07)**	-21.7
Age	0.15 (0.01)**	5.6	0.10 (0.01)**	36.5	0.14 (0.01)**	3.6
Female	0.07 (0.04)	2.5	0.06 (0.06)	-19.8	0.02 (0.07)	3.8
Education	0.03 (0.01)**	1.0	0.03 (0.01)**	3.6	0.03 (0.01)**	8.8
Marital Status				2.0		
Married 1	0.27 (0.12)**	10.0	0.26 (0.08)**	9.3	0.10 (0.08)	1.9
New Marriage	-0.51 (0.28)*	-17.3	-0.56 (0.45)		-0.52 (0.39)	-10.6
New Divorce	-0.11 (0.23)	1.2	0.45 (0.44)	15.9	-0.36 (0.32)	-7.9
New Widow	0.13 (0.30)	-4.2	0.29 (0.38)	-22.9	-0.39 (0.58)	-8.4
Spouse Info						
Limits Worse	0.09 (0.10)	3.3	0.16 (0.08)*	17.7	0.57 (0.09)**	7.0
Limits Better	-0.14 (0.20)	-5.2	-0.04 (0.17)	1.4	0.00 (0.18)	0.1
General Worse	-0.18 (0.11)*	-6.8	0.02 (0.15)	0.8	-0.47 (0.18)	-10.1

General Better	0.04 (0.21)	2.9	-0.03 (0.09)	13.6	0.39 (0.30)	-10.1

** significant at the 5% level

* significant at the 10% level

Table 5. Multinomial Logit Results

	Planned to Retire	Planned to Work	
Variables	**Not Retired**	**Retired**	**Not Retired**
Health			
Limit worse	-0.36 (0.13)**	0.22 (0.13)**	-0.74 (0.13)**
Limits better	0.06 (0.27)	0.06 (0.31)	-0.02 (0.26)
General worse	0.10 (0.14)	0.22 (0.14)*	0.06 (0.14)
General better	0.10 (0.30)	0.03 (0.34)	-0.02 (0.29)
Heart Attack	0.24 (0.35)	0.13 (0.37)	-0.25 (0.37)
Economic Status			
HH Income	-0.04 (0.10)	0.01 (0.01)	-0.01 (0.01)
Net Worth	0.10 (0.08)	-0.00 (0.00)	-0.00 (0.00)
Ann. Pension	0.00 (0.13)	-0.00 (0.00)	-0.00 (0.00)
SS Benefit	0.02 (0.07)	-0.00 (0.00)	-0.01 (0.01)
Retiree HI	-1.84 (0.13)**	-0.56 (0.13)**	-3.56 (0.15)**
Emp'er HI	0.80 (0.11)**	-0.09 (0.12)	1.21 (0.10)**
Age	-0.17 (0.02)**	-0.23 (0.02)**	-0.45 (0.02)**
Female	-0.03 (0.10)	-0.16 (0.10)*	-0.15 (0.10)*
Education	-0.04 (0.02)**	0.06 (0.02)**	-0.02 (0.02)
Marital Status			
New Marriage	0.45 (0.65)	0.66 (0.64)	1.21 (0.58)**
New Divorce	-0.78 (1.17)	0.31 (0.84)	1.23 (0.71)*
Widowed 4	-0.29 (0.60)	-1.52 (1.07)	-0.80 (0.62)
Spouse's Info			
Age	-0.01 (0.001)**	-0.00 (0.00)	-0.01 (0.00)**
Limits worse	0.05 (0.23)	0.13 (0.23)	0.00 (0.21)
Limits Better	0.52 (0.45)	0.32 (0.49)	0.43 (0.49)
General worse	0.08 (0.24)	-0.22 (0.28)	0.46 (0.22)**
General better	0.47 (0.49)	0.53 (0.50)	0.24 (0.49)

Table 4: Sequential Model of Retirement Conditional On Expectations

Variables	Full Retirement	Full or Partial Retirement

Health		
Limit worse	0.11 (0.02)**	0.11 (0.02)**
Limits better	0.01 (0.03)	-0.01 (0.03)
General worse	0.02 (0.02)	-0.00 (0.18)
General better	-0.01 (04)	-0.01 (0.04)
Heart Attack	0.04 (0.04)	0.01 (0.05)
Economic Status		
HH Income	0.001 (0.001)	0.00 (0.00)
Net Worth	-0.00 (0.00)	-0.00 (0.00)
Ann. Pension	-0.00 (0.00)	0.00 (0.00)
SS Benefit	0.00 (0.00)	0.00 (0.00)
Retiree HI	0.42 (0.02)**	0.46 (0.02)**
Emp'er HI	-0.12 (0.01)**	-0.20 (0.01)**
Age	0.03 (0.00)**	0.05 (0.00)**
Female	0.03 (0.01)**	0.01 (0.01)
Education	0.002 (0.002)	0.01 (0.00)**
Marital Status		
New Marriage	0.01 (0.06)	-0.06 (0.06)
New Divorce	-0.01 (0.01)	-0.08 (0.08)
Widowed 4	0.01 (0.08)	0.00 (0.01)
Spouse's Info		
Age	0.002 (0.002)	0.001 (0.002)**
Limits worse	-0.03 (0.03)	0.01 (0.03)
Limits Better	-0.13 (0.01)**	-0.06 (0.06)
General worse	-0.03 (0.03)	-0.06 (0.03)*
General better	-0.08 (0.06)*	-0.03 (0.06)
Lambda[12]	0.09 (0.01)**	0.10 (0.01)**

[12] Lambda is the inverse mills ratio measuring the propensity to expect to retire by wave 4. The first stage equation was a probit of whether or not they expected to retire by wave 4. The economic factors (including pensions, hh income, net worth and health insurance) and own health were very significant in that stage. Spouse's information was not.

References

Anderson, K., and R. Burkhauser (1984). The Importance of the Measure of Health in Empirical Estimates of the Labor Supply Model of Older Men. Economic Letters 16:375-80.

Bernheim, B.D. (1987). How DO the Elderly Form Expectations? An Analysis of Responses to New Information, in D.Wise (Ed.), Issues in the Economics of Aging, University of Chicago Press, 259-285.

Blau, D.M., D.B. Gilleskie, and C. Slusher (1997). The Effects of Health on Employment Transitions of of Older Men. Presented at the 1997 annual meeting of the Population Association of America, Washington, DC.

Bound, J., M. Schoenbaum, T.R. Stinebricker, T. Waidmann (1998). The Dynamic Effects of Health on the Labor Force Transitions of Older Workers, NBER Working Paper #6777.

Dwyer, D.S., and O.S. Mitchell (1999). Health Shocks as Determinants of Retirement: Are Self-Rated Measures Endogenous?, Journal of Health Economics, 18:173-193.

Dwyer, D.S. and J. Hu. (1999). The Relationship Between Retirement Expectations and Realizations: The Role of Health Shocks, Presented at the 1998 Meeting of the Pension Research Council, Philadelphia, PA. Forthcoming in conference volume.

Fields, G. O.S. Mitchell (1984). The Economics of Retirement Behavior. Journal of Labor Economics, 2:84-105.

Gatti, R. (1997). Savings and Health Shocks. Unpublished Manuscript. Washington, DC.

Grossman, M. (1972). On the Concept of Health Capital and the Demand for Health. Journal of Political Economy. 80(2):223-255.

Irelan, L.M. (1976). Almost 65: Baseline Data from the Retirement History Study. Research Report No. 49, Office of Research and Statistics, US Social Security Administration, Washington, DC. GAO.

Juster, F.T. and R.M. Suzman (1995). An Overview of the Health and Retirement Survey. Journal of Human Resources, 30: Supplement: S7-S56.

Madalla, G.S. (1983). Limited Dependent and Qualitative Variables in Econometrics. Cambridge University Press,

Smith, J.P. (1997), The Changing Economic Circumstances of the Elderly: Income, Wealth, and Social Security. Syracuse University Policy Brief, No. 8.