

## Sample Dissertation Fellowship Proposal

## **Abstract**

This dissertation aims to contribute to our understanding of subjective expectations and how they affect behavior and economic outcomes. It focuses on developing tools for harnessing subjective information from surveys for behavioral inference. Surveys remains the unique avenue for researchers to access subjective measures, while administrative data provides complementary objective measures.

The first chapter examines the impact of anticipated and unanticipated health changes on retirement timing, age of claiming Social Security payments and also hours worked. I use survey data to construct a novel, empirical measure of individual-level health expectations and estimate a distribution of heterogenous health expectations in the population. I find that unanticipated changes in health cause an increased likelihood of retirement while anticipated changes do not. Poorer expected health is also correlated with earlier claiming of Social Security. However, both anticipated and unanticipated health declines result in reduced work hours conditional on not retiring entirely. This also provides an empirical test of the extent to which retirement is a planned event.

The second chapter directly estimates the relationship between health and labor supply using survey responses on expected labor supply, conditional on different health states. By leveraging on the counterfactual, we are able to study behavior response to health changes without observing realized shocks. Using a unique dataset from the Vanguard Research Initiative, we uncover the non-linear relationship between expected retirement wealth and health-contingent labor supply.

The third chapter investigates gender differences in retirement trajectories, with focus on the job transitions when nearing retirement. We pioneer a novel method of collecting employment histories by sampling up to two job spells from each respondent. We also field comprehensive batteries on job perception around the time of separation (if any) and any job search activities that did not result in an observed job spell. This enables us to compare not only the realized work histories, but also opportunity sets faced by male versus female workers late-in-life.

## **Introduction**

Health and retirement are intrinsically related and much has been uncovered about the role of health in retirement decision-making (Bound et al., 1999) (Currie and Madrian, 1999). The explicit role of health expectations, however, has received much less attention since McGarry (2004). As administrative data becomes more readily accessible to researchers and proves a cost-effective way of obtaining objective data, developing tools for extracting subjective data and behavioral parameters from surveys becomes increasingly pertinent. Fielding survey questions on conditional expectations also allows us to study behavioral responses without observing realized shocks. As forward-looking instruments, understanding subjective health and labor expectations will prove useful in guiding policy during this time when health institutions in America are undergoing radical change.

## **The Impact of Anticipated versus Unanticipated Health Changes on Retirement Timing**

Health changes late-in-life are often endogenous with respect to labor participation and retirement wealth (Grossman, 1972). Previous research has provided some insight on this relationship by using previous periods' health as an exogenous instrument or by using deviations from population trends in health as a shock to infer the causal effect of health on retirement. However, these methods impose the strong assumption that health expectations late-in-life are homogenous conditional on observed variables. This assumption is violated if individuals have access to private information not observed by researchers that shape their expectations. I relax this assumption by allowing for heterogenous expectations conditional on observed health attributes and use a survey measure from the *Health and Retirement Study* (HRS) to estimate the distribution of individual health expectations and compute a proxy for health expectations for each respondent.

I compute the anticipated and unanticipated changes in health by comparing my proxy for health expectations against ex-ante and ex-post health. Preliminary results suggest that an unanticipated decrease in health predicts an increased likelihood of retirement but an anticipated decrease does not. In the intensive margin, however, both anticipated and unanticipated declines in health result in decreased work hours, conditional on not retiring entirely. Both effects are more pronounced for those in the lower half of the wealth distribution than the upper half,

contributing to evidence of wealth interactions with the effect of health on retirement. My estimates also provide empirical verification of the extent to which retirement is a planned event.

At the same time, large, negative anticipated health changes are strongly correlated with withdrawing Social Security payments at age 62 rather than 65 or later. The results hold even after controlling for ex-post health, suggesting one possible venue for policy intervention in encouraging older workers to delay collection of Social Security may be helping them form more accurate health and longevity expectations.

**How does Health Affect Retirement? New Estimates Based on Conditional Expectations**  
*(Joint work with Pamela Giustinelli and Matthew D. Shapiro)*

This project advances a new approach that uses subjective conditional expectations to study the causal effect of health on retirement. By using survey questions on expected labor supply under hypothetical health states, we gain access to the counterfactual and are able to study behavioral responses without observing realized health shocks. This property proves convenient for evaluating treatment effects as the healthy and wealthy seldom experience large negative health shocks for researchers to observe, but nonetheless are a key factor for consideration in retirement planning. By using survey responses to hypothetical situations, we circumvent the selection problem (Manski, 1994) and are able to estimate treatment effects on both treated and untreated.

We field a survey module on expectations as part of the Vanguard Research Initiative (VRI), a survey-administrative linked dataset of clients of the Vanguard Group. Non-retired respondents are asked about the probability of work given different hypothetical health states. By construction, every respondent in the sample has non-negligible retirement wealth which makes this dataset particularly well suited to studying the interactions of wealth on conditional labor supply. Preliminary findings suggest that, although unlikely to be observed, healthy and wealthy households will reduce labor supply in response to large, negative health shocks, possibly accompanied by earlier Social Security withdrawals. However, this response may be non-linear in household wealth, requiring closer examination at program interactions with Social Security claiming, Medicare costs, and payroll taxes.

## **The Nonlinear Path to Retirement**

In this project, we re-examine the labor market transitions of older workers in today's macroeconomy. Recent papers have begun to look at non-monetary aspects of job transitions (Angrisani et al., 2015); here we focus on the phenomenon of transiting from career to bridge jobs en-route to retirement.

In a recently fielded survey from VRI, we collected up to two job spells from each respondent which are self-classified as either a "career" job or "bridge" job. Mapping Occupational Information Network (O\*NET) occupation attributes to job history from VRI surveys, we first characterize "career" jobs versus "bridge" jobs in both monetary and non-monetary terms and compare typical paths towards retirement for male versus female workers. In our sample, women are slightly less likely than men to transition through a bridge job, but classification of jobs into career versus bridge is itself endogenous. We follow up with analysis of the situation surrounding each job separation and attempt to determine to what extent is retirement a voluntary event for men versus women and look into job features that contribute to prolonged workplace attachment.

## **Data**

### *Health and Retirement Study*

The *Health and Retirement Study* (HRS) is a longitudinal study of health, retirement, and aging of households with at least one primary respondent above the age of 50. Younger respondents may be surveyed if their spouse is above age 50. The core survey is rich with labor market and health measures, and fielded every other year since 1992. I focus on the waves 2006 and 2010 for my study and restrict myself to the subset of respondents that are not retired as of 2006, as my preferred specification of health expectations questions were introduced in 2006.

In each wave, respondents are surveyed on their self-rated health on a subjective five point scale of "Excellent," "Very Good," "Good," "Fair," and "Poor." Respondents also report more objective health measures including doctor-diagnosed ailments, whether they need assistance with Activities of Daily Living (ADLs) or Instrumental Activities of Daily Living (IADLS), and whether they had any mobility or fine motor skills limitations.<sup>1</sup>

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<sup>1</sup> Please see <http://hrsonline.isr.umich.edu/sitedocs/userg/dr-008.pdf> for discussion on physical measures included in the core survey.

Table 1. *Randomization Design for 2010 Expected Health, in 2006*

Self-rated health	Corresponding second fill	% chance asked
Excellent	Still be excellent	0.5%
	Very good or worse	0.125
	Good or worse	0.125
	Fair or poor	0.125
	Poor	0.125
Very Good	Still be very good or better	0.5
	Good or worse	0.167
	Fair or poor	0.167
	Poor	0.167
Good	Still be good or better	0.5
	Fair or poor	0.25
	Poor	0.25
Fair	Still be fair or better	0.5
	Poor	0.5
Poor	Have improved significantly	1.0

In the core survey of 2006, respondents were also asked about their expectations of their health in 2010. The specific question asked was:

“Earlier we asked you to rate your health on a scale of excellent, very good, good, fair or poor and you rated your current health as [*Fill from self-rated health*]. What are the chances that your health will [*Corresponding second fill*] four years from now?”

Based on each respondent’s self-rated health, asked earlier in the survey, respondents may be randomized to different corresponding fills referring to a health state better or worse than one’s current health. However, in every instance, the second fill makes explicit reference to the same subjective scale used in accessing self-rated health. For instance, one with self-rated “Fair” health may be asked for the chance that their health will be “still fair or better,” or “Poor.” Table 1 details the possible fills used and the probability of being assigned to each fill, conditional on self-rated health. Respondents are allowed any numerical response from 0 percent to 100 percent, although there is significant heaping at 25 percent, 50 percent, 75 percent, and other round numbers. The methodology section shall outline how I use these survey responses to recover a proxy for underlying health expectations.

## Vanguard Research Initiative

The Vanguard Research Initiative (VRI) is a survey-administrative linked dataset on older wealth holders. Survey respondents are account holders at the Vanguard Group who are aged 55 and above, are web-survey eligible, and have at least \$10,000 in financial assets. Conditional on the screening conditions used to select the sample, the respondents are similar to those from HRS and the *Survey of Consumer Finances* (SCF) (Ameriks et al., 2014). As of December 2015, four waves of the survey have been completed by about 3,000 respondents, with each wave focusing on a different aspect of retirement decision-making.<sup>2</sup>

*Survey Four* was designed to collect information on labor market transitions late in life with particular emphasis on the career to bridge job phenomenon. To economize on survey time while extracting the most relevant information, VRI features a novel way of sampling job history. Respondents are first asked about their current or most recent job in terms of conventional job attributes (industry, occupation, salary, hours worked, and whether it is ex-time<sup>3</sup>), and if they consider that to be their career job. We invite respondents to self-classify their job as career job or otherwise, given that the career job is the “longest or main job since age 40.” This definition is intentionally ambiguous.

If it is not their career job, they are then asked about their career job, the situation surrounding their separation from their career job, and the search process from career to bridge job, including whether they have had any other jobs in between their career and most recent job. If it is their career job, they are asked about any on-the-job job search they may have conducted.

This design allows us to obtain a fairly descriptive snapshot of labor market transitions late-in-life without a lengthy survey of all job spells up to this point. Please see Figure 1 for a graphical representation of the response collection strategy. Occupations collected are also mapped onto O\*NET database of occupational attributes to further enrich this labor market history.

Respondents that are currently working in either a career job or bridge job are asked a module on expectations and conditional labor supply. Respondents are first asked for their subjective self-rated health (similar to the HRS), and the percent chance that they will be

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<sup>2</sup> For more information on the Vanguard Research Initiative, please see <http://ebp-projects.isr.umich.edu/VRI/>.

<sup>3</sup> We define flex-time in this survey to be whether respondents are allowed to increase/decrease the hours worked for all or some of the working year.

working in two and four years' time. They are also asked the percent chance that their health will be some particular state in two and four years' time. The health states referenced are phrased in the same scale as self-rated health. For instance, "What are the chances that your health will be 'Good' in four years' time?" They are then asked about their probability of working in the next two years and four years, conditional on three different health states. Respondents are able to give any numerical response between 0 percent and 100 percent. This sequence will also be fielded as an experimental module in HRS 2016.

In addition to labor market variables collected in the most recent survey, VRI also includes administrative data on financial accounts held at Vanguard and highly detailed survey measures of household financial assets at an account level (Ameriks et al., 2014). This dataset is particularly suited in evaluating the impact of wealth interactions on retirement behavior as every respondent in our sample has significant wealth and some stock market exposure.

## **Methodology**

### *Anticipated versus Unanticipated Health Changes*

Using survey questions on health expectations detailed in the "Data" section, I construct an individual proxy for expected health in 2010 given a population distribution of health expectations mapped onto a latent health index. Using this proxy, I decompose health changes from 2006 to 2010 into anticipated and unanticipated changes on the latent health index, and estimate their impact on labor market outcomes in 2010 including - likelihood of retirement, hours worked, whether respondent is collecting Social Security at early, regular or delayed ages, or Social Security Disability Insurance.

I propose a model of survey response as follows:

1. Individuals observe their latent health precisely. Latent health is some function of perfectly observable health attributes, with a random error component not observed by the researcher.
2. However, there is ambiguity in interpretation of self-rated health, which I model as an error term on the thresholds separating each subjective health category. With this uncertainty, individuals give the self-rated health which is the category they are most *likely* to fall into, given their age and other demographic variables.



3. Individuals also form expectations of their next period health which is a function of this period's latent health, and some private information that is unobserved by the researcher. One may think about this private information as family history; the family histories of a representative sample such as the HRS are also representative, so the population average of this private information is zero.
4. Based on this private information, individuals respond to the survey question on future health expectations framed using subjective self-rated health categories. Variation in this survey response may come from ambiguity due to interpretation of thresholds, or variance in latent health conditional on observed health attributes which is unknown to the researcher.

Assuming independence across the error terms, I jointly estimate the error terms and the distribution of private information which generates heterogenous health expectations. I also address rounding by treating each response as an interval. In other words, individual proxy for health expectations is the expected latent health for 2010, conditional on survey response and estimated population distribution of latent health expectations. Using these proxies in causal inference will give me unbiased parameter estimates (Miles S. Kimball, 2008).

### **How Does Health Affect Retirement? New Estimates Based on Conditional Expectations**

We begin by asking respondents for their unconditional probability of working in two and four years' time, then the conditional probability given three different health states. By eliciting labor supply probabilistically, we allow expression of uncertainty (Manski, 1999). Conditioning on several health states also allows us to isolate and remove the endogeneity of health with regards to labor supply. For completeness, we also ask respondents for the likelihood that the health states we conditioned upon will be realized.

Next, we validate the survey responses by computing the implied unconditional labor supply using the conditional responses. Over 90 percent of our sample have implied unconditional labor supply within 5 percent that of the survey response recorded. The slight discrepancy may be attributed to rounding. This strongly argues for the validity of our survey strategy in eliciting health-contingent labor supply in a probabilistic format.

We will then recover the ex-ante individual-level effects of health on retirement by comparing respondents' probabilistic beliefs of working at different health states. Such effects can be then aggregated to estimate various corresponding treatment effects at the population level, (e.g., on the treated, on the untreated, average, distributions, etc.).

Additionally, we can obtain better motivated estimates of the health-contingent disutility of work parameter in a fairly standard life-cycle model. This may inform to what extent households, even fairly well-to-do ones, rely on the Social Security system as a “buffer” such that they may reduce labor supply in case of large, negative health shocks.

### **The Nonlinear Path to Retirement**

We pioneer a novel method of eliciting job history by asking respondents to classify each job spell as either a “career” or “bridge” job. By mapping O\*NET occupational attributes to VRI, we are able to characterize career versus bridge jobs in monetary and non-monetary dimensions. Examples of non-monetary dimensions would be physical demands, computer skills, and other categories aggregated from O\*NET attributes. This will enable us to compare career trajectories towards retirement for male versus female workers.

We then follow up with analysis on business or health conditions around the time of separation from each job to determine if women are more likely to be displaced under certain conditions. We also look at any job search activities that did not result in a realized job spell to ascertain if male versus female workers face different opportunity sets late-in-life.

Lastly, we will infer preferences for on-the-job flexibility with this new data. By incorporating preference parameters governing risk preferences and savings motives that were previously estimated (Lee, 2015), we hope to build a dynamic search model that can better replicate labor market transitions of older workers.

### **Timeline**

A preliminary version of “The Impact of Anticipated versus Unanticipated Health Changes on Retirement Behavior” will be presented in April, 2016 at the Midwest Economic Association Annual Meetings to garner feedback from the broader research community. I have been involved in the design and implementation of VRI *Survey Four*, and data collection has

recently been completed as of December 2015. Drafts of the two following chapters are expected to be ready in fall 2016.

I will be on the job market during the 2016-2017 academic year. I expect to finish my dissertation in April, 2017.

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Figure 1. Flow chart for VRI - Labor Market Survey

