Insuring against retirement health care consumption risk: The role of (non)guaranteed income

PRELIMARY DRAFT
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Abstract

Medical expenses in retirement are becoming one of the largest expenditures of retirees. It is unclear how households plan to use guaranteed income to insure against retirement health care consumption risk. We surveyed employees over fifty at fourteen higher education institutions about their perceptions and plans toward retiree health expenditures. Despite the large concern for these costs and expected reliance on social security to pay for retiree medical expenses, less than half plan to use annuities, and most plan to use non-annuitized retirement plan assets. We find significant differences on the use of (non)guaranteed income for retiree medical expenses by financial literacy, retirement plan assets, and whether individuals save specifically for retiree health costs. The large reliance on non-annuitize assets for retiree health expenses leaves households to bear much risk in retirement that could be mitigated by additional annuitization.

Keywords: annuitization, health cost, retiree health, retirement
JEL Codes: I10, I20, J26, D14

Any opinions expressed herein are those of the authors, and do not necessarily represent the views of any organization with which the authors are affiliated.

I. Introduction

One of the major concerns of older workers is the expected cost of healthcare in retirement. If medical expenditures are not considered in one's retirement plan, estimates of income in retirement will underestimate the actual income needed to sustain one's desired standard of living. An increased number of years in retirement associated with a rising life expectancy, and the continued rise of healthcare costs, are the main drivers of higher medical expenditures in retirement. Further, the lower incidence and coverage of traditional retiree health insurance leaves workers bearing more health risk in retirement. These changes regarding expected medical expenditures in retirement raise two significant questions. First, are older workers including these expected costs in their retirement plans and saving decisions? Second, if so, how do individuals plan to use guaranteed income to reduce the risk of unforeseen health events on well-being in retirement? This paper examines both of these questions to understand how older adults approaching retirement prepare for retiree health expenditures and how individuals plan to use (non)guaranteed income to provide consumption insurance against these risks.

Retirees often need substantial savings in order to cover medigap premiums and prescription drug costs. One estimate from research by the Employment Benefit Research Institute (Fronstin and VanDerhei, 2018) notes that for Medicare beneficiaries[1] even a couple with median prescription drug costs would need nearly $174,000 if they want a 50% chance of having enough resources to cover their medical bills in retirement, which increases to $296,000 if they want a 90% chance.[2] Additionally, similar to changes in pension plans that have been placing more responsibility on individuals to save for retirement, the incidence of retiree health plans in the private sector has sharply declined. The Kaiser Family Foundation reports that among firms with 200 or more employees, the proportion of firms offering retiree health insurance has fallen from 66 percent in 1988 to only 18 percent in 2018.[3] This decline in employer-provided retiree health insurance has placed new saving demands on workers in the private sector and shifts workers to bear more financial risk in retirement. Employers in two

[1] There calculations assume an individual "who turns age 65 in 2018 and who purchases both Medigap Plan F to supplement Medicare and Medicare Part D outpatient drug benefits." (Fronstin and Vanderhei, 2018, p. 6).
[2] For additional research and data going back to 2011 see Fronstin and VanDerhei (2016, 2017, and 2018).
[3] Data are from the 2018 Kaiser Family Foundation annual report on health insurance coverage, https://www.kff.org/health-costs/report/2018-employer-health-benefits-survey/ , accessed October 15, 2018.

sectors of the economy still have relatively high coverage of traditional retiree health insurance plans – public sector employers and higher education (both private and public institutions).[4]

We believe our sample of university faculty and staff over fifty is of interest to study for several reasons. The first is that employees in higher education have greater access to retiree health insurance than employees in most other sectors. The second reason is, due to this increase benefit coverage (in aggregate), this group may, counterintuitively, not have adequate resources to pay for retiree medical costs, since the availability of this coverage can result in lower savings rates and less wealth than individuals without retiree health insurance (Clark and Mitchell, 2014). Further, retiree health benefits in higher education vary substantially, ranging from traditional retiree health insurance with the employer paying the majority premiums to no traditional retiree health benefit.

The dual impact of increasing out-of-pocket retiree health costs and decline in availability of traditional retiree health insurance has a direct impact on household's financial decisions during the decumulation phase of their lifecycle. Given these increased risk in health costs, we seek to examine if individuals plan to use guaranteed income sources to provide consumption insurance later in life. As such, this study aims to sheds light on the well-known "annuitization puzzle" in the context of retiree health expenditures.[5]

Recent research has investigated optimal annuitization decisions when medical costs are costly and unexpected. A stream of recent literature finds that health shocks can affect both the demand and optimality of annuitizating assets at retirement (Reichling and Smetters, 2015; Peijenburg, Nijman, and Werker, 2015; Ai, Brockett, Golden, Zhu, 2017). Ai et al. (2017) find that when health socks and longevity are included, wealthier retirees may have an increased demand for annuities, and an annuity can provide a hedge against these health socks. However, they find those who may receive support from government subsidies may have a decreased demand for annuities. Thus, understanding how unexpected heath care costs and an increased life expectancy affect financial decisions surrounding retirement is paramount to improving

[4] For an assessment of plans offered by state and local employers and their funding status, see Clark and Morrill (2010) and The Pew Charitable Trusts (2017). The Pew Charitable Trust produces regular reports on the funding status of state and local retiree health plans. For the latest report see http://www.pewtrusts.org/en/research-and-analysis/issue-briefs/2017/09/state-retiree-health-care-liabilities-an-update, accessed October 19, 2018.

[5] The annuitization puzzle stems from the fact that while (traditional) economic theory predicts retirees should annuitize all of their assets to hedge against the risk of out-living their income (Yaari, 1965) few households annuitize. For a discussion and additional research on the annuitization puzzle see Benartzi, Previtero, and Thaler (2011), Beshears, Choi, Laibson, and Madrian (2014), Brown, Kling, and Mullainathan (2008), among others.

Americans' financial well-being. Moreover, as Ai et al. (2016) remark, "our results suggest health state transitions and associated health care costs play a key role in understanding the impact of increased longevity on annuitization" (p. 322). Considering that the average man and woman who retire today at 65 will live to ages 84 and 86, respectively (with one in four living until age 90),[6] households will need to be able to cover approximately twenty years of retiree health expenses (if not more).

We surveyed employees age 50 and older and at various colleges and universities that have varying employee benefits, including defined benefit or defined contribution plans, as well as having varying retiree health benefits such as traditional retiree health insurance, retiree health savings plans, among others. We surveyed individuals about their demographics, retirement and health plan participation, concerns regarding retiree health expenditures, and how they expect to use (non)guaranteed income to use to pay for retiree health expenses.

We find that despite the large concern individuals have for retiree health costs, few individuals "bucket-save" for these costs or review their retiree health coverage. Notwithstanding the concern regarding retirement health risks and the high expected reliance on Social Security to pay for these costs, few individuals plan to use annuities and most plan to use non-annuitize retirement plan assets for retiree medical expenses. The expected use of annuities and retirement plan assets for retiree health expenditures increases significantly by financial literacy and those who bucket-save for such expenditures. Those with more retirement assets plan to use their non-annuitized retirement plan assets for retiree medical expenses significantly more often. By relying on non-annuitize assets for retiree health expenses individuals are subject to additional market risk which could be mitigated by further annuitization.

The remainder of the paper is structured as follows. The next two sections describe retiree health plans in higher education and our survey and demographics. Expectations of retirement, life expectancy, and health costs are overviewed in section IV. Section V and VI discuss our results on retirement health cost concern and saving for these costs. The role of (non)guaranteed income is presented in section VII. We discuss our results more generally and offer concluding remarks in Section VIII.

[6] https://www.ssa.gov/planners/lifeexpectancy.html (accessed June 6, 2018).

II. Retiree health plans in higher education

Given the lack of a national data base on individuals covered by retiree health plans, we identified a diverse set of 14 colleges and universities and sent surveys to their employees who were age 50 and over. This sample includes large research state universities, private research universities, and other private colleges and universities. While there are systematic data on state and local retiree health plans, we are aware of no national data base providing coverage of retiree health plans in higher education. Thus little is known about how such plans are changing over time or how they affect college and university employees and retirees. This study seeks to fill this important gap by gathering coverage data from employees at a diverse set of institutions that have a diverse set of benefits, examining how concerned these individuals are regrading retiree health costs and how they expect to use different income sources to pay for these costs.

Before we describe the data used in this analysis, it is useful to provide brief descriptions of various types of employer retiree health plans overall. First, traditional retiree health plans allow individuals to remain in their employer health plan after they retire from the institution. Important characteristics of these plans include the proportion of the insurance premiums paid by the individual and the proportion paid by the employer, deductibles and co-payments, the number of years needed to be eligible to be included in the plan, and whether coverage is terminated when the individual becomes eligible for Medicare at age 65. However, even higher education employees within the public sector have a wide variety of retiree health plans (Clark and Morrill, 2010). Higher education institutions often offer different benefits to different types of employees (as such as faculty versus staff).

Second, employers can offer plans that have more defined-contribution features but are designed to be used to pay specifically for out-of-pocket health expenses with various tax benefits. Employers can offer health savings accounts (HSAs) in conjunction with high deductible health plans. Both employers and employees can contribute to HSAs, for employees these contributions have tax benefits but subject to maximum contribution limits. The employee owns the funds in the account and can take these funds with them at termination or retirement. An organization can also establish a health reimbursement arrangement (HRA); however, only employers can contribute to HRAs. Funds in an HRA are the employee's but they can be used only for qualified medical expenses. Other details, such as rollovers and distribution to an HSA

from an HRA, may vary from plan to plan. Additionally, employers can offer a Retirement Healthcare Savings Plan (RHSPs), where the employer and employee can contribute to an RHSP, which has tax benefits. However the funds in an RHSP account can only be used for qualified medical expenses in retirement and cannot be withdrawn for other purposes like funds in an HSA.

Since most of the individuals in our survey expect to qualify for some type of retiree health benefit we discuss some of the literature on the effect this has on the retirement decision. Generally, the overall impact of having retiree health insurance on leads workers to retire earlier (e.g. Nyce et al. 2013; Blau and Gilleski 2008, 2006), which carries over to public sector employees as well (Fitzpatrick 2014; Shoven and Slavov 2014). In higher education, the industry sector focus of this paper, Clark (2015) finds that the expected age of retirement among university faculty does not change when they expect to have retiree health insurance, although this may be due to the general late retirement (after age 65) of university of faculty – hence the term "reluctant retirees".[7]

The Affordable Care Act (ACA) might be one method individuals could use if they would like to retire early (before being eligible for Medicare), especially when they do not have retiree health benefits. The results of the ACA on retirement are mixed. Gustman, Steinmeier, and Tabatabai (2018) find that the ACA had no significant impact on the decision to retire, while Ayyagari (2018) finds that the ACA decreased the expected age of retirement for individuals without retiree health insurance compared to those with such insurance. To this point we offer that since individuals in higher education, and our survey results, indicate that the average individual in our sample will retire at age 65 (age of Medicare eligibility) or older much of the variation in responses across our retirement decision survey questions (such as whether an individual has a target retirement date) should not be due to the variation in retiree healthcare benefits across the surveyed institutions or differences in ACA plans by state.

III. Survey protocol and demographics

We targeted our survey to individuals who were at least 50 years old in 2016 and who were active contributors to their employer-sponsored retirement plans managed at TIAA. We

[7] For additional information on the retirement decision of university faculty see Yakoboski (2015).

sent our survey to 22,929 individuals at a diverse set of 14 colleges and universities, and received completed surveys from 2,532 individuals. The survey included questions on household composition, income and wealth, personal and family health, retirement savings strategies, financial literacy, and additional questions on retirement and paying for retiree medical expenses. The survey data was then matched to retirement saving information contained in the TIAA records for these individuals. Information from the TIAA files included assets held in all TIAA employer-sponsored retirement accounts, ages, and their college or university of employment. Survey demographic data is shown in Tables 1-2.

[Table 1]

[Table 2]

The large majority of our sample is White/Caucasian and 58% were women. Nearly 70% is married or lives with a partner. The average individual had nearly $370,000 in their employer-sponsored retirement account(s) in TIAA in 2016. When surveyed about household income, the median individual is in a household earning $100,000 - $149,999, much higher than the national median of just over $60,000 in 2016.[8] When surveyed about total household retirement assets, the median response between $250,000 - $499,999 (the median of assets in the TIAA system is just over $170,000). The distribution of surveyed household income and total retirement assets is shown in Table 2. TIAA Assets do not include assets held in a retirement healthcare savings plan (RHSP) at TIAA. Slightly over 200 individuals (8% of the sample) had assets in an employer-sponsored RHSP in the TIAA system and the average individual had nearly $6,000 in an RHSP in 2016.

Table 3 reports participation in various healthcare and retirement benefit programs in our sample. Individuals participate in a diverse set of employer-provided retirement and healthcare programs. Most individuals expect to qualify for a retiree healthcare plan with their current employer and have either a defined contribution plan (DC) or a defined benefit plan (DB). For those expecting to qualify for a retiree healthcare plan, we asked if individuals have reviewed their retiree health coverage, only 56% indicated they have reviewed it with 8% not having

[8] Fontenot, Semega, and Kollar (2018).

thought about it and 35% said no. On the whole a majority of individuals in our sample expect to qualify for some type of retiree healthcare benefit. The large portion of individuals indicated that they did not review their coverage is concerning as understanding whether or not an individual qualifies for retiree health coverage, and what the benefits are, is essential to having an adequate retirement financial strategy.

[Table 3]

We now report the financial literacy of our sample. In a similar manner to Lusardi and Mitchell (2011) – hereafter L&M – we asked three financial literacy questions on stock risk, interest, and inflation.[9] The financial acumen of our sample is reported in Table 4. Our sample performs well on the financial literacy quiz with nearly 70% correctly answering either two or all three questions. Nearly half of our sample is financially numerate (47%), those individuals who answered both the inflation and interest question correctly, There are some notable differences between our sample and L&M, who also survey individuals age 50 and older. We find that compared to their results, a higher proportion of individuals in our sample got all three correct or none correct, with a small proportion getting one or two questions correct. A higher proportion of our sample answered the stock risk question correctly, while a smaller proportion answered the compound interest and inflation questions correctly compared to L&M.

[Table 4]

IV. Expectations: Life expectancy, retirement, and health costs

We begin our analysis with expectations of retirement age, life expectancy, number of years in retirement, and expected health costs in retirement. When asked if they had a target retirement age, 63% of individuals responded "Yes" and 22% responded maybe (2,496 observations). We then asked individuals responding yes or maybe, at what age they expect to retire. This is shown in Figure 1 by gender and whether they responded yes or maybe to having a

[9] The structure and wording of the questions are slightly different, however both our survey and the three questions in Lusardi and Mitchell (2011) have one question each on compound interest, investment diversification, and inflation.

target retirement date. Individuals responding maybe indicated a significantly later target retirement age compared to those answering yes, both for men and women ($p<0.001$, Chi-squared tests). This difference is expected since those who definitely have a target retirement date likely have a date that is more near-term compared to those who only might have a target retirement date.

[Figure 1]

We asked individuals to report their current health status. Individuals could respond "Excellent", "Very good", "Good", "Fair", or "Poor", or "I prefer not to answer". 20% responded excellent, 42% - very good, 30% - good, and 8% responding fair or poor. To see if individuals in our survey accurately estimate their remaining life expectancy we split life expectancy by men and women and again for those who answer excellent or very good health, and those who respond good, fair, or poor health in Figure 2. Individuals indicating a better state of health are significantly more likely to indicate that they will live longer than those who respond that their health is good, fair, or poor. This is significant for both men and women (Chi-squared test, $p<0.01$; 2,475 obs). Using the most current life expectancy tables form the CDC, the average 60-year old man and woman can expect to life to ages 82.4 and 84.6 respectively (Arias, et al. 2018). With well over half of those who state that they are excellent or very good health expecting to life to at least 85, our sample has fairly accurate beliefs when it comes to life expectancy.

[Figure 2]

Figure 3 shows expected retiree medical costs in early and later years of retirement. Individuals estimate retiree health costs to be significantly higher in later years of retirement, with 47% of individuals expecting medical bills to be greater than $20,000 in later retirement years. This is significantly more than the 13% of individual expecting medical expenses to be greater than $20,000 in early retirement years.

[Figure 3]

Expectations of retiree health costs can range drastically depending on the number of years one spends in retirement. Therefore, we construct a variable to estimate the number of years one could expect to spend in retirement conditional on their survey responses to target retirement age and life expectancy. We define years in retirement as the midpoint of what they indicated for their life expectancy, plus/minus two on the endpoints (i.e. 72, 77, 82, 87, 92), minus their target retirement age. Overall women in our survey expect to spend 20.5 years in retirement, significantly more than men, who expect to spend 17.7 years in retirement (t-test, $p<0.001$, 1,763 observations). Moreover, those who indicate a better health state expect to spend significantly longer in retirement than those indicating a lesser state of health (Kolmogorov-Smirnov tests, $p<0.001$; 1,750 observations), which is 3.6 more years for men and 3.4 more for women. This is shown with kernel density estimates in Figure 4. The ability to cover out-of-pocket retiree medical expenses for 15-20+ years represents a large risk to households in retirement. When asked about income needs in retirement, individuals are accurate (compared to the general accepted benchmark of at least 80% of current income) in estimating what proportion of their current income they need in retirement to sustain their current standard of living in retirement, with nearly 60% responding with greater than 75% of their current income.

[Figure 4]

The number of years individuals expect to spend in retirement is especially important considering two empirical facts in our survey. The first is that that 42% in our survey state that when they retire they do not expect to work again. Thus, their expected income sources must come only from social security, pensions, or retirement plan assets and annuitized assets. The second, and perhaps more important finding, are the reasons individuals consider to be important for their retirement decisions. While many individuals indicate that job satisfaction (53%, 2,080 observations) or the desire for more free time (61%) are important, 64% state that their physical or mental health are important considerations. This percentage increases to 74% for those in good, fair, or poor states to health – significantly higher those indicating excellent or very good health at 59% (test of proportions, $p<0.001$, 2,058 observations). Finally, 41% state that their need for employer sponsored health insurance is an important consideration, which signifies the

concern many individuals have. It is likely that physical or mental health considerations are likely to be a stronger retirement considering than the desire to have access to employer sponsored health insurance when few individuals who expect to retire after age 70 are still working by age 70 (Greenwald, Copeland, and VanDerhei, 2017).

V. Concern about health care costs in retirement

When asked generally, "based on your current saving and your knowledge of your employer's retiree health plan, are you concerned about having sufficient resources to pay for your out-of-pocket health care costs in retirement?", and 62% of those responding indicated "Yes". This differs significantly by health status as 57% of those indicating excellent or very good health were concerned compared to 72% of those indicating good, fair, or poor health.[10] Expecting to qualify for retiree health benefits is a large determination of overall concern for medical expenses in retirement as 56% of those expecting to qualify are concerned, which is significantly lower than the 73% of those concerned who do not expect to qualify for retiree health benefits or do not know. Concern is significantly lower for individuals in households with above median income for our sample (73% for less than $150,000 household income vs. 45% for $150,000 or more household income), but is significantly higher for women. 71% of women indicated concern compared to only 50% of men. Finally, we note that a significantly smaller proportion of individuals who save specifically for health expenditures in retirement were concerned (52% for those who save specifically for health care costs in retirement vs. 65% for those who do). Much of these results are robust to our regression analysis later in this section.

The above results indicate that most of our survey population is concerned about health costs in retirement. Therefore, it becomes important to understand at which point of retirement individuals have concern. We asked three questions to gather information on how concern varied over one's retirement cycle: (1) health costs in early years of retirement, (2) health costs in later years of retirement, and (3) chronic or end-of-life health costs. Table 5 shows percentages of those "Very concerned", "Somewhat concerned", "Not concerned", or those who indicated that they "Don't know" or "Haven't thought about it" across later years of retirement and early years

[10] All comparisons reported as significant in Section IV are significant at the 1% level with two-sample test of proportions tests.

of retirement.[11] In early retirement 21% were very concerned, and nearly all of these individuals were very concerned in later years of retirement as well. Close to half are somewhat concerned at 41% and approximately a third is not concerned.

[Table 5]

Concern significantly increases in later years of retirement, with the proportion of those very concerned increasing from 21% in early years to 32% in later years. This significant increase in the proportion of those very concerned in later years of retirement is robust across health status (16% vs. 27% for those in excellent and very good health, and 29% vs. 41% for those in good, fair, or poor health), income (12% vs. 22% for those in household with incomes of $150,000 or greater, and 27% vs. 39% for those in households with incomes of less than $150,000), and gender. Concern increases for both men and women in later years compared to early years but concern in both time periods is higher for women than for men. In early years of retirement only 12% of men are very concerned compared to 27% of women. A larger proportion of both men and women are very concerned in later years of retirement, but there is a stark difference with women being more concerned; 40% of women are very concerned in later years of retirement compared to 21% of men. These comparisons (gender, income, and health status) are all significantly different. Additionally, those who are over 65 years old indicate a significantly lower level of concern in both early and later years of retirement.[12]

Concern about running out of money due to chronic or end-of-life health costs is shown across several factors in Table 6. Interestingly, the proportion that is very concerned here is only slightly above concern in early years of retirement (not significantly higher) and significantly less than the concern in later years of retirement (when examining the percentage of those very concerned). When examining individuals who are either very concerned or somewhat concerned we find that there is a significant increase in concern for end-of-life compared to early years of retirement, but concern in later years of retirement is still greater than concern because of end-of-life or chronic health costs. The differences mentioned in the aforementioned paragraph (income,

[11] Not concerned combines two categories: "Not concerned: my family will take care of me" and "Not concerned, I have enough money".

[12] Percentage very concerned: 1) in later years of retirement, 35% vs. 22% for those under and over 65, respectively, 2) in early years of retirement 24% vs. 12% for those for those under and over 65, respectively. $P<0.001$ for both comparisons, and when included those who are somewhat or very concerned.

health status, gender) are also significant in Table 6, as well as the level of concern between those who are at least 65 years old or under 65.[13] Examine the Spearman's correlation coefficient also for each of the comparisons in Table 6 is also significant ($p<0.01$). Why might the level of concern be higher in later years of retirement but lower when asked about health costs due to end-of-life issues? One possibility is that the costs related to end-of-life are viewed as occurring after later retirement, and thus are more heavily discounted. However, we do not survey data to support this, but it is one possibility we find plausible.

[Table 6]

V.1. Regression analysis for retiree health cost concern

We provide logit regression analysis on who is likely to be concerned overall in Table 7. The dependent variable is individuals who indicated "Yes" they are concerned, while the dependent variables takes value zero if they indicated otherwise. Table 7 presents logit regression analysis estimating individuals who responded that they are concerned about their ability to pay for medical costs in retirement. A description of the explanatory variables in Model 1 is as follows. *Age* is the age.[14] *Married* is a dummy variable equal to 1 if an individual reported being married or living with a partner and 0 otherwise. *Assets/$10,000* are total assets an individual has with TIAA in their employer-sponsored retirement accounts divided by $10,000. *Income $150,000* is a dummy variable equal to 1 for if an individual is in a household with an annual income of $150,000/year or greater, and 0 otherwise. *Female* is a dummy variable equal to 1 female and 0 for male. *White/Caucasian* is a dummy variable equal to 1 for if an individual responded their race was White/Caucasian and 0 otherwise. *Inflation & Interest correct* is a dummy variable equal to 1 for if an individual answered the inflation and interest financial literacy questions correct and 0 otherwise. *Very good or excellent health* is a dummy variable equal to one for if an individual's self-reported health status was very good or excellent and 0 if

[13] These differences are robust to when comparing the proportion of individuals that are either very concerned or somewhat concerned.

[14] We also ran specifications using expected number of years in retirement, as used in Figure 3, for Tables 7-9. In general, include this variable did not results in better model fit and was not significant. Furthermore, there are a large loss in observations since individuals had to answer yes or maybe to having a target retirement date and provide an answer to their the life expectancy question which wasn't not sure or prefer not to answer.

they reported good, fair, or poor health. *Ever used tobacco* is a dummy variable if an individual indicated they have ever used tobacco and 0 otherwise.

In our Model 1 baseline in Table 7 we find that women are significantly more concerned and older individuals significantly less concerned. Intuitively, predicted concern significantly decreases when individuals have more retirement assets, in households with higher income, are in very good or excellent health, or have never used tobacco. Adding whether or not someone has a target retirement date in Model 2 is negatively correlated with concern, while this is marginally significant in Models 2 and 3, it drops below 10% significance in Models 4-6 when controlling for additional factors.

[Table 7]

In our last four models in Table 7 we add several additional explanatory variables. *Save for medical cost* is a dummy variable equal tot 1 if someone indicated that they save specifically for retiree medical costs and zero otherwise. *Qualify for retiree health* is a dummy variable equal to 1 if an individual expects to qualify for retiree health benefits through their current employer, previous employer, spouse's/partner's employer, or by other means, and 0 otherwise; *RHSP Assets* is a dummy variable equal to 1 if an individual has assets in a TIAA managed RHSP and 0 otherwise.

Model 3 in Table 7 includes whether or not someone reported they save specifically for medical costs in retirement, and Model 4 includes if they qualify for employment-based retirement health benefits. Both are highly significant (negative) predictors of overall concern. Finally, Model 5 adds an interaction between women and individuals expecting to qualify for retiree health benefits, *Qualify X Female*. We include this interaction to see if the effect of expecting to qualify for retiree insurance affected women's concern since they expect to spend more years in retirement than men. However, we do not find this to be the case. There is no effect on having RHSP assets in Model 6 and participation in a DB plan, DC plan, or HSA is not significant in additional regressions, not shown.

We offer regression analysis of concern for chronic or end-of-life medical costs in retirement in Table 8, which displays our logit regression results. We provide standard logit regressions with robust standard errors in parenthesis. We construct the following order for this

analysis. Individuals who reported "Very concerned" or "Somewhat concerned" are coded as 1, and 0 otherwise. We use an ordinary logit here as it provides better fit and more explanatory power than any ordered model we examined.

Examining Model 1 in Table 8 we find that age (although now only marginally significant), amount of retirement assets, household income, self-reported health status, non-tobacco use, are all significantly negatively correlated with predicted concern due to chronic or end-of-life costs, while women are significantly positively correlated with predicted reported concern (these results hold for all specifications in Table 8). One major difference compared to Table 7 is that now more numerate individuals (answering the inflation and interest questions correctly) along with whites are significantly more concerned about end-of-life health costs.

Models 2-6 in Table 8 add controls similar to Table 7. Beginning with Model 2, we find that having a target retirement date is a significant predictor of end-of-life concern. However, savings for medical costs is not significant and qualifying for retiree health benefits is only significant at the 10% level in Table 8, unlike the results in Table 7. We do not find that gender differences are dependent on qualifying for retiree health coverage in Model 5. Model 6 controls for participation in an HSA. *HSA* is a dummy variable equal to 1 if an individual indicated they participate in an HSA and 0 otherwise. This had a marginally significant negative effect on end-of-life concern. Participation in DB or DC programs had no significant effect on end-of-life concern in separate regressions.

[Table 8]

VI. Saving specifically for health care costs in retirement

Only 16% of individuals said that they save specifically for health care costs in retirement. A significantly higher proportion of men indicated that they save compared to women (19% for men vs. 14% for women; 2,388 observations; $p<0.01$, two-sample test of proportions), as well as individuals 65 and over (19% for those 65 and over vs. 15% for those under 65; 2,508 observations, $p=0.025$). The largest difference is for those who expect to qualify for retiree health benefits and have reviewed their retiree health benefit, with 24% of those individuals indicated that they save specifically for health costs in retirement compared to 10% who expect

to qualify for retiree health benefits and have not reviewed their coverage (1,535 observations; $p<0.001$). There is no significant difference in self-reported health status. There is only a marginal difference by income with 18% of those in households with incomes of $150,000 or greater saved, compared to 15% of those in households with incomes under $150,000 (2,508 observations, $p=0.062$).

We find some significant differences in financial literacy results and those who indicated that they save specifically for health costs in retirement. Specifically, a significantly smaller proportion of those who fail to answer any of the three questions correctly indicated that they save specifically for health costs in retirement compared to those who answered all three correct ($p=0.08$), and compared to answered either both the interest and inflation question correctly or the stock risk question correctly ($p<0.05$). However, in absolute terms the differences are rather small and when we examine the correlation between saving specifically for health costs and financial literacy was not significant (Spearman's correlation, $p=0.26$), and this is also not significant in regression analysis in Table 9.

We begin our regression analysis by examining factors that contribute to the likelihood of saving specifically for health care costs in retirement. Table 9 presents logit regression analysis estimating individuals who responded that they save specifically for medical costs in retirement. A description of explanatory variables is similar to Tables 7-8 with the exception that we now include overall concern, *concern for medical costs*, in Table 9 which equals 1 if an individual responded yes and 0 otherwise. The Model 1 in Table 9 provides our baseline analysis. Older individuals are significantly more likely to save for medical expenses in retirement, while women are significantly less likely, although the latter result is not robust to additional controls in Models 3-6. None of the other regressors in Model 1 are significant.

[Table 9]

Model 2 adds individuals who responded that they have a target retirement date with the variable *Target retirement date*, which is equal to 1 if an individual indicated that they have a target retirement date and 0 otherwise.[15] The effect of having a target retirement date is large and

[15] Those choosing no, maybe, haven't thought about it, don't know, or prefer not to answer are coded as 0. We include those who indicate maybe as 0 since they did not indicate that they have a definite target retirement date and are likely more similar to those who responded don't know or haven't thought about it.

significant, as those who do where predicted to be approximately 9% more likely to respond that they save for medical costs in retirement.[16] Model 3 adds the dummy variable *Concern for medical costs*, which equals 1 if individuals are concerned about having sufficient resources to pay for your out-of-pocket health care costs in retirement and 0 otherwise. This is highly significant, and those who are concerned are predicted to be 6% less likely to save for medical costs in retirement. Such a result could be worrisome – that those individuals who are concerned are not engaging in financial behaviors that may alleviate these concerns.

In our last three models in Table 9 we add several additional explanatory variables similar to our previous regressions. Model 6 adds *Defined Benefit* and *Defined Contribution* are dummy variables if an individual indicated that they participate in a defined benefit or a defined contribution plan and zero otherwise. Expecting to qualify for employment-based retiree health benefits has little effect on predicted saving, although this is only marginally significant at the 10% level in Models 5 and 6. Participating in an HSA however has a large positive significant effect on whether has someone indicated they saved; with a marginal effect of 18% for those participating in an HSA. Likewise, those with RHSP assets are significantly more often. However, these later two results could simply be a function of the these types of account in of themselves – that by definition they are tax-advantaged vehicles designed to be used for health expenditures. Finally, in there is no significant effect for individuals who participate in a DC or DB plan.

VII. The role of (non)guaranteed income

This section provides survey results and regression analyses for individual's reported reliance on guaranteed and non-guaranteed income sources for income sources and retiree health expenditures. Beginning with retiree income sources, only 25% of individuals plan to fully or partially annuitize their retirement assets and over 60% expect to take occasional lump-sum amounts or systematic withdrawals. Considering the average individual in our sample has nearly $370,000 in retirement assets in TIAA, failing to annuitize any amount leaves the individual left to bear significant market risk.

[16] This uses the marginal probabilities as opposed to the odd-ratios, which applies throughout the text.

Table 10 shows the overall distribution on the answers for how likely individuals were to use each of the programs below to pay for medical bills in retirement (Social Security, Defined Benefit Plan, Annuity, Retirement Plan Assets, Other Savings, RHSP, or Family). Individuals could select any, all, or none of the aforementioned programs. Social Security, by far, had the highest proportion of individuals selecting that they were "Very likely" or "Likely" to rely on it to pay for medical bills, a significantly higher proportion (84%) than for any of the other categories[17]. Retirement Plan Assets was the next option for which individual selected very likely or likely at 72%, significantly more often than the five programs. Other Savings was selected third most frequently at 67%, followed by Defined Benefit Plan (61%), and an Annuity at 58%. Individuals were least likely to state that they would be likely or very likely to rely on an RHSP or Family to pay for health expenses in retirement, at 37% and 9%, respectively.

[Table 10]

[Table 11]

Table 11 examines the percent to expect to be likely or very likely to rely on social security, retirement plan assets, or an annuity by performance on our financial literacy quiz. We break financial literacy down by those who got none, one, or all three answers correct, as well as those who answer the interest and inflation question correctly and those who correctly answer the stock risk question. Over 77% of all individual expect to rely on social security, regardless if they are financially literate. Reliance on retirement plan assets (a risk income source) increases significantly with increased financial literacy, again with over three-quarters of respondents rely on this risky-income source. Provided that individuals are fairly accurate in their life expectancy we might expect a larger reliance on annuities than what the survey results show in Table 7, especially once controlling for financial literacy. Only 44% of individuals answering at least one financially literacy correct expects to rely on an annuity, while significantly higher than the 28% of those who are not financially literate, it is still substantially lower than the other two sources in Table 11. Provided that our sample is of higher income and has more retirement assets than

[17] Differences reported as being significant in this paragraph are significant at the 0.01% level using two-sample tests of proportions.

the median American household, if these individuals plan to use an annuity more often (or annuitize a higher proportion of these assets), they may insure themselves against loss of consumption later in life and ease their current concerns.

VII.1 Guaranteed sources of income

Logit regression analysis on the resource(s) individuals expect to rely on to pay for retiree medical costs is shown in Tables 12-13. Models 1-5 in Table 12 reports results for those who state that they are "Likely" or "Very Likely" to rely on guaranteed income. We define that an individual plans to rely on guaranteed income if they indicated they are either "Likely" or "Very Likely" to rely on either Social Security, Defined Benefit Plan, or an Annuity. Models 6-8 separated out the three sources of guaranteed income using the Model 5 specification.

Beginning with Models 1-5 (modelling indication of using any source of guaranteed income), older, more numerate, and white individuals are significantly more likely to indicate that they would rely on guaranteed income. Those in higher income households are significantly less likely to rely on guaranteed income in Model 1 but this is no longer significant in further specifications. Individuals who are generally concerned that they might not have enough resources for medical costs in retirement are significantly more likely to state that they will rely on guaranteed income to pay for medical bills. Participating in an HSA has no significant effect. Finally, employees who participate in a DB plan are significantly more likely to indicate that they expect to rely on guaranteed income. Overall however these results mask important differences when separating out the types of guaranteed income.

Moving to the Models 6-8 of Table 12, we apply the Model 6 specification to individuals who indicated that they are "Likely" or "Very Likely" to rely on Social Security in Model 6, Defined Benefit Plan in Model 7, and an Annuity in Model 8, again using standard logit models with robust standard errors in parenthesis. Examining reliance on Social Security age, concern, and numeracy are significant positive indicators while qualify is a significantly negative predictor. Moving on to reliance on defined benefit plan in Model 7, age, qualify, and participation in a DB plan are significantly positive indicators (and participation in a DC plan is marginally significant) while assets is a significantly negative indicator. There are some notable differences in Model 8, reliance on an annuity. Marital status is now has a significant effect,

along with age, numeracy, and expecting to qualify for retiree health coverage. Additionally, those who state that they save specifically for retiree health costs, and participate in a DC or DB plan are more likely to rely on an annuity. Additional variables such as self-report health status and target retirement date were not significant in further specifications.

[Table 12]

VII.2 Non-guaranteed sources of income

Our last set of regression analyses in Table 13 examines expected reliance on non-guaranteed resources (or risky resources) to pay for medical bills in retirement which we define as relying on retirement plan assets, RHSP assets, or other savings. Table 13 is structured in a similar manner to Table 12. Models 1-5 examine reliance on any non-guaranteed income source, and Models 6-8 examine reliance on retirement plan assets, RHPSs, and other savings, respectively. Age is significant in Models 6-8, but in different directions for Retirement Plan Assets and Other Savings than it is for reliance on RHSP. Expectedly, individuals with more assets are significantly more likely to rely on retirement plan assets but not on other savings, while for individuals in high income households they are significantly more likely to rely on both retirement plan assets and other savings (comparing Models 6 and 8).

As we continue examining Table 13 we find that more numerate individuals are significantly more likely to state that they will rely on retirement plan assets and other savings to pay for retirement medical bills. Individuals saving specifically for medical costs in retirement are significantly more likely to rely on any form of risky income. Individuals qualifying for retiree health benefits are significantly more likely to rely on RHSP and retirement plan assets but significantly less likely to rely on other savings. Participants in an HSA are 27% more likely to indicate they would rely on their RHSP, which is highly significant. Finally, individuals participating in a DC plan expect to rely on retirement plan assets significantly more often.

[Table 13]

In comparing expected reliance on guaranteed and non-guaranteed income sources, we find several noticeable differences. Those with greater retirement assets expect to use their retirement plan assets significantly more often, but there is no significant impact on the expect use of annuities. Those who save and are more numerate expect to use both annuities and retirement plan assets significantly more often. Married individuals are significantly more likely to state that they will rely on an annuity, but not on retirement plan assets.

VIII. Discussion

Responses to our survey of employees over 50 in higher education institutions indicate a high level of concern regarding retiree medical expenses. There is some attenuation in concern in households with higher incomes and retirement assets, but even a substantial proportion of these individuals are concerned. We find few individuals save specifically for these costs. To compound this problem, those who are concerned about medical costs in retirement save less. Individuals with a target retirement date save more, perhaps since they are more likely to have a financial plan for before and after retirement. Those who expect to qualify for retiree health benefits and who report a better health status are less concerned about medical bills in retirement but women and individuals with fewer assets and lower incomes are significantly more likely to be concerned.

As employers continue to decrease the level of retiree health benefit coverage available, coupled with increasing expected medical cost throughout longer retirements, individuals are left bearing greater health risk in retirement. Therefore, much of this concern could be alleviated by creating a financial strategy that explicitly includes out-of-pocket medical costs in retirement. Such a strategy would condition on the type of retiree health benefits households have (if any), and whether or not they have access to an HSA or RHSP – so individuals could take advantage of the tax benefits of these accounts. The increased use of annuities to pay for these basic needs could reduce household's health risk in retirement by providing increased consumption insurance.

However, when we examine the role guaranteed income has for individual's plans for these expenses most individuals expect to rely heavily on Social Security but not annuities. Individuals who save for medical expenses in retirement, are concerned, and who expect to

qualify for retiree health benefits are significantly more likely to rely on an annuity to pay for these costs. Individuals with more retirement assets plan use to non-annuitized retirement plan assets significantly more often for retiree health costs. More numerate individuals plan to use retirement assets and annuities significantly more often than less numerate individuals.

With the decline in traditional retiree health insurance, the use of tax advantage accounts specifically targeted for retiree health costs (such as RHSPs or HSAs) will continue to become more prevalent in the future. Such a trend makes optimal asset location even more importance for households in their accumulation stage.[18] Moreover, as households face greater health care risk in retirement, insuring later-life consumption becomes more important. Households entering the deculumation stage of their lifecycle may want to consider annuities (or annuitizing more assets) to ease concerns regarding retiree health costs and provide insurance later in life to sustain their current consumption levels.

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[18] For additional research on asset location see Dammon, Spatt, and Zhang (2004), Shoven and Sialm (2004), and Bergstresser and Poterba (2004).

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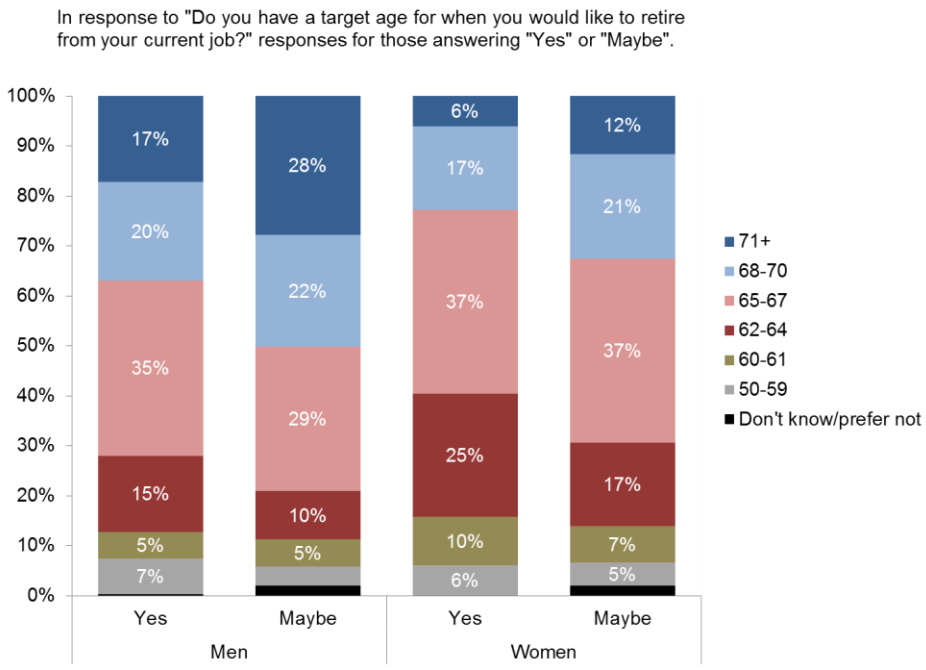
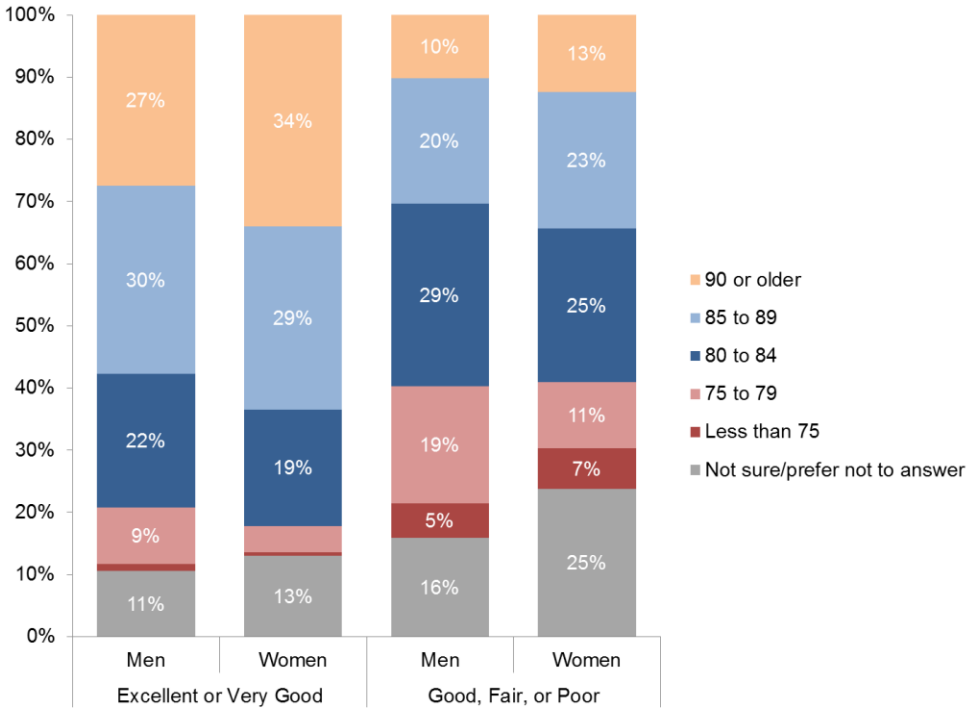
Figures and Tables

Figure 1. Target retirement age



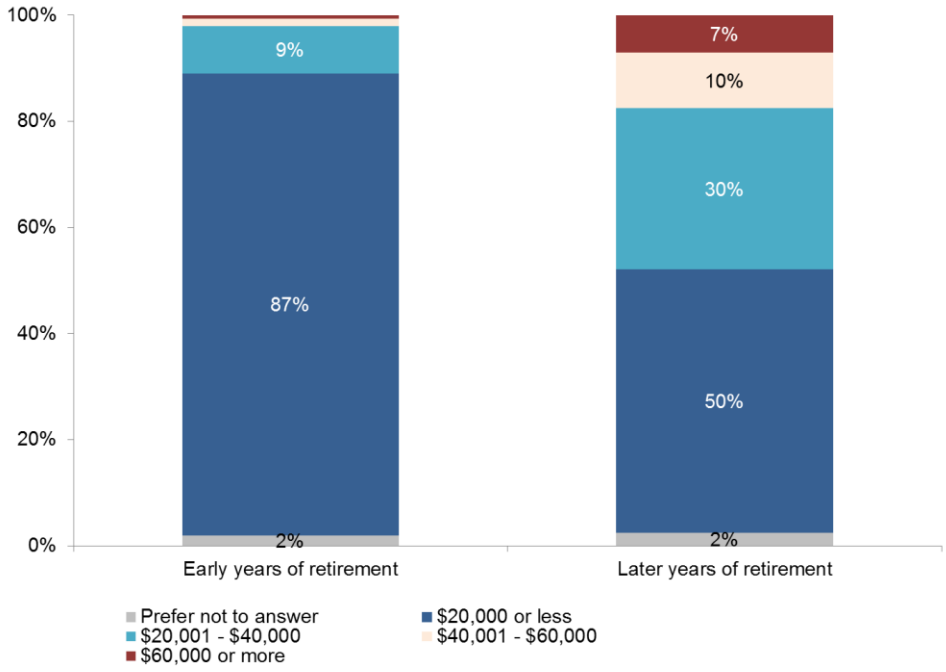
Note: 855 observations for men and 1,177 observations for women.

Figure 2. Life expectancy by gender and self-reported health status.



Notes: 1,446 observations for women and 1,024 observations for men.

Figure 3. Expected out-of-pocket health care costs



Notes: 1,668 observations for early years of retirement and 1,351 observations for later years of retirement.

Figure 4. Kernel density estimates for number of years in retirement by gender and self-reported health status.

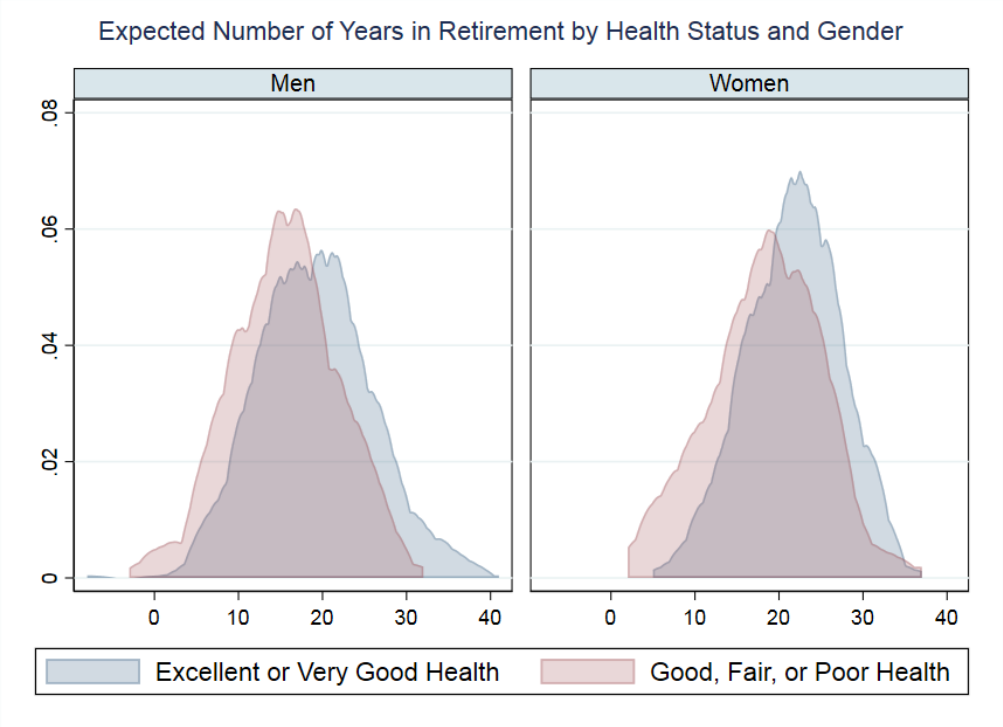


Table 1. Summary Statistics

	Mean	Median	Std. Dev.	Obs
Age	60.78	60.17	6.53	2,532
Assets in TIAA	368,479	170,218	566,293	2,532
Female	0.58	-	-	2,532
Married/Living with a partner	0.68	-	-	2,515
Divorced	0.14	-	-	2,515
Never married	0.08	-	-	2,515
Widowed	0.04	-	-	2,515
White/Caucasian	0.83	-	-	2,514
Asian	0.03	-	-	2,514
Black/African-American	0.07	-	-	2,514
Hispanic/Latino	0.02	-	-	2,514
Other race/ethnicity	0.02	-	-	2,514

Table 2. Distribution of Income and Retirement Assets

Household Income		Total Retirement Assets	
Less than $25,000	0.5%	Less than $25,000	4%
$25,00 to $49,999	7%	$25,000 to $99,999	11%
$50,000 to $74,999	18%	$100,000 to $249,999	17%
$75,000 to $99,999	15%	$250,000 to $499,999	20%
$100,000 to $149,999	27%	$500,000 to $999,999	23%
$150,000 to $249,999	22%	$1 million or more	26%
$250,000 or more	11%		

Note: 2,297 observations for household income and 2,140 for total retirement assets.

Table 3. Participation in healthcare and retirement programs.

Retirement Plan Participation	Percent	Retiree Health Benefit Participation	Percent
Defined Benefit Plan	35.2%	Long-term Care Insurance	21.1%
Defined Contribution Plan	42.5%	Retiree Health Savings Account	4.6%
Individual Retirement Account	52.7%	Spouse/Partner's Retiree Healthcare Plan	9.0%
Retiree Health Savings Plan	5.1%	Previous Employer's Retiree Healthcare Plan	8.9%
Health Savings Account	13.7%	Current Employer's Retiree Healthcare Plan	63.0%
After Tax Brokerage	16.6%	No Retiree Health Benefit	13.7%
Keogh	4.1%	Prefer not to answer	6.0%
No DC or DB Plan	22.4%		
Prefer not to answer	9.6%		

Notes: 2,438 observations for retirement plan participation and 1,904 for health benefit participation

Table 4. Financial Acumen of our sample

Distribution of answers to financial literacy questions

	Responses			
	Correct	Incorrect	DK	Blank/PNA
Compound interest	56.0%	22.2%	12.9%	8.8%
Inflation	68.4%	14.6%	9.6%	7.4%
Stock risk	73.7%	4.3%	14.6%	7.4%

Joint probabilities of being correct on financial literacy questions

	All three	Only two	Only one	None	Interest & Inflation
Proportion	43.6%	26.2%	14.9%	15.3%	47.3%

Note: DK = "I don't know". PNA = "I prefer not to answer". 2,532 observations.

Table 5. Reported concern of out-of-pocket medical expenses in early years and later years of retirement.

Percentages by Row	**Later years of retirement**					
Early years of retirement	Very concerned	Somewhat concerned	Not concerned	Don't know/haven't thought	Total	Obs
Very concerned	93.8%	6.0%	0.0%	0.2%	100%	514
Somewhat concerned	27.4%	71.0%	0.6%	1.0%	100%	1,039
Not concerned	2.5%	46.4%	47.2%	3.9%	100%	763
Don't know/haven't thought	3.6%	14.4%	3.6%	78.4%	100%	139
Total	32.2%	46.6%	15.1%	6.1%	100%	2,455

Percentages by Column	**Later years of retirement**				
Early years of retirement	Very concerned	Somewhat concerned	Not concerned	Don't know/haven't thought	Total
Very concerned	60.9%	2.7%	0.0%	0.7%	20.9%
Somewhat concerned	36.0%	64.6%	1.6%	6.7%	42.3%
Not concerned	2.4%	31.0%	97.0%	20.0%	31.1%
Don't know/haven't thought	0.6%	1.7%	0.3%	72.7%	5.7%
Total	100%	100%	100%	100%	100%
Observations	791	1,143	371	150	2,455

Excludes answers of "I prefer not to answer" to either survey question, which were 28 for Early years of retirement and 30 for later years of retirement.

Table 6. Reported concern of chronic of end-of-life health care costs.

Concern because of end-of-life/chronic health costs					
	Overall	Health Status		Gender	
		Excellent or Very Good Health	Good, Fair, or Poor Health	Men	Women
Very concerned	21.9%	17.7%	28.8%	14.2%	27.4%
Somewhat concerned	48.7%	49.6%	47.8%	51.9%	46.5%
Not concerned	14.3%	17.5%	9.5%	21.1%	9.5%
Don't know/haven't thought about it	15.0%	15.3%	14.0%	12.9%	16.6%
Observations	2453	1489	938	1026	1427
		Age		Income	
		Over 65	65 or younger	At least $150k/yr	Below $150k/year
Very concerned		14.6%	24.2%	15.1%	26.1%
Somewhat concerned		49.3%	48.5%	48.7%	48.7%
Not concerned		25.2%	10.9%	22.9%	50.4%
Don't know/haven't thought about it		10.9%	16.4%	13.3%	16.1%
Observations		596	1857	942	1511

Table 7. Regression analysis of overall concern about health care costs in retirement.

Concerned about having sufficient resources to pay for your out-of-pocket						
	(1)	(2)	(3)	(4)	(5)	(6)
Age	-0.043***	-0.042***	-0.041***	-0.043***	-0.043***	-0.043***
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
Married	-0.095	-0.079	-0.074	-0.063	-0.059	-0.063
	(0.121)	(0.122)	(0.123)	(0.124)	(0.124)	(0.124)
Assets/$10,000	-0.007***	-0.007***	-0.007***	-0.006***	-0.006***	-0.006***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Income >=$150,000	-0.702***	-0.720***	-0.718***	-0.768***	-0.766***	-0.770***
	(0.110)	(0.111)	(0.111)	(0.114)	(0.114)	(0.114)
Female	0.487***	0.501***	0.493***	0.521***	0.702***	0.522***
	(0.110)	(0.111)	(0.111)	(0.112)	(0.185)	(0.112)
White	-0.011	0.004	0.000	0.009	0.009	0.001
	(0.149)	(0.149)	(0.150)	(0.152)	(0.152)	(0.152)
Inflation & Interest Correct	-0.107	-0.081	-0.079	-0.083	-0.086	-0.086
	(0.136)	(0.137)	(0.138)	(0.140)	(0.141)	(0.140)
Very good or excellent health	-0.614***	-0.602***	-0.606***	-0.621***	-0.623***	-0.622***
	(0.108)	(0.108)	(0.109)	(0.111)	(0.111)	(0.111)
Ever used tobacco	0.249**	0.237**	0.237**	0.276**	0.268**	0.276**
	(0.116)	(0.116)	(0.117)	(0.119)	(0.119)	(0.119)
Target retirement date		-0.230**	-0.195*	-0.132	-0.134	-0.128
		(0.109)	(0.110)	(0.111)	(0.111)	(0.111)
Save specifically for medical costs			-0.393***	-0.368***	-0.370***	-0.379***
			(0.132)	(0.133)	(0.133)	(0.133)
Qualify for retiree health benefits				-0.801***	-0.660***	-0.787***
				(0.111)	(0.163)	(0.113)
Qualify X Female					-0.269	
					(0.223)	
RHSP assets						0.157
						(0.191)
Constant	3.872***	3.935***	3.933***	4.478***	4.391***	4.434***
	(0.563)	(0.572)	(0.573)	(0.599)	(0.601)	(0.599)
N	2,000	1,987	1,986	1983	1,983	1,983
pseudo R-sq	0.125	0.128	0.131	0.151	0.152	0.151

Dependent variable: concerned about overall health costs in retirement. Logit regression with robust standard errors in parenthesis. ***, **, and * indicates significance at the 1%, 5%, and 10% level, respectively.

Table 8. Regression analysis of concern due to chronic or end-of-life health care costs.

Concern about running out of money because of chronic or end-of-life retiree health care costs						
Dep Var: end-of-life concern Logit: 1=Very concerned, somewhat concerned, 0=not concerned/don't know/haven't thought/prefer not to answer						
	(1)	(2)	(3)	(4)	(5)	(6)
Age	-0.015*	-0.015*	-0.014*	-0.015*	-0.015*	-0.016**
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
Married	-0.045	-0.049	-0.052	-0.039	-0.044	-0.016
	(0.110)	(0.110)	(0.110)	(0.111)	(0.111)	(0.112)
Assets/$10,000	-0.004***	-0.004***	-0.004***	-0.004***	-0.004***	-0.003***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Income >=$150,000	-0.291***	-0.282***	-0.282***	-0.301***	-0.301***	-0.299***
	(0.100)	(0.101)	(0.101)	(0.101)	(0.101)	(0.102)
Female	0.158	0.173*	0.167*	0.181*	0.074	0.200**
	(0.100)	(0.100)	(0.100)	(0.100)	(0.160)	(0.101)
White	0.302**	0.275**	0.277**	0.305**	0.307**	0.296**
	(0.123)	(0.123)	(0.124)	(0.124)	(0.124)	(0.126)
Inflation and Interest correct	0.386***	0.373***	0.373***	0.379***	0.381***	0.427***
	(0.112)	(0.113)	(0.113)	(0.114)	(0.114)	(0.116)
Very good or excellent health	-0.401***	-0.420***	-0.420***	-0.427***	-0.426***	-0.408***
	(0.096)	(0.097)	(0.097)	(0.097)	(0.097)	(0.099)
Ever used tobacco	0.253**	0.216**	0.217**	0.220**	0.223**	0.224**
	(0.105)	(0.105)	(0.106)	(0.106)	(0.106)	(0.107)
Target retirement date		0.297***	0.307***	0.329***	0.330***	0.332***
		(0.094)	(0.094)	(0.095)	(0.095)	(0.097)
Save specifically for medical costs			-0.132	-0.122	-0.121	-0.106
			(0.121)	(0.121)	(0.121)	(0.125)
Qualify for retiree health benefits				-0.187*	-0.282*	-0.186*
				(0.096)	(0.145)	(0.098)
Qualify x Female					0.168	
					(0.192)	
HSA						-0.258*
						(0.133)
RHSP assets						0.020
						(0.178)
Constant	1.583***	1.457***	1.443***	1.551***	1.607***	1.562***
	(0.488)	(0.490)	(0.491)	(0.494)	(0.499)	(0.505)
N	2,463	2,448	2,446	2,438	2,438	2,371
pseudo R-sq	0.035	0.039	0.039	0.041	0.041	0.043

Dependent variable: Very concerned or somewhat concerned about chronic of end-of-life health care costs. Logit regressions with robust standard errors in parenthesis. ***, **, and * indicates significance at the 1%, 5%, and 10% level, respectively.

Table 9. Regression analysis of saving specifically for medical costs.

Saving specifically for out-of-pocket health costs in retirement						
Dep Var: Save specifically for retirement						
Logit with robust standard errors in parenthesis						
	(1)	(2)	(3)	(4)	(5)	(6)
Age	0.023***	0.023**	0.015	0.016	0.025**	0.026**
	(0.009)	(0.009)	(0.010)	(0.010)	(0.011)	(0.011)
Married	0.024	-0.012	0.050	0.055	0.016	0.029
	(0.129)	(0.130)	(0.141)	(0.142)	(0.148)	(0.149)
Assets/$10,000	0.000	0.000	-0.000	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Income >=$150,000	0.056	0.090	0.041	0.055	-0.001	0.019
	(0.123)	(0.125)	(0.139)	(0.139)	(0.143)	(0.144)
Female	-0.257**	-0.261**	-0.140	-0.145	-0.128	-0.137
	(0.119)	(0.120)	(0.132)	(0.132)	(0.136)	(0.136)
White/Caucasian	-0.078	-0.134	-0.095	-0.086	-0.128	-0.113
	(0.148)	(0.150)	(0.166)	(0.167)	(0.174)	(0.173)
Inflation & Interest correct	0.057	-0.004	-0.030	-0.020	-0.111	-0.093
	(0.140)	(0.141)	(0.156)	(0.157)	(0.164)	(0.166)
Very good or excellent health	0.075	0.030	-0.113	-0.115	-0.151	-0.141
	(0.114)	(0.116)	(0.126)	(0.126)	(0.130)	(0.131)
Ever used tobacco	0.013	-0.026	0.017	0.016	0.071	0.072
	(0.124)	(0.125)	(0.135)	(0.135)	(0.140)	(0.140)
Target retirement date		0.738***	0.717***	0.693***	0.746***	0.751***
		(0.129)	(0.143)	(0.144)	(0.146)	(0.146)
Concern for medical costs			-0.406***	-0.379***	-0.394***	-0.394***
			(0.132)	(0.133)	(0.137)	(0.137)
Qualify for retiree health benefits				0.183	0.241*	0.259*
				(0.130)	(0.137)	(0.137)
RHSP Assets					0.485**	0.468**
					(0.210)	(0.212)
HSA					1.078***	1.085***
					(0.157)	(0.158)
Defined Contribution						-0.072
						(0.136)
Defined Benefit						-0.205
						(0.136)
Constant	-2.984***	-3.353***	-2.550***	-2.756***	-3.449***	-3.407***
	(0.581)	(0.601)	(0.691)	(0.701)	(0.734)	(0.728)
N	2,460	2,446	1,986	1,983	1,932	1,932
pseudo R-sq	0.009	0.026	0.028	0.029	0.059	0.060

Robust standard errors in parenthesis. ***, **, and * indicates significance at the 1%, 5%, and 10% level, respectively.

Table 10. How individuals plan to pay for out-of-pocket health costs in retirement.

Stated likelihood on using the following programs to pay for out-of-pocket health costs in retirement				
	Social Security	Defined Benefit Plan	Annuity	RHSP
Very Likely	45.7%	28.0%	22.1%	14.4%
Likely	38.1%	32.7%	36.1%	22.4%
Not Likely	11.1%	23.1%	24.8%	36.0%
Don't Know	5.1%	16.3%	17.0%	27.1%
Obs	2,434	1,862	1,756	1,530
	Retirement Plan Assets	Other Savings	Family	
Very Likely	32.9%	26.8%	2.9%	
Likely	39.1%	40.7%	6.4%	
Not Likely	12.7%	19.2%	74.5%	
Don't Know	15.3%	13.3%	16.2%	
Obs	1,931	1,807	1,367	

Table 11. Reliance on (non)guaranteed income sources by financial literacy results

% expecting to rely on the following to pay for retiree health care costs:	*Performance on three question financial literacy quiz*				
	All three correct	Inflation & Interest correct	Stock Risk Correct	Only one correct	None correct
Retirement Plan Assets	80.7%	76.8%	78.3%	64.0%	44.1%
Social Security	84.8%	76.8%	78.3%	84.3%	77.6%
Annuity	43.9%	44.0%	42.8%	41.4%	27.6%

Table 12. Regression analysis of reliance on guaranteed income to pay for health costs in retirement.

Which resource(s) do individuals plan to rely on to pay for medical costs in retirement								
	Rely on Gauranteed Income					Rely on:		
						Social Security	Benefit Plan	Annuity
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Age	0.025*	0.032**	0.032**	0.031*	0.030*	0.051***	0.032***	0.042***
	(0.013)	(0.016)	(0.016)	(0.016)	(0.016)	(0.013)	(0.011)	(0.010)
Married	-0.034	0.018	0.022	0.061	0.022	0.107	-0.024	0.263**
	(0.166)	(0.205)	(0.204)	(0.206)	(0.207)	(0.163)	(0.137)	(0.134)
Assets/$10,000	-0.002	-0.003*	-0.003*	-0.003**	-0.002*	-0.002	-0.008***	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)
Income >=$150,000	-0.388**	-0.246	-0.245	-0.244	-0.308	-0.247	-0.230*	-0.195
	(0.153)	(0.190)	(0.190)	(0.195)	(0.196)	(0.154)	(0.138)	(0.133)
Interest and Inflation correct	0.758***	0.674***	0.683***	0.715***	0.685***	0.385**	-0.183	0.424***
	(0.151)	(0.187)	(0.187)	(0.187)	(0.189)	(0.167)	(0.150)	(0.145)
Female	0.087	0.186	0.189	0.221	0.240	0.102	0.057	0.008
	(0.155)	(0.187)	(0.188)	(0.188)	(0.189)	(0.153)	(0.128)	(0.125)
White	0.449***	0.430**	0.435**	0.430**	0.364*	0.068	-0.355**	-0.013
	(0.165)	(0.204)	(0.203)	(0.205)	(0.207)	(0.182)	(0.170)	(0.157)
Save specifically for medical costs		0.072	0.063	0.058	0.093	-0.236	0.185	0.507***
		(0.221)	(0.222)	(0.222)	(0.225)	(0.166)	(0.160)	(0.158)
Concern for medical costs		0.594***	0.604***	0.562***	0.576***	0.869***	0.154	-0.079
		(0.183)	(0.187)	(0.189)	(0.190)	(0.148)	(0.133)	(0.132)
Qualify			0.039	-0.012	-0.087	-0.311**	0.497***	0.305**
			(0.177)	(0.182)	(0.183)	(0.152)	(0.128)	(0.122)
HSA				0.043	0.027	0.063	-0.129	-0.134
				(0.247)	(0.248)	(0.191)	(0.162)	(0.164)
RHSP assets				-0.502*	-0.484*	-0.069	-0.180	-0.097
				(0.278)	(0.280)	(0.250)	(0.216)	(0.212)
Defined Benefit					0.795***	-0.009	1.328***	0.248**
					(0.207)	(0.143)	(0.133)	(0.124)
Defined Contribution					0.151	0.053	0.240*	0.286**
					(0.179)	(0.142)	(0.124)	(0.122)
Constant	0.051	-0.652	-0.658	-0.596	-0.689	-1.910**	-1.657**	-2.970***
	(0.788)	(1.004)	(1.010)	(1.024)	(1.025)	(0.822)	(0.688)	(0.680)
N	2,482	1,974	1,970	1,917	1,917	1,871	1,444	1,360
pseudo R-sq	0.029	0.035	0.035	0.037	0.052	0.049	0.099	0.039

Logit specifications with robust standard errors in parenthesis. ***, **, and * indicates significance at the 1%, 5%, and 10% level, respectively. In Models 1-5 the dependent variable equals 1 if an individual plan to rely (indicated "Very Likely" or "Likely" on any form of guaranteed income (social security, defined benefit plan, or an annuity) to pay for medical costs in retirement and 0 otherwise. In Models 6-8 the dependent variable equals 1 if an individual indicated they plan to rely on the respective form of guaranteed income and 0 if they selected "Not Likely" or "Don't Know".

Table 13. Regression analysis of reliance on non-guaranteed income to pay for health costs in retirement.

Which resource(s) do individuals plan to rely on to pay for medical costs in retirement								
						Rely on:		
	Rely on non-Gauranteed Income					Retirement Plan Assets	RHSP	Other Savings
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Age	0.002	-0.008	-0.008	-0.003	-0.000	0.029***	-0.023**	0.017*
	(0.008)	(0.009)	(0.009)	(0.009)	(0.009)	(0.010)	(0.012)	(0.010)
Married	0.142	0.162	0.154	0.131	0.116	0.115	0.155	0.235*
	(0.109)	(0.125)	(0.125)	(0.129)	(0.129)	(0.139)	(0.151)	(0.134)
Assets/$10,000	0.003*	0.004*	0.003*	0.003	0.003	0.004**	-0.000	-0.000
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)
Income >=$150,000	0.463***	0.423***	0.439***	0.461***	0.429***	0.293**	-0.014	0.381***
	(0.114)	(0.133)	(0.134)	(0.137)	(0.138)	(0.141)	(0.151)	(0.141)
Interest and Inflation correct	0.726***	0.739***	0.744***	0.681***	0.614***	0.764***	-0.013	0.518***
	(0.114)	(0.132)	(0.132)	(0.136)	(0.135)	(0.148)	(0.167)	(0.148)
Female	-0.190*	-0.157	-0.163	-0.147	-0.133	-0.353***	-0.109	-0.052
	(0.108)	(0.124)	(0.124)	(0.126)	(0.127)	(0.134)	(0.144)	(0.133)
White	0.355***	0.454***	0.445***	0.384***	0.360**	0.359**	-0.676***	0.506***
	(0.123)	(0.141)	(0.141)	(0.145)	(0.146)	(0.160)	(0.168)	(0.156)
Save specifically for medical costs		1.190***	1.200***	1.093***	1.101***	0.565***	1.080***	1.001***
		(0.198)	(0.201)	(0.207)	(0.208)	(0.185)	(0.165)	(0.186)
Concern for medical costs		-0.257**	-0.206	-0.182	-0.191	-0.079	0.094	-0.383***
		(0.127)	(0.128)	(0.130)	(0.131)	(0.139)	(0.149)	(0.137)
Qualify			0.272**	0.317***	0.292**	0.308**	1.096***	-0.196
			(0.116)	(0.120)	(0.120)	(0.130)	(0.150)	(0.128)
HSA				0.742***	0.723***	0.072	1.137***	0.109
				(0.227)	(0.227)	(0.191)	(0.175)	(0.192)
RHSP assets				0.767***	0.813***	0.484**	1.130***	0.381
				(0.260)	(0.264)	(0.246)	(0.231)	(0.237)
Defined Benefit					0.105	-0.038	0.032	0.293**
					(0.124)	(0.132)	(0.142)	(0.133)
Defined Contribution					0.556***	0.575***	-0.018	0.458***
					(0.127)	(0.132)	(0.138)	(0.131)
Constant	-0.006	0.603	0.434	0.087	-0.241	-2.229***	0.052	-1.468**
	(0.496)	(0.590)	(0.597)	(0.614)	(0.616)	(0.688)	(0.735)	(0.673)
N	2,482	2,012	2,008	1,955	1,955	1,532	1,213	1,438
pseudo R-sq	0.052	0.080	0.083	0.093	0.103	0.107	0.132	0.085

Logit specifications with robust standard errors in parenthesis. ***, **, and * indicates significance at the 1%, 5%, and 10% level, respectively. In Models 1-5 the dependent variable equals 1 if an individual plan to rely (indicated "Very Likely" or "Likely" on any form of guaranteed income (social security, defined benefit plan, or an annuity) to pay for medical costs in retirement and 0 otherwise. In Models 6-8 the dependent variable equals 1 if an individual indicated they plan to rely on the respective form of guaranteed income and 0 if they selected "Not Likely" or "Don't Know".