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HOW WELL DO RETIREES ASSESS THE RISKS THEY FACE IN RETIREMENT?

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Introduction

Planning for retirement has always been hard, because retirees face numerous risks – including outliving their money (longevity risk), investment losses (market risk), unexpected health expenses (health risk), the unforeseen needs of family members (family risk), and even retirement benefit cuts (policy risk). The questions are: 1) How important are these risks? and 2) Do retirees properly perceive these risks when making their consumption and investment decisions?

To answer these questions, this *brief*, which is based on an earlier paper, systematically values and ranks the impacts of these various risks from both the objective and subjective perspectives.[1] That is, it quantifies the magnitude of the *objective* risks that retirees face, repeats the exercise for retirees' *subjective* perceptions of the risks, and then compares the two. The analysis, which uses data from the *Health and Retirement Study,* involves constructing a lifecycle optimization model to quantify each risk by estimating how much wealth retirees are willing to give up to insure against it.

The discussion proceeds as follows. The first section presents the background on risks in retirement. The second section discusses the data and methodology. The third section presents the results, showing a significant disconnect between actual and perceived risk. The biggest risk in the objective ranking is lon-

gevity risk, followed by health risk and market risk. At the top of the subjective ranking is market risk, which reflects retirees' exaggerated assessments of market volatility. Perceived longevity risk and health risk rank lower, because retirees are pessimistic about their survival probabilities and often underestimate their health costs in late life. The final section concludes that retirees' misunderstanding of the importance of various retirement risks highlights the need for more education and provides unique insight into the need for lifetime income, either through Social Security or annuities, which hedge both longevity and market risks.

Risks in Retirement

The five major risks identified in recent studies are:

1. Longevity Risk: The risk of living longer than expected and exhausting one's resources.

2. Market Risk: Since most people now save through 401(k) plans, retirees face the risk associated with market volatility. They also face risks in the housing market, because few downsize after retirement.

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3. Health Risk: Retirees also may have unexpected medical expenses and long-term care needs. Out-of-pocket expenses rise quickly with age, and health costs in retirement have increased substantially over the past few decades.

4. Family Risk: This risk, which has received increasing attention, includes divorce, death of a spouse, and adult children becoming ill or unemployed. This risk might be harder to manage than the longevity, market, and health risks because it could have an effect over a longer period of time.

5. Policy Risk: Social Security is the primary income source for most retirees, and the program's trust fund reserves are projected to be depleted in 2035. Therefore, without any policy changes, everyone would experience a 20- to 25-percent benefit reduction after that point.[5]

This study: 1) systematically and simultaneously values and ranks the financial impacts of these risks within a unified framework; and 2) measures risk from both the *objective* and *subjective* perspectives. The following describes the steps required for such an exercise.

Data and Methodology

This study mainly uses data from the *Health and Retirement Study* (HRS), a biennial longitudinal survey of a representative sample of U.S. households over age 50. The survey interviews approximately 20,000 respondents every two years on subjects like health care, housing, assets, pensions, employment, and disability. It is the most comprehensive survey of older Americans, and the economic measures captured by the survey data are considered very high quality.[6]

The analysis involves constructing a lifecycle optimization model for a retired household, similar to that commonly used in the literature. In the model, at age 65, the household holds housing wealth, retirement savings, and other financial wealth (liquid assets). At the beginning of each year, the retiree needs to decide: 1) how much to withdraw from retirement accounts; 2) how much to consume of liquid assets; and 3) the share of assets held in risky investments. During each year, the retiree faces the five risks as discussed above.

Solving this model produces an optimal pattern of consumption and investment over retirement. This optimal pattern can be assigned an "expected lifetime utility," which serves as the benchmark. Then, to quantify each source of risk, the model is rerun removing one source of risk at a time. For example, longevity risk is removed by fixing the life span at average life expectancy. When this risk is eliminated, a person needs less wealth to achieve the benchmark level of expected lifetime utility. The exercise is done first using the objective risk distributions from empirical data and then using the subjective risk distributions from the HRS.

Quantifying Initial Retirement Wealth

Wealth includes: 1) housing wealth, calculated as the gross value of the primary residence less any relevant mortgages and home loans; 2) retirement savings, calculated as the total balances of all 401(k)-type plans and IRAs; and 3) other financial wealth, calculated as the sum of the values of stocks, bonds, mutual funds, checking, savings, and money market accounts, certificates of deposit, and government savings bonds – minus debts.[7]

Quantifying Objective Risks

For the objective risks, the study relies on several sources of data, as summarized below.

Survival Probabilities: The mortality data come from the gender-specific cohort life tables used in the *2019 Social Security Trustees Report,* for the cohort age 65 in 2020.

Market Volatility: This measure comes from the Wilshire 5000 Price Index for equities and the S&P/Case-Shiller Home Price Index for house prices. For simplicity, bonds are assumed to earn a real risk-free return equal to 1 percent.[8]

Medical Spending: The HRS collects medical expenditure data through both the regular interviews in the core surveys and through the exit surveys, which cover medical costs in the last years of life. Medical expenditures are defined as the sum of what the individual spends out of pocket on insurance premiums, drugs, hospital stays, nursing home care, doctor visits, dental visits, and outpatient care, excluding expenses covered by public or private insurance.

Family Transfers: Family transfers involve giving money, helping pay bills, or covering specific costs for medical care, insurance, schooling, a down payment on a house, rent, etc. The HRS survey collects the amount given and received by children, parents, other relatives, and friends. The net transfer is the sum of total money transferred out of the retired household less the total amount received by the retired household. Roughly one-third of households ages 65+ make family transfers over a two-year period, mainly by giving money to children.

Policy Changes: It is difficult to model Social Security benefit reform because of the lack of historical data. Therefore, this project relies on Social Security history and expert opinions for predictions. In the objective settings, the benefit reduction is modeled as a one-time delay in the annual cost-of-living adjustment (COLA) that randomly happens between now and 2035.

Quantifying Subjective Expectations of the Risks

The HRS asks respondents to assess the probability of various outcomes. The respondents give a number from 0 to 100 where 0 means absolutely no chance and 100 means absolutely sure to happen. The following discusses the questions for each retirement risk source in this analysis.

Survival Probabilities. This question depends on the respondent's current age. If the age is less than 65, the question is asked for the chance of living to age 75; if the age is 65-69, the target age asked is age 80, and so on.[9] Table 1 shows the average subjective probability of 65-69-year-olds living to age 80, compared with the empirical life table probabilities. Individuals are pessimistic.[10] For example, the probability for a woman between ages 65 and 69 of living to age 80 is 75-78 percent, but women of this age have an average expectation of only 64 percent.

TABLE 1. PROBABILITY OF LIVING TO AGE 80 FOR INDIVIDUALS AGES 65-69 IN 2016

	Average expectation	Expectation implied by life table	
		At age 65	At age 69
Men	58%	66%	70%
Women	64	75	78

Sources: University of Michigan, *Health and Retirement Study* (HRS) (2016); and author's calculations.

Market Volatility. The HRS has elicited respondents' beliefs about stock returns since 2002 by asking the probability that stocks will be worth more next year than they are today.[11] In addition, since 2010, respondents have been asked two more questions: the chance of gaining 20 percent or more over the next year and the chance of losing 20 percent or more. On balance, individuals' expectations about volatility are much larger than the volatility of actual returns for the Wilshire 5000 Price Index, which bounces between the plus- and minus-20-percent range but generally stays positive.

Similar questions for respondents' expectations of their home value have been asked since 2010. Rather than asking everyone whether prices will be 20 percent higher and 20 percent lower, the HRS randomly assigns to respondents one of eight future values: gain/fall more than 10, 20, 30 and 40 percent compared to what it is worth today. Similar to the stock market responses, the house price responses show a significant overestimation of market volatility.

Medical Spending. HRS respondents are asked the probability of spending $1,500 or more in the coming year. Depending on their answer, they are then asked about other thresholds such as $500, $3,000, and $8,000. Table 2 shows, for men, the average subjective expectations for various spending thresholds by age group.[12] Surprisingly, expectations barely change as age increases, suggesting that older people underestimate medical spending and younger people overestimate it.

TABLE 2. SUBJECTIVE EXPECTATION OF MEDICAL SPENDING IN THE NEXT YEAR FOR MEN

Age	Spend $1,500+	Spend $3,000+	Spend $8,000+
65-69	44.2%	25.7%	11.7%
70-74	45.1	25.9	12.3
75-79	43.1	24.6	11.8
80-84	42.9	25.5	12.4
85+	41.6	26.1	13.7

Source: HRS (2010-2016).

Family Transfers. Similar to medical spending, the HRS has a series of questions based on the initial response. The first HRS question pertains to the chance of giving/receiving financial help of $5,000 or more in *the next 10 years.* In 2004 and 2006, other

thresholds such as $1,000, $10,000, and $20,000 or more were asked based on the answers to previous questions.[13] Unfortunately, the transfer expectation was removed in the 2008 and later surveys. Based on 2006 data, individuals underestimate the possibility of a family transfer.[14]

Policy Changes. For the subjective expectation of a Social Security benefit reduction, the HRS questions are slightly different depending on whether the respondent is receiving a benefit now or will receive one in the future. The relevant question for this exercise is respondents' expectations that the benefit they receive from Social Security will be cut at some point over the next 10 years. The average answer is about a 40-percent chance in the 2016 HRS, which is somewhat lower than other surveys.[15]

With these measures of objective and subjective risk in hand, the next step is to solve the benchmark models and then to re-solve the models removing one risk at a time: 1) the longevity risk is removed by fixing the life span at average life expectancy; 2) the market, health, and family risks are each removed independently by using the mean level to replace the random shocks; and 3) the policy risk is removed by restoring the original COLA. After solving the model with one of the risks removed, the risk-averse retiree will be better off and have a higher expected lifetime utility. The final step is to translate the change in utility into "utility-equivalent wealth." That is, as the result of removing one risk, risk-averse retirees could give up a portion of their initial retirement wealth and maintain the same lifetime utility level.

Results

The ranking of objective risks by utility-equivalent wealth for single men is shown in Table 3. The three main sources of objective risk, from highest to lowest, are longevity, health, and market. It is not surprising that longevity risk tops the list, because it affects the planning horizon for the retirement period. The result indicates that a person would be willing to give up 27 percent of his initial wealth to eliminate longevity risk. Interestingly, this value is close to the 30 percent suggested in the literature.[16] Health risk ranks second, mainly due to the unpredictability of medical expenditures in late life, particularly the cost of long-term care. Market risk is third, thanks to retirees' relatively long – about 20 years – investment horizon. One big reason the policy risk is small is that Social Security reform is unlikely to have a significant impact on people who have already retired.

TABLE 3. OBJECTIVE RISK RANKING FOR SINGLE MEN

Ranking	Source	Value
1	Longevity risk	27.2%
2	Health risk	14.0
3	Market risk	10.8
4	Family risk	3.2
5	Policy risk	0.1

Source: Author's calculations.

The risk ranking for married couples, shown in Table 4, mirrors the result for singles. Because of the existence of the spouse, the relative value of the risks is larger overall. For example, a couple would be willing to give up 33 percent of their initial wealth to avoid longevity risk – compared to the 27-percent figure for a single man.

TABLE 4. OBJECTIVE RISK RANKING FOR MARRIED COUPLES

Ranking	Source	Value
1	Longevity risk	33.4%
2	Health risk	28.5
3	Market risk	22.2
4	Family risk	9.1
5	Policy risk	0.1

Source: Author's calculations.

To complete the analysis, Table 5 shows the risk ranking for single men from the subjective model. Given the large volatility of subjective expectations,

TABLE 5. SUBJECTIVE RISK RANKING FOR SINGLE MEN

Ranking	Source	Value
1	Market risk	31.0%
2	Longevity risk	14.6
3	Health risk	9.6
4	Family risk	1.1
5	Policy risk	0.3

Source: Author's calculations.

it is not surprising that market risk is now at the top of the list. The health risk is not as large as in the objective ranking, because retirees significantly underestimate their medical expenses in old ages. Due to the pessimistic and relatively certain subjective life expectancy compared to what the life table implies, the magnitude of the longevity risk is smaller in the subjective analysis – equal to just 15-percent of initial wealth. A shorter expected life span also intensifies the market risk expectation because of a shorter investment horizon and reduces the subjective health risk due to a lower chance of facing the uncertain medical expenses in late life.

Conclusion

Planning for retirement has always been challenging because retirees face numerous risks and may not perceive them accurately. This study develops a lifecycle model of a typical retired household facing five categories of risk from both the objective and subjective perspectives. The biggest risk in the objective ranking is longevity risk, followed by health and market risks. In contrast, the subjective rankings show that market risk tops the list, which reflects retirees' exaggerated assessments of market volatility. Perceived longevity risk and health risk rank lower, because retirees are pessimistic about their survival probabilities and often underestimate their health costs in late life.

The implications of this analysis are threefold. First, retirees do not have an accurate understanding of their true retirement risks. This finding highlights the importance of educating the public on the most significant sources of risk. Second, this analysis confirms the importance of longevity and market risk, underscoring the need for lifetime income either through Social Security or private sector annuities. Finally, long-term care is also a significant risk faced by retirees, but one they often underestimate. Better designed public programs and private products, possibly integrated with life annuities, could be encouraged to protect retirees with limited financial resources from this potentially catastrophic risk.

Endnotes

1 Hou (2020).

2 Munnell, Chen, and Siliciano (2021).

3 Society of Actuaries (2018).

4 See Prudential Financial (2018) and Massachusetts Mutual Life Insurance (2018).

5 Another example of policy risk, not covered here, is changes in tax policy, which could affect retirees' income by changing their tax burden.

6 See French, Jones, and McCauley (2017).

7 For households where debt exceeds wealth, the measure of non-401(k) financial wealth is allowed to be negative. Similarly, for households where mortgage debt exceeds equity, housing wealth is allowed to be negative.

8 This assumption is consistent with most recent academic research and projections from the industry. For example, see Horneff, Maurer, and Mitchell (2018) and Morningstar (2018).

9 Due to the high frequency of focal point responses, since 2006, the HRS has used a control question for respondents who answer 50 percent to understand whether this answer expresses epistemic uncertainty. This study exploits that question by recoding the answers as missing unless they are confirmed as equally likely. The control question asks "Do you think that it is about equally likely that you will die before age X as it is that you will live to age X or beyond, or are you just unsure about the chances, or do you think no one can know these things?" The missing answers are recoded as "unsure," "can't know," "don't know," and "refused to answer."

10 This pessimism is not surprising, because parental longevity has been shown to be an important source of subjective life expectancy (Griffin, Loh, and Hesketh 2013). For HRS participants who were around age 65 in 2016, the average age of parental death was about 76.5, which is very close to the participants' subjective estimation of their own longevity.

11 As a proxy for the stock market, the question asks about the mutual fund shares invested in blue chip stocks like those in the Dow Jones Industrial Average. Similar to the survival probability questions, a control question was added in 2006 for respondents who answer 50 percent. In the 2008 HRS only, this follow-up question is added to respondents who answer 0 percent and 100 percent as well. In 2002, a question for 10 percent or more was added in the survey. In 2008, one of the eight questions – market gains/losses of 10/20/30/40 percent or more – was randomly assigned to respondents. Since these questions only appear in one year of the survey, this study excludes them from the analysis.

12 Statistics by gender and survey years are similar. See Appendix Table A5 in Hou (2020) for details.

13 For example, if the respondent answers "less than 30-percent chance" to the question of $5,000 or more, then the question of $1,000 will be asked; if the answer is greater than 30 percent, the follow-up question is $10,000. Because those questions are asked only under certain conditions, this analysis excludes them.

14 This finding is consistent with Merrill Lynch and Age Wave (2016).

15 See Walker, Reno, and Bethell (2014) and Parker, Morin, and Horowitz (2019).

16 See Mitchell et al. (1999) and Milevsky and Huang (2018).

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