Understanding Longevity Risk Annuitization Decision-making: An Interdisciplinary Investigation of Financial and Nonfinancial Triggers of Annuity Demand

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Background and Motivation

- The Annuity Puzzle
  - Economists' rational expected utility models say people should fully annuitize wealth at retirement. (Under this model, for maximal lifetime utility of consumption you want the last of your money to run out exactly at death having no shortfall or excess.)
  - TIAA-CREF's second "Lifetime Income" study (March, 2015): 84% of respondents say receiving a guaranteed monthly paycheck during retirement is important yet only 14% purchased an annuity.
  - People are reluctant to annuitize and do not fully annuitize!
  - And, those that do annuitize only partially annuitize their wealth.
- Are the people getting it wrong or is the economists' model getting it wrong?

Presentation Purpose

- Provide a model of retirement annuity demand that includes bequest motives, government assistance, longevity changes, and health shock cost preparedness effects
- Present related empirical primary exploratory research
- Discuss the importance of multi-method synergistic research: Combining mathematical econometric modeling and behavioral science methodology
- Since our ultimate focus is a new mathematical model of annuity demand, we present that last. We begin with our empirical behavioral research to understand "***WHY does the Annuity Puzzle exist***"?

Why Talk to Customers When Model Developing?

Insurance, reinsurance, and actuarial science depend on sales to survive.

To facilitate exchange in the marketplace, a goal of "marketing" in its broadest meaning, the firm needs to ***understand the customer and target market***.

Behavioral science and ***listening*** to customers and relevant target markets have a role in understanding behavioral decision-making (as do mathematical models).

Behavioral Science Research Purpose

To explore potential annuity consumers' attitudes, beliefs and behavior around annuity purchase (or not)

We did this using a Focus Group Technique

What is a Focus Group?

- Qualitative research technique commonly used
- 8-12 people in a discussion focus group
- Lead by an impartial moderator following a discussion guide developed with researchers
- *Goal*: Open group discussion of topic relevant to the research--decision often influenced by others (e.g., annuity purchase)

Methodology

Two 1.5 hour focus groups were conducted with a total of 19 participants in Austin, Texas, on December 2, 2014, recruited to be within retirement age by a professional research firm

Combined Focus Group Composition (N=19)

- Aged 60-73 years
- Nine were female
- Eight were 65 or older and eleven were younger than 65 (over 59)
- Fifteen were married and seventeen had children
- Seven participants were employed full-time, six identified themselves as retired, and six participants said they had a combination of employed and retired (including part-time employment)

Strict Questioning Protocol Used

- It was critical to find out what people knew about annuities without initially giving information that may influence responses.
- In professional participant recruiting, respondents were not told the research involved annuities, only that the purpose was related to retirement. Groups were not recruited to be retired or not.
- Focus groups began with general questions about retirement planning to see if "annuity" was mentioned—***It was not***. Not ever—not salient or in the "evoked set" of retirement financing options! (Economic models often assume full information.)
- Half hour into discussions, "annuity" was defined and people asked if they knew of them. Of course, most did not and began recalling.

Results

"They do not know if it is a car with two, three or four wheels and they are not sure how many wheels a car actually has".

Statement in Moderator's Summary

Participants' Prior Experience and Behavior

- Three participants had annuities and tried to explain them to others. One had bad advice from a salesperson in cashing in her annuity.
- Two saw annuities useful and would not fully annuitize.
- The remainder were very uninformed, uneducated, vulnerable to negative media/press and investment advisors as well as skeptical of purchase.
- Insurance companies had a very bad image and reputation with the group and so did their products.

Focus Groups Identified Decision Factors

- Did not want to tie up a lump sum
- If money is annuitized might be 10-40% of disposable wealth
- Poor health and long-term care concerns are annuity demotivators
- Wanted to leave money to others—bequest motive
- Respected financial advisors very often recommend against buying annuities so discarded as retirement planning alternative
- Articles on retirement talk about annuity scams and negative press
- Fees perceived to be too high
- Viewed as more risky than other options—lack of control
- Annuities could also be used to protect bequest
- Social security not good option, yet is available for retirement

Can We Improve Current Econ Models?

- What are forces influencing annuity demand that might explain the Annuity Puzzle? Why are people not annuitizing? Can we bring the model more in line with observed annuitization behavior?
  - We incorporate some of the demand factors into the rational utility model to make it more consistent with market behavior:
    - Bequest motive demand impacts (negative annuitization impact)
    - Consumers' perceived need to prepare for possible health shocks (reserve liquid funds for emergencies by not fully annuitizing)
    - Current health status annuity demand impact (if you think you are quite ill you will be less likely to annuitize) and expected transitions among health states
    - Social programs provide safety net (e.g., Social Security, welfare) lowering demand
    - Longevity expectations impact demand, direction depends on health state

Our Basic Model Characteristics and Assumptions

- Health dynamics and health costs (from Ameriks et al. 2011)
  - Four health states: good health (s=1); incurring medical problems but requiring no long-term care(s=2); long-term care(s=3); and death (s=4)
  - Health status follows a Markov chain with an age-varying one-period state transition matrix
  - The health cost (H): \$1000 in state 1; \$10,000 in state 2; \$50,000 in state 3; 0 in state 4 (ignore costs of death)

Further Assumptions

- Mortality projections use Lee-Carter model
  - Annuity: Actuarially fair immediate annuity at retirement (say, at age 65), providing income Y_n in period n
  - Investment alternative: Risk-free bond with return R_f and risky asset with return $\tilde{R}$ (~ Lognormal)
  - Consumption floor and public long-term care (Ameriks et al. 2011): In health states 1 and 2, provided with consumption floor C^f; while in state 3, provided with minimal level of consumption C^{PC}, $C^f \geq C^{PC}$

Further Model Assumptions

- CRRA utility over consumption

$$u(c) = \frac{c^{1-\gamma}}{1-\gamma}$$

- Bequest utility

$$V(B) = \frac{\omega}{1-\gamma}(\varphi + \frac{B}{\omega})^{1-\gamma}$$

- Parameters calibrated so the ending probabilities of state 4 in the transition matrix, become identical to the HMD mortalities

Optimal Decision Model

- Optimization Problem

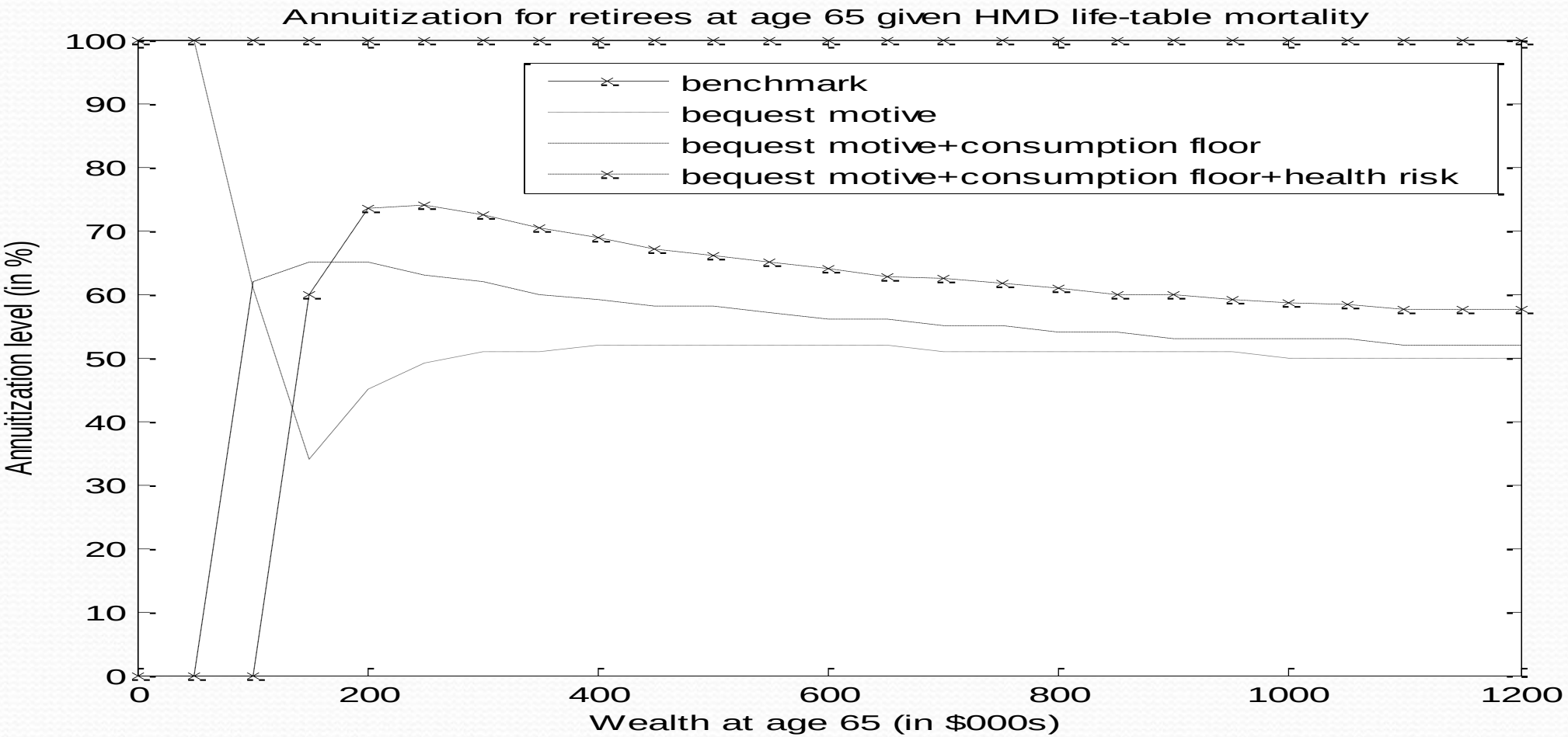
$$U_n(s_n, W_n) = \begin{cases} \max_{C_n}[u(C_n) + \beta E_n U_{n+1}(s_{n+1}, W_{n+1})] & \text{if } s_n < 4; \\ v(B_n) & \text{if } s_n = 4. \end{cases}$$

s.t. budget constraint

$$W_{n+1} = \begin{cases} (W_n + Y_n - H(s_n) - C_n)(R_n^f + (\tilde{R}_{n+1} - R_n^f)w_n) & \text{if } I_n^G = 0; \\ 0 & \text{if } I_n^G = 1. \end{cases}$$

$I_n^G = 1$ if $C_n < C^f$ in states 1 and 2, or $C_n < C^{PC}$ in state 3

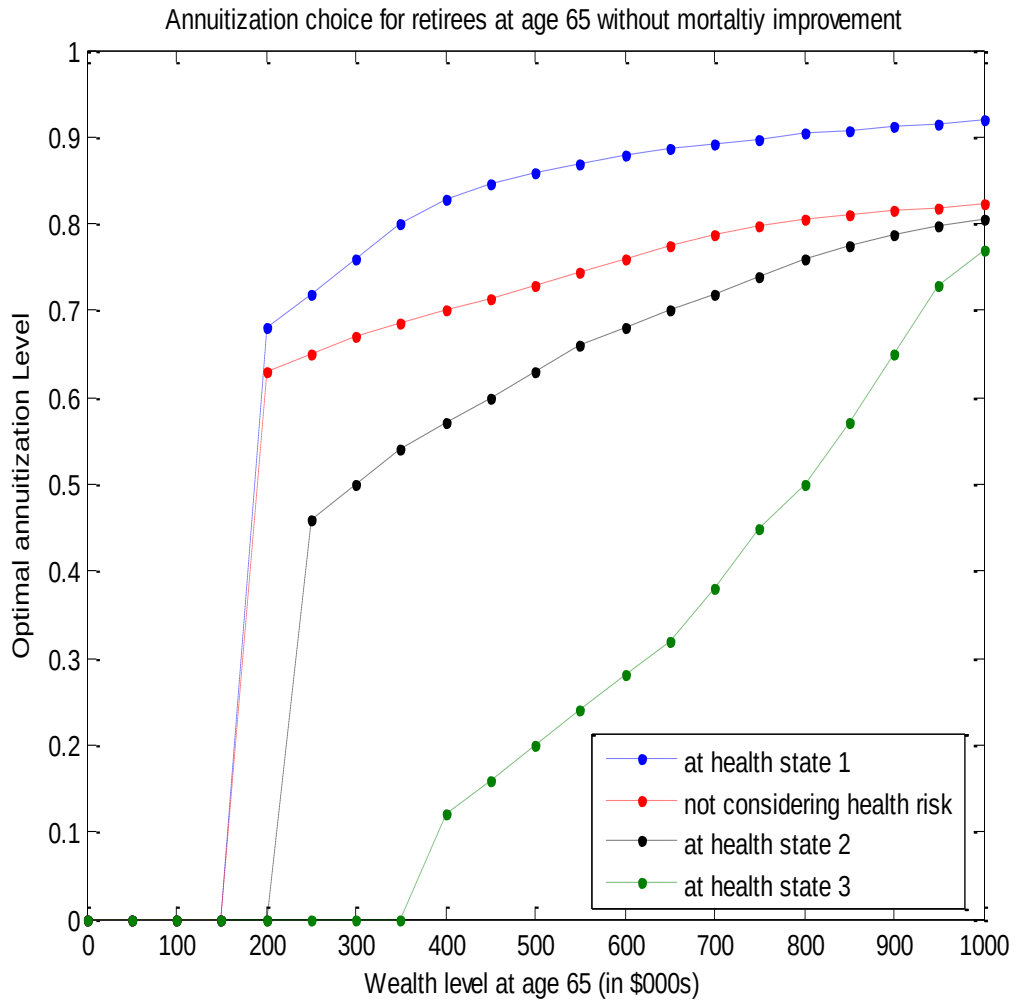
Results of Adding Information



- In this figure, the horizontal axis and vertical axis represent the retirees' wealth level and the optimal annuitization level respectively.

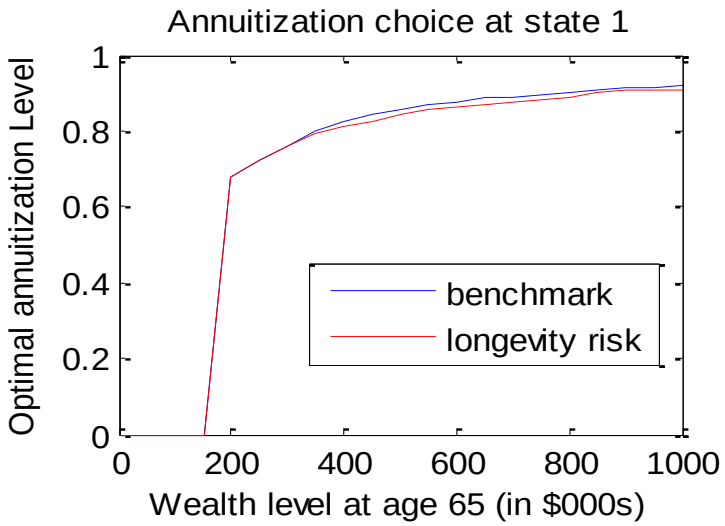
Still does not provide the explanation as to why people do not annuitize more

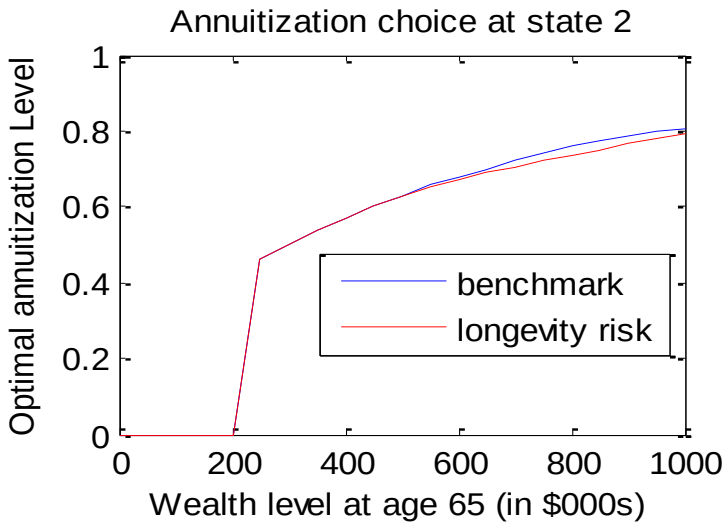
Basic Model Insights

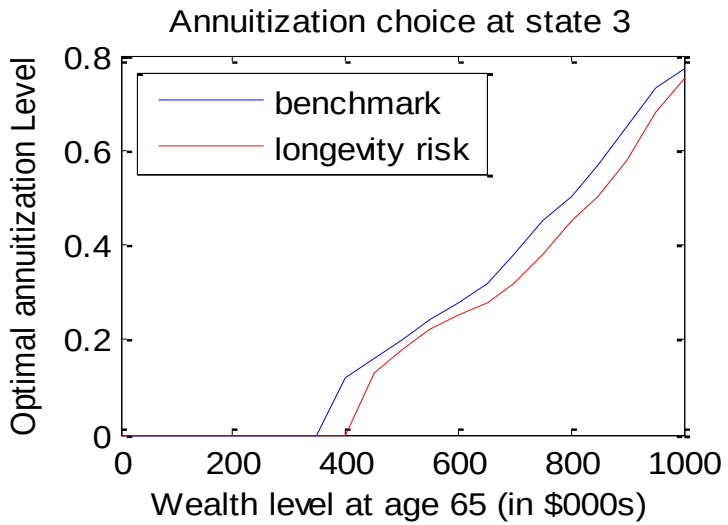


- Adverse selection
  - More annuitization with lower health risk
- Consumption floor and public healthcare
  - Low-wealth people prefer not to purchase annuity. The worse the health, the more so.
- The impact of bequest motive
  - Optimal annuitization level is less than 1 in the case not considering health risk

Basic Results







- Prefer to purchase less annuity as longevity risk is taken into account. The higher the health risk is, the more so.

Conclusions From Adding to the Utility Model

- Our additions improve the annuity model fit
- Still does not fully explain the annuity puzzle
- Still not in line with what is seen in the marketplace
- How do we incorporate other revealed drivers of demand?

Include Distrust and Lack of Knowledge

- We found general distrust and lack of knowledge about annuities
  - AARP/ACLI(2007) study also showed general consumer distrust.
  - Market lack of knowledge of annuities and unfamiliar terminology cause confusion which may deter purchase.
  - Try incorporating heterogeneous population model with mixed levels of annuity knowledge reflective of market segments
- Consumers did not understand complex annuities
  - Kasten and Kasten (2011) explain that normal aging negatively affects the capability to make financial decisions in an increasingly complex retirement planning environment. Annuities are very complex instruments, hence more avoided.
  - How to incorporate complexity avoidance into model?

Next Steps

- Survey based empirical analysis
  - Explore existing NIA funded HRS survey (secondary data)
  - Extend model and simulation assumptions: Heterogeneous knowledge population, Include different costs of annuity vs investing, Make costs within health stages stochastic- more risk
  - Include behavioral and perceptual factors influencing annuity demand: Framing matters (consumption view vs, investment view), Complexity avoidance

Thank You