Long Term Care Utility and Long Term Care Insurance: Using Strategic Survey Questions to Estimate and Test Life Cycle Models

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- Standard behavioral data too limited

- Elevates economic analyst (EC) over DM

- Economic Data Engineer to rebalance

- "Where EC was, there DM shall be"

- Samuelsonian RP spiritual forebear

- Papers LTCU and LTCI with Ameriks, Briggs, Shapiro, and Tonetti (on Vanguard Research Initiative Website)

- SSQs add unobserved contingent strategies to the data set

  - Ameriks, Caplin, Laufer, van Nieuwerburgh (2011)

  - Barsky, Juster, Kimball, and Shapiro (1997) on preference parameters

  - Juster/Manski on probabilities

- Implementation in VRI

- Today: high level overview of method/results

  - 2 papers on my Website (under VRI) for analytics

- Late in life spending: little/no spend down
  - Sotto, Penner, and Smith (2009), Poterba, Venti, and Wise (2013)
  - Contra Modigliani-Brumberg
- Also annuity puzzle
  - Yaari (1965)
  - Benartzi, Previtero, Thaler (2011)
 - Beshears, Choi, Laibson, Madrian, Zeldes (2014)

- One contribution is LTC costs high

  - Brown and Finkelstein (2008)
  - De Nardi, French, and Jones (2010)

- Other is bequest motive

  - High (Kotlikoff and Summers (1981))
  - Luxury (De Nardi (2004))

- Hard to separate conceptually
  - Dynan, Skinner, and Zeldes (2002))
  - ACLvN confirm flat likelihood
- Relative importance debated
  - De Nardi, French, and Jones (2010) and ACLvN both operative
  - Lockwood (2014) linear bequest motive

- Current models asymmetric

- LTC as expense = cost shock

- Bequest as only residual motive

- In reality need health dependent utility
  - Koijen, Van Nieuwerburgh, and Yogo (2013)
  - Finkelstein, Luttmer, and Notowidigdo (2013)

- Need long-term care (LTC) if need help with the activities of daily living (ADL)

- ADL include: eating, dressing, bathing, walking across a room, and getting in or out of bed

- In U.S., public provision of long-term care when in need of help with ADL is complicated—LTC is not a typical health expenditure covered by Medicare
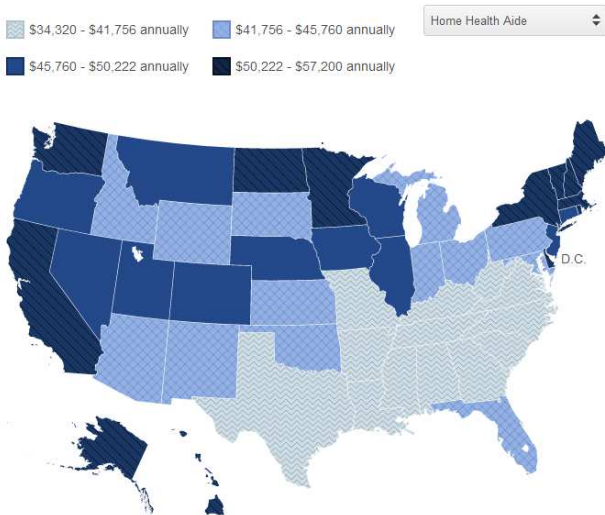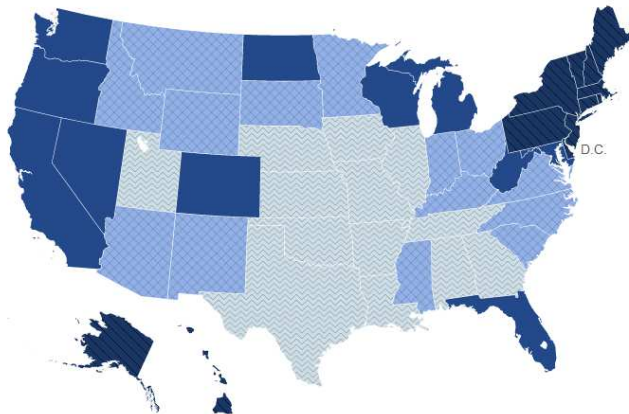
- Private LTC insurance held by less than 10% of population

  - Low demand for good available insurance product?

  - High demand for good unavailable insurance product?

- Long-term care insurance market

  - Escalating premiums

  - Poor reimbursement model

  - High loads

- Room for improvement?

  - Depends on counterfactual demand

- We introduce symmetric model

- Introduce LTC-state dependent utility

- Symmetric with bequest utility as in De Nardi (2004)

- Discrete ages $55 - 108$.

- When alive, choose c, e_{LTC}, assets, government care

- Bequest b at death residual (yields utility...)

- No borrowing

- State variables include assets at 55.

- Deterministic income profile

- Return $(1 + r)$ on savings.

- Health states:

  - Good health ($s = 0$)

  - Sick ($s = 1$)

  - Needs help with ADLs ($s = 2$)

    - Bathing, eating, dressing, walking across a room, getting out of bed, etc.

  - Dead ($s = 3$)

- Markovian evolution by age and gender

- $s = 0, 1 \implies$ CRRA parameter σ.

- When $s = 3$, De Nardi warm glow utility function,

$$v(b) = \frac{\theta_{beq}}{1 - \sigma} \left(b + \kappa_{beq} \right)^{1 - \sigma}.$$

- Symmetrically, when $s = 2$,

$$U(e_{LTC}) = \frac{\theta_{LTC}}{1 - \sigma} \left(e_{LTC} + \kappa_{LTC} \right)^{1 - \sigma}.$$

  - Impose minimum cost χ

- Key parameters, θ and κ;
    - θ affects the marginal utility
    - κ controls luxury or necessity.
    - Negative κ for necessity.

- Can always use government care:

  - Wealth set to zero

  - Get welfare consumption $c = \omega_G$ if healthy

  - Get public care consumption $e_{LTC} = \psi_G$ if need LTC

- Paper provides full recursive formulation

- Difficult to separately identify motives using standard HRS data on wealth (weak identification of preference parameters)

- Need to engineer questions to separate motives

- Need for appropriate sample

- Vanguard Research Initiative (VRI)

- Website: http://ebp-projects.isr.umich.edu/VRI/

- Logged onto Vanguard last six months.

- Minimum Vanguard assets $10,000 (pilot helpful)

- Stratify and invite based on the following characteristics:

  - Ages 55+

  - Individual and employer-sponsored accounts

  - Oversample administratively single

- Dillman letter to recruit

- Small rewards

- Survey 1 on demographics and wealth (verifications)

- Innovative measurement (paper Wealth of Wealthholders on website under VRI)

- Linked to account data

  - Used to validate the survey responses.

  - Mean wealth $840,000 employer sample, $1.1M individual sample

  - Portfolio details in paper

- Strategic Survey Questions (SSQs) are designed to provide data on preferences using answers to strongly identifying hypothetical questions

- The structure of SSQs:
  - describe hypothetical environment
  - describe hypothetical state
  - describe hypothetical future
  - describe hypothetical choice set
  - verify understanding
  - record a choice

- Illustrate for trade off ADL state $(s = 2)$ and healthy state $(s = 0)$

- Specify wealth (W), chance LTC needed $(1 - \pi)$

- Choice set: Arrow securities (x_1, x_2) given a relative price of x_2 (p_2)

    - In the survey, we set $p_2 = \frac{1}{1-\pi}$.

- The maximization problem:

$$\max_{x_1, x_2} \quad \pi \frac{x_1^{1-\sigma}}{1-\sigma} + (1-\pi) \frac{\theta_{LTC}(x_2 + \kappa_{LTC})^{1-\sigma}}{1-\sigma}$$

$$x_1 + p_2 x_2 \leq W$$

$$x_1, x_2 \geq 0; \ x_2 \geq -\kappa_{LTC}.$$

Suppose you are 80 years old, live alone, rent your home, and pay all your own bills. Now, suppose that there is a chance that you will need help with ADLs in the next year. If you need help with ADLs you will need long-term care.

- There is a **25%** chance that you **will** need help with ADLs for all of next year.

- There is a **75%** chance that you **will not** need any help at all with ADLs for all of next year.

You have **$100,000** to divide between two plans for the next year. This choice will affect your finances for next year alone. At the end of next year you will be offered the same choice with another $100,000 for the following year.

- Plan C is hypothetical ADL insurance that gives you money if you **do** need help with ADLs.
  - For every \$1 you put in Plan C, you will get **\$4** to spend if you need help with ADLs.
  - From that money, you will need to pay all your expenses including long-term care at home or in a nursing home and any other wants, needs, and discretionary purchases.

- Plan D gives you money only if you **do not** need help with ADLs.
  - For every \$1 you put in Plan D, you will get **\$1** to spend if you **do not** need help with ADLs.
  - From that money, you will need to pay for all of your wants, needs, and discretionary purchases.

Here are the rules for this scenario.

- You can only spend money from Plan C or Plan D next year. You do not have any other money.

- If you want to be able to spend whether or not you need help with ADLs, you need to put money into both plans.

- If you need help with ADLs, all money in Plan D is lost.

- If you do not need help with ADLs, all money in Plan C is lost.

- Any money that is not spent at the end of next year cannot be saved for the future, be given away, or be left as a bequest

- You must make your choice before you know whether you need help with ADLs. Once you make your choice, you cannot change how you split your money.

- Regardless of whether or not you need help with ADLs, your hospital, doctor bills, and medications are completely paid by insurance.

- Other than Plan C, you have no other resources available to help with your long-term care. **You** have to pay for any long-term care you may need from Plan C.

- There is **no public-care option or Medicaid** if you do not have enough money to pay for a nursing home or other long-term care.

- An impartial third party that you trust will verify whether or not you need help with ADLs immediately, impartially, and with complete accuracy.

Subset of stated comprehension questions:

- Money in Plan C is available
  - Only if you do not need help with ADLs
  - Only if you do need help with ADLs
  - Whether or not you need help with ADLs
  - Neither if you need help with ADLS or do not

- If you cannot take care of yourself next year, can anyone take care of you for free?
  - Yes
  - No

Click here for complete scenario

Please make your decision on splitting money into Plan C and Plan D by clicking on the scale below. To put more money in Plan C, move the slider to the left. To put more money in Plan D, move the slider to the right. The numbers in the boxes will change as you move the slider to let you know how much you will receive if you need long term care and if you do not.

Please move the slider to see how it works. When you are ready, place the slider at the split you want and click NEXT to enter your choice.

Plan C
$120,000

You will have the
above amount if you
need help with ADLs.

Plan D
$70,000

You will have the
above amount if you
do not need help with
ADLs.

- SSQ 3 on LTC vs. bequests

- Seek to specify the following optimization problem:

$$\max_{\{x_1, x_2 | x_1 + x_2 = W\}} \quad \frac{\theta_{LTC}(x_1 + \kappa_{LTC})^{1-\sigma}}{1 - \sigma} + \frac{\theta_{beq}(x_2 + \kappa_{beq})^{1-\sigma}}{1 - \sigma}$$

$$x_1, x_2 \geq 0; \ x_1 \geq -\kappa_{LTC}; \ x_2 \geq -\kappa_{beq}.$$

- Use $W = \$100,000; \$150,000; \$200,000$

Suppose you are 85 years old, live alone, rent your home, and pay all your own bills. You know with certainty that you will live for only 12 more months and that you will need help with *ADLs for the entire 12 months.

You have **$100,000** that you need to split into Plan E and Plan F.

- Plan E is reserved for your spending. From Plan E, you will need to pay all of your expenses, including long-term care and any other wants, needs, and discretionary purchases.

- Plan F is an irrevocable bequest.

Here are the rules for this scenario.

- You have no money other than the $100,000.

- Other than Plan E, you have no other resources available to help with your long-term care. You have to pay for any long-term care you may need from Plan E.

- Any money in Plan E that you do not spend cannot be given away or left as a bequest.

- You have full insurance that covers all of your hospital, doctor, and medications, but you have no long-term care insurance.

- There is no public-care option or Medicaid if you do not have enough money to pay for a nursing home or other long-term care.

- Explore credibility of SSQ responses

- As in Manski 2004 on probabilities, look for internal coherence.
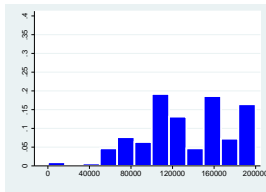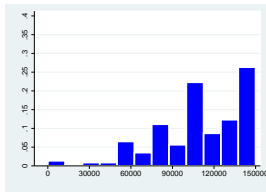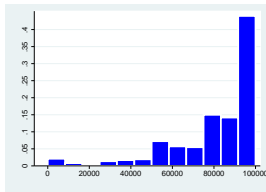
- Questions in distinct blocks.

- Find positive correlation within block, little between

- Direct comprehension questions well answered

- More than 90% no more than one error all questions (5-9) per SSQ

- Slider movements stored: initial clicks do little to predict final answers.

- Average survey time on order of 1 hour: most on SSQs

- Three interesting "post-survey" questions

Overall, how clear were the tradeoffs that the hypothetical scenarios asked you to consider?		Overall, how well were you able to place yourself in the hypothetical scenarios and answer these questions?		How much thought had you given to the issues that the hypothetical scenarios highlighted before taking the survey?	
Response	Percent	Response	Percent	Response	Percent
Very Clear	51.8	Very Well	23.1	A lot of thought	29.5
Somewhat Clear	39.7	Moderately Well	60.5	A little thought	52.1
Somewhat Unclear	7.4	Not very well	14.2	No thought	18.4
Very Unclear	1.1	Not very well at all	2.2		

- Regress responses on economic and demographic variables
- In 6/7/8 ADL state is recorded.
    - Having children less to ADL state (bequest motive)
    - Also ADL costs high more to ADL state
- Consistency passed for others also

- Estimation Methodology

- First Stage: Estimate parameters outside model

  - Income age-profile quintiles

  - Health state transitions (HRS data)

  - Health costs (HRS data)

- Second Stage: Match simulated model moments to data

  - Central case: match both wealth (25th, 50th, 75th percentiles by age) and SSQ moments (mean of survey responses normalized by dollars to allocate)

  - In second stage we treat first stage estimates as error-free
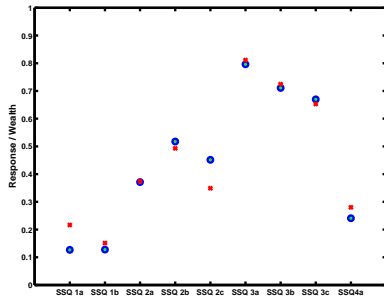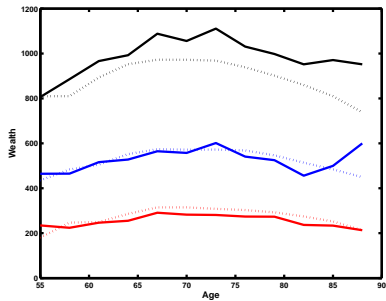
Model Fit When Jointly Targeting Wealth and SSQ Moments

- σ of 5.85 between DFJ behavioral (3.8) and KSS survey (8.2)

- MU very different when LTC needed

  - Necessary good spending floor of $-\kappa_{LTC} = \$45,000$ (above $40,000 set minimum)

  - $\theta_{LTC} = 1.57$ says MU higher than regular C also

- Bequest MU significantly lower

  - Slight luxury with $\kappa_{beq} = \$8,000$

  - $\theta_{beq} = 0.59$ says low MU

- Paper shows estimates based on SSQ alone and on wealth alone

- Very imprecise with wealth alone (ACLvN)

- Wealth only estimates miss on SSQs

- Believe DM or econometrician?

- LTC motives as drivers of late in life savings behavior if $Y \leq \$50,000$ and $W \leq \$400,000$ (majority of the US population).

- Bequest motives contribute only modestly to late in life savings.

- This is true whether targeting SSQ, wealth, or both sets of moments

- Relates to "Annuity Puzzle"

- Explain low demand for wealth below $Y \leq \$50,000$ and $W \leq \$400,000$

- Demand high above (our sample!)

- Also analyze demand for ADLI that pays out when $s = 2$.

- High interest regardless of motive

    - Direct if care about LTC

    - Indirect as bequest protection if care about bequests.

- Dig deeper in ABCST: "Long Term Care Insurance, Annuities, and the Under-Insurance Puzzle."

- Can estimate individual preference parameters using our SSQs (simple parameteric response error process assumed)

- Meaningful individual differences:

  - Those with children have stronger bequest motives

  - Those with higher opinions of the quality of public care assign a higher monetary equivalent to the public care option.

- Calculate model-implied demand for actuarially fair insurance

- VRI 2 includes analogous stated preference questions

- Follow test of comprehension of ADL and ADLI

- Price actuarially fair.

- Meaningful individual differences, but below model-implied demand

Please suppose that you are offered a hypothetical new form of insurance called ***ADL insurance** with the following features:

- You pay a one-time, nonrefundable lump sum to purchase this insurance.
- If you need help with activities of daily living (*ADLs), you will immediately receive a monthly cash benefit indexed for inflation.
- For each **$10,000** you pay for this insurance, you will receive $Y per month indexed for inflation in any month in which you need help with *ADLs
- The monthly cash benefit is set at the time of purchase and is not dependent on your actual expenses.
- There is **no restriction** on the use of the insurance benefits. You are free to use benefits in any way you wish: to pay for a nursing home; a nurse to help at home; for some other form of help; or in literally any other way you would like.
- An impartial third party who you trust will verify whether or not you need help with *ADLs immediately, impartially, and with complete accuracy.
- The insurance is priced fairly based on your gender, age, and current health.
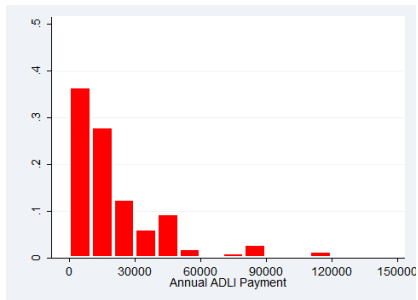- There is no risk that the insurance company will default or change the terms of the policy.
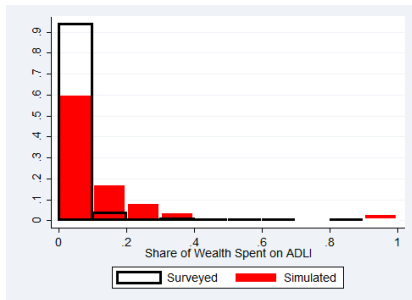
Figure: This figure omits the 71.2 percent of individuals with zero stated demand.

- Higher stated demand than observed holdings suggest

- Model overpredicts demand significantly

- Unfamiliarity?

- Repeat for actuarially fair ideal annuities (e.g. no risk of default)

- More extreme difference:
  - 90%+ estimated to be interested with big dollars
  - Less than 25% stated interest, small dollars

- llustrates the annuity puzzle in dramatic form

- Most VRI respondents can self insure against LTC out of the income from their annuity.

- With low bequest motive optimal to annuitize the bulk of their wealth

- Gap appears robust

- Want to know why model overpredicts demands so significantly

- Use difference in demand estimates to check for misspecification

  - Develop a method to detect systematic patterns:
  - $D_i - S_i = G(x_i, \Theta_i, q_i)$
  - $G(x_i, \Theta_i, q_i) \approx g_x(x_i) + g_\Theta(\Theta_i) + g_q(q_i)$
  - g_x, g_Θ non-parametrically approximated; g_q linear
  - $D_i - S_i = \beta^x C_i^x + \beta^\Theta C_i^\Theta + \Gamma q_i + \epsilon_i$

- A priori, the family is of interest given reduced form and small bequest motive (altruism?)

- VRI Survey 3 measures intergenerational transfers

	ADLI difference	Annuity difference
Transfers	0.348**	0.191**
	(.097)	(.070)
$\mathbb{I}_{Transfer>20k}$	13,889*	8,251
	(4,659)	(4,654)
$\mathbb{I}_{child}$	5,025	4,321
	(4,697)	(4,959)

Table: Bootstrap standard errors to account for preference parameters as generated regressors.

- Differences in model and stated ADLI demands are large and significant

  - Suggests existing LTCI products part of reason for low holdings and also that current models overpredict demand

- Difference is predicted significantly by the presence of intergenerational transfers

  - VRI 3, future work focuses on measuring and modeling transfers (Mi Luo)

- Evidence that model is missing a motive related to the family

  - Ongoing work is developing a model of the family and intergenerational concerns

- Method can be applied more generally

- Well known that workhorse model misses important features of data

    - How to develop richer models?

    - Observable vs. unobservable heterogeneity

    - Need better measures of important observables and methods to estimate unobservable heterogeneity