# Evaluating Long-Term Care Policy Options, Taking the Family Seriously

*CIRANO Workshop*:
*The Design and Evaluation of Long-Term Care Policy*

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# Our question

**What are the effects of LTC policies?**

- Evaluate policy options in the U.S. context based on . . .
  - Germany's public LTC insurance program, and
  - changes to the size in Medicaid spending
- . . . for:
  - families' behavior: will government insurance merely crowd-out family insurance?
  - labor supply of caregivers
  - the government budget
  - savings rates
  - welfare for young and old generations

# Our main contributions

- Document importance of family-provided care and its economic correlates using the HRS
- Build fully-dynamic non-cooperative model with altruistically- and exchange-motivated transfers

  $\Rightarrow$ allows for savings for both child and parent within family

  $\Rightarrow$ gives rise to variety of care arrangements and its financing
- Family as partial insurance against LTC risk

  $\Rightarrow$ implications for precautionary savings
- Calibrate model, using a quantitatively realistic life cycle, family, and risk structure

  $\Rightarrow$ analyze a set of policy reforms

  $\Rightarrow$ open up family margin in response to policy changes

# Data summary I

Sample: HRS (2000-2010) respondents with at least one helper due to functional limitations.

- Almost 2/3 of all hours of care are provided informally.
- Few heavy helpers provide lion's share of care:
  - Couple: spouse crucial.
  - Single: children and nursing homes are key.
- Determinants of informal care:
  - Presence of spouse/partner, children
  - Childrens' opportunity cost in labor market
  - Elderly's wealth in form of "threshold effect"

# Data summary II

Sample: *disabled* (90+ hours monthly care) widow(er)/single respondents

- Care arrangements:
  - 44.7% of respondents obtain informal care
  - 33.5% obtain Medicaid-financed nursing-home care
  - 21.8% are private payers of nursing-home care
- Typically one heavy-helper child (average age 48, female)
- Compensating (heavy-helper) children for informal care:
  - Co-residence common, typically a transfer to child
  - Signing over home ownership during lifetime
  - Potential bequests (protect assets from spend-down)

  $\Rightarrow$ Rationalize through intra-family bargaining channel
- Heavy help also takes place without measurable compensation

# Empirical motivation for modeling

Our data suggests a model in which:

1. IC is a feasible choice, though time intensive to provide
2. Vast majority of care goes to disabled elderly
3. One caregiver plays dominant role (spouse, child)
4. IC more likely with lower opportunity cost children
5. Caregiving children often receive compensation

# Demographics

Continuous-time overlapping-generations (OLG) model:

- Population growth rate $g$
- Individuals have **two life stages**:
  1. Kid: 35 to 65 years old.
  2. Parent: 65 to 95 years old.
- Each **family** consists of two decision units:
  1. **Parent** generation of age $j_p \in [65, 95)$.
  2. **Kid** generation of age $j_k = j_p - 30$.

# Parent generation

- Parent's state:
  1. age $j_p \in [65, 95)$,
  2. wealth $a^p \geq 0$,
  3. fixed productivity type $\varepsilon_p \in E \equiv \{e_1, \ldots, e_n\}$
  4. LTC state: $s \in \{0, 1\}$.

- Hazards:
  1. LTC: Start healthy, turn sick at hazard $\delta_s(j_p, \varepsilon_p)$. Sick state is absorbing.
  2. Death: Mortality hazard $\delta_d(j_p, \varepsilon_p, s)$
  3. Medical spending (non-LTC): event hazard $\delta_m(j_p, \varepsilon_p, s)$

- Parent household has $n^p(j_p, \varepsilon_p, s)$ members.
  - Always one female.
  - Husband dies alway slowly while $s = 0$, disappears when $s = 1$.
  - A measure of $s_m(j_p, \varepsilon_p)$ of males have LTC needs, while $s = 0$.
  - Of these, an exogenous fraction obtains IC from spouse.

# Kid generation

- Kid generation's state:
  1. age $j_k = j_p - 30$,
  2. wealth $a^k \geq 0$,
  3. productivity $\varepsilon_k \in E$.

- Poisson process for $\varepsilon_k$ with hazard matrix $\delta_\varepsilon$.

- Households:
  1. The **generation** consists of $1 + \nu$ **households**
  2. Each household consists of **two individuals**

- Kid generation's labor-earnings flow is:

$$wy(j_k, \varepsilon_k)\Big[\underbrace{\underbrace{\beta}_{\text{male}} + \underbrace{(1-\beta)\mathbb{I}(\text{marginal member works})}_{\text{female}}}_{\text{marginal hh}} + \underbrace{\nu}_{\text{infra-marginal hh}}\Big],$$

$y(j_k, \varepsilon_k)$: labor efficiency units,
$\beta \in [\frac{1}{2}, 1)$: male contribution to household income.

# Generational transition

Parents either die:

- Randomly at age $j_p < 95 \Rightarrow$ assets $a_p$ to kid generation.
- At age $j_p = 95$ with certainty.

**Generational transition** at $j_p = 95$:

1. Kid generation splits into $(1 + \nu)$ new parent households.
   - Keep last type: $\varepsilon_p = \varepsilon_k(65)$.
   - Split assets
2. Each new parent household is matched to new kid:
   - with same productivity
   - $j_k = 35$
   - $a_k = 0$

# Incomplete markets with altruistic agents

We build on `Barczyk & Kredler (2014a,b)`:

- $a^p, a^k$: Each generation saves in riskless asset
  - $r$: return
  - $\underline{a} = 0$: no-borrowing constraint
- $g^p, g^k \geq 0$: Agents can give **altruistically-motivated gifts** to each other
- **No commitment** to future actions $\Rightarrow$ **removes indeterminacy** in:
  - within-family wealth distribution
  - timing of transfers

$\Rightarrow$ **Equilibrium**: Gifts only flow when recipient is constrained.

# Care decision

When $s = 1$, family chooses one of the following (each instant):

1. $h = 1$: **Informal care (IC)**.
   - Both parent and kid have to agree.
   - Monetary transfer $Q \geq 0$ from parent to kid
     $\Rightarrow$ determined by Nash bargaining

2. $h = 0$: **Formal care**
   Once family chose $h = 0$, parent decides:

   a) $m = 1$: **Medicaid (MA)**.
      - Parent must hand in all remaining wealth and pension flow.
      - Government provides consumption floor $C_{ma}$.

   b) $m = 0$: Buy **privately-paid care (PP)** on market.

# Preferences: imperfect altruism

- Flow **felicity**:

$$u^k(c^k) = 2(1+\nu)u\left(\frac{c^k}{\phi(2)(1+\nu)}\right),$$

$$u^p(c^p; s, n^p) = \begin{cases} n^p u\left(c^p/\phi(n^p)\right) & \text{if healthy,} \\ u(c^p) & \text{if IC,} \\ u(c^p - \bar{C}_f) & \text{if PP,} \\ u(C_{ma}) & \text{if MA.} \end{cases}$$

  - $u(c) = c^{1-\gamma}/(1-\gamma)$ with $\gamma > 1$,
  - $\phi(n)$: household equivalence scale

- Both agents maximize expected flow **utility**, discounted at rate $\rho > 0$:

$$U^k = u^k(c^k) + \alpha^k u^p(c^p; \cdot), \qquad U^p = u^p(c^p; \cdot) + \alpha^p u^k(c^k).$$

where $\alpha^p, \alpha^k \in [0, 1]$.

# Production

There are two competitive sectors with constant-returns-to-scale technologies in labor:

1. consumption good (numeraire)
2. nursing homes: care services at price $p_{bc}$
   $\Rightarrow$ We interpret $p_{bc} + c^p$ as private-pay (PP) nursing-home expenditures.

# Government

The government runs a balanced budget with the following items:

1. Regular policy:
   1.1 Income taxation.
   1.2 Social-security contributions and benefits.
   1.3 Covering medical shocks for broke agents.
   1.4 Other expenditures (fixed).

2. LTC policy:
   2.1 $p_{bc} + y_{ma}$: expenditures for MA nursing-home slot.
   2.2 $s_{ic}$: IC subsidy (to caregiver)
   2.3 $s_{pp}$: PP subsidy (to parent)

# Timing protocol (at each $t$)

stage 1 Does IC generate surplus? Nash bargain pins down $Q \geq 0$

stage 2 Gift-giving, especially relevant if no IC

stage 3 No IC: parent decides Medicaid or private-pay nursing home

stage 4 Consumption-savings decision, unless Medicaid

# Hamilton-Jacobi-Bellman (HJB) equations

- States:
  1. $j$: parent's age
  2. $x = (a^k, a^p, \varepsilon^k, \varepsilon^p)$: family's financial state
  3. $s \in \{0, 1\}$: LTC need if $s = 1$
- If $a^p > 0$, $a^k > 0$ (no gifts, no Medicaid):

$$\rho V^k(j, x, 1) = V^k_j + \max_{c^k, h^k} \left\{ u^k(c^k) + \alpha^k u^p(c^p; \cdot) + \dot{a}^k V^k_{a^k} + \dot{a}^p V^k_{a^p} \right\} + JT^p,$$

$$\rho V^p(j, x, 1) = V^p_j + \max_{c^p, h^p} \left\{ u^p(c^p; \cdot) + \alpha^p u(c^k) + \dot{a}^p V^p_{a^p} + \dot{a}^k V^p_{a^k} \right\} + JT^k,$$

$$\text{s.t.} \qquad h = h^k h^p,$$

$$\dot{a}^k = ra^k + wy(j, \varepsilon^k)(1 + \nu) + h[Q + s_{ic} - (1 - \beta) w(j, \varepsilon^k)] - c^k,$$

$$\dot{a}^p = ra^p + n^p P(\varepsilon^p) - hQ - (p_f - s_{pp})(1 - h) - c^p - M^p.$$

- When healthy ($s = 0$): remove red terms, add terms for LTC hazard.
- Constrained case ($a^p = 0, a^k = 0$): also altruistic gifts $g^k, g^p$.

# Equilibrium definition

A recursive **Markov-perfect equilibrium** is given by value functions for the kid, $V^k$, and the parent, $V^p$, policy rules for the kid, $\{g^k, c^k\}$, and the parent, $\{g^p, m, c^p\}$, an informal-care (IC) rule, $h$, and a transfer function, $Q^*$, such that:

Given prices and a government policy, $\{s_{ic}, s_{pp}, C_{ma}\}$,

1. the value function $V^p$ satisfies the parent's HJB, the maximum being attained by the policies $\{g^p, m, c^p\}$, taking as given the kid's policy rules, $\{g^k, c^k\}$;
2. the value function $V^k$ satisfies the kid's HJB, the maximum being attained by the policies $\{g^k, c^k\}$, taking as given the parent's policy rules, $\{g^p, m, c^p\}$;
3. the IC decision rule, $h$, and the transfer rule, $Q^*$, are the Nash-bargaining solution between kid and parent.

# Characterizing the IC choice

Focus on case where both generations have positive wealth

$\Rightarrow$ conveys intuition for informal-care choice well

**Backward induction:**

stage 4 Consumption given by $c^i = (u_c)^{-1}(V^i_{a^i})$ for $i \in \{k, p\}$

stage 3 Medicaid is not chosen because $a^p > 0$

stage 2 Gifts are set to zero because $V^i_{a^i} > V^i_{a^j}$
`see Barczyk & Kredler (2014a,b)`

stage 1 ...

# Backward induction: stage 1

- Evaluate the HJBs using stage 2-4 for:
  1. informal care, $h = 1$, and arbitrary transfer $Q \geq 0$
  2. privately-paid care (PP), $h = m = 0$ and $Q = 0$

  $\Rightarrow$ subtract 2 from 1 to obtain surplus function

- Kid's surplus function from IC:

$$S^k(Q) = \underbrace{(Q + s_{ic})V^k_{a^k} + (\bar{C}_f + p_{bc} - s_{pp})V^k_{a^p}}_{\text{marginal benefit}} - \underbrace{(\Delta y_{ic} V^k_{a^k} + QV^k_{a^p})}_{\text{marginal cost}}.$$

- Special case 1: $\alpha^k = \alpha^p = 1$ (dynastic model)
  Dynasty chooses informal care iff $\bar{C}_f + p_{bc} - s_{pp} \geq \Delta y_{ic} - s_{ic}$.

- Special case 2: $\alpha^k = \alpha^p = 0$ (selfish OLG model).
  Selfish child provides care iff $Q + s_{ic} \geq \Delta y_{ic}$.

# Kid's reservation transfer

- The surplus $S^k$ is linearly increasing in $Q$.
- Solving $S^k(Q) = 0$ yields kid's *reservation transfer*:

$$\underline{Q}^k = \frac{(\Delta y_{ic} - s_{ic})V^k_{a^k} - (\bar{C}_f + p_{bc} - s_{pp})V^k_{a^p}}{\underbrace{V^k_{a^k} - V^k_{a^p}}_{>0}}$$

$\Rightarrow$ lowest $Q$ for which kid is willing to provide care

- $\underline{Q}^k$ is:

  1. increasing in $\Delta y_{ic}$ and $s_{pp}$
  2. decreasing in $p_{bc}$ and $s_{ic}$,
  3. decreasing in parent's IC preference $\bar{C}_f$.

# Parent's willingness to pay and bargaining result

- Parent's surplus function from informal care (IC):

$$S^p(Q) = \underbrace{(\bar{C}_f + p_{bc} - s_{pp})V^p_{a^p} + (Q + s_{ic})V^p_{a^k}}_{\text{marginal benefit}} - \underbrace{(QV^p_{a^p} + \Delta y_{ic} V^p_{a^k})}_{\text{marginal cost}}.$$

- The surplus $S^p$ is linearly decreasing in $Q$.
- Solving $S^p(Q) = 0$ yields the parent's *willingness to pay for IC*:

$$\bar{Q}^p = \frac{(\bar{C}_f + p_{bc} - s_{pp})V^p_{a^p} - (\Delta y_{ic} - s_{ic})V^p_{a^k}}{\underbrace{V^p_{a^p} - V^p_{a^k}}_{>0}}.$$

  $\Rightarrow$ highest $Q$ for which parent wants IC.
- $\bar{Q}^p$ is:
  1. increasing in IC preference $\bar{C}_f$,
  2. increasing in cost of formal care $p_{bc}$, and subsidy $s_{ic}$, and
  3. decreasing in kid's net-income loss $\Delta y_{ic}$ and $s_{pp}$.
- **IC takes place iff $\bar{Q}^p \geq \underline{Q}^k$**

Model calibration

# Calibration: direct identification

Estimate directly from HRS data:

- $\delta_s(j^p, \varepsilon^p)$: LTC hazards
- $\delta_d(j^p, \varepsilon^p, s)$: mortality hazards
- $\delta_m(j^p, \varepsilon^p, s)$: medical-event hazard rate; given event, out-of-pocket medical expenditures is drawn from $F_m(M)$ (excluding nursing home).
- $n^p(j^p, \varepsilon^p, s = 0)$: number of surviving men to determine HH size
- $s_m(j^p, \varepsilon^p)$: fraction of disabled married individuals. Of these, get fraction of disabled husbands who receive IC.

  $\Rightarrow$ care arrangements in couples

From government statistics:

- Medicaid reimbursement rate
- $p_{bc}$: care-related nursing-home cost
- Taxes and social-security system

Standard:

- $h_\varepsilon, E$: Productivity process (based on U.S. Census, 2000).

# Calibration targets and identification

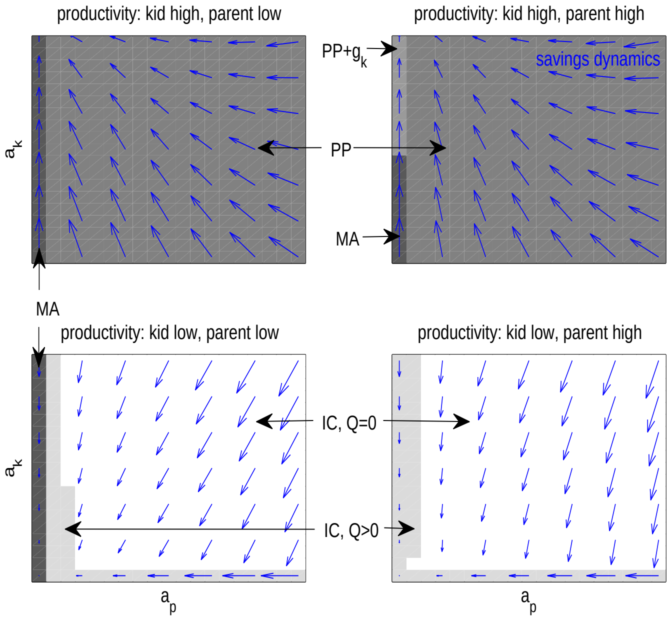
| Calibration target | Data | Model |
|---|---|---|
| Median wealth (ages 70-75) | \$178,600 | \$178,600 |
| Informal care | 44.7% | 44.7% |
| Total PP/MA spending | 0.821 | 0.821 |
| Parent (healthy) gift | \$1,548 | \$1,548 |
| Kid gift to parent (PP) | \$620 | \$620 |
| Exchange transfer | \$9,878 | \$9,878 |
| **Parameter** | **Description** | **Value** |
| $\rho$ | Discount rate | 0.1280 |
| $\bar{C}_f$ | Formal-care consumption penalty | \$4,050 |
| $C_{ma}$ | Medicaid consumption floor | \$4,650 |
| $\alpha^p$ | Parent altruism | 0.4781 |
| $\alpha^k$ | Kid altruism | $2.7 \times 10^{-4}$ |
| $\omega$ | Kid bargaining weight | 0.050 |

Notes: coefficient of relative risk aversion is $\gamma = 3.8$ following De Nardi et al. (2010)

- median wealth $\Rightarrow$ rate of time preference $\rho$
- percentage of IC recipients $\Rightarrow$ consumption penalty from nursing home $\bar{C}_f$
- ratio total PP/MA spending $\Rightarrow$ consumption floor $C_{ma}$
- mean gifts from and to healthy parents $\Rightarrow$ altruism $\alpha^k$, $\alpha^p$
- exchange transfer $\Rightarrow$ kid's bargaining weight $\omega$

# Results

# The model in action: care choices and dynamics



# Policy experiments I: Germany

Implement Germany's LTC policy (in year 2000 dollars):

(1) Informal care (IC) subsidy ($s_{ic}$), annual $4,375

(2) Private-payer (PP) subsidy ($s_{pp}$), annual $11,460

| | **Care type (%)** | | | **Costs (as $\Delta\tau$)** | | | | **Ex-ante CEV** | |
|---|---|---|---|---|---|---|---|---|---|
| **LTC policy** | IC | MA | PP | $\Delta\tau =$ | $\Delta\tau_s$ | $\Delta\tau_{ma}$ | $\Delta\tau_{inc}$ | short run | long run |
| Status quo | 44.7% | 33.5% | 21.8% | | | | | | |
| $s_{ic}\uparrow$ | 59.0 | 23.6 | 17.4 | 0.11 | 0.25 | -0.20 | 0.06 | **0.380** | **-0.033** |
| $s_{ic}\uparrow$ (to young) | 59.0 | 23.6 | 17.4 | -0.01 | 0.13 | -0.20 | 0.06 | 0.323 | 0.012 |
| $s_{pp}\uparrow$ | 23.6 | 32.1 | 44.3 | 0.22 | 0.32 | -0.03 | -0.07 | -0.098 | -0.275 |
| $s_{ic}\uparrow + s_{pp}\uparrow$ | 44.0 | 22.9 | 33.1 | 0.25 | 0.47 | -0.21 | -0.01 | **0.352** | **-0.193** |

Notes: IC = informal care; MA = Medicaid; PP = private payer

- $s_{ic}\uparrow$ crowds-in IC and crowds-out MA:
  - cost of subsidy $\Rightarrow$ tax hike
  - less reliance on Medicaid $\Rightarrow$ tax cut
  - less labor supply $\Rightarrow$ tax hike
- $s_{pp}\uparrow$ crowds-out IC but crowds-out MA only slightly
- $s_{ic}\uparrow + s_{pp}\uparrow$ leaves IC unchanged, crowds-out MA, crowds-in PP

# Policy experiments II: Changes to Medicaid

Changes to Medicaid: 20% change in $y_{ma}$

assumption: consumption-floor changes by the same percentage

| | Care type (%) | | | Costs (as $\Delta\tau$) | | | | Ex-ante CEV | |
|---|---|---|---|---|---|---|---|---|---|
| **LTC policy** | IC | MA | PP | $\Delta\tau =$ | $\Delta\tau_s$ | $\Delta\tau_{ma}$ | $\Delta\tau_{inc}$ | short run | long run |
| Status quo | 44.7% | 33.5% | 21.8% | | | | | | |
| MA↑ | 40.3 | 40.2 | 19.5 | 0.20 | | 0.21 | -0.01 | 0.111 | -0.361 |
| MA↓ | 50.1 | 25.5 | 24.4 | -0.22 | | -0.20 | -0.02 | -0.360 | 0.288 |
| MA↓+$s_{ic}$ ↑ | 62.8 | 18.1 | 19.2 | -0.03 | 0.26 | -0.34 | 0.05 | **0.221** | **0.300** |

Notes: IC = informal care; MA = Medicaid; PP = private payer

- MA↑ crowds-out IC but does not help to expand tax base from additional labor supply
- MA↓ crowds-in IC, tax rate falls – not enough to avoid welfare loss in short run
- MA↓ + $s_{ic}$ ↑ crowds-in IC, PP changes little, and crowds-out MA substantially!

# Changes to Medicaid: Current welfare

CEV for currently-alive generations (children and parents)

| | $MA\downarrow$ | | | | $MA\downarrow + s_{ic}\uparrow$ | | | |
|---|---|---|---|---|---|---|---|---|
| | *children* | | *parents* | | *children* | | *parents* | |
| group | average | % + for | average | % + for | average | % + for | average | % + for |
| all | -0.889 | 3.5% | -3.907 | 6.4% | +0.374 | 82.3% | +0.451 | 75.3% |
| below 80 | -0.415 | 7.1% | -3.269 | 6.5% | +0.367 | 91.5% | +0.571 | 77.0% |
| above 80 | -1.175 | 0.0% | **-5.728** | 6.2% | +0.566 | 88.7% | +0.109 | 70.7% |
| low-prod kid | -1.360 | 5.1% | -4.779 | 0.0% | +0.235 | 66.3% | +0.583 | 74.0% |
| high-prod kid | -0.415 | 1.5% | -2.864 | 15.3% | +0.484 | 94.3% | +0.736 | 78.1% |
| low-prod parent | -0.784 | 8.0% | **-6.896** | 0.1% | +0.377 | 85.0% | **-1.669** | 49.5% |
| high-prod parent | -0.478 | 1.0% | -1.240 | 14.7% | +0.387 | 92.0% | +2.340 | 97.6% |

Notes: average is over CEV. "% + for" means fraction out of the group with positive CEV.

- MA↓ widespread welfare losses especially for poor and old
- MA↓ + $s_{ic}\uparrow$ most welfare losses are undone. Exception: low productivity parents.

# Conclusions

- *Empirical*: Importance of informal caregiving and economic determinants of informal care in the U.S.
- *Theoretical*:
  1. Barczyk & Kredler (2014a,b):
     - **Determinacy** for intra-family wealth distribution and transfers
     - **Both agents** can save.
  2. This paper:
     - Calibrated quantitative OLG model
     - Both, altruistically-motivated **and** exchange-motivated transfers
     - Variety of empirically plausible **care arrangements**
- *Policy*:
  1. MA-spending-cut: increases IC and decreases payroll tax; disliked by current generations but liked by future generations
  2. MA-spending-cut with IC subsidy: strong increase in IC and large decrease in MA; **cheap policy**, liked by majority of current and future generations
  3. German-style policy (menu of IC and PP subsidy): very popular among current generations but largest tax hike. **Better**: only IC subsidy (PP subsidy benefit those who need it least)

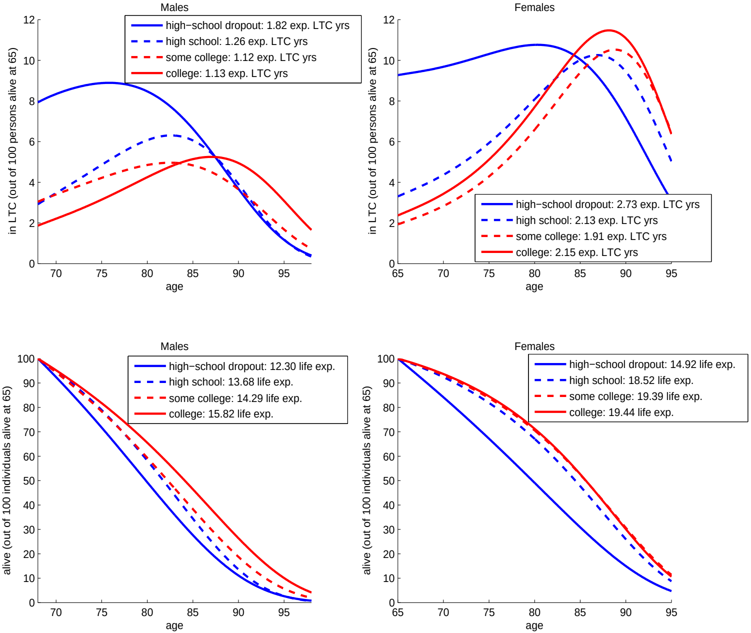
Extra slides

# Literature

1. Macro literature on old-age risks: no family
   - *Retirement savings puzzle*
     - Medical-expense risk
       Hubbard et al. (1995), DeNardi et al. (2010)
     - LTC is major uninsured financial risk
       Brown & Finkelstein (2007, 2008, 2011), Finkelstein & McGarry (2006)
     - *Medicaid aversion* (survey evidence)
       Ameriks et al. (2011)
     - Nursing-home risk drives precautionary savings
       Kopecky & Koreshkova (2014)
   - Analysis of Medicare and Medicaid policy
     Attanasio et al. (2011), DeNardi et al. (2013), Braun et al. (2015)
2. Applied micro literature: care crowds out labor supply of females ⇒ macro implications not studied
   Johnson & Sasso (2006), Van Houtven et al. (2013), Skira (2014)

⇒ **We aim to bring together 1. and 2.**

back


Males
high−school dropout: 1.82 exp. LTC yrs
high school: 1.26 exp. LTC yrs
some college: 1.12 exp. LTC yrs
college: 1.13 exp. LTC yrs
in LTC (out of 100 persons alive at 65)
0
2
4
6
8
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12
70
75
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85
90
95
age
Females
high−school dropout: 2.73 exp. LTC yrs
high school: 2.13 exp. LTC yrs
some college: 1.91 exp. LTC yrs
college: 2.15 exp. LTC yrs
in LTC (out of 100 persons alive at 65)
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age
Males
high−school dropout: 12.30 life exp.
high school: 13.68 life exp.
some college: 14.29 life exp.
college: 15.82 life exp.
alive (out of 100 individuals alive at 65)
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Females
high−school dropout: 14.92 life exp.
high school: 18.52 life exp.
some college: 19.39 life exp.
college: 19.44 life exp.
alive (out of 100 individuals alive at 65)
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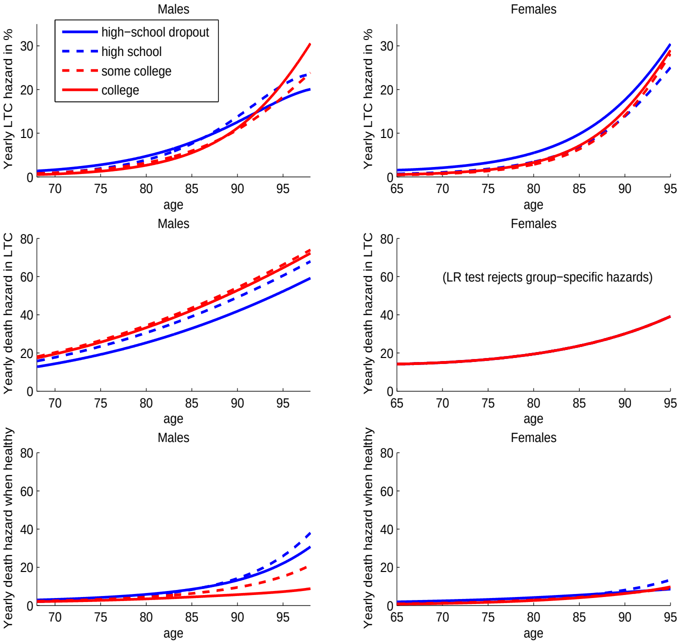
Males
Females
high−school dropout
high school
some college
college
Yearly LTC hazard in %
Yearly death hazard in LTC
Yearly death hazard when healthy
(LR test rejects group−specific hazards)
age
0
10
20
30
40
60
80
65
70
75
80
85
90
95

Table: Females: life expectancy at age 65 by educational attainment.

| Source | $<$ high school | high school | some college | college |
|---|---|---|---|---|
| Data | 14.92 | 18.52 | 19.39 | 19.44 |
| Model | 15.79 | 18.94 | 19.64 | 19.76 |

Table: Females: expected duration of LTC, conditional on LTC, by educational attainment.

| Source | $<$ high school | high school | some college | college |
|---|---|---|---|---|
| Data | 2.73 | 2.13 | 1.91 | 2.15 |
| Model | 2.35 | 1.98 | 1.83 | 2.05 |

Table: Males: life expectancy at age 65 by educational attainment.

| Source | $<$ high school | high school | some college | college |
|---|---|---|---|---|
| Data | 12.30 | 13.68 | 14.29 | 15.82 |
| Model | 12.86 | 13.94 | 14.60 | 16.03 |

Table: Males: expected duration of LTC, conditional on LTC, by educational attainment.

| Source | $<$ high school | high school | some college | college |
|---|---|---|---|---|
| Data | 1.82 | 1.28 | 1.12 | 1.13 |
| Model | 1.48 | 1.15 | 1.01 | 1.07 |