The Demand for Private Long-Term Care Insurance in Canada

Pierre-Carl Michaud

HEC Montreal, CEDIA and RAND

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Motivation

- Some provinces are aging rapidly with low economic growth to support it
- Demand for LTC will explode in decades to come
- Public provision limited by supply constraints
- Near absence of a private market for LTCI

This Project

- Use the framework proposed by Einav et al. (2010, QJE) to simulate equilibrium in a market with selection
- Counterfactual Simulations of a LTCI Market in Quebec
  - Construct LTC risk distribution from microsimulation model
  - Compute WTP for LTCI under various scenarios
  - Investigate cost structure of insurers as a function of market size
  - Derive predictions for equilibrium

LTC risks

- Use COMPAS, a dynamic microsimulation model (Boisclair et al., 2016):
  - representative of population aged 30+ in terms of risks
  - simulates health profile, including disability, 7 diseases (e.g. dementia and stroke) and mortality
  - simulates use of home care (formal) and institutionalization

LTC risks (2)

- We select population age 50 to 60 in 2010
- We obtain 100 draws from their :
  - prospective health
  - income
  - use of LTC (formal home care and institutionalization) until death

Prevalence of Risk by Age

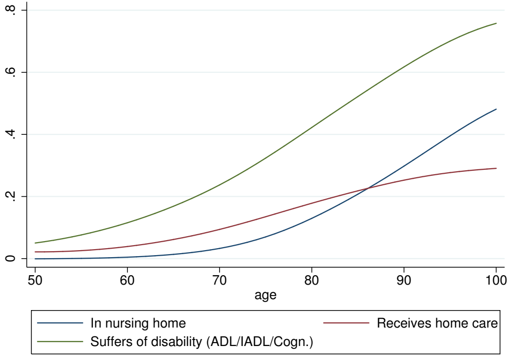

Figure: COMPAS Projections: Age 50-60 in 2010

Distribution of Longevity by 2010 Income

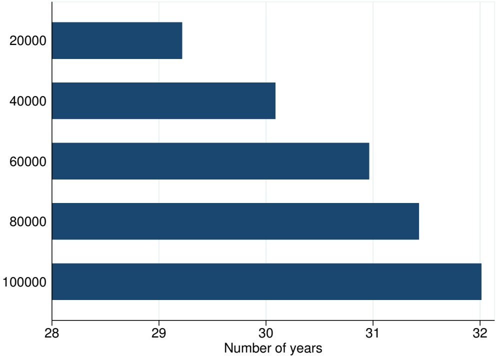

Figure: COMPAS Projections: Age 50-60 in 2010

Distribution of Disability by 2010 Income

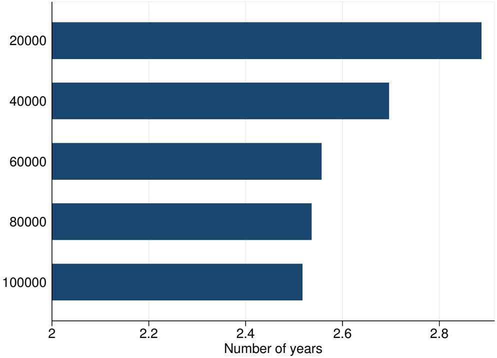

Figure: COMPAS Projections: Age 50-60 in 2010

Preferences

We assume that the agent has an iso-elastic utility function given by:

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

Preferences are DARA: for given risk, an increase in income should decrease demand for LTCI. Ambiguous since risk also depends on income (SES-health gradient).
He discounts annually at a rate β.

Private Insurance

Private insurance is heterogeneous. Most common product:

- pay a (fixed) premium p
- payment based on disability status (not based on expense, rather annuity)
- benefit equal to b
- Fraction of year in period before b is paid (waiting period) is $d < 1$.
- Hence $b_t = (1 - d)b$ if first year, $b_t = b$ subsequent years.

A contract is thefore given by (α, p) where $\alpha = (b, d)$.

Public Insurance

- Without insurance nursing homes cost h.
- Contribution rate, including insurance payments: $\tau(x_t)$ where $x_t = y_t + b_t$. If $x < x_{\text{min}}$, $\tau_{\text{min}} h < x_t$, otherwise $\tau_{\text{max}} h$.
- Places in public nursing homes are rationed. Denote by η the fraction of months in a year one has to wait. In first year, pays cost $s_t = \eta h + (1 - \eta)\tau(x_t)h$ and $s_t = \tau(x_t)h$ otherwise.

Consumption

- With private insurance, consumption when autonomous is given by $c_{0,t} = y_t - p$.
- If the individual is disabled, consumption is given by

$$c_{1,t} = y_t - n_t s_t - f_t(1-\nu)e + b_t \tag{2}$$

- If $c_{1,t} < c_{\min}$, $c_{1,t} = c_{1,t} + tr$ where $tr = c_{\min} - c_{1,t}$. Note that this situation is likely to occur during the waiting period for a public nursing home spot.

Willingness to Pay by 2010 Income

- For a given income, baseline risk, payoff from contract α and premium p, can use the 100 draws to compute expected utility : $V_t(y_t, \psi, \alpha, p)$
- The maximum premium one is willing to pay for this contract, $\rho_t(y_t, \psi, \alpha)$ is given by :

$$V_t(y_t, \psi, \alpha, \rho_t(y_t, \psi, \alpha)) = V_t(y_t, \psi, 0) \tag{3}$$

Willingness to Pay

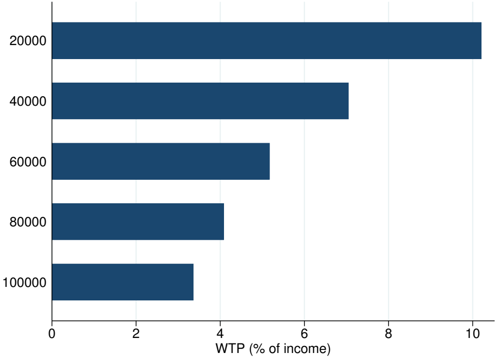

Figure: Average: Age 50-60 in 2010

Demand

Given the distribution of $\rho_t(y_t, \psi, \alpha)$, we can compute the demand given a premium p as

$$D(p) = \int I(\rho_t(y_t, \psi, \alpha)) > p) dG(y_t, \psi) \qquad (4)$$

Cost Structure of Insurer

The fair insurance premium can be computed by solving for $p = p(\alpha, y_t, \psi)$ in:

$$EPDV[p|\alpha, y_t, \psi] = EPDV[b|y_t, \psi, \alpha] \quad (5)$$

Fair Premiums

Current monthly premium is 153$ per month.

Table: Fair Monthly Premium by Income Levels

	p10	p25	p50	p75	p90
20000$	90	119	161	221	363
40000$	78	111	144	188	252
60000$	71	101	130	165	218
80000$	73	96	126	159	200
100000$	67	95	119	155	200
Total$	72	101	131	171	227

Average Cost

The average cost as a function of the premium is given by

$$AC(p) = \frac{1}{D(p)} \int w(y_t, \psi, \alpha) I(\rho_t(y_t, \psi, \alpha)) > p) dG(y_t, \psi) \qquad (6)$$

where $w(y_t, \psi, \alpha)$ is the expected cost to the insurer of covering using the contract α the individual with characteristics (y_t, ψ). The relationship between market size and $AC(p)$ depends on the degree of adverse (or advantageous) selection.

Expected Cost to Insurer by 2010 Income

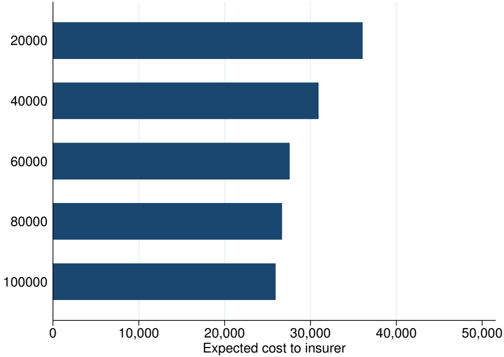

Figure: Derived from Expected Cost Distribution: Age 50-60 in 2010

Equilibrium

- Competitive Equilibrium with no-entry condition yields: $AP(p^*) = AC(p*)$ where $AP(p)$ is the average EPDV of premiums paid.
- Efficient allocation requires $MP(p^{**}) = MC(p^{**})$
- Potential for over and under-insurance.

Predicted Equilibrium with Selection

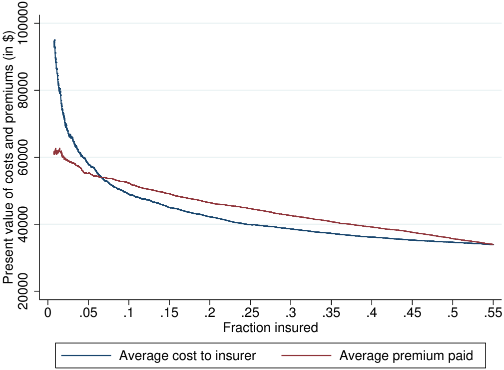

Figure: Age 50-60 in 2010

Predicted Optimal Allocation

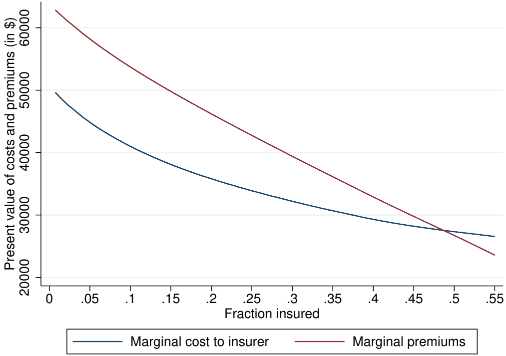

Figure: Age 50-60 in 2010

Road Ahead

- Relapse and return structure of insurers
- Stated-preference survey to infer preferences (e.g. premium elasticity)
- Prospective market analysis with COMPAS (population level)