Living longer: products, problems and possibilities

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Outline

- What do we know of life expectancy?
- How do we presently deal with it?
- Problems in the market
- Possible solutions
What do we know of life expectancy?

- Developed economies:
  - Male life expectancy over 75 in most OECD countries, an overall increase of 12% since 1960
  - Combined with a drop in fertility rates, aged dependency ratios set to increase from 23% today to 42% in 2030!

- Asia: Life Expectancy has moved from 41 (1950) to 61 (1980)

- China:
  - Male: 39 (1950) to 64 (1980)
  - Female: 42 (1950) to 67 (1980)
Increasing longevity

Statistics on survival probability

Survival Probability to age 90 for at least one member of couple: Male 65/Female 60

<table>
<thead>
<tr>
<th>Year</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>1975</td>
<td>37.6%</td>
</tr>
<tr>
<td>2005</td>
<td>56.9%</td>
</tr>
<tr>
<td>2025</td>
<td>64.4%</td>
</tr>
</tbody>
</table>

Source: Authors’ calculation based on mortality rates and 100-year improvement factors reported in Australian Life Table 2000-02.
Population over age 65 (millions)

- China
- India
- Indonesia
- Japan
- Korea

Percent 65+, 2000

Toshiko Kaneda http://www.prb.org/images3/PercentElderly2050.gif
Percent elderly, 2050

Toshiko Kaneda http://www.prb.org/images3/PercentElderly2050.gif
What we do not know: life-expectancy uncertainty

<table>
<thead>
<tr>
<th>Life expectancy (years)</th>
<th>Baseline</th>
<th>5%</th>
<th>25%</th>
<th>Median</th>
<th>75%</th>
<th>95%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men</td>
<td>15.1</td>
<td>20.1</td>
<td>19.1</td>
<td>18.5</td>
<td>18.0</td>
<td>17.1</td>
</tr>
<tr>
<td>Women</td>
<td>18.7</td>
<td>23.7</td>
<td>22.8</td>
<td>22.2</td>
<td>21.7</td>
<td>20.9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Change (years)</th>
<th>5%</th>
<th>25%</th>
<th>Median</th>
<th>75%</th>
<th>95%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men</td>
<td>+5.0</td>
<td>+4.0</td>
<td>+3.4</td>
<td>+2.9</td>
<td>+2.0</td>
</tr>
<tr>
<td>Women</td>
<td>+5.0</td>
<td>+4.1</td>
<td>+3.5</td>
<td>+3.0</td>
<td>+2.2</td>
</tr>
</tbody>
</table>

Note: OECD average.
Source: Baseline mortality rates from UN/World Bank database, projections by OECD
Dealing with it: traditional response

- **Personal resources**: fail to save, early retirement, no insurance, most wealth locked in the family home.
- **Family resources**: the child as your pension.
- **Working longer**: a “natural” solution, but institutional and maybe health status constraints.
- **Social security**: usually defined benefit schemes. Many are under-funded, implying fiscal stress.
- **Occupational pension plans**: Many are insolvent and sometimes lack the annuity payout.
Dealing with it: Government response: Switch to DC

- 1981 – Chile
- 1985 – Switzerland; Netherlands
- 1986-92 – Australia
- 1993 – Argentina; Columbia, Denmark, Peru
- 1996 – Uruguay
- 1998 – Hungary; Kazakhstan; Bolivia; Mexico
- 1999 – El Salvador; Poland
- 2000 – Hong Kong; Sweden
- 2001 – Latvia
- 2003 – Dominican Republic
But what after retirement: designing payouts

- Life annuities
- Health and aged care provision
- Phased withdrawals
- Other products:
  - LTC insurance
  - Reverse mortgages
Annuities

Reasons for annuities being a small market are standard

- Asymmetric information => adverse selection
- Bequests
- “Crowding out” by age pension/safety net
- Myopia
- Other supply side issues
Phased withdrawals

- Allow intermittent access to capital within preset maximum and minimum limits based on life expectancy at retirement
- However little or no flexibility when near the exhaustion of resources
- Half of the retiree cohort may live longer than that predicted by the life expectancy at retirement
Comparing conventional and RM annuities: RM like a “family” annuity

<table>
<thead>
<tr>
<th></th>
<th>Conventional Annuity</th>
<th>RM Annuity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Premium</strong></td>
<td>Premium due up front</td>
<td>Premium due on closure</td>
</tr>
<tr>
<td><strong>Bequest</strong></td>
<td>Once for all reduction</td>
<td>Gradual reduction</td>
</tr>
<tr>
<td><strong>Payment</strong></td>
<td>Higher</td>
<td>Lower</td>
</tr>
</tbody>
</table>
What is still missing?

- Most longevity insurance products under-produced
- Stronger longevity protection markets
- Opportunities for accessing home equity
- Evidence based regulation
Popn Ageing and Financial Integrity

- Financial integrity challenged by increasing longevity in several markets
  - Annuity, life insurance, reverse mortgage, health insurance, aged care insurance, liability, auto

- Popn Aging means more longevity risk around:
  - which eventually markets and new products will move to insure, increasing risk management issues
A major problem: projecting life expectancy risk

- Idiosyncratic life-expectancy risk
- The average length of life of a cohort is uncertain
Future mortality

- Two views
  - Continuous improvement: mortality will decline at all ages
  - Compression view: life expectancy, fundamentally biologically fixed at some very advanced age. Yet mortality will continue to decline over a wide range of ages.
Hedging the mortality risk

- Reinsurance
  - Cost of reinsurance has been high
  - *Just too toxic and dangerous* (Wadsworth 2005)
- Immunization
  - Survivor bonds
- Securitization
  - Heavy information requirements
Current stock of government and corporate bonds too small and ill-suited to this market.

However, long-dated corporate bond issuance has overtaken that of government long-dated bonds in the UK.
Possibility 1: Reverse mortgages

- Programs like Home Equity Conversion Mortgage (HECM) in the US, could be encouraged elsewhere.
- Innovations by Bluestone (‘protected equity option’) and Xcapital (incorporates eventual accommodation in a retirement home and long term health care) in Australia.
- Securitisation of RMs. Two so far: Lehman Brothers (1999) and Citibank (2001)
Possibility 2: Risk sharing

- Assign idiosyncratic risk to the insurance company and leave the systematic risk with the annuitant.
- Example: TIAA-CREF
- New cohorts to be admitted into the insurance pool.
- Payout formula must guarantee that new entrants face an ex ante expectation of an actuarially fair payout.
Possibility 3: Mortality based securities

- Swiss Re mortality bond issued in December 2003
- Based on a mortality index selected on the mortality experience of the US, UK, France, Italy and Switzerland.
What is the fundamental problem?

- Lack of knowledge on life expectancy
- If we could agree on longevity projections, then instruments and products allowing diversification could be marketed
- Ignorance generates over-regulation or bankruptcy
Modeling Longevity Risks

- Modeling changes in longevity involves:
  - Coping with extreme value risk
  - Structural breaks

- Current state of the art:
  - The Lee Carter approach
  - Scenario analysis

→ This is not adequate for an issue of this magnitude
How Can Research Help?

- Longevity Modelling → quantify risks related to longevity and mortality;
- Regulatory framework → Pricing, solvency, risk management, consumer protection etc.
- Housing Modelling → quantify risks related to residential property price
- New Products → taxation, prudential and policy implications in retail and wholesale markets
The UNSW Population Aging Research Program

- Managing Longevity Risk
  - Develop unifying methodology to produce acceptable stochastic forecasts of longevity increases
  - Research possible new financial products that could be developed with good information about longevity change
  - Investigate acceptable solvency requirements for longevity based products
The UNSW Population Aging Research Program

- Working Longer
  - Demographic aspects:
    - Mortality and morbidity projections
  - Occupational Health:
    - Does “phased retirement”, with insecure employment, have negative health consequences?
  - Economic and Finance issues:
    - How will working longer help fiscal stress and enhance retirement incomes?
Thank you

Questions?