Session 25 PD, Learnings on Longevity

Moderator:
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Presenters:
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Allen M. Klein, FSA, MAAA
Laurence Pinzur, FSA
Larry N. Stern, FSA, MAAA
Annual Meeting & Exhibit

SOA Longevity Advisory Group
Session 25: Learnings on Longevity
October 12, 2015
Agenda

• Longevity Challenges
• SOA Longevity Initiative
• Recap of February Longevity Seminar
• Panel Discussion
Longevity Challenges
Last century shows steady longevity improvement

Data: SSA Actuarial Study 120 – Periods 1900-2000, 50% male, 50% female
Increases in life expectancy vary based on measurement basis

Data: SSA Actuarial Study 120 – Periods 1900-2000, 50% male, 50% female
Mortality improvement is volatile & difficult to predict

Historical data source: US (SSA) Male 50-100; 1950-2005
Improvement rates aren’t uniform across populations

Change In Female Mortality Rates From 1992–96 To 2002–06 In US Counties

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Challenges for the actuarial profession

- Longevity risk is important
- History shows steady longevity improvement
- Need to take into account “improvement” in mortality rates
- Improvement rates aren’t uniform across populations
- Modeling is imperfect
SOA Longevity Initiative
Why does longevity matter for actuaries?

• Key roles of actuaries:
  • Measure and manage longevity risk for providers of life insurance, annuities, pensions and long-term care
  • Help to ensure solvency of annuity, life insurance, pension and social insurance systems
  • A ‘core competency’

• Professional associations must serve multiple stakeholders:
  • Public
  • Members
  • Regulators
  • Policy-makers
SOA Longevity Task Force (2012/13)

• Core premises:
  • Longevity risk is an issue of social and economic importance, and
  • Actuaries have a key role to play in the measurement and management of risk to financial institutions (public and private) that provide income in old age
  • Actuaries best positioned to do the analysis & measurement
  • Need to take a leadership role
SOA Longevity Task Force –
Four Recommended Goals

1. SOA members recognize the impact of changing longevity as a key risk to be managed
2. SOA members play a public leadership role in longevity risk management
3. The SOA supports actuaries so that they can be leading experts on longevity risk management
4. SOA members and volunteers recognize the expertise of others in longevity and use that expertise
Tactics

• Education
  • Targeted for key volunteers & thought leaders
  • Expanded for candidates & members

• Research & resources
  • Improve experience study work / processes
  • Expand longevity research efforts
  • Explore “population index” models

• Partnerships
  • Academics, other actuarial orgs, industry, researchers, think tanks, etc.
SOA Longevity Advisory Group (LAG)

• Jean-Marc Fix, OptimumRe
• George Graziani, SwissRe
• Jenny Haid, AIG
• Al Klein, Milliman
• Larry Pinzur, Aon Hewitt
• Tom Jones, Prudential

Support: Andy Peterson, Larry Stern, Dale Hall
SOA February (2015) Longevity Seminar
SOA Longevity Seminar

• Seminar for key SOA volunteers and other thought leaders practicing in the longevity space

• Provide a common understanding of the current state of:
  • The science of longevity risk
  • The measurement and modeling of longevity risk
  • The management of longevity risk
<table>
<thead>
<tr>
<th>Key Sessions</th>
<th>Seminar Speakers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implications of Longevity Risk</td>
<td>• Pablo Antolín-Nicolás, Principal Economist, OECD</td>
</tr>
<tr>
<td></td>
<td>• Michael Hodin, Executive Director, Global Coalition on Aging</td>
</tr>
<tr>
<td>Drivers of Future Mortality</td>
<td>• Professor S. Jay Olshansky, University of Illinois at Chicago</td>
</tr>
<tr>
<td></td>
<td>• Dr. Phil Smalley, VP &amp; Medical Director, RGA International Corporation</td>
</tr>
<tr>
<td></td>
<td>• Peter Nakada, Stone Ridge Asset Management</td>
</tr>
<tr>
<td>Lunch Speaker</td>
<td>• Dr. Tomáš Paus, University of Toronto</td>
</tr>
<tr>
<td>Academic Advances in Methodology</td>
<td>• Professor Séverine Arnold, University of Lausanne</td>
</tr>
<tr>
<td></td>
<td>• Andrew Hunt, Cass Business School, City University of London</td>
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<tr>
<td></td>
<td>• Professor Nan Zhu, Illinois State University</td>
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<tr>
<td>Advanced Actuarial Practice in Modeling</td>
<td>• Steve Goss, Chief Actuary, Social Security Administration</td>
</tr>
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<td></td>
<td>• Tim Gordon, Chairman of the UK CMI</td>
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<tr>
<td></td>
<td>• Professor Louis Adam, Universite Laval</td>
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<tr>
<td>Approaches for Management of Longevity Risks</td>
<td>• George Graziani, Senior VP – Head Longevity NA, SwissRe</td>
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<td></td>
<td>• Jenny Haid, Manager, Ernst &amp; Young (now with AIG)</td>
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<td></td>
<td>• Jeff Mulholland, Managing Director, Societe Generale</td>
</tr>
</tbody>
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Implications of Longevity Risk

• Longevity risk has become a bigger issue because of low birth rates / fertility
• Longevity needs to be framed in the context of population aging
• Management of longevity / mortality risk
  • Regular updates to tables (regulatory oversight)
  • Capital markets can offer capacity for hedging
  • Govts can help to facilitate transparency & standardization of longevity hedging
Drivers of Future Mortality

• Possible drivers of future mortality (discussed in session):
  • Lifestyle (e.g., diet, exercise)
  • Improvements in cancer and cardiovascular treatments
  • Longevity genes – Siblings of a centenarian are 8-17 times more likely to live beyond 100 than others
  • Personalized medicine
  • Parabiosis
  • Caloric restriction – Increases life expectancy in rodents by 42%
  • Increase in global obesity
  • Antibiotic resistant bacteria
Drivers of Future Mortality (cont.)

• Need to change focus to understanding aging vs. disease management
• Improving mortality from one cause may just push the mortality to other causes
• Linear extrapolation can be dangerous
• Modeling is important, but traditional approaches don’t capture regime shifts
• Model should include things like:
  • Estimate of potential improvement
  • Estimate of time to adoption
  • Scenario testing to determine reasonability
• “All models are wrong but some are useful”
Methodology – Academic Advances in Modeling

• Understanding cause of death dependencies
• Developing models to price forward mortality rates on a market-consistent basis
• Evaluation of natural hedging (annuities vs. life insurance)
Methodology – Academic Advances in Modeling: Causes of Death

• Severine Arnold (Gaille) & Michael Sherris

• Different causes of death have different trends

• Yet the causes compete against one another: we will all die of something!

• Vector Error Correction Models can model dynamic systems including time dependency between variables -developed in econometrics

• This can be applied to causes of death
Methodology – Academic Advances in Modeling: Forward Mortality Rates

• Andrew Hunt & David Blake

• In the same way that a yield curve generates a set of forward interest rates, mortality surfaces can generate forward mortality rates

• Given a current mortality surface, one can develop (with some work) implied forward mortality rates that are market consistent

• Useful tool for hedging and key for market risk transfer

• More valuable for rates not too far in the future
Methodology – Academic Advances in Modeling: “Natural” Hedging

• Nan Zhu and Daniel Bauer
• The degree of natural hedging (annuities vs. life insurance) appears less effective depending on model choice
• Not so great for non-parametric models
• Parametric models may oversimplify and not capture disparate shifts at different ages
Methodology – Advanced Actuarial Practice in Modeling

• The theory and practice of modeling mortality continues to evolve

• Increasing recognition of variations in base mortality rates; e.g. socioeconomic, health-related, etc.

• Important developments in connection with the projection of future mortality rates
  • Increasing interest in two-dimensional (age and calendar year) mortality improvement assumptions
    • Implications of year-of-birth “cohort effects”
    • CMI (UK), CPM-2014 (Canada), MP-2014 (US Pensions), SSA
  • Ongoing dialog on the relative importance of historical cause-of-death analyses
Approaches for Management of Longevity Risks

• Longevity risk is real, materially financially, but solutions exist

• Understanding of longevity by individuals & institutions is catalyst for effective longevity risk management

• “Longevity Risk Value Chain” – capital markets can take longevity risk that has traditionally been located in insurance sector
Panel Discussion
Current activities

• What specific projects & initiatives is the Longevity Advisory Group (LAG) working on?
  • Education
    • Webcast series being planned...stay tuned
  • Partnerships (& learning from others)
    • Institute & Faculty of Actuaries (IFoA) / Continue Mortality Investigation Limited (CMI)
    • Canadian Institute of Actuaries (CIA)
    • IAA Mortality Working Group
    • Human Mortality Database (HMD)
    • International Longevity Risk and Capital Markets Solutions Conferences (Longevity X series)
  • Research
LAG-Sponsored Research Projects

• Project 5 – Gathering meaningful data
  • Investigation underway

• Project 6 – Components of Historical Mortality Improvement
  • RFP will be issued

• Project 7 – Developing a Consistent Framework for Mortality Trend Assumptions
  • Working group of key experts will be assembled

• Project 8 – Analysis of Mortality Improvement by Socio-economic / Income Status
  • Contingent on Project 5 data gathering results
Questions & Discussion

• What are some of the recent developments in the projection of future mortality trends?
• How is longevity influenced by socio-economic factors?

• What’s in it for SOA members?
• How can SOA members get involved?
Key SOA Contacts

• Andy Peterson, SOA Senior Staff Fellow
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• Dale Hall, SOA Managing Director Research
  dhall@soa.org / 847-706-8835

• Also, feel free to contact any LAG member
Thank you!