CMI Update
Tim Gordon, CMI Chairman

Agenda
- The CMI
- SAPS (Self Administered Pension Schemes)
- Working parties
- Annuities
- Assurances
- Mortality Projections

The CMI
- We aim to be regarded across the world as setting the benchmark for the quality, depth and breadth of analysis for graduation and projection
- CMI tables and models are the UK actuarial lingua franca
- The CMI works because of:
  - industry support – sharing data and supporting volunteers
  - dedication of individual actuaries
- Quality of CMI output derives from:
  - diversity of CMI committees
  - dedicated secretariat
  - consultation and openness
CMI structure

Executive Committee
Management Committee
Annuities
Assurances
SAPS
Mortality Projections
Income Protection
Secretariat

Roadmap
- Overhaul graduation and modelling methods and tools
- Business as usual e.g. SAPS S2 (2014), annuities graduation (2015)
- Ongoing/planned
  - High age mortality
  - Review projections model
  - SAPS mortality improvements analysis
- International co-operation / consistency / coherence

SAPS
(Self Administered Pension Schemes)
SAPS

- Tables published
  - S1 (2009) – 2000-06 experience
- Good range of sub group calibrations:
  - all / heavy / (mid) / light
  - all / normal / ill / dependants
- Table selection + scaling 100% ±10% leads to good shape

- S2 v S1
  - Similar approaches – stable
  - Timing locked down to CMI (and other) projection models
  - Different high and young age extrapolations
- Forthcoming
  - Industry-based analysis
  - SAPS + mortality improvement

High age extrapolation S2 v S1

- Edge-effects
- No co-graduation

Working parties
Graduation and Modelling Working Party
- Issues: CMI methods specific to CMI, edge effects/unpredictable extrapolation, intractability, over-fitting and overdispersion
- Objective: overhaul CMI graduation and modelling methods and tools
- Initial report to CMI Management Committee in January 2014
- Findings already fed into
  - CMI_2014 Model – ONS data quality and overdispersion
  - Annuities graduation – co-graduation and visualisation of results – also used to test and harden the software
- Plan to publish initial report and (beta) software

High Age Mortality Working Party
- Issue: poor data at high ages, inconclusive academic view, but view required for base tables (annuity and SAPS) and projections
- Objective: investigate estimation of mortality at high ages (90+)
  - Survey current state of knowledge and make it accessible to actuaries
  - Undertake further research on high age mortality
- Ongoing:
  - Active but inconclusive debate on pattern of mortality at high ages
  - Data and modelling affect – and may bias – high age mortality analysis
- Working towards a paper / presentation in Summer 2015

Annuities
2007-2011 data: timeline
- May 2012 – exercise launched at CILA
- June 2012 – first data received
- Sept 2012 – Secretariat started focussing on annuities over assurances
- May 2013 – last annuities data received
- Oct 2013 – Working Paper 70 / All Office annuities results
- May 2014 – last assurances data received
- Dec 2014 – Working Paper 75 / All Office assurances results

NB 2011 data used to “complete” claims data for 2007-2010; no allowance for subsequent late-reporting
Proposed annuities graduations (2/2)

<table>
<thead>
<tr>
<th>Description</th>
<th>Additional information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pensioners, males, Normal</td>
<td>amounts</td>
</tr>
<tr>
<td>Pension Annuitants, males</td>
<td>amounts</td>
</tr>
<tr>
<td>Experience by duration</td>
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<td>Experience by distribution channel</td>
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<tr>
<td>Experience by amount band</td>
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<tr>
<td>Widows, amounts</td>
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<tr>
<td>Pensioners, males, Early</td>
<td>amounts</td>
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<tr>
<td>Pensioners, males, Combined</td>
<td>amounts</td>
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<tr>
<td>Pensioners, females, Normal</td>
<td>amounts</td>
</tr>
<tr>
<td>Pension Annuitants, females</td>
<td>amounts</td>
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<tr>
<td>Experience by duration</td>
<td></td>
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<td>Experience by distribution channel</td>
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<td>amounts</td>
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<tr>
<td>Pensioners, females, Combined</td>
<td>amounts</td>
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<tr>
<td>Personal Pensioners, males</td>
<td>deferred</td>
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<tr>
<td>Personal Pensioners, females</td>
<td>deferred</td>
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<tr>
<td>Retirement Annuitants, males</td>
<td>deferred</td>
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<td>combined</td>
</tr>
</tbody>
</table>

Proposed graduations – Pension Annuitants

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Proposed graduations – Pension Annuitants

29 January 2015
CMI Annuities Committee – Next steps

- Consult on proposed graduations
  - Proposed graduated tables
  - Extensions to younger / older ages
    - Target by Feb 2015
- Graduated “08” Series tables
  - Final tables + accompanying working paper
    - Target Q2 2015 – but dependent on responses to draft tables
- What’s next?
  - Enhanced Annuities
    - All-Offices results for standard annuities for 2011 (and 2012)
    - Individual Offices’ experience by GLM?

Assurances

CMI Assurances – 2007-2010 results

- Working Paper 75 described data and high-level commentary
- Summary results produced by:
  - Age (last birthday, 5-year age bands)
  - Duration (curtate; 0, 1-4, 5+)
  - Gender and Smoker status (where relevant)
  - Product category (separately for mortality, accelerated CI and stand-alone CI)
- Datasheets:
  - Individual age / duration + sum assured band and distribution channel
  - No allowance for IBNS
- Further analysis now underway -> additional working papers and graduated tables.
Change in mix of offices (Mortality / Term)

- 11 offices gained in 2003-2006
- 6 offices lost in 2007-2010

Change in mix of offices (Mortality / Endowment and Whole Life)

- 11 offices gained in 2003-2006
- 6 offices lost in 2007-2010

Exposure by Age (Term v EAWL)

- DB Term
- DB End and WoL

Exposure (Life-years)
Mortality / Term Results: Lives vs. Amounts

Expected claims calculated using $T_{xy}$

<table>
<thead>
<tr>
<th>No. of Expected Claims</th>
<th>Lives A/E</th>
<th>Amounts A/E</th>
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<tbody>
<tr>
<td>10%</td>
<td>2,000</td>
<td>4,000</td>
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<tr>
<td>20%</td>
<td>4,000</td>
<td>8,000</td>
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<tr>
<td>30%</td>
<td>6,000</td>
<td>12,000</td>
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</table>

Mortality / Term Results by Age – Males

Expected claims calculated using $T_{xy}$

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Lives A/E</th>
<th>Amounts A/E</th>
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</thead>
<tbody>
<tr>
<td>&lt;30</td>
<td>2,000</td>
<td>4,000</td>
</tr>
<tr>
<td>30-34</td>
<td>4,000</td>
<td>8,000</td>
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<td>35-39</td>
<td>6,000</td>
<td>12,000</td>
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<td>40-44</td>
<td>8,000</td>
<td>16,000</td>
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<td>45-49</td>
<td>10,000</td>
<td>20,000</td>
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<tr>
<td>50-54</td>
<td>12,000</td>
<td>24,000</td>
</tr>
<tr>
<td>55-59</td>
<td>14,000</td>
<td>28,000</td>
</tr>
<tr>
<td>60-64</td>
<td>16,000</td>
<td>32,000</td>
</tr>
<tr>
<td>65+</td>
<td>18,000</td>
<td>36,000</td>
</tr>
</tbody>
</table>

CMI Assurances – 2007-2010 graduations

- Do we need to update the 00 tables?
  - Critical illness tables look like they are in more need of work
  - T00 tables look a better fit
  - A00 will largely be used at ultimate durations

- Issues to consider:
  - Graduate (a) Term only or (b) Term + Endowment + WoL?
  - Should the tables vary by - distribution channel, sum assured?
  - Lives tables only, or lives and amounts?
  - Should we conduct a specific investigation in GA WOL?
Mortality Projections

CMI_2014 changes to initial rates calibration
- Driven by population data quality:
  - Start from 1974 to avoid lower quality earlier data – expect to use a 40-year rolling period going forward
  - Adjust exposure data for age/year cells which are anomalous
  - Allow for overdispersion when fitting the p-spline model – smoother fit
- Driven by perceived need for up-to-date fit:
  - Use weekly deaths data 1 January 2013 to 30 September 2014
  - more up-to-date
  - reduces volatility due to 2013/14 experience

Population data quality/artefacts
- P-spline model fits data less well than would be expected
  - over-dispersion in general
  - particular issues with 1960s calendar years and 1919 birth cohort
- Informed by:
  - Graduation and Modelling Working Party
  - Cairns et al – ‘Phantoms never die’ (2014)

Extreme deviance residuals (1-in-10,000 probability)
Mortality improvements in 2013 and 2014

- Crude improvements of
  - ~0% in 2013
  - 4-5% in 2014
- CMI_2014 improvements lower than CMI_2013 at most ages
- CMI_2014 improvements have less extreme cohort effects, due to changes in calibration method.

Impact on (male) life expectancy

- Most ages see a modest fall in life expectancy
- Changes to CMI_2014 led to a lower fall v ‘business as usual’ (BAU)

Release timing

- Release timing driven by ONS data availability
- Problem for life offices:
  - November too late for year-end
  - Auditors need justification for not using the latest model
- Can achieve September provided no issues arise, but this is still late
- Consultation planned shortly
Future versions of the Model

- SoA (US), CIA (CA) and AG (NL) recently improved their projections
- Projections Committee is actively reviewing:
  - More objective statistical approach – e.g. how volatile should projections be?
  - Review current deterministic method and consider alternatives
  - Not cause of death, but cause of death data does inform the philosophy
  - Coherent modelling: males v females, UK v Western World, SAPS
- Best guess
  - CMI 2015 – business as usual
  - CMI 2016 – new approach/model (subject to prior consultation)?

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Questions

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Feedback always welcome: info@cmilimited.co.uk

Comments