Reserving for Solvency II
What you need to be doing NOW!
14 October 2010
GI ROC Working Party
Members

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GI ROC Working Party
Reserving under Solvency II

Working party has a wide remit looking at practical implications of:

- Risk Margins
- Provisions
- Process
- Uncertainty
- Validation
- Expenses
- Cashflows
- Data
- Reporting
- Segmentation
- Reinsurance
- TP governance
- Communication
Contents

1. Process
2. Segmentation
3. Changes in Best Estimate valuation
4. Priorities
Process – the old way

Booked provisions decided by management.
Booked provisions for Solvency II determined by the actuary.
Booked provisions for Solvency II determined by the actuary.
Process – Solvency II vs IFRS Phase II

Solvency II
- Free assets
- SCR
- Risk margin
- Discounted probability weighted future cashflows

IFRS
- Equity
- Residual margin*
- Risk margin
- UPR
- Claims: Discounted probability weighted fulfilment cashflows

* Residual margin is set to avoid a “Day 1 gain”
Process – Solvency II vs IFRS Phase II
The principal areas of difference

- Composition
- Premium reserves
- Risk Margin
- Discount rate
- Profit recognition
- Expenses
- Segmentation
Process – Key changes

- Management adjustments cannot be left to the end
  - Best estimate
  - Discounting requirement

More iterative process
  - Circular interaction with capital; risk margin
  - Need to express changes in cashflow for discounting

Integration with published accounts

Deadlines

Complexity

Documentation
Contents

1. Process
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Insurance and reinsurance undertakings shall segment their insurance and reinsurance obligations into homogeneous risk groups, and as a minimum by lines of business, when calculating their technical provisions.

- Level 2 Implementing Measures further introduce “…by currency”
- Emphasis remains on homogeneous risk groups
  - ensures calculations at the “right level”
  - need to consider credibility
- May be similar to current splits of business
- Results can be allocated or aggregated to higher or lower levels as appropriate
- Consider link with internal model classes for risk margin calculation
Data collection for claims provision

**Step 1:** Gross and Ceded separately

**Step 2:** Split by LoB

**Step 3:** Split by geographical region

**Step 4:** Split by currency

- Gross
- Ceded
- Methodology close to Gross
- Region 1
- Region 2
- Region n
- LoB 1
- LoB 2
- LoB n
- Currency 1
- Currency 2
- Currency n
- ...
Contents

1. Process
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3. Changes in Best Estimate valuation
4. Priorities
The starting point continues to be the actuarial estimate. The actuarial and statistical methods to calculate technical provisions should be proportionate to the nature, scale and complexity of the risks supported by the undertaking.
Technical Provisions
From UK GAAP to Solvency 2 – Cross the Bridge!

Key

<table>
<thead>
<tr>
<th>UK GAAP Technical Provisions elements</th>
<th>Items expected to reduce technical provisions</th>
<th>Items expected to increase technical provisions</th>
<th>Solvency II Claims provisions</th>
<th>Solvency II Premium provisions</th>
</tr>
</thead>
</table>

Removal of any margins (implicit or explicit)

Future premium income

Future Premium on written and unincepted legally obligated business

Impact of discounting ALL items

Uncertainty Allowance (incl Binary Events)

Unearned claims on written business

Unearned claims on unincepted legally obligated business

RI Bad Debt on ALL claims

All expenses not just ULAE

Risk Margin

Risk Margin

Uncertainty allowance

Future premium (NB reduces premium provision)

Unearned Claims - Unincepted business

Unearned Claims - Written Business

Earned Claims Reserves

RI Bad Debt on Earned Claims Reserve

ULAE on earned claims

UPR - 100% of unearned written premium
Technical Provisions

Removal of any margins (implicit or explicit)

- UPR - 100% of unearned written premium
- ULAE on earned claims
- RI Bad Debt on Earned Claims Reserve
- Earned Claims Reserves

Future premium income

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Risk Margin

Risk Margin

Expenses

RI Bad Debt

Binary Events Allowance

Uncertainty allowance

Future premium (NB reduces premium provision)

Unearned Claims - Unincepted business

Unearned Claims - Written Business

Solvency II Claims provisions

Solvency II Premium provisions

Uncertainty Allowance (incl Binary Events)

Solvency II

Yes We Can!
Best Estimate
Removal of any margins

The best estimate should correspond to the probability weighted average of future cash-flows taking account of the time value of money. Therefore the best estimate calculation should allow for the uncertainty in the future cash-flows BUT allowance for uncertainty does not suggest that additional margins should be included within the best estimate.

That means:

- No explicit buffer
- Claims provision based on realistic assumptions
- Premiums provision should account for any profits or losses on unexpired risk

How does one factor in management judgement?
Best Estimate
Premium provisions

Gross (and Reinsurer’s share) UPR does not exist anymore under Solvency II. It is replaced by the premium provision:
Claims related to unexpired risk for existing contracts.
Less future premium cashflows.

The premium provision amount may be negative.
**Best Estimate**

**Premium provision**

- Assume 1st July 1-year policy with uniform risk
- Payments are paid in the month following the end of the quarter of occurrence
- No discounting / risk margins

- **Claim ratio = 72%**
- **Total Premium = 100**, payable by 40 on day 1 and 3 equal payments of 20 in the 1\(^{st}\) month of the quarter

<table>
<thead>
<tr>
<th></th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td><strong>Premiums</strong></td>
<td>(40)</td>
<td>0</td>
<td>0</td>
<td>(20)</td>
<td>0</td>
<td>0</td>
<td>(20)</td>
<td>0</td>
<td>0</td>
<td>(20)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>(100)</td>
</tr>
<tr>
<td><strong>Paid claims</strong></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>18</td>
<td>0</td>
<td>0</td>
<td>18</td>
<td>0</td>
<td>0</td>
<td>18</td>
<td>0</td>
<td>0</td>
<td>18</td>
<td>72</td>
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<tr>
<td><strong>Cash-flow</strong></td>
<td>(40)</td>
<td>0</td>
<td>0</td>
<td>(2)</td>
<td>0</td>
<td>0</td>
<td>(2)</td>
<td>0</td>
<td>0</td>
<td>(2)</td>
<td>0</td>
<td>0</td>
<td>18</td>
<td>(28)</td>
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<tr>
<td><strong>Premium Earning</strong></td>
<td>(8)</td>
<td>(8)</td>
<td>(8)</td>
<td>(8)</td>
<td>(8)</td>
<td>(8)</td>
<td>(8)</td>
<td>(8)</td>
<td>(8)</td>
<td>(8)</td>
<td>(8)</td>
<td>(8)</td>
<td>0</td>
<td>(100)</td>
</tr>
</tbody>
</table>
# Best Estimate Unearned business

## UK GAAP Approach

<table>
<thead>
<tr>
<th>Assets</th>
<th>82</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash</td>
<td>42</td>
</tr>
<tr>
<td>Receivables</td>
<td>40</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Liabilities</th>
<th>68</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS claims</td>
<td>18 (on earned)</td>
</tr>
<tr>
<td>UPR</td>
<td>50</td>
</tr>
</tbody>
</table>

| Available Profit | 14 |

## Solvency II Approach

<table>
<thead>
<tr>
<th>Assets</th>
<th>42</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash</td>
<td>42</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Liabilities</th>
<th>14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Claim reserve</td>
<td>18</td>
</tr>
<tr>
<td>Premium provision</td>
<td>(4) = (40) + 36</td>
</tr>
</tbody>
</table>

| Available Profit | 28 |

## Cash flows

<table>
<thead>
<tr>
<th></th>
<th>Past</th>
<th>Future</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Premiums</td>
<td>(60)</td>
<td>(40)</td>
<td>(100)</td>
</tr>
<tr>
<td>Paid claims</td>
<td>18</td>
<td>54</td>
<td>72</td>
</tr>
<tr>
<td>Net cash-flow</td>
<td>(42)</td>
<td>14</td>
<td>(28)</td>
</tr>
<tr>
<td>Premium earning</td>
<td>(50)</td>
<td>(50)</td>
<td>(100)</td>
</tr>
</tbody>
</table>

## Main observations
- Provisions reduce drastically
- All profit taken year 1
- Premium provision is negative
- No concept of non-monetary items
Best Estimate
Written unincepted business

Extract from DOC 25/09
A reinsurance or insurance contract should be initially recognized by insurance or reinsurance undertakings as an existing contract when the undertaking becomes a party of the contract..... the undertaking becomes a party of the contract when the contract between undertaking and policyholder is legally formalized. In particular, the recognition may take place earlier than the inception of insurance cover, because from an economic point of view the obligation to provide cover already exists and has an economic value before the inception.

Move to a “legal obligations” basis
• big change
• will include 1/1 renewals for a 31/12 valuation
• need to consider notice periods on binders?

Data implications are significant
Future premiums means provisions for these will often be negative
The best estimate should correspond to the probability weighted average of future cash-flows taking account of the time value of money.

Need to create cash-flows gross of reinsurance and for reinsurers’ share separately.

Segmentation by line of business and currency.

Need to create cash-flows for:

- Claims payments (out)
- Expenses LAE, ULAE, overheads/admin, commissions (out)
- Future premiums (in)
- Receivable for salvage and subrogation (in)

Need then to discount these future cash-flows using the risk-free term structure for the relevant currency.
Best Estimate
Cashflows, where to start?

Creating deterministic cashflows
• Is this the best starting point?
• What if you don't use triangles/chain ladder for reserving?
• Can you just start with triangles?
• Large losses will need separate consideration
• Actuaries should take care to avoid over-smoothing in their analyses
• Cashflows need to be the mean cashflows

Data
• Is suitable data available?
• What data should we be collecting now?
• Actuaries should consider the level of granularity they require to produce estimates that meet statistical quality standards of SII
Best Estimate
Reserving versus capital modeling

The technical provisions need to be consistent with the internal model. This creates a number of challenges.

Earned reserves (claims provision)
• What methods make it easiest to ensure consistency between point estimates and means of stochastic distributions.
• Consideration of correlations.

Unearned reserves (premium provision)
• Typically the remit of the capital actuaries
• Need input from planning also
## Best Estimate
### Uncertainty allowance – Binary Events

<table>
<thead>
<tr>
<th>What are they?</th>
<th>Why bother?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Health</strong></td>
<td>• Best estimate = Probability weighted average of all possible future cash flows</td>
</tr>
<tr>
<td>• Nanotechnology</td>
<td>• Current methods probably underestimate a “true” mean</td>
</tr>
<tr>
<td>• Aspartame</td>
<td>• Data / parameterisation</td>
</tr>
<tr>
<td>• Electro magnetic fields</td>
<td>• Unknown unknowns</td>
</tr>
<tr>
<td>• GM crops</td>
<td>• “Margin” used for binary events</td>
</tr>
<tr>
<td>• Nuclear waste</td>
<td>• Binary events fill <strong>part of</strong> the gap between the current approach and the requirements</td>
</tr>
<tr>
<td><strong>Events</strong></td>
<td>• Premium provisions</td>
</tr>
<tr>
<td>• Meteor strike</td>
<td>• Cat &amp; latent loadings – be consistent with pricing assumptions</td>
</tr>
<tr>
<td>• Mega Volcanoes</td>
<td>• Claims provisions</td>
</tr>
<tr>
<td><strong>Social Environmental</strong></td>
<td>• Latent loadings</td>
</tr>
<tr>
<td>• Global warming</td>
<td></td>
</tr>
<tr>
<td>• Polluters</td>
<td></td>
</tr>
<tr>
<td><strong>Legislative/Political</strong></td>
<td></td>
</tr>
<tr>
<td>• “Step change” in court rulings (e.g. Ogden)</td>
<td></td>
</tr>
<tr>
<td>• “the greater good” e.g. asbestos, US Healthcare</td>
<td></td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td></td>
</tr>
</tbody>
</table>
Best Estimate
Uncertainty allowance – Binary Events

Methodology:
• Deterministic projection:
  • Estimate “mean” binary outcome
  • Explicitly adjust claims reserve

• Stochastic projection
  • Select distributions (frequency/severity) for binary loss and model cashflows
  • Model cashflows for standard losses in normal way (e.g. bootstrapping)
  • Combine cashflows from two projections

Results:
• Deterministic projection:
  • Binary “allowance” can be reduced to simple percentage increase in reserves

• Stochastic projection
  • Required increase in reserve is clouded by effect of discounting / reinsurance
Best Estimate
RI Bad Debt on ALL claims

This should approximate the expected present value of the losses in the event of default weighted by the probability of default for each counterparty.

It should take into account default events during the whole run-off period of the recoverables (i.e. it is not sufficient to multiply the expected recoveries by the probability of default over the current year).

It should be calculated separately for each line of business and separately for premiums provision and claims provision.

The aim is to get an expected probability of default and loss given default for each future time period for each line of business and each counterparty (or at least each rating group).
Best Estimate
All Expenses

Expenses cashflows incurred servicing existing policies during their lifetime, i.e.
should include, for example:

- Acquisition expenses
- Claims management expenses
- Unallocated expenses (ULAE would be part of it)
- Investment management expenses

They should be allocated between lines of business, gross/ceded, currency and
between earned and unearned exposure.

Expenses cashflows should be calculated on the assumption of an ongoing
business basis and assumptions should be made for inflation.

The actuarial function needs to document the rationale for the allowance for
expenses in the technical provision calculations.
Best Estimate
Validation and other issues

Validation
• How do we validate / justify initial approach?
• How do we monitor, validate and apply P&L attribution on an ongoing basis?
• What will be acceptable to the regulator, and how will this line up with model validation?

Other issues
• Does bootstrapping cover all areas of risk
• Is your finance department ready for this?
• Reinsurance
• Groups
Risk Margin

- Amount required to ensure the value of the technical provisions is increased from the discounted best estimate to an amount equivalent to the theoretical level required to transfer the obligations to another insurance undertaking.
- Where the best estimate and risk margins are calculated separately, risk margins should be calculated using a cost of capital approach.
- This is a new concept compared to current practice and it is envisaged that RM will be calculated to some extent using suitable simplifications.
- Should not be calculated separately for premium and claim provisions.
- Should be defined net of reinsurance only. For IM can be calculated gross and RI separately.
- Cost of Capital rate is a ‘long term’ rate above the risk free rate, not adjusted for market cycle – 6% appears the ‘magic number’.
Technical Provisions
From UK GAAP to Solvency 2 – You did it!

- UPR - 100% of unearned written premium
- Removal of any margins (implicit or explicit)
- Release of profit on UPR unearned written premium
- Future Premium on written and unincepted legally obligated business
- Impact of discounting ALL items
- Uncertainty Allowance (incl Binary Events)
- Unearned claims on written business
- Unearned claims on unincepted legally obligated business
- RI Bad Debt on ALL claims
- All expenses not just ULAE
- Risk Margin

Key:
- UK GAAP Technical Provisions elements
- Items expected to reduce technical provisions
- Items expected to increase technical provisions
- Solvency II Claims provisions
- Solvency II Premium provisions
- Expenses
- Future premium (NB reduces premium provision)
- Uncertainty allowance
- Binary Events Allowance
- RI Bad Debt
- Earned Claims Reserves
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1. Process
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Priorities

- Resourcing/budget
- Process
- Methodology and assumptions/approximations
- Data
- Roles, responsibilities of others from whom input is required
- Interaction with the capital team
- Communication/Education to wider management and the board
- Governance and validation
- Documentation
- MI
Conclusions

• Technical Provisions are changing significantly
  • Both quantitative and qualitative elements
  • Don’t underestimate the work involved

• Dry run / QIS5 are HERE!
  • Read the guidance & plan your work now
  • Remember it is an evolving area so be flexible

• Look out for updates from the WP whenever you can
  • There’s more to come
  • And if you have ideas or comments then let us know
Questions or comments?