Solvency II: The good, the bad and the ugly

David Simmons, Willis Re
Managing Director: Capital, Science and Policy Practice
Algiers 21st October 2015
Solvency II Context
Solvency II
On the home straight

Solvency II goes live on 1st January 2016
What is Solvency II?

Solvency II is the European Union’s new insurance regulatory regime

It applies to the European Economic Area (EEA), the European Union plus Norway, Iceland and Liechtenstein, 31 states in total

It is risk based - the riskier the business you write, or assets you hold, the more capital you have to hold

It encourages companies to identify, understand, manage and mitigate the risks they face – an ERM framework

Standard capital formulae may be replaced by approved internal models

It replaces Solvency I, a far simpler capital calculation
Solvency I

Solvency I is the EU's insurer solvency regime introduced in 2004

- Solvency I did not fundamentally change capital requirements laid down in the 1970s
- But the process of the review showed that more fundamental changes were required: Solvency II

The Solvency I capital requirement is the greater of:

- 18% of premium written up to €50m plus 16% of premiums above €50m.
- 26% of claims up to €35m plus 23% of claims above €35m.

Some risk related adjustments are made

- Premiums for high risk classes of business are increased for the purpose of this calculation
- For example, aircraft liability, ships liability and general liability premiums and claims amounts are increased by 50%.

Reinsurance is taken into account as far as it impacts premium and/or claim levels

- Premium and/or claim numbers are multiplied by a “retention rate”, the 3 year average net to gross claims ratio
- But subject to a maximum of 50%

In reality many regulators looked for multiples of the Solvency I amount

- The UK formalised this process with a Solvency II like system, ICAS, in 2005
- Solvency II was then due to be implemented in 2008
Solvency II Background

Solvency II is a European manifestation of a global regulatory movement

- Towards principle-led, risk-based insurance regulation

Insurance regulation is the little brother of banking regulation

- Banks embarked on this journey with the Basel accords

Uses Carrot and Stick approach

- Encourage banks/insurers to better manage their risks by rewarding them with lower capital charge

English speaking countries led the way

- Australia after insurance failure of HIH failure in 2001
- UK after creation of a unitary financial regulator, FSA, in 1997 (led by bankers)

UK introduced ICAS regime in 2005

- Insurance response to Basel II accord
- Insurers had to assess own capital requirements whilst demonstrating good risk management
- Lead to explosion in demand for, and cost of, actuaries to build capital models

Solvency II was the European response

- Announced in 2005 for 2008 launch
- We are still waiting….but will launch in 2016!
Solvency II: the three pillars

**Pillar I: Quantitative requirements**
- Market-consistent valuation methodology
- Two levels of Solvency Capital Requirement: SCR and MCR
- Use of internal capital model subject to regulatory approval
- Group solvency capital requirements

**Pillar II: Risk management**
- Governance requirements
- Own Risk Solvency Assessment (ORSA): own view of risk over a longer-term planning horizon

**Pillar III: Reporting and disclosure**
- Regular Supervisory Report (RSR) to supervisor
- Solvency and Financial Condition Report (SFCR) to public
- Extensive disclosure requirements
- Market discipline
Structure of Solvency II Insurance Risk

SCR

Adj

BSCR

Op

Market

Health

Default

Life

Non-life

Intang

Interest rate

Equity

Property

Spread

Currency

Concentration

Illiquidity

SLT Health

Mortality

Longevity

Disability Morbidity

Lapse

CATA

Non-SLT Health

Premium Reserve

Lapse

Mortality

Longevity

Disability Morbidity

Lapse

Premium Reserve

Lapse

Expenses

Revision

CAT
Underwriting Risk
QIS5: Non-Life Companies

60% of Basic Solvency Capital Requirement came from Underwriting Risk
Market Risk dominates, but Underwriting Risk still nearly a quarter of BSCR
Overall 15% of insurers failed to meet SCR

- But considerable variation by country and company type
- Fail rate lower than expected plus some surprises, implies mistakes on the submissions
- UK result probably depressed by London Market company problems with the natural catastrophe scenario and factor methods
- 2016 failure rate was expected to be lower
  - Companies stronger
  - Capital formula more benign
  - But a limited 2015 stress test implied similar levels of failure
Insurance Risk
So what are the options?

<table>
<thead>
<tr>
<th>Standard Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Factor based, factors based upon market wide loss ratio standard deviation</td>
</tr>
<tr>
<td>• Rewards diversification</td>
</tr>
<tr>
<td>• Limited ability to reflect reinsurance (ex catastrophe, proportional only)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Standard Formula Plus (Undertaking Specific Parameters or USPs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Replace standard factors with ones appropriate for your business</td>
</tr>
<tr>
<td>• Use own data (5 to 15 years) supplemented with market proxies if required</td>
</tr>
<tr>
<td>• Greater ability to apply variety of appropriate reinsurance structures</td>
</tr>
<tr>
<td>• But not available for catastrophe component of underwriting risk</td>
</tr>
<tr>
<td>• And subject to regulator approval, process still unknown</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Internal Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Replace standard formula, partially or totally, with an approved internal model</td>
</tr>
<tr>
<td>• Full ability to apply any reinsurance you chose (subject to passing basic tests)</td>
</tr>
<tr>
<td>• But very heavy approval process with associated costs</td>
</tr>
<tr>
<td>• Large organisational impact, but real benefits beyond Solvency II?</td>
</tr>
</tbody>
</table>

The “right answer” depends upon the insurer’s portfolio, company and regulator
### Standard Deviation by Class of Business

<table>
<thead>
<tr>
<th>Standard Deviations by Class of Business</th>
<th>Non-Cat Premium Risk</th>
<th>Reserve Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>QIS 5/7/10</td>
<td>Joint Working Group 12/12/11</td>
</tr>
<tr>
<td>Motor Vehicle Liability</td>
<td>10.0%</td>
<td>9.6%</td>
</tr>
<tr>
<td>Other Motor</td>
<td>7.0%</td>
<td>8.2%</td>
</tr>
<tr>
<td>Marine, Aviation and Transport</td>
<td>17.0%</td>
<td>14.9%</td>
</tr>
<tr>
<td>Fire/Property</td>
<td>10.0%</td>
<td>8.2%</td>
</tr>
<tr>
<td>General Liability</td>
<td>15.0%</td>
<td>13.9%</td>
</tr>
<tr>
<td>Credit and Suretyship</td>
<td>21.5%</td>
<td>11.7%</td>
</tr>
<tr>
<td>Legal Expenses</td>
<td>6.5%</td>
<td>6.5%</td>
</tr>
<tr>
<td>Assistance</td>
<td>5.0%</td>
<td>9.3%</td>
</tr>
<tr>
<td>Miscellaneous Financial Loss</td>
<td>13.0%</td>
<td>12.8%</td>
</tr>
<tr>
<td>Non-Prop Property Reinsurance</td>
<td>17.5%</td>
<td>17.0%</td>
</tr>
<tr>
<td>Non-Prop Casualty Reinsurance</td>
<td>17.0%</td>
<td>17.0%</td>
</tr>
<tr>
<td>Non-Prop MAT Reinsurance</td>
<td>16.0%</td>
<td>17.0%</td>
</tr>
<tr>
<td>Medical Expenses</td>
<td>4.0%</td>
<td>5.0%</td>
</tr>
<tr>
<td>Income Protection</td>
<td>8.5%</td>
<td>8.5%</td>
</tr>
<tr>
<td>Workman’s Compensation / PA</td>
<td>5.5%</td>
<td>8.0%</td>
</tr>
<tr>
<td>Non-Prop Health Reinsurance</td>
<td>17.0%</td>
<td>17.0%</td>
</tr>
</tbody>
</table>

- Non-life products (including health) split between 16 broad lines of business
- 12 primary classes (including inwards proportional) & 4 inwards non-proportional reinsurance classes
- Each class has a different Standard Deviation which determines the premium load
- Some down (eg Fire, Credit)
- Some up (eg Legal Expenses, Assistance)
- Some Up and Down (eg Other Motor, Medical Expenses)

Latest calibrations are significantly different to QIS5
Standard Formula
Stand-alone CoB Premium Loads

- In latest calibration premium factor is 3 times standard deviation
- In QIS5 a formula was applied: less than 3x if SD less than 14.3%, more than 3x if more than 14.3%
- Impact of formula change ranges from -10% to +7% for stand-alone CoBs
- Therefore, dependent upon portfolio, load factor change could be more extreme than SD changes imply
- Premium loads range from 15% to 51%
- Reserve loads range from 15% to 60%

<table>
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<tr>
<th>Premium Factors by Class of Business</th>
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<th>Reserve Risk</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>QIS 5/7/10</td>
<td>Latest Tech Spec 30/4/14</td>
</tr>
<tr>
<td>Motor Vehicle Liability</td>
<td>28.7%</td>
<td>30.0%</td>
</tr>
<tr>
<td>Other Motor</td>
<td>19.5%</td>
<td>24.0%</td>
</tr>
<tr>
<td>Marine, Aviation and Transport</td>
<td>52.4%</td>
<td>45.0%</td>
</tr>
<tr>
<td>Fire/Property</td>
<td>28.7%</td>
<td>24.0%</td>
</tr>
<tr>
<td>General Liability</td>
<td>45.3%</td>
<td>42.0%</td>
</tr>
<tr>
<td>Credit and Suretyship</td>
<td>69.2%</td>
<td>36.0%</td>
</tr>
<tr>
<td>Legal Expenses</td>
<td>18.0%</td>
<td>21.0%</td>
</tr>
<tr>
<td>Assistance</td>
<td>13.6%</td>
<td>27.0%</td>
</tr>
<tr>
<td>Miscellaneous Financial Loss</td>
<td>38.5%</td>
<td>39.0%</td>
</tr>
<tr>
<td>Non-Prop Property Reinsurance</td>
<td>54.2%</td>
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<td>52.4%</td>
<td>51.0%</td>
</tr>
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<td>Non-Prop MAT Reinsurance</td>
<td>48.8%</td>
<td>51.0%</td>
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The net impact is entirely portfolio dependent
Omnibus II, the revised Solvency II directive has been passed

- The “Trialogue” between the European Commission, Parliament and Council of Ministers finally came to agreement in November 2013
- European Parliament vote on Omnibus II was held in March 2014, and passed
- Implementation is now fixed for 1/1/2016

A classic political fudge: all three burning issues avoided

- Long Term Guarantees for life business: rather than pick one solution, insurers can pick one or more of three (the preferred solutions of UK, France and Germany)
- Transition: some aspects of Solvency II are subject to transition periods of up to 16 years (e.g. adjustments to the relevant risk-free interest rate and deductions to technical provisions)
- Equivalence: USA, and no doubt others, will be granted temporary 3rd country equivalence, initially for up to 10 years but renewable for another 10 (effectively for ever)

Local regulators are in radically different stages of preparedness

- Particularly around internal model validation
- A level playing field is far from guaranteed

Solvency II is coming, but some local regulators are moving faster than others
EIOPA introduced interim measures in January 2014 aimed at local regulators:

- To ensure that local regulators don’t go off in different directions
- Focus on Pillar II (risk management) and Pillar III (reporting) rather than Pillar I (capital adequacy)
- Local regulators or “national competent authorities” (NCAs) to report annually on progress, explaining any deviations

Interim measures covered four areas:

- System of governance
- Forward Looking Assessment of Own Risk (FLAOR – “based on ORSA principles”)
- Reporting to local regulators
- Internal model approval

But again different regulators move at different speeds:

- Keener local regulator asked companies to complete a FLOAR from 1st January 2015
- Internal model approval is on-going with still radically different numbers of approvals by country
- Some regulators asked insurers to complete a version of the standard formula in 2015

Solvency II implementation is delayed, but some local regulators have been moving.
Solvency II
Consultation for 2016 is complete

A series of consultations were held in 2014/5

- Covering Implementing Technical Standards (ITSs) and Guidelines
- In truth it was less a consultation, more a preview

The Solvency II consultancy timetable was as below:

<table>
<thead>
<tr>
<th>Date Range</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>April – June 2014</td>
<td>Public consultation: ITS Set 1</td>
</tr>
<tr>
<td>June-September 2014</td>
<td>Public consultation: Guidelines Set 1</td>
</tr>
<tr>
<td>31 October 2014</td>
<td>Submission to the EC: ITS Set 1</td>
</tr>
<tr>
<td>December 2014 – March 2015</td>
<td>Public consultation: ITS Set 2</td>
</tr>
<tr>
<td>December 2014 – March 2015</td>
<td>Public consultation: Guidelines Set 2</td>
</tr>
<tr>
<td>February 2015</td>
<td>Publication of Guidelines Set 1 in all EU languages</td>
</tr>
<tr>
<td>30 June 2015</td>
<td>Submission to the EC: ITS Set 2</td>
</tr>
<tr>
<td>July 2015</td>
<td>Publication of Guidelines Set 2 in all EU languages</td>
</tr>
<tr>
<td>1 January 2016</td>
<td>Implementation of Solvency II</td>
</tr>
</tbody>
</table>

Note:
Set 1 = Capital calculation/approval processes
Set 2 = Pillars 2 (risk management) and 3 (reporting)

As at time of writing, no revised technical specifications and guidelines are available on the EIPOA website
Andrew Bailey, then head of the UK’s Prudential Regulatory Authority, said in February 2015:

• “I think there should have already been more accountability for how the processes of the European Union could have created such a vast cost for an industry for the implementation of a directive which has not even yet been finally agreed, and for which I cannot give you a date. Largely unseen in the banking crisis has been the shocking cost of Solvency II”

Bronek Masojada, CEO of Hiscox, also said in February 2016:

• “Solvency II regulations are too costly, complicated and risk being ineffective in a crisis after 10 years in development”

Solvency II has become much more political as it comes closer to implementation.
Andrew Bailey reportedly estimated the cost of Solvency II to the UK insurance industry to be over £3bn so far

- This is sunk money, nothing will get it back, but how can insurers get value from it?

The answer is, unlikely as it may seem, to embrace the underlying principles of Solvency II

- Whilst Solvency II implementation has been dreadful, the original ideas are common sense

Whilst perhaps counter-intuitive, embracing core Solvency II principles can:

- Release cost
- Improve efficiency
- Inform decision-making
- Rationalise reinsurance

To do this it is vital that firms move from compliance to guidance

- Focus on processes that help not hinder the organisation
- Embed what is good and reject what adds little or no value (or at least downplay until the prognosis of Solvency II is clear)

Reinsurance can play a key part in this value enhancing process but first the organisation must know what it is trying to achieve
Reinsurance in Solvency II
Standard Formula
Reinsurance Options

Non-catastrophe premium risk

- Proportional reinsurance reduces the charge proportional to premium ceded
- The capital formula is blind to commission terms, but there must be adequate risk transfer
- The latest implementing draft removes the complex formula method to get benefit from risk XLs
- Rather it assumes a 20% benefit for some classes of business from risk XL whether it is actually bought or not (motor liability, liability and property)

Catastrophe risk: Natural and Man-made

- A series of draft guidelines have been published
- The guidelines are relatively simple in theory, but complex in practice
- The good news is that all forms of reinsurance can be shown to have value, even stop loss
- But not necessarily anything like true economic value

Reserving Risk

- Like non-cat premium risk only products that take away reserve volume work
- Adverse development covers therefore do not work, whilst loss portfolio transfers do

Reinsurance options limited, but Solvency II demands a thorough holistic review
\[ NP_{lob} = \sqrt{\frac{1 + \left( \frac{\Omega_{lob}^{net}}{M_{lob}^{net}} \right)^2}{1 + \left( \frac{\Omega_{lob}^{gross}}{M_{lob}^{gross}} \right)^2}} \]

where

\[ M_{lob}^{net} = M_{lob}^{gross} \cdot \left[ 1 - F_{m+\sigma^{2},\sigma} (a + b) + F_{m+\sigma^{2},\sigma} (a) \right] + a \cdot \left[ F_{m,\sigma} (a + b) - F_{m,\sigma} (a) \right] - b \cdot \left[ 1 - F_{m,\sigma} (a + b) \right] \]

\[ \Omega_{lob}^{net} = \left( \left( \Omega_{lob}^{gross} \right)^2 + \left( M_{lob}^{gross} \right)^2 \right) \left( 1 - F_{m+2\sigma^{2},\sigma} (a + b) + F_{m+2\sigma^{2},\sigma} (a) \right) \]

\[ \sigma = \ln \left( 1 + \left( \frac{\Omega_{lob}^{gross}}{M_{lob}^{gross}} \right)^2 \right) \]

and

\[ m = \ln \frac{M_{lob}^{gross}}{2} \]

\[ M_{lob}^{gross} = \begin{cases} \tilde{M}_{lob}^{gross} & \text{if } S \geq 1 \\ S \cdot \tilde{M}_{lob}^{gross} & \text{otherwise} \end{cases} \]

\[ \Omega_{lob}^{gross} = \begin{cases} \tilde{\Omega}_{lob}^{gross} & \text{if } S \geq 1 \\ S \cdot \tilde{\Omega}_{lob}^{gross} & \text{otherwise} \end{cases} \]

and

\[ S = \sqrt{\frac{n \cdot \sigma^2_{(prem. gross, lob)} \cdot V^2_{(prem. gross, lob)}}{N \cdot (\tilde{\Omega}_{lob}^{gross})^2 + (\tilde{M}_{lob}^{gross})^2}} \]

Gone but not forgotten...
The rules governing catastrophe reinsurance are now known

- But it is far from clear how regulators will interpret them

Willis Re was active in the process, an advocate for our clients’ interests

- We succeeded maintaining a high level of flexibility against European Commission demands for strict codification

Good news

- For the first time the guidelines explicitly multi-line XLs, aggregate XLs, umbrella covers and even stop losses
- There is flexibility to help firms demonstrate the real economic value of their reinsurance programmes

Bad news

- Full benefit can be shown only within the natural and man-made catastrophe element of the calculation
- The rules are fiendishly complicated and poorly drafted with no useful examples
- There are many ways calculate reinsurance benefit; what will be acceptable to each regulator is far from clear

Brokers such as Willis can guide insurers through the maze

- Ensuring reinsurance that meets risk appetite
- Whilst getting maximum recognition in the standard formula
- If the standard formula still does not work, explore other customisation options
Core to Solvency II’s standard formula is diversification: 6 levels within non-life catastrophe alone.

Understanding that diversification is key to understanding how the rules are applied to reinsurance.

If a firm has limited ability to diversify, the need to maximise reinsurance efficiency becomes even more important.

But understanding is not enough, regulators have to be convinced by insurers calculations.
<table>
<thead>
<tr>
<th>Risk Type</th>
<th>Year 1 Standard Formula Impact</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Premium</td>
<td>✅</td>
<td>Reduces pro-rata to earned premium reduction</td>
</tr>
<tr>
<td>Natural Catastrophe</td>
<td>✅</td>
<td>Reduces pro-rata to cession percentage</td>
</tr>
<tr>
<td>Man-made Catastrophe</td>
<td>✅</td>
<td>Reduces pro-rata to cession percentage</td>
</tr>
<tr>
<td>Reserve Risk</td>
<td>✗</td>
<td>Reduces future years’ net best estimate reserve / SCR</td>
</tr>
</tbody>
</table>

Reinsurers have promoted “Structured Quota Shares” as Solvency II solutions:

- Often aggressive sliding scales reducing commission in bad years
- The standard SCR formula does not take commission terms into account but some regulators are alert to this, and may impose capital add-ons if the true capital benefit of a quota share is not as the cession percentage implies
- A fixed commission with profit commission may attract less scrutiny

Co-insurance delivers the same benefits as quota share:

- With the additional benefit of no counterparty credit charge
- Co-insurance commission terms may also attract less scrutiny although it is likely that firms would be expected to test for any reduction of commission in a 1 in 200 year in their ORSA
## Reinsurance Solutions

### Excess of Loss

<table>
<thead>
<tr>
<th>Risk Type</th>
<th>Year 1 Standard Formula Impact</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Premium</td>
<td>✗</td>
<td>Other than proportionate impact on net premium</td>
</tr>
<tr>
<td>Natural Catastrophe</td>
<td>✗</td>
<td>Full benefit can be shown</td>
</tr>
<tr>
<td>Man-made Catastrophe</td>
<td>✗</td>
<td>Full benefit can be shown</td>
</tr>
<tr>
<td>Reserve Risk</td>
<td>✗</td>
<td>Can reduce future years’ net best estimate reserve/SCR</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Excess of Loss can show full economic value in the catastrophe element of the standard formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Both for natural and man-made catastrophes (the latter is essentially a risk loss)</td>
</tr>
<tr>
<td>• For nat cat flood risk comprises two events and so SCR incurs two retentions plus cost of reinstatements</td>
</tr>
<tr>
<td>• Pre-paid reinstatements (or reinstatement premium protector cover) maximise capital efficiency</td>
</tr>
<tr>
<td>• Aggregate XLs are explicitly allowed – only incur one retention</td>
</tr>
<tr>
<td>• The guidelines are flexible but calculations are subject to regulator agreement, not guaranteed</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>But Excess of Loss gives no little benefit within the premium risk element of the formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Only its impact is on net earned premium, reducing the charge pro-rata</td>
</tr>
<tr>
<td>• Earlier formula versions attempted to show XL value by a complicated formula</td>
</tr>
<tr>
<td>• But now it is assumed that XL is bought for Motor Vehicle Liability and the charge reduced by 20% <strong>whether or not XL reinsurance is actually purchased or not</strong></td>
</tr>
<tr>
<td>• By contrast it is assumed that no XL reinsurance is purchased for Other Motor and so no premium risk charge reduction is given, again <strong>whether or not XL reinsurance is actually purchased</strong></td>
</tr>
</tbody>
</table>
## Reinsurance Solutions
### Stop Loss

<table>
<thead>
<tr>
<th>Risk Type</th>
<th>Year 1 Standard Formula Impact</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Premium</td>
<td>✗</td>
<td>But Premium risk charge counts towards cat recovery</td>
</tr>
<tr>
<td>Natural Catastrophe</td>
<td>✓</td>
<td>Full benefit can be shown</td>
</tr>
<tr>
<td>Man-made Catastrophe</td>
<td>✓</td>
<td>Full benefit can be shown</td>
</tr>
<tr>
<td>Reserve Risk</td>
<td>✗</td>
<td>Can reduce future years’ net best estimate reserve/SCR</td>
</tr>
</tbody>
</table>

**Stop Loss covers are now explicitly allowed by the guidelines**

- For the first time the new reinsurance guidelines explicitly state that stop-loss cover, the most efficient form of capital protection, may be shown to have value under the standard formula

**But benefit is limited to the catastrophe element of the SCR**

- Calculation of benefit is limited to impact on the natural and man-made catastrophe elements of a 1 in 200 as-if year, although the contribution of premium risk and average year’s losses must be taken into account
## Reinsurance Solutions

### Retrospective Covers

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<tbody>
<tr>
<td>Premium</td>
<td>✗</td>
<td>No impact</td>
</tr>
<tr>
<td>Natural Catastrophe</td>
<td>✗</td>
<td>No Impact</td>
</tr>
<tr>
<td>Man-made Catastrophe</td>
<td>✗</td>
<td>No Impact</td>
</tr>
<tr>
<td>Reserve Risk</td>
<td>✓</td>
<td>Full or partial benefit can be shown</td>
</tr>
</tbody>
</table>

### Loss Portfolio Transfer
- A LPT is equivalent to a Quota Share for active insurance risk
- A percentage of reserves are covered, though subject to a limit
- The economic value of an LPT is fully reflected in the standard formula by reduction in the net best estimate reserve measure

### Adverse Development Cover
- Equivalent to an XL, covering reserve deterioration over a limit
- As with XLs for premium risk, ADCs show little value in the standard formula
- “In the money” ADC’s will show some value if net estimate reserves reduce, but nothing approaching true economic value
- But ADCs deliver better economic value at an affordable price
Solvency II
Beyond the Standard Formula

If the standard formula becomes a constraint there are workable solutions

**Undertaking Specific Parameters (USPs)**

- Works for Premium and Reserve Risk, but not Catastrophe Risk
- Replace standard load factors with ones based upon your own data
- Can be used to show that Excess of Loss or Adverse Development covers show value beyond the default in Solvency II (20% value for XL for motor liability, 0% value for XL for motor own damage or ADCs)
- USPs require approval from the regulator but the approval process is far less onerous than for an internal model
- Willis can help you prepare the calculation and optimise reinsurance within it to match the optimal solution for you economically

**Partial Internal Model**

- Replace elements of the standard formula that do not work, eg premium risk, catastrophe risk (natural and man-made), reserve risk etc
- But an onerous approval process and ongoing cost of model development, documentation, maintenance, updating and proof of use
- Willis can help you with the process of model selection, parameterisation development, model build and documentation with all associated training.
- But the process must be visibly owned by you, ownership of the model and the assumptions within it cannot be sub-contracted.
Reinsurance in Solvency II
Conclusion

Firms should undertake a thorough Solvency II review:

| Independently audit the impact of your current reinsurance in the standard formula | Check if a different, defensible calculation method gives a lower number | Test if the reinsurance can be improved to work better in standard formula but also, crucially, to better support your risk appetite | Determine if the standard formula is a constraint, if so could a partial internal model and/or USPs be a better solution? |

There is some flexibility – firms must use it
Diversification in Solvency II
**Standard Formula**

**Diversification Impacts**

**By class of businesses**
- Charges significantly reduced if multiple lines written
- Correlation coefficients mostly 0.25, some 0.5
- Diversification benefit for balanced portfolio circa 20% to 33% depending on classes written

**By geographical region**
- Regions based on "macro-geographical regions" developed by the United Nation Statistics Division
- Latest draft applies geographical diversification to catastrophe as well as non-catastrophe business

A smaller company gains little benefit from geographic diversification and many gain comparatively little from class of business diversification.
Diversification Solutions

Mergers and Acquisitions

- Many believe that Solvency II will lead to a large increase in merger/takeover activity
- But little evidence of much Solvency II linked activity so far
- Delays and transition arrangements may depress demand
- BUT logic of diversification and operational cost/impact is persuasive
- Solvency II may be the catalyst but perhaps not the cause, good business reasons also required

Trade risk

- Seek partner organisations to trade risk to get benefit of diversification
- Can be done on a 1 to 1 basis, a swap, or via creation of a pool
- Relative behaviour of swapped treaties can be managed by commission terms to some extent, but must show true risk transfer
- BUT do you want someone else’s business on your books, indeed are you allowed to?
- Would members be comfortable when your mutual posts a loss in a different country or for a class of business you have little recognised expertise in?

The simplest solution to obtain account balance: reinsurance….
Customisation in Solvency II
Solvency II allows ways to amend/avoid the standard formula

- Where the standard formula is clearly inappropriate for your business
- To allow greater flexibility to use reinsurance to manage your capital

But it does not come without cost

- Time: Requires regulatory approval
- Money: Requires dedicated staff
- Culture: May require profound cultural change to implement properly

Options are:

- Undertaking Specific Parameters (USPs)
- Partial Internal Model
- Full Internal Model
Undertaking Specific Parameters
Greater flexibility, lower capital?

Replace Standard Deviation factors for non-cat premium and reserve risk

- Use own data or market proxies to calculate standard deviation of net loss ratio by class of business
- USPs require at least five years of data, with full benefit only if 15 years of data are supplied for liability and trade credit classes, 10 years for other
- Loss and exposure data must be “what-ifed” to reflect inflation and portfolio change

Can apply any reinsurance to control historic as-if’ed losses

- Data must be in the correct form/level of detail (eg need large losses for risk XL)
- Calculate the reinsurance that best controls “what-if” historic losses and so minimise capital charge
- Aggregate covers are particularly effective to control standard deviation (see example)
- In theory any form of non-finite reinsurance can be applied
- Multi-year may possible but “payback” limited to a profit commission

But USPs require regulator approval/oversight

- Calculation must be defensible
- Reinsurance must be appropriate to meet future risk appetite not just control historic claims
- The approval process is still to be defined, some regulators may have little appetite for USPs

An option to selectively explore
Gross USP saves 7% of standard capital charge, after reinsurance saves 20%
Internal Models
The ideal solution?

Insurers have the option to replace all or part of the standard formula with an “Approved Internal Model”

- An internal model allows better modelling of gross risk but also allows total flexibility to show the true capital benefit of any type of reinsurance

But the approval process is long and painful

- Bronek Masojada, CEO of Hiscox, in February also attacked Solvency II’s approach to internal modelling and the UK regulator’s interpretation of the model approval process, noting that their internal model documentation was 5,000 pages long.
- Hiscox have reverted to the standard formula for all but their Lloyd’s operation despite its limitations
- Bronek also thinks that thinking behind Solvency II’s internal modelling is flawed saying: “Imagine if we all drove cars with individually set speed limits based on design of suspensions etc. It would cause absolute chaos on the roads. Models can never be that good.”

Solvency II has got it wrong, firms should be positively encouraged to build internal models

- To demonstrate that they understand their risks and can stress assumptions
- But the European Commission doesn’t like anything which is not tightly defined and repeatable
- The UK’s current ICAS approach is arguably much more appropriate, but requires regulator subjectivity about not only the model, but the people building, running and using it

Like Hiscox, build an internal model for internal purposes, but don’t necessarily try to get it approved
<table>
<thead>
<tr>
<th>Country</th>
<th>Current Solvency II Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>5 insurers in IM pre-approval but no official figures have been published</td>
</tr>
<tr>
<td>Belgium</td>
<td>Regulators asking insurers to focus on calculation of technical provisions and on ORSA, timetable for IM approval extended. 30 insurers have indicated intention to develop IMs for SII in middle or long term, 12 in pre-approval</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>“Only a few” insurers have declared an interest in IM</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>At least 6 insurers applying for IM, one partial IM</td>
</tr>
<tr>
<td>Denmark</td>
<td>Insurers see pillar 3 as main concern - no plans to allow internal models before SII launched. 5 non-life insurers in pre-approval</td>
</tr>
<tr>
<td>Finland</td>
<td>Considering introducing some elements of pillar 2, probably ORSA, before SII implementation. Regulator gave no info on companies in IM pre-approval</td>
</tr>
<tr>
<td>France</td>
<td>Firms must provide regulator with prudential balance sheet, SCR calculation and ORSA this year based on SII principles. IM approval process still open, 16 companies applying.</td>
</tr>
<tr>
<td>Germany</td>
<td>EAFIN supports EIOPA interim measures and is working on Solvency 1.5 for 2014. IM process is open and running with 6 currently in process</td>
</tr>
<tr>
<td>Greece</td>
<td>4 insurers implementing IM</td>
</tr>
<tr>
<td>Hungary</td>
<td>2 companies in pre-approval though regulator expects at least 2 more when rules finalised</td>
</tr>
<tr>
<td>Ireland</td>
<td>CBI discussing with industry introducing some elements of SII - particularly pillar 2. Has a risk based regime (PRISM) - in place since Nov 2011. 31 companies in pre-approval for IM - representing 20 groups.</td>
</tr>
<tr>
<td>Italy</td>
<td>Regulators say it strongly supports EIOPA’s interim measures but there is some scepticism on reporting. Expect 10 to 12 IM applications.</td>
</tr>
<tr>
<td>Netherlands</td>
<td>Insurers prepared for pillar 2 after undergoing ORSA pilot tests. DNB scrapped 2nd parallel run of SII planned for this year but most insurers still working on directive. 4 insurers in IM pre-approval;</td>
</tr>
<tr>
<td>Norway</td>
<td>Six insurers applying for IM - 4 in pre-app for partial IM</td>
</tr>
<tr>
<td>Poland</td>
<td>15 in pre-approval for IM, 4 life 11 non-life both local and international</td>
</tr>
<tr>
<td>Portugal</td>
<td>5 to 10 insurers submitting IM for approval - but “developments have slowed due to economic conditions”</td>
</tr>
<tr>
<td>Romania</td>
<td>4 applied so far - all subs of larger groups - 3 more expected “before rules finalised”</td>
</tr>
<tr>
<td>Slovakia</td>
<td>9 insurers have declared interest in IM, 2 in pre-approval for full IM, 1 for partial IM</td>
</tr>
<tr>
<td>Slovenia</td>
<td>1 or 2 insurers applying for IM</td>
</tr>
<tr>
<td>Spain</td>
<td>No elements of SII currently in place but plans to follow EIOPA recommendations. 4 or 6 insurers are still in pre-approval of 20 initially</td>
</tr>
<tr>
<td>Sweden</td>
<td>5 applying for IMs (11 including subs of larger groups) - 10 larger groups use IM</td>
</tr>
<tr>
<td>Switzerland</td>
<td>Not covered by SII though Swiss Solvency Test likely to be deemed equivalent. FINMA has completed 31 IM reviews from 70 submissions in last 18 months: 25% unconditionally accepted, 60% conditionally accepted, 25% rejected</td>
</tr>
<tr>
<td>UK</td>
<td>Insurers can use SII models in ICAS+. Large concern over long-term guarantees given large annuity market. 60 insurers in pre-approval</td>
</tr>
</tbody>
</table>

Source: Insurance ERM 14th February 2013
Solvency II requires companies to demonstrate good business management

- The ORSA and associated risk management will be time consuming and costly, but can also be the way to re-engineer your business.
- The ORSA/Pillar 2 is covered in session 3 today, but the following have reinsurance implications:

Risk Appetite

- Is your reinsurance programme appropriate for your capital risk appetite?
- Is your reinsurance programme appropriate for your income volatility risk appetite?
- How can perhaps contradictory objectives be best managed?

Stress and scenario testing

- If using the standard formula, is it appropriate for your business?
- Is any catastrophe modelling done consistent with the standard formula result?
- If using an internal model, how dependent is the result on the vendor model selected?
- How do historical events, actual and as-if compare to vendor model results and/or standard formula?
- Are there any significant perils not in the standard formula, or unmodelled within your internal model?

Reinsurance is key to managing performance against risk appetite and to control stress tests
Risk Appetite:
What are your optimal shoes?
Measuring Shoe Performance

Possible Key Performance Indicators for shoes:

- Look
- Comfort
- Grip
- Weather-Proof
- Colour matching this dress
- Colour matching this handbag
- …

Key Insights:

- Decide what matters most for you
- There is no one “optimal” shoe that can suit everyone of us all the time
- Reinsurance is easier than shoes…[Not so sure Giorgio]
Measuring Insurance Performance

Typically two major risk appetites:

- Capital
- Earnings

Risk appetites expressed to given return periods

- More commonly expressed as Value at Risk
- Some measures may be expressed as Tail Value at Risk or equivalent

Capital Risk Appetite

- Protect certain level of capital to 1 in 100 return period
- Protect certain capital ratio to a 1 in 50 level
- Protect a margin over regulatory (or rating agency) capital requirement to a 1 in 30 level
- Guarantee that given percentage of capital is not lost in the year more than 1 in 50 years

Earnings Risk Appetite

- Make an underwriting loss no more than 1 year in, say, 10
- Miss an earnings target no more than 1 year in 5
- Limit earnings volatility as measured by standard deviation of loss ratio to \( x\% \) over 5 years
Risk Appetite challenges

Reconciling different risk appetites

- What is optimal for the capital risk appetite is unlikely to be optimal for the earnings risk appetite
- Need a means to reconcile/rank solutions against various risk measures/KPIs
- Relative weights may change over time, due to, for example, company health, external conditions, competitive pressure and investor expectation
- A challenge, but one that can be met and, as with all challenges, the process can be as enlightening as the outcome

Implementing appropriate controls

- Converting high level appetites into operational level tolerances and then appropriate limits and controls is a non-trivial task
- Need to balance fit verses function; process of monitoring should not detrimentally affect outcome (corollary with Heisenburg’s uncertainty principle) to detriment of the business

An example could be monitoring catastrophe aggregates

- Risk Appetite: will not loss more than £Xm from one catastrophe event more than 1 year out of 50
- Risk Tolerance: will not suffer more than £(X*0.75)m for a UK flood more than 1 year in 50
- Risk Limits: No more than £Ym cat aggregates in selected peak zones and £Zm nationally
## Typical optimisation output

### Solvency Capital Requirement (standard formula) 2014

<table>
<thead>
<tr>
<th>Amount</th>
<th>Gross</th>
<th>Option 1</th>
<th>Option 2</th>
<th>Option 3</th>
<th>Option 4</th>
<th>Option 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excess Capital</td>
<td>170,552</td>
<td>213,950</td>
<td>321,086</td>
<td>323,256</td>
<td>387,999</td>
<td>389,044</td>
</tr>
<tr>
<td>Solvency Ratio</td>
<td>122.5%</td>
<td>131.0%</td>
<td>153.0%</td>
<td>153.3%</td>
<td>170.2%</td>
<td>170.4%</td>
</tr>
<tr>
<td>Total Own Funds</td>
<td>927,415</td>
<td>904,120</td>
<td>927,370</td>
<td>929,301</td>
<td>941,054</td>
<td>941,990</td>
</tr>
<tr>
<td>Solvency Capital Requirement (SCR)</td>
<td>756,862</td>
<td>690,169</td>
<td>606,284</td>
<td>606,045</td>
<td>553,055</td>
<td>552,946</td>
</tr>
</tbody>
</table>

Basic Solvency Capital Requirement (BSCR)

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic SCR (BSCR)</td>
<td>684,965</td>
</tr>
<tr>
<td>Intangible Assets Risk</td>
<td>3,613</td>
</tr>
<tr>
<td>Diversification benefit</td>
<td>216,837</td>
</tr>
<tr>
<td>Sum over modules</td>
<td>898,189</td>
</tr>
<tr>
<td>Market Risk</td>
<td>134,557</td>
</tr>
<tr>
<td>Counterparty Default Risk</td>
<td>170,922</td>
</tr>
<tr>
<td>Life Underwriting Risk</td>
<td>6,408</td>
</tr>
<tr>
<td>Health Underwriting Risk</td>
<td>70,993</td>
</tr>
<tr>
<td>Non-Life Underwriting Risk</td>
<td>515,309</td>
</tr>
</tbody>
</table>

Adjustment for technical provisions and deferred taxes

|                        | -            | -         | -         | -         | -         |

### Basic SCR (BSCR)

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<td>Non-Life Underwriting Risk</td>
<td>515,309</td>
</tr>
</tbody>
</table>
Risk vs Return
King of the Efficient Frontier

Risk Return Analysis

- Less Risk
- Less Cost
- More Risk
- More Cost

Expected Underwriting Result vs Margin increase in capital

Diagram showing options:
- Option 1
- Option 2
- Option 3
- Option 4
- Option 5
Developing A Decision Making Framework

What is optimal for an earnings measure will rarely be optimal for capital.

Increasingly decision making will need to be nuanced.

The challenge – to design products to meet multiple objectives.

Your insurance brokers should help you agree a decision making framework.
Evaluating Reinsurance Value
Key Performance Indicators

In this real example there are not just two KPIs but four, marked with a ★

- **Change in underwriting result:** -£6.3m
- **Profit** from other classes added plus investment and other income
- **Estimated capital impact** after all risks, a 30% margin over economic capital is assumed
- **£55m capital saving** driven by lower 1 in 200 EC
- **Return on Capital** enhanced by 0.3%
- **Result volatility** reduces by nearly a third
- Lower 1 in 10 improves **buffer safety**
Comparing Option Efficiency against all KPIs

Reinsurance options are compared to the equivalent measure for the no reinsurance option.

The closer to the edge of the web, the more efficient the option.

Here the option at 10 o'clock is clearly optimal for Return on Capital but sub-optimal against the other three measures.

But which risk measure(s) will drive the decision?
Developing a decision making framework?

One method proposed by a client was a scoring mechanism

- eg if 5 options gives 5 for best, 1 for worst for each risk measure/KPI
- Then apply a weight depending on which risk measure is most important
- In example below, Return on Capital is the most important taking 60% of the weight

<table>
<thead>
<tr>
<th>KPI Values</th>
<th>Current</th>
<th>Option 1</th>
<th>Option 2</th>
<th>Option 3</th>
<th>Option 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital Saving</td>
<td>55.1m</td>
<td>55.6m</td>
<td>55.4m</td>
<td>52.8m</td>
<td>45.1m</td>
</tr>
<tr>
<td>Return on Capital</td>
<td>12.7%</td>
<td>12.6%</td>
<td>12.6%</td>
<td>12.8%</td>
<td>13.9%</td>
</tr>
<tr>
<td>Reduction in Standard Deviation</td>
<td>31.9%</td>
<td>32.9%</td>
<td>32.3%</td>
<td>29.3%</td>
<td>21.1%</td>
</tr>
<tr>
<td>Safety of Capital Buffer</td>
<td>49.9%</td>
<td>49.8%</td>
<td>49.7%</td>
<td>47.9%</td>
<td>46.8%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Simple Rank (5 high, 1 Low)</th>
<th>Weight</th>
<th>Current</th>
<th>Option 1</th>
<th>Option 2</th>
<th>Option 3</th>
<th>Option 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital Saving</td>
<td>10.0%</td>
<td>3</td>
<td>5</td>
<td>4</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Return on Capital</td>
<td>60.0%</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Reduction in Standard Deviation</td>
<td>10.0%</td>
<td>3</td>
<td>5</td>
<td>4</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Safety of Capital Buffer</td>
<td>20.0%</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Weighted Score</td>
<td>3.40</td>
<td>2.40</td>
<td>2.60</td>
<td>3.20</td>
<td>3.40</td>
<td></td>
</tr>
</tbody>
</table>

Option 4 is clearly far better for RoC

But it ties for the preferred option with the current programme if we use the simple ranking as client suggested

Ranking that takes into account how much better than the rest an option is gives a more realistic final scoring

Ranking systems should guide not decide!
Conclusion

Solvency II is coming! Do we celebrate or weep?
• It is unlikely that many companies will fail the SCR test
• But quite a few will be too close for comfort
• And all will have more things to think about, more ways to value reinsurance

Reinsurance works within Solvency II
• But the standard formula limits options, particularly for non-proportional ex catastrophe
• But there are/should be workarounds (eg partial internal models, USPs) to show true value
• But many require approval, will regulators be consistent?

Risk Appetite is key
• Typically a firm will have capital and earnings targets
• What is optimal for one will not be optimal for the other
• Peer comparison remains important to many, even if their risk appetite statement doesn’t admit it

A decision-support framework is required
• Simple, transparent, appropriate
• Remember that models advise, they don’t decide

But Solvency II is for Europe, we don’t have to worry in Algeria?
Solvency II
Part of a global movement!

Source: KPMG International 2015.
Reinsurance (Article 172)

• If the foreign regulatory system is deemed to be equivalent with regard to reinsurance, reinsurance contracts between E.U. insurers and foreign reinsurers will receive the same treatment under Solvency II as contracts between E.U. insurers and E.U. reinsurers. A major consideration here is whether reinsurers are required to collateralize unearned premiums and unpaid claims.

Calculation of group capital (Article 227)

• Is a foreign company owned by an E.U. insurer subject to a solvency regime equivalent to Solvency II? If so, the E.U. owner may take into account the Solvency Capital Requirement (SCR) and own funds of the foreign subsidiary when calculating group capital.

Supervision of groups (Article 260)

• Does the foreign regulator supervise groups in a matter equivalent to Solvency II? If so, E.U. insurers with a foreign parent will rely on the group supervision exercised by the parent’s regulator.
Solvency II
More equivalence

For E.U. companies with foreign parents or subsidiaries, failure to establish equivalence can cause substantial headaches.

- Effectively, such companies might have had to separately establish compliance with both regimes.
- And lack of equivalence could have severely hampered the market for reinsurance transactions between E.U. insurers and foreign reinsurers.

The U.S. has been a particular concern

- Its risk-based solvency standard – while long established – differs fundamentally in approach from Solvency II
  - For example, it is state rather than nationally based, and issue for Solvency II as it can only negotiate with national regimes

The first wave of equivalence decisions were made in June 2015

- Switzerland was made fully equivalent in all 3 classes
- Australia, Bermuda, Brazil, Canada, Mexico and the United States were made provisionally equivalent for group capital calculation only
So what does this mean for Algeria?

Algeria is unlikely to be a candidate for Solvency II equivalence soon

• But does it need to be?

But it will be expected to move towards the International Association of Insurance Supervisors (IAIS) core principles

• Inspired by Solvency II but without necessarily the same complication and bureaucracy
• Countries like Switzerland have shown the way for smarter, smaller compliant regulation
• Regulators

It is likely that the IAIS will in time become the arbiter of "equivalence"

• The USA cannot stand the idea that Europe is judging them, they do not use the word equivalence, but talk instead of “mutual recognition”
• But even the USA responds to IAIS initiatives

The IAIS is now the insurance arm of the Financial Stability Board

• It is now empowered, not just advisory
• Its role and importance is likely to be mainly constrained by its size
• Large companies and countries are the priority

An IAIS compliant risk adjusted regulatory regime with ERM attributes like the ORSA and risk appetite will come to Algeria in the near future
Contact

David Simmons
Managing Director
Capital, Science and Policy Practice
Willis Re

david.c.simmons@willis.com
+44 20 3124 8917