The Actuarial Profession
making financial sense of the future

A Closer Look at Solvency II
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Health & Care
Good Practice for Internal Models

28 April 2010

Discussion Agenda

1. Health & Care under Solvency II
2. Internal Models – best practice

Health & Care under Solvency II

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Health underwriting risk module – target and key issues

- Target – each healthcare risk must be treated appropriately and it must be clear where it falls within the standard formula
- Key issues:
  - Diversity of healthcare insurance/provision across the EU Member States
  - Healthcare insurance varies depending on whether there is a developed State healthcare system

→ Difficult to develop a standard formula that works for all Member States

Health underwriting risk module - key consultations

- March 2008 – QIS4
- July 2008 – questionnaire on "health treatment" to European supervisors
- February 2009 – proposal on how to define health lines of business and the SCR health underwriting module
- July 2009 - CP50 (part of 2nd wave of CP's); SCR standard formula - health underwriting risk module
- September 2009 – CEIOPS Catastrophe Task Force 1st meeting

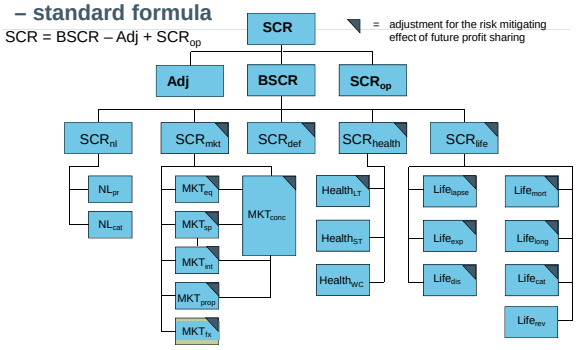
Health underwriting risk module - key consultations (continued)

- November 2009 - CP72 (part of 3rd wave of CP's); SCR standard formula – further advice on health underwriting risk module
- January 2010 – CEIOPS announces further calibration is required
- 8 April 2010 – CEIOPS' final advice on Level 2 Implementing Measures (including health calibrations)
- 15 April 2010 – European Commission released draft technical specification for QIS5 and various calibration papers

QIS4, March 2008

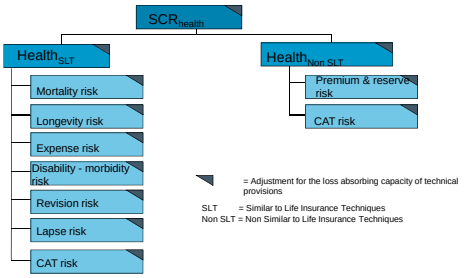
Solvency Capital Requirement (SCR) – standard formula

SCR = BSCR – Adj + SCR_{op}



CP50 , July 2009

CP50 - SCR health underwriting risk module



CP50 , July 2009

CP50 –SCR health underwriting risk module (1)

- Main issues:
  - A lack of common understanding as to what exactly health insurance is
  - Scope of "health insurance" is defined differently in the Member states
- Further guidance given on:
  - Classification of specific insurance products
  - Split between "SLT Health" (e.g. income protection) and "Non-SLT Health" (e.g. private medical insurance).

Should help to have a common understanding on the classification of health insurance and where it should be included in the SCR

CP50 , July 2009

CP50 – SCR health underwriting risk module (2)

- Health CAT risk now in health module using "non-life CAT risk module methodologies"
- Risk drivers of the SLT health to be developed consistently with life underwriting risk module (except for CAT risk):
  - Calibration of stresses same as for life, although suggest separate stress tests for CI, IP and LTC to reflect different nature of the underlying risk
  - Recovery rates are now explicitly stressed
- Allowance for premium adjustment mechanisms in stressed scenarios unclear

Some improvements, but difficulty in setting a standard formula that allows for the diversity of healthcare products across Member states

Catastrophe task force

CEIOPS - Catastrophe task force

- Terms of reference – develop standardised catastrophe scenarios* that adhere to the goals of a "1 in 200" event and harmony across Member states
- Membership – mainly non-life reinsurers (across the EU) plus representatives from the UK AP Health & Care Solvency II WP
- Initially non-life and health combined, but eventually split the task force
- First meeting – held on 11 September in Frankfurt
- Deadline – June 2010 (to be ready for QIS5)

* Health catastrophe scenarios matrix (initial draft):

-Line of business (split SLT and NSLT)

- Pan European or local event

-Varies between countries with and without developed national healthcare systems

CP72, November 2009

CP72 – further advice on SCR health underwriting risk (1)

- Health SLT – no significant changes from CP50
- Health non-SLT – calibration based on a broader sample than QIS4 calibration using data from six member states. Proposed factors for premium and reserve risk sub modules (for accident, sickness and worker's compensation) increased relative to QIS4 on average 34%
- No health specific correlations; however, CEIOPS does suggest that data is collected in the future to support the revision of these factors as appropriate
- Calibration of catastrophe risk – will be provided in June 2010 as output from the CEIOPS Task Force on catastrophe risk which includes health and non-life
- CEIOPS comment that there are limitations to the calibrations, largely due to the lack of data, and are based on the profile of a representative undertaking and that undertakings that consider such parameters to be inappropriate may apply for the approval of a partial internal model or make use of undertaking specific parameters.

CP72, November 2009

CP72 – further advice on SCR health underwriting risk (2)

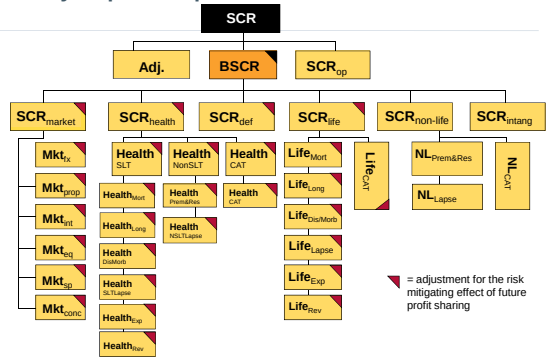
- Health SLT:
  - Disability - morbidity risk for income insurance stress retains one stress for all products, potentially too high for IP, too low for CI. Further analysis/justification is needed.
  - Further clarification on the scope of health revision risk is required as this is still not fully understood.
- Health non-SLT:
  - Option 3 chosen from CP50 for premium and reserve risk, which we are comfortable with
  - The calibration of premium/reserve risk is based on just six Member states data. Is it representative of all Member states? Why were those Member states chosen? Concern that the proposed increases would result on average in an increase of 34% on the premium and reserve risk sub module (as per CP72 3.8).

Health underwriting risk module - leading to QIS5

- January 2010 – further calibration required
- 8 April 2010 – final advice on Level 2 Implementing Measures
- 15 April 2010 – draft QIS5 released

QIS5

Solvency Capital Requirement: The standard formula



QIS5

Summary of non-SLT health underwriting risk sub-module – development of premium factors

Line of business	QIS4	CP50 option 3	CP72 original	CP72 revised	QIS5
Accident	5%	5%	10%	12.5% x NGR	9% x NGR
Sickness	3%	3%	7.5%	9.5% x NGR	6% xNGR
Workers compensation	7%	7%	10%	5.5% x NGR	5.5% x NGR

NGR – net-gross ratio

QIS5

Summary of non-SLT health underwriting risk sub-module – development of reserve factors

Line of business	QIS4	CP50 option 3	CP72 original	CP72 revised	QIS5
Accident	15%	15%	17.5%	17.5%	16%
Sickness	7.5%	7.5%	12.5%	12.5%	10%
Workers compensation	10%	10%	12.5%	12%	11%

QIS5

Health catastrophe risk

- Standardised catastrophe scenarios:
  - Arena disaster
  - Concentration
  - Pandemic
- Not split between SLT and non-SLT
- Open for consultation

QIS5

Health task force – set up by the European Commission

- Purpose – to review the modelling on NonSLT health business (eg short-term business such as PMI)
- Reason – consensus among stakeholders and supervisors that further technical work is needed on the NonSLT health underwriting sub-risk module to arrive at an appropriate standard formula
- Membership – composed of representatives from the insurance and reinsurance industry, actuaries and supervisors. The following stakeholder associations to be represented by one member:
  - CEA
  - AMICE
  - CRO Forum/CFO Forum
  - Groupe Consultatif
  - CEIOPS
- Meetings - first meeting 22 April; work to be concluded by end of May

Internal Models – best practice

Tamsin Abbey
Deloitte

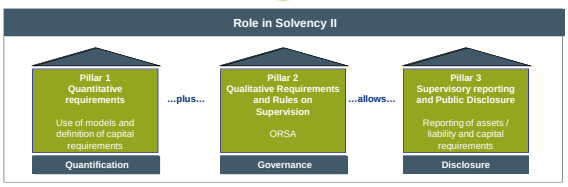
What are Internal Models?

Relevancy to Solvency II

Internal model risk and capital management frameworks are core to Solvency II. The first pillar defines how models work, which when combined with the qualitative risk information (ORSA) in pillar 2 is used for disclosure under pillar 3

A capital model is a mathematical model which forms part of, and is central to, the whole risk and capital management framework. This model enables the insurer to analyse the risk position, quantify risks and determine capital requirements

An internal model not only includes the 'capital model' but also the risk management framework and system of governance



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Internal models under Solvency II

Overall framework

An internal model is a risk and capital management framework that not only includes the calculation engine to quantify capital requirements, referred to as the 'capital model', but also aspects of the risk management framework and system of governance

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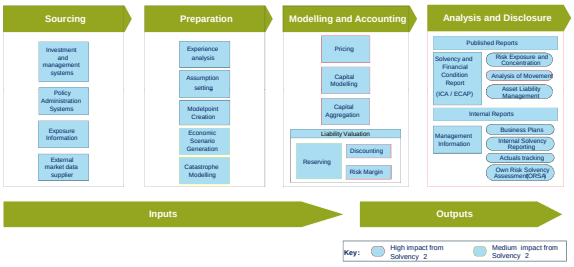
How is Solvency Calculated?

Inputs, processes and outputs

Solvency calculations are part of a dynamic process with clear inputs and outputs



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SCR Approaches – Overall Methodology

Firms must determine the SCR by using appropriate methods chosen from the following list, taking into account nature, scale and complexity of the risks:

- **Full internal model**
- **Standard formula**
- Standard formula and **partial internal model**
- Standard formula with **undertaking-specific parameters**
- **Simplifications**

Firms should be able to explain what methods are used and why the specific methods are selected.

To decide whether the standard calculation or a simplified calculation could be considered proportionate to the underlying risks, firms should use the following steps:

- Assess the nature, scale and complexity of the risks.
- Assess the model error that results from the use of a given simplification, having regard to the nature, scale and complexity of the underlying risks. The simplification should be regarded as proportionate

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SCR Approaches – Partial Internal Model

Article 112(2) of the Level 1 Text allows firms to use a partial model for the SCR of certain risks or part of their business.

Scope of partial models is flexible:

- One or more risk modules, or sub-modules
- Different risk categorisations or risks not covered by standard formula
- Whole business or only one or more major business units

Approval process is required for partial model:

- Requirements of Articles 120-125 for internal models (adapted)
- Justification for the limited scope, for example:
- Transitory step
- Lack of reliable information
- Proportionality
- Merger and acquisitions
- Better reflection of the risk profile
- Design consistent with SCR principles

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SCR Approaches – Partial Internal Model Cont'd

Integration with standard formula could present challenges. Prescribed steps within Level 2 guidance around integration:

Step 1:	The **standard formula correlation matrix** shall be used whenever: • **Feasibility test:** It is possible to integrate the partial model this way • **Appropriateness test:** No strong evidence that it is inappropriate
Step 2:	Next alternative - choose from CEIOPS list of techniques (to be defined in Level 3). • Initial review to identify shortlist • In depth review of shortlisted techniques
Step 3:	If none of the Level 3 techniques is both feasible and appropriate, then develop own techniques (subject to supervisory approval)
Step 4:	If not approved then supervisory authority will impose an integration technique

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How will internal models be approved?

Internal model tests

To gain sign-off an internal model needs to pass six tests which need to be repeated when the model is changed to enable on-going appropriateness of the model

Use test	Demonstrate that the internal model is widely used and plays an important role in system governance , significantly in risk management systems and economic and Solvency Capital assessment
Statistical quality standards	Demonstrate that internal model complies with adequate actuarial and statistical techniques and data quality requirements. Verify it assesses all material risks the company is exposed to and the mitigation actions for these risks taking into account policyholders and management actions using realistic assumptions
Calibration standards	Demonstrate calibration details of the internal model and verify the reconciliation to regulatory standard i.e. the level of protection within 1 year being at 99.5% confidence interval
Profit and loss attribution	Demonstrate that the causes and sources of profit and losses for each major business unit are reviewed at least annually and verify how categorisation of risks chosen explains the causes of profits and losses
Validation standards	Demonstrate that there is a regular cycle of model validation that includes monitoring performance, appropriateness of specification and testing results against experience
Documentation standards	Document the design and operational details of the internal model to provide a detailed outline of theory, assumptions and mathematically and empirical basis underlying the model and indicate any circumstances where the model does not work effectively

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The documentation standard
Objectives

- Give **confidence to supervisors** of appropriateness and reliability of the internal model
- Give **confidence to the Board** that the model upon which it is basing its business decisions is sound
- Mitigate **key person risk**

- In particular:

- Documentation should be sufficiently detailed to allow a **knowledgeable independent third party** to be able to **understand** the reasoning, design and operational details of the internal model and to be able to **judge** its reliability and appropriateness and whether it complies with the requirements of the other 5 standards
- In addition it should be **detailed and comprehensive enough** that the knowledgeable third party could **in principle** construct an independent model producing consistent results given the same data and parameters

Documentation
General considerations

- It should be thorough, **sufficiently detailed and sufficiently complete** to satisfy the criterion that an **independent knowledgeable third party** could form a sound judgement as to:
  - the reliability of the internal model
  - compliance with the 6 tests
  - could understand the reasoning and the underlying design and operational details of the internal model
- Be **timely and up to date**
- Describe the **drawbacks and weaknesses** of the model (both design and operational details), including when it does not work effectively and possible implications of any lack of compliance with Articles 118-124. The Board need to **demonstrate awareness** of these issues when making decisions
- Granularity of the documentation should take into account the **level** in the organisation it is intended to be used
- Include **evidence** that all levels of management understand the relevant areas of the internal model
- Have an **index** of all relevant documents and where and how they can be accessed
- Document any **changes** in the internal model and rationale for changes – good version control
- Documentation of **compliance** with Articles 118-122 shall verify how the different requirements have been taken into account and **how** they have been fulfilled

Use Test Embedding

The internal model needs to be used in a number of areas to pass the use test. It will be important to have policies and processes in part to ensure that these form part of the business as usual of the firm.

- Reserving and regulatory capital
- External relations
- Risk transfer strategy
- Investment strategy
- Risk management
- Capital management
- Strategic decisions and business performance
- Mergers and acquisitions
- Product development
- Remuneration policy

Questions or comments?

Expressions of individual views by members of The Actuarial Profession and its staff are encouraged.

The views expressed in this presentation are those of the presenters.