Solvency II
Standard Model for Health Insurance Business

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KPMG
Agenda

1. Solvency II Project
2. Future regulatory framework (Solvency II)
3. Calculation of Solvency Capital Requirement for Health Insurance (SCR)
4. Internal Models
Agenda

1. Solvency II Project

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4. Internal Models
1. Solvency II Project

- EU expansion
- Deregulation of insurance markets in the EU
- Creation of a single integrated financial services market by 2005
- Capital market downturn

Impetus for change in the EU

Common prudential rules

§ Deregulation of insurance markets in the EU
§ Capital market down turn
§ EU expansion
§ Creation of a single integrated financial services market by 2005
1. Solvency II Project

Solvency II is a regulatory project:

Participants
- European Commission (Insurance Committee)
- Conference of European Insurance Supervisory Authorities (CEIOPS)
- Insurance industry and associations (companies, actuaries, etc.)

Phase I
- Preliminary discussions aimed at deciding on a structure for the future system

Phase II
- Detailed work, preparing legislative and regulatory drafting, "field testing"

Phase II is in progress.
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4. Internal Models
2. Future regulatory framework (Solvency II)

- Key objective of Solvency II
  Implementation of a new solvency regime (in the EC) which takes into account the economic risk profiles of insurance undertakings.

The three pillar approach of Basel II is the starting point:

- Pillar 1: Quantitative capital requirements
- Pillar 2: Quantitative and qualitative requirements on internal processes and systems, power of the supervisors
- Pillar 3: Focus on disclosure and transparency requirements

  Risk management process should be coherent and holistic
2. Future regulatory framework (Solvency II)

- Pillar 1: Quantitative capital requirements

**Step 1:** All economic risks (underwriting, market, operational risks, etc.) have to be captured and aggregated in one financial ratio = **SCR** (Solvency Capital Requirement)

**Step 2:** The economic available financial resources (AFR) have to be determined = own funds

**Step 3:** **SCR** and **AFR** are compared:
- If the ratio **AFR / SCR >= 1 (100%)**, then the Solvency II quantitative capital requirement of pillar 1 is fulfilled
- (subject to possible capital add ons in pillar 2).
2. Future regulatory framework (Solvency II)

- **Conditions for the Solvency II Standard Formula**
  - the Standard Formula has to be **practicable** for all market participants
  - undertaking specific parameters (USP) should be taken into account
  - the operations with the Formula have to be **transparent** and **verifiable**
  - the design should be **compatible with all business models** in the EC
  - all economic risks have to measured be with **prudence**
2. Future regulatory framework (Solvency II)

- Key characteristics of the Solvency II Standard Formula

  - all (quantifiable) economic risks are quantified (2009/138/EC, Art. 101(3))

  - Value-at-Risk (VaR) measure, with a 99.5% confidence level, over a one-year-period (2009/138/EC, Art. 101 (3.) & Art. 104 (4.))

  - Going concern (2009/138/EC, Art. 101(2.))

  - Shall cover existing business and business expected to be written in the next twelve months (2009/138/EC, Art. 101(3.))
2. Future regulatory framework (Solvency II)

• Key characteristics of the Solvency II Standard Formula

- **diversification effects** shall be taken into account in the design of each risk module (2009/138/EC, Art. 104 (4.))

- The calculation of technical provisions shall make use of and be consistent with information provided by the financial markets and generally available data on underwriting risks (**market consistency**), (2009/138/EC, Art. 76 (3.))
2. Future regulatory framework (Solvency II)

Available Financial Resources (AFR)

Assets at market value

Free capital “surplus”

Includes valuation adjustments to assets & liabilities

(Minimum) Required Capital

Technical provisions

Other liabilities

Portion I: Market Value of hedgeable liabilities

Portion II: Best estimate liabilities (non hedgeable liabilities)

Risk margin

SCR

MCR

Risk margin

Includes valuation adjustments to assets & liabilities

Assets covering technical provisions and other liabilities

Other liabilities

Risk margin

Includes valuation adjustments to assets & liabilities

Risk margin

Includes valuation adjustments to assets & liabilities

Assets at market value

Free capital “surplus”

Includes valuation adjustments to assets & liabilities

(Minimum) Required Capital

Technical provisions

Other liabilities

Portion I: Market Value of hedgeable liabilities

Portion II: Best estimate liabilities (non hedgeable liabilities)

Risk margin

Includes valuation adjustments to assets & liabilities

Available Financial Resources (AFR)
2. Future regulatory framework (Solvency II)

- Calculation of the technical provisions (2009/138/EC, Art. 77)

1. The value of technical provisions (TP) shall be equal to the sum of **best estimate (BE)** and a **risk margin**.

2. The BE shall correspond to the **probability-weighted average of future cash-flows**, taking account of the time value of money (...), using the **relevant risk-free interest rate term structure**.

The calculation of the best estimate shall be based upon **up-to-date** and **credible** information and **realistic** assumptions and be performed using **adequate**, applicable and **relevant** actuarial and statistical methods.
2. Future regulatory framework (Solvency II)

- **Calculation of the technical provisions** (2009/138/EC, Art. 77)

  3. The *risk margin* shall be such as to ensure that the value of technical provisions is *equivalent to the amount* that insurance (...) undertakings would be *expected to require* in order to *take over and meet* the insurance (...) obligations.

  4. The risk margin and the best estimate shall be valued *separately*, however, if cash flows related to insurance obligations can be *replicated* using financial instruments for which a reliable market value is observable the value of the liability shall be equal to the market value of the financial instruments.
2. Future regulatory framework (Solvency II)

• Calculation of the technical provisions (2009/138/EC, Art. 77)

5. Where insurance and reinsurance undertakings value the best estimate and the risk margin separately, the risk margin shall be calculated by determining the cost of providing an amount of eligible own funds equal to the Solvency Capital Requirement necessary to support the insurance and reinsurance obligations over the lifetime thereof.
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3. Calculation of Solvency Capital Requirement for Health Insurance (SCR)
4. Internal Models
3. Calculation of SCR

Structure of SCR
(2009/138/EC, Art. 103-104)

SCR = Adjustment for the risk mitigating effect of future profit sharing

= Adjustment for the risk mitigating effect of future profit sharing
- Adjustment for the risk mitigating effect of future profit sharing

SLT = Similar to Life insurance Techniques
Non SLT = Non Similar to Life insurance Techniques

(*) = including Expense risk

- Mortality risk
- Longevity risk
- Expense risk
- Disability – morbidity risk
- Revision risk
- Lapse risk
- CAT risk

- Premium & reserve risk *
- CAT risk
3. Calculation of SCR

- Structure & correlations in Health(similar to life technique)-uw.-module according to CEIOPS* Consultation Paper No. 72 (3.19, 3.91)

<table>
<thead>
<tr>
<th></th>
<th>1. mortality</th>
<th>2. longevity</th>
<th>3. claims/morbidity</th>
<th>4. lapse</th>
<th>5. expense</th>
<th>6. revision</th>
<th>7. CAT</th>
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<td>100%</td>
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<td>25%</td>
<td>100%</td>
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* Committee of European Insurance and Occupational Pensions Supervisors.
3. Calculation of SCR

- Relevant stress factors for health insurance business (Similar to Life Technique)

1. **Mortality** risk = + 15% mortality rate permanently

2. Longevity risk = -25% mortality permanently

3. **Claims/morbidity** risk: change of the trend := + / - 1%
   - relative increase of claims:= + 10%

4. **Cat**-Risk: claims increase suddenly within one year with + 6,5%

5. **Lapse** risk: 50% * $l_{up/down}$ * $n_{up/down}$ * $l_{up/down}$

6. **Expense** risk: change of the costs of + 1%;
   - change of the proportional costs + 10%
3. Calculation of SCR

- Relevant stress factors for health insurance business (Non-Similar to Life Technique) premium and reserve risk

<table>
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<tr>
<th>LOB</th>
<th>Premium Factor</th>
<th>Reserve Factor</th>
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<tbody>
<tr>
<td>Accident</td>
<td>10.0%</td>
<td>17.5%</td>
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<tr>
<td>Sickness</td>
<td>7.5%</td>
<td>15.0%</td>
</tr>
<tr>
<td>Workers Compensation</td>
<td>10.0%</td>
<td>12.5%</td>
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</tbody>
</table>
3. Calculation of SCR

- **Market risk module** (2009/138/EC, Art. 105, 5.)

The market risk module shall reflect the risk arising from the level or volatility of market prices of financial instruments which have an impact upon the value of the assets and the liabilities (...). It shall properly reflect the structural mismatch between assets and liabilities, in particular with respect to the duration thereof.

Components of the market risk module:

a) **interest rate** risk (term structure and volatility) at least shift of +/- 100 bps and volatility +12% / - 3 % (CP 70)

b) **equity** risk (risk factor = 45% for global equities (EEA & OECD countries), 55% (others) (CP 69)

c) **property** risk (risk factor = 25%) (CP 70)

d) **spread** risk (factor depends on instrument, rating & duration (CP 70)

e) **currency** risk (risk factor = 25%)

f) market risk **concentrations**
3. Calculation of SCR

- Scenario-based calculation of the interest rate risk
3. Calculation of SCR

Correlations in the market risk module

<table>
<thead>
<tr>
<th>Risk Type</th>
<th>Interest rate</th>
<th>Equity risk</th>
<th>Property risk</th>
<th>Spread risk</th>
<th>Concentration risk</th>
<th>Currency risk</th>
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<td>0</td>
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<td>1</td>
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<tr>
<td>Currency risk</td>
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<td>0,25</td>
<td>0,25</td>
<td>0,25</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>
3. Calculation of SCR

- Structure and calculation of the operational risk

\[ \text{SCR} = \text{BSCR} - \text{Adj} + \text{SCR}_{\text{op}} \]

**Operational risk** := risk of loss arising from inadequate or failed internal processes, people, systems or external events

\[ \text{SCR}_{\text{op}} = \min \{ 0.30 \times \text{BSCR}, \, \text{Op}_{\text{In ul}} \} \times 0.25 \times \text{Exp}_{\text{ul}}, \text{ with...} \]
3. Calculation of SCR

\[ \text{Op}_{\text{lnul}} = \max \{ \text{Op}_{\text{premiums}} ; \text{Op}_{\text{provisions}} \}, \text{ and} \]

\[ \text{Op}_{\text{premiums}} = 0.055 \times ( \text{Earn}_{\text{life}} + \text{Earn}_{\text{SLT Health}} - \text{Earn}_{\text{life-ul}} ) + 0.038 \times ( \text{Earn}_{\text{non-life}} + \text{Earn}_{\text{Non SLT Health}} ) + \max \{ 0 , 0.055 \times ( \Delta \text{Earn}_{\text{life}} - \Delta \text{Earn}_{\text{life-ul}} ) \} + \max \{ 0 , 0.038 \times \Delta \text{Earn}_{\text{non-life}} \} \]

\[ \text{Op}_{\text{provisions}} = 0.006 \times ( \text{TP}_{\text{life}} + \text{TP}_{\text{SLT Health}} - \text{TP}_{\text{life-ul}} ) + \]
\[ + 0.036 \times ( \text{TP}_{\text{non-life}} + \text{TP}_{\text{Non SLT Health}} ) + \max \{ 0 , 0.006 \times ( \Delta \text{TP}_{\text{life}} - \Delta \text{TP}_{\text{life-ul}} ) \} + \]
\[ + \max \{ 0 , 0.036 \times \Delta \text{TP}_{\text{non-life}} \} \]

\text{1)Management action taken into consideration}
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4. Internal Models
4. Internal Models

- Insurance companies may use full or partial internal models (2009/138/EC, Art. 112, 1.)
- Partial models permitted for
  - one or more sub-modules of the Basic Solvency Capital Requirement
  - the capital requirement for operational risk
  - the adjustment for the loss absorbing capacity of technical provisions and deferred taxes referred to in 2009/138/EC, Art. 108
- Subject to approval of supervisory authority (2009/138/EC, Art. 112)
- Policy for changing full or partial internal models requires the approval of the supervisory authority
- Reversion to standard formula generally prohibited (2009/138/EC, Art. 117)
- Reversion to standard formula may be required by supervisory authority in case of non compliance with requirements of (2009/138/EC, Art. 118)
4. Internal Models

• Requirements for internal models
  – Need to be widely used and needs to play an important role in corporate governance (2009/138/EC, Art. 120) = “use test”
    • in particular in risk management system and economic and solvency capital assessment
  – The internal model and the calculation of the probability distribution need to comply with quality standards (2009/138/EC, Art. 121)
    • assess all options and guarantees in the insurance contracts including policyholder options
    • may take account of management action
    • may take account of risk mitigation techniques
  – SCR shall be derived from the probability distributions generated by the internal model (2009/138/EC, Art. 122, 2.)
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kpmg
Backup
5. German Health Insurance

Products

• Alternative for social security
  – Medical treatment (outpatient) (STL)
  – Hospitalisation insurance (STL)
  – Long Term Care (STL)
  – Per diem indemnity for sickness (STL)

• Other
  – Per diem indemnity in case of hospitalisation (STL)
  – Supplementary covers (STL & NSTL)
  – Travel Insurance (NSTL)
  – Insurance for public corporations with obligations to indemnify their employees in case of sickness (NSTL)
5. German Health Insurance

Main features

- Products classified (STL) provide lifetime coverage
- Policy Benefits and Premium are guaranteed if the cost to provide contractual benefits and frequency of claims remain unaltered
- Benefit Reserve is accrued
- STL contracts are participating business
  - Bonus funds is accrued
    - eligible as own funds?
- Requirement to adjust the premium if cost to provide benefits or frequency of claims change
  - Subject to approval of independent trustee