Quantitative Impact Study 4
Main Results – an EU-Perspective

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Budapest
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Impressive participation

- All 30 EEA-Countries
- 1412 Solo-Undertakings
- Participation: 33.6% (+37.4%)
- 98.8% based on 2007 data
Availability of results - MCR, SCR modules

Low numbers need not mean that a module or submodule was not accepted by undertakings, it may also mean that it was not applicable.
Availability of results - SCR modules

Low numbers need not mean that a module or submodule was not accepted by undertakings, it may also mean that it was not applicable.
Overall financial impact: no major impact on total balance sheet composition
Capital requirements QIS4 increase over Solvency I ...
... but solvency ratios (QIS4 eligible capital / SCR) ...
... may rise as well (Solvency II ratio / Solvency I ratio)
QIS4 Tier 1 and 2 Basic Own Funds largely exceed the MCR
Firms not meeting SCR or MCR in QIS4

<table>
<thead>
<tr>
<th>MCR</th>
<th>Large</th>
<th>Medium</th>
<th>Small</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life insurer</td>
<td>2.4%</td>
<td>0.0%</td>
<td>1.6%</td>
<td>1.1%</td>
</tr>
<tr>
<td>Non-Life insurer</td>
<td>0.0%</td>
<td>0.7%</td>
<td>1.2%</td>
<td>0.9%</td>
</tr>
<tr>
<td>Composite insurer</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Reinsurance</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Captive</td>
<td>n.a.</td>
<td>0.0%</td>
<td>7.1%</td>
<td>7.1%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>0.9%</td>
<td>0.4%</td>
<td>1.9%</td>
<td>1.2%</td>
</tr>
</tbody>
</table>

Not meeting the capital requirement ≠ need to raise capital
- Firms belonging to a group - change in capital allocation
- De-risking the balance sheet

<table>
<thead>
<tr>
<th>SCR</th>
<th>Large</th>
<th>Medium</th>
<th>Small</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life insurer</td>
<td>16.7%</td>
<td>7.2%</td>
<td>7.9%</td>
<td>9.7%</td>
</tr>
<tr>
<td>Non-Life insurer</td>
<td>14.5%</td>
<td>10.3%</td>
<td>11.2%</td>
<td>11.2%</td>
</tr>
<tr>
<td>Composite insurer</td>
<td>4.7%</td>
<td>6.3%</td>
<td>5.7%</td>
<td>5.7%</td>
</tr>
<tr>
<td>Reinsurance</td>
<td>10.0%</td>
<td>6.7%</td>
<td>0.0%</td>
<td>4.1%</td>
</tr>
<tr>
<td>Captive</td>
<td>n.a.</td>
<td>0.0%</td>
<td>28.6%</td>
<td>28.3%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>13.2%</td>
<td>8.6%</td>
<td>12.0%</td>
<td>10.9%</td>
</tr>
</tbody>
</table>
## Surplus migration Solvency I → Solvency II

<table>
<thead>
<tr>
<th>Decrease &gt; 50%</th>
<th>Large</th>
<th>Medium</th>
<th>Small</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life insurer</td>
<td>33.3%</td>
<td>18.0%</td>
<td>14.2%</td>
<td>20.2%</td>
</tr>
<tr>
<td>Non-Life insurer</td>
<td>31.3%</td>
<td>26.1%</td>
<td>21.5%</td>
<td>24.5%</td>
</tr>
<tr>
<td>Composite insurer</td>
<td>16.3%</td>
<td>10.5%</td>
<td>12.5%</td>
<td>12.3%</td>
</tr>
<tr>
<td>Reinsurance</td>
<td>0.0%</td>
<td>0.0%</td>
<td>12.5%</td>
<td>6.1%</td>
</tr>
<tr>
<td>Captive</td>
<td>n.a.</td>
<td>100.0%</td>
<td>30.6%</td>
<td>31.3%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>27.7%</strong></td>
<td><strong>20.5%</strong></td>
<td><strong>19.9%</strong></td>
<td><strong>21.3%</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Increase &gt; 50%</th>
<th>Large</th>
<th>Medium</th>
<th>Small</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life insurer</td>
<td>32.1%</td>
<td>47.5%</td>
<td>45.7%</td>
<td>43.0%</td>
</tr>
<tr>
<td>Non-Life insurer</td>
<td>20.5%</td>
<td>30.1%</td>
<td>18.8%</td>
<td>23.5%</td>
</tr>
<tr>
<td>Composite insurer</td>
<td>51.2%</td>
<td>42.1%</td>
<td>22.7%</td>
<td>36.1%</td>
</tr>
<tr>
<td>Reinsurance</td>
<td>0.0%</td>
<td>33.3%</td>
<td>25.0%</td>
<td>22.4%</td>
</tr>
<tr>
<td>Captive</td>
<td>n.a.</td>
<td>0.0%</td>
<td>31.6%</td>
<td>31.3%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>30.0%</strong></td>
<td><strong>37.0%</strong></td>
<td><strong>26.5%</strong></td>
<td><strong>30.9%</strong></td>
</tr>
</tbody>
</table>
Impact Trends

Methodological considerations on solvency ratios:

• QIS4 SCR-Quoten of two firms not 1:1 comparable
  • Free assets
  • Underlying distribution is specific to each firm

• Comparing QIS4 to Solvency I
  – Solvency I: include change in technical provisions to take into account the requirement of prudent technical provisions

  \[
  \frac{\text{SCR} + \Delta \text{Technical Provisions SII/SI}}{\text{SI margin}}
  \]
Overall financial impact trends

↑ Life:

- Majority reports better solvency ratios for QIS4 compared to Solvency I. However, this is not a common fact

↓ Non-Life:

- Majority reports declining solvency ratios, with some declining capital surpluses too

? Health:

- Diversity of health insurance schemes
- Considerable variation regarding SCR coverage

↓ Captives:

- Trend towards lower surplus ratios
Valuation

• **Broad support** for general design and methodologies

• economic valuation non-problematic **for IFRS users**
  – clear need for Solvency II valuation approach and IFRS phase II to develop consistently

• **Accounting balance sheet often used as proxy**
  – Appreciation of analysis required to derive an economic balance sheet

• **Some valuation difficulties (for all)**
  – deferred taxes
  – participations
  – reinsurance recoverables
  – intra-group transactions
Technical Provisions

• Difficulties in valuation of liabilities
  – Data requirements, in particular SME
  – Too little guidance in QIS4 Technical Specifications

• Simplifications: well received, not commonly needed.
  – Favourites: Risk margin, interest rate risk module.

• Proxies: Useful for best estimate calculation, particularly for smaller companies.
  – Market based proxies for lack of data.
Own Funds

- Average **increase** 27%
- **Total own funds**: 95% Tier 1 / 4% Tier 2 / 1% Tier 3
- Classification deemed suitable and practicable
- Increase of **hybrid capital in the future**
- **“Surplus funds”**: significant in 4 Member States
- **Group support**: little evidence
- **Ancillary own funds**: small volume, **no useful feedback** on valuation
- **Supplementary mutual member calls**: separation OK
BSCR Composition (life)
BSCR composition (non-life)
Main issues SCR

- Equity Risk
- Counterparty Risk
- Deferred taxes
- Operational risk
- Correlations
SCR : Risk mitigating effect of future profit sharing and deferred taxation

= Key element in SCR calculation for life and health insurers

• Request for further and more detailed guidance on the calculation, and on impact of management actions

• Some undertakings saw the gross of profit sharing calculations as artificial;

• "Lower boundary SCR" calculated by 467 participants

• "Equivalent scenario" tested by 64 participants

• Deferred taxation – Difficulties were encountered with the interpretation of the specification, including in relation to national tax laws, more clarification and guidance needed
• Calibration
  – Equity shock adequately prudent?

• Participations
  – "Halving" of charge not transparent for some participants and some supervisors
  – Ratio SCR\textsubscript{eq} differentiated approach / SCR\textsubscript{eq} across the board: 90%
  – Look-through method (Option 3) more fitted to wholly owned subsidiaries for some participants and some supervisors
SCR – Equities

• Duration dampener
  – Two aspects: cyclicity + duration of liabilities
  – Tested by about 25% of participants
  – Resulted on average in a 9% reduction of equity risk capital
  – Contested by majority of undertakings and all but one supervisor:
    • Lack of theoretical and empirical justification
    • Not in line with 1 year, 99.5% Value at Risk
    • Inappropriate incentives for risk management
SCR - Counterparty default risk

• Unanimously criticised by participants and supervisors as too complex
  – Volume of data collection seen as too burdensome
    → Ad hoc proxies have been used
• Calibration for unrated intermediaries
  – Use of own experience data?
  – CEIOPS’ rating?
• Artefacts due to the use of the Vasicek distribution
• Issues not addressed yet:
  – Derivatives
  – Modulated recovery rate
  – Non-rated reinsurance pools: look-through approach?
  – Policyholder’s credit (risk mitigation: cancellation!)
SCR – Operational risk

- Represented between 5-10% of total SCR
- Formula simple but not risk sensitive,
- Dislike for lack of diversification with other risks
- Suggestions from participants
  - Calculate as a percentage of SCR or BSCR
  - Take account of operational risk sources and quality of risk management process and control framework
- Around 40% of undertakings capture loss events, and most of these then attempt to quantify these events
SCR – Correlations

• Critics: No objective technical basis for the present correlation matrix

• Many alternative suggestions for some specific coefficients
Reactions on MCR

• QIS4 combined approach better received than QIS3 modular design.

• Little or no practical difficulty with MCR calculation.

• Compact Approach supported by majority of participants, majority of supervisors support Combined Approach.

• By design, the corridor kept all combined MCR to SCR ratios in the 20% to 50% range (save the absolute floor).

• Non-life business: linear approach meets target.

• Life business: linear approach needs improvement
MCR – Distribution of MCR to SCR ratios, life

Combined MCR to standard SCR
(life undertakings)

<table>
<thead>
<tr>
<th>floor</th>
<th>cap</th>
<th>linear &gt; SCR</th>
<th>% of all cases</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Life</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>26%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>29%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>12%</td>
</tr>
</tbody>
</table>

- Linear result
- Combined result

number of cases
MCR – Distribution of MCR to SCR ratios, non-life

Combined MCR to standard SCR (property & casualty undertakings)

<table>
<thead>
<tr>
<th>floor</th>
<th>cap</th>
<th>linear &gt; SCR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>% of all cases</td>
</tr>
<tr>
<td>Non-life</td>
<td>21%</td>
<td>12%</td>
</tr>
</tbody>
</table>

- Linear result
- Combined result
MCR – Distribution of MCR to SCR ratios, composite

**Combined MCR to standard SCR (composite undertakings)**

- **Linear result**
- **Combined result**

<table>
<thead>
<tr>
<th>floor</th>
<th>cap</th>
<th>linear &gt; SCR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>% of all cases</td>
</tr>
<tr>
<td>Composite</td>
<td>27%</td>
<td>20%</td>
</tr>
</tbody>
</table>

- Number of cases:
  - 5%
  - 10%
  - 15%
  - 20%
  - 25%
  - 30%
  - 35%
  - 40%
  - 45%
  - 50%
  - 55%
  - 60%
  - 65%
  - 70%
  - 75%
  - 80%
  - 85%
  - 90%
  - 95%
  - 100%
  - Tail
MCR – Distribution of MCR to SCR ratios, reinsurance and captive

Combined MCR to standard SCR (reinsurance and captives)

<table>
<thead>
<tr>
<th>floor</th>
<th>cap</th>
<th>linear &gt; SCR</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of all cases</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reinsurers</td>
<td>36%</td>
<td>23%</td>
</tr>
<tr>
<td>Captives</td>
<td>69%</td>
<td>1%</td>
</tr>
</tbody>
</table>

Number of cases

- Linear result
- Combined result
MCR – Distribution of MCR to SCR ratios, internal models

Combined MCR to internal model SCR (all segments)

<table>
<thead>
<tr>
<th>floor</th>
<th>cap</th>
<th>linear &gt; SCR</th>
<th>% of all cases</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Internal models</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>15%</td>
</tr>
</tbody>
</table>

The chart shows the distribution of combined MCR to internal model SCR ratios for all segments. The data is categorized into linear and combined results, with a floor, cap, and percentage of all cases.
MCR – MCR to SCR ratios per size segment

<table>
<thead>
<tr>
<th></th>
<th>floor</th>
<th>cap</th>
<th>linear &gt; SCR</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of all cases</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>large undertakings</td>
<td>12%</td>
<td>34%</td>
<td>9%</td>
</tr>
<tr>
<td>medium undertakings</td>
<td>18%</td>
<td>21%</td>
<td>5%</td>
</tr>
<tr>
<td>small undertakings</td>
<td>40%</td>
<td>8%</td>
<td>2%</td>
</tr>
</tbody>
</table>
MCR – Variation by country, linear MCR to SCR, life
MCR – Variation by country, linear MCR to SCR, non-life
Internal models

• Many undertakings consider the standard formula to work reasonably well and will hence not seek internal model approval.

• Use of partial or full internal model possible route for many undertakings.

• Better risk management and governance seem to be the key drivers for seeking internal model approval.

• Wide variety of partial internal models currently in use.
Internal Models – main findings

• Majority of respondents indicated that SCR will decrease with an internal model and slightly less than half of the respondents reported a potential decrease of more than 20%.

• **Lower** internal models capital requirement than standard formula: Overall SCR, BSCR, market risk (interest rate risk) life underwriting risk (longevity risk, lapse risk), health underwriting risk (health short term underwriting risk), non-life underwriting risk and premium/reserve risk.

• **Higher** internal model capital requirement than standard formula: Operational risk, equity risk, property risk and mortality risk.
Internal Models - conclusions

- Sophistication of internal models varies strongly.
- Very scarce sample size: no meaningful estimates can be made for the expected total EU wide costs related to the potential use of internal models in Solvency II.
- To reach a full compliance with an anticipated Solvency II framework: further work required
  - use test
  - statistical quality
  - Calibration
  - profit and loss attribution
  - validation
  - etc.
Group Solvency

- 111 Groups
- from
- 16 EEA-Member States
## Comparison of methods

- Impact of IGT, “real” diversification, non-EEA entities and with profit business

<table>
<thead>
<tr>
<th>Impact of</th>
<th>10th</th>
<th>25th</th>
<th>50th</th>
<th>75th</th>
<th>90th</th>
<th>Weighted average</th>
<th>Sample size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global impact</td>
<td>60.3%</td>
<td>69.0%</td>
<td><strong>80.5%</strong></td>
<td>89.9%</td>
<td>98.1%</td>
<td>73.7%</td>
<td>(48)</td>
</tr>
<tr>
<td>IGT</td>
<td>64.4%</td>
<td>79.0%</td>
<td><strong>89.9%</strong></td>
<td>97.5%</td>
<td>100.0%</td>
<td>91.4%</td>
<td>(54)</td>
</tr>
<tr>
<td>Real diversification</td>
<td>77.2%</td>
<td>83.5%</td>
<td><strong>88.7%</strong></td>
<td>93.7%</td>
<td>96.2%</td>
<td>78.7%</td>
<td>(24)</td>
</tr>
<tr>
<td>EEA</td>
<td>64.5%</td>
<td>71.3%</td>
<td><strong>82.0%</strong></td>
<td>92.7%</td>
<td>97.1%</td>
<td>79.1%</td>
<td>(42)</td>
</tr>
<tr>
<td>WP</td>
<td>72.7%</td>
<td>79.4%</td>
<td><strong>86.8%</strong></td>
<td>94.2%</td>
<td>96.9%</td>
<td>84.1%</td>
<td>(35)</td>
</tr>
</tbody>
</table>
• On average, slight increase of group surpluses in QIS4 compared to the surplus in Solvency I

• Results vary largely from one group to another
Main findings

• Significant “real” worldwide diversification (21.3%)
• Significant “real” EEA diversification (20.9%)
• Relevant impact of with-profit business on the diversification effects
• Relevant impact on diversification from third countries but subsample very limited
• Slight increase of group surplus in QIS4 / Solvency I – large variation
• Higher proportion of hybris capital vis-a-vis solo-results
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