

Practicalities of QIS3 - Life

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Agenda

- QIS3 background & objectives
- Contents of QIS3 “pack”
- QIS3 framework
- What’s involved?



Background & objectives

- This is the third Quantitative Impact Study for Solvency II
 - *“Participation in QIS1 or QIS2 is not a prerequisite for participating in QIS3”*
 - This is really the first full-blown QIS
- *“The goals of QIS3 are fourfold”*
 - Better understanding of practicality and suitability of calculations
 - Understanding impact on balance sheets (calibration)
 - Feedback on suitability of SCR and MCR calculations
 - Looking for information on effect on insurance groups



QIS3 “pack”

- Available from CEIOPS website
 - Follow links “Consultations” -> “QIS”
 - Or <http://www.ceiops.org/content/view/118/124>
- Page may be updated from time to time with further clarifications etc.
 - e.g. Errata sheet and Q&A sheet recently added

Ceios - Quantitative Impact Studies - Microsoft Internet Explorer

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Quantitative Impact Studies

In this section you will find all public documents related to CEIOPS' Quantitative Studies in the Framework of the Solvency II project.

Quantitative Impact Study 3

A.	<i>Specifications, Spreadsheets, Guidance</i>	
1.	QIS3 Cover Note	
2.	QIS3 Technical Specifications - Part 1	Technical spec.
3.	QIS3 Technical Specifications - Part 2	
4.	QIS3 Technical Specifications - Annexes	
5.	QIS3 Calibration Papers	Spreadsheet
6.	QIS3 Spreadsheet Instructions	
7.	QIS3 Spreadsheet	
8.	QIS3 Term Structures	
9.	QIS3 Qualitative Questionnaire for Solo Undertakings	Questionnaire
10.	QIS3 Qualitative Questionnaire for Groups	
11.	QIS3 Guidance Paper	
12.	Errata to the QIS3 Technical Specifications_ (up dated: 24.04.2007)	
13.	QIS3 Calibration of the Credit Risk	
B.	<i>Questions and Answers</i>	
	Questions and Answers	
	List of Contact Persons for QIS 3	

Internet



Where to start?

- Download the following:
 - QIS3 Guidance Paper (no. 11) - 8 pages
 - QIS3 Technical Specifications - Part 1 (no. 2) – 119 pages
 - But, strip out non-life and group sections and it falls to 70 pages
 - QIS3 Spreadsheet (no. 7)
 - QIS3 Spreadsheet Instructions
- Other items on list are useful...
 - ... but not strictly necessary

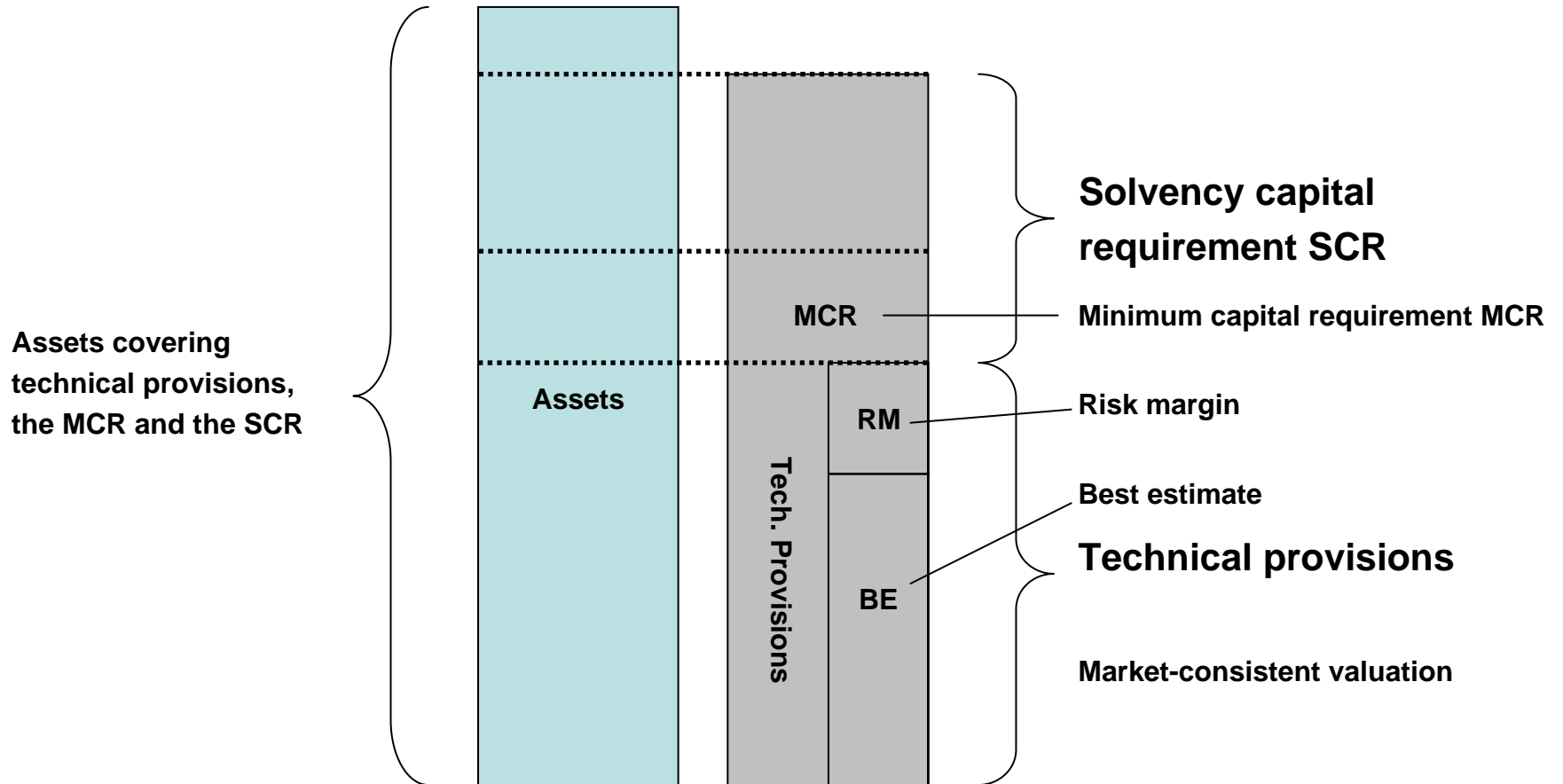


QIS3 Framework

- Components of QIS3 balance sheet
 - Assets
 - Eligible capital
 - Technical Provisions
 - Best estimate
 - Risk margin
 - Solvency Capital Requirement (SCR)
 - Standard Formula
 - Minimum Capital Requirement (MCR)
- Graph on following slide illustrates interaction....



QIS3 Framework





Assets

- Valued at market value
 - If market value not available then valuation should be “*consistent with any relevant market information*”
 - Illiquid/non-tradable assets should “*be valued on prudent basis*”
 - Not higher than historic cost (depreciated)
 - Certain assets (intangibles, fixtures & fittings, computers etc.) to be given nil value



Eligible capital

- Capital classified into three Tiers
- Tier 1
 - Excess of assets over technical provisions and other liabilities
 - Subordinated liabilities with certain characteristics
- Tier 2
 - Other subordinated liabilities meeting certain criteria
 - Certain forms of contingent capital
- Tier 3
 - Subordinated liabilities which do not meet the criteria for inclusion in Tiers 1 or 2
 - Contingent capital which does not meet the criteria for inclusion in Tier 2
- Only Tier 1 likely to be relevant for vast majority of Irish life companies



Technical Provisions

- **Technical Provisions**
 - (Perfectly) Hedgeable risks valued at replicating value
 - Non-hedgeable at best estimate + risk margin
- **Best estimate**
 - Cashflow projection (market consistent)
 - Discount at risk free rate
- **Risk margin**
 - Determined using “Cost of Capital” approach
- **No artificial rules/constraints**
 - (e.g. SV floor, zeroising of negatives, net premium etc.)
 - For unit-linked: unit liability plus additional provision (likely to be negative)



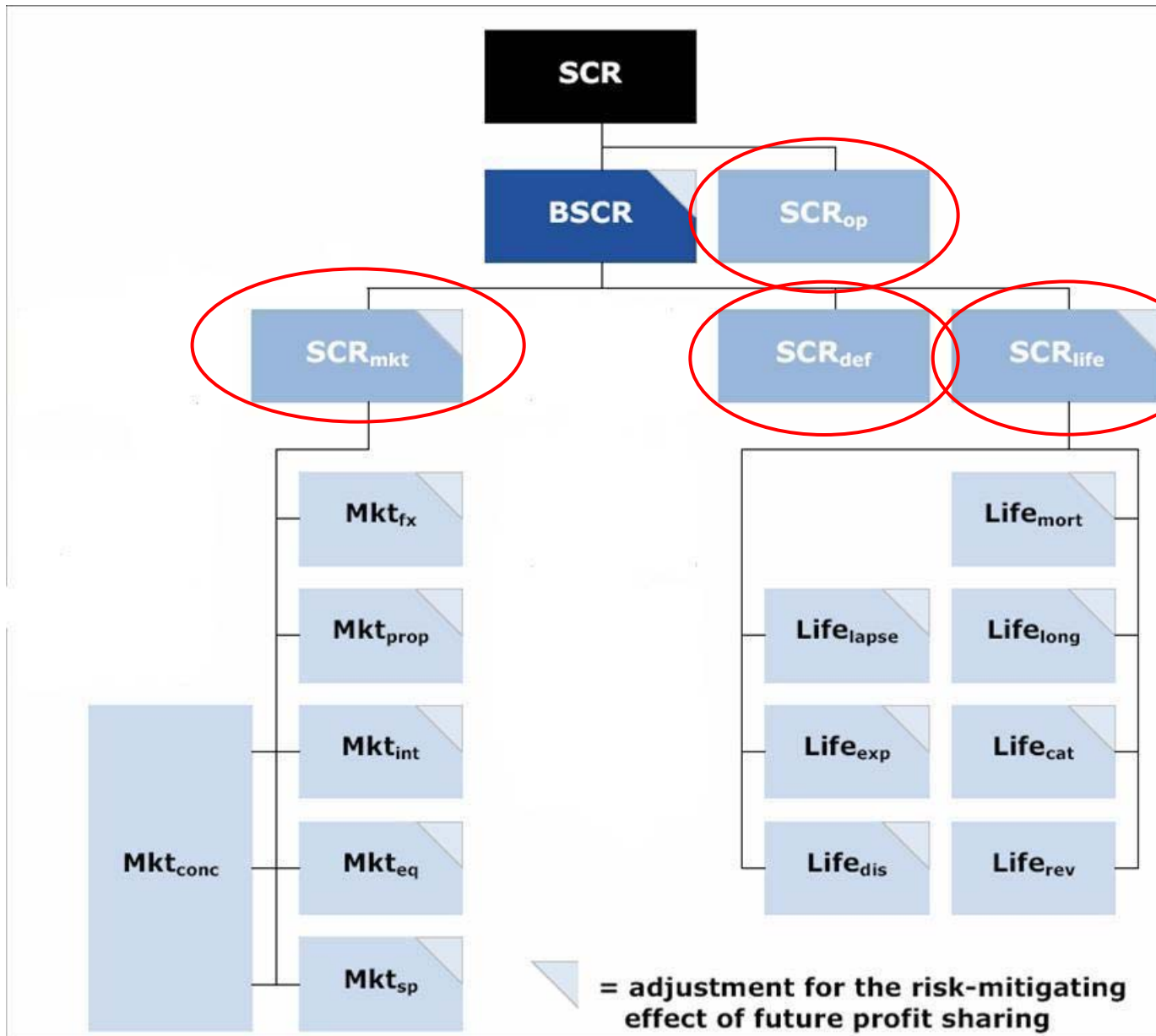
Risk margin

- “Cost of capital” approach
 - The entity taking on the liabilities has to be compensated for the cost of providing the capital required during the run-off of the transferred portfolio
- Calculated by
 - 1. Projecting the run-off of required capital (simplified projection of future SCRs)
 - 2. Multiplying SCR_t by (Risk-free rate + 6%)
 - 3. Discounting (risk-free rate) and summing



Solvency Capital Requirement (SCR)

- SCR is a modular calculation
- Calculate various SCR components
 - Such as Market risk, Underwriting risk
- Each component can be further broken down into sub-components
 - E.g. Market risk includes sub-components for interest rate risk, equity market risk, f/x risk.....
- Bottom-up calculation
 - Stress tests on various factors
 - Alternative of simpler 'factor-based' formulae
- Combine components into overall SCR
 - Using (prescribed) correlation matrix





Individual SCR components

SCR_{mkt}

Market Risk

- Interest rate
- Equity
- Property
- Currency
- Spread
- Concentration

SCR_{def}

Default Risk

- Counterparty default
(reinsurance, financial instruments)

SCR_{life}

Life Underwriting Risk

- Mortality
- Longevity
- Disability
- Lapse
- Expense
- Catastrophe

SCR_{op}

Operational Risk

- Operational risk

- First calculate BSCR based on SCR_{mkt} , SCR_{def} and SCR_{life}
- Then, $SCR = BSCR + SCR_{op}$



Calculation of SCR_{mkt}

- Net change in assets and liabilities
- Sub-components include:
 - Interest rate
 - Equity
 - Property
 - F/x
- Prescribed stress tests
 - E.g. upward/downward shift in yield curve, equity market shock (32% for most equities)
- Brought together into overall SCR_{mkt} using (prescribed) correlation matrix



Calculation of SCR_{life}

- Net change in assets & liabilities
- Sub-components include
 - Mortality: 10% increase in mortality rates
 - Longevity: 25% decrease in mortality rates
 - Lapse: 150% of central rates / +3 percent points
 - Expenses: 10% increase; inflation +1 pp
- Brought together into overall SCR_{life} using (prescribed) correlation matrix



Calculation of BSCR

Calculation

The BSCR is determined as follows:

$$BSCR = \sqrt{\sum_{rxc} CorrSCR_{r,c} \cdot SCR_r \cdot SCR_c} - \min(\sqrt{\sum_{rxc} CorrSCR_{r,c} \cdot KC_r \cdot KC_c}, FDB)$$

where

$CorrSCR_{r,c}$ = the cells of the correlation matrix CorrSCR

SCR_r, SCR_c = capital charges for the individual SCR risks according to the rows and columns of the correlation matrix CorrSCR

KC_r, KC_c = risk mitigation effects for the individual SCR risks¹⁵

and CorrSCR is defined as follows:

$CorrSCR =$	SCR_{mkt}	SCR_{def}	SCR_{life}	SCR_{health}	SCR_{nl}
SCR_{mkt}	1				
SCR_{def}	0.25	1			
SCR_{life}	0.25	0.25	1		
SCR_{health}	0.25	0.25	0.25	1	
SCR_{nl}	0.25	0.5	0	0	1



Calculation of SCR_{op}

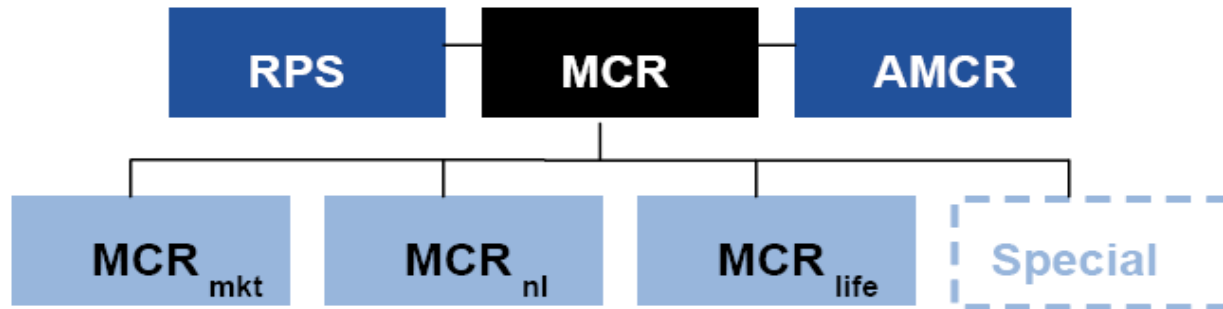
- SCR_{op} calculated as greater of
 - 3% of gross premium income, and
 - 0.3% of gross technical provisions
- But then limited to 30% of BSCR
- However
 - “...this formula should not be viewed as the final proposal”
 - “CEIOPS considers that the suggested formula needs to be developed further to adequately reflect operational risk where an insurer writes unit-linked business”



Calculation of MCR

Overall MCR calculation

The MCR calculation is divided into components as follows:



- MCR should be less than SCR
- Detailed formulae for calculating MCR
- Calculated automatically by QIS3 spreadsheet
 - But requires lots of inputs



Recap & summary

- Basic participation in QIS3 requires
 - Valuation of assets
 - Classification of eligible capital items
 - Calculation of best-estimate provisions
 - Calculation of risk margin for non-hedgeable risks
 - Involves projection of (simplified) SCR into the future
 - Calculation of SCR
 - Calculation of MCR
 - Completion of spreadsheet
- Further (optional) participation
 - Qualitative questionnaire
 - Info on internal model
 - Group information



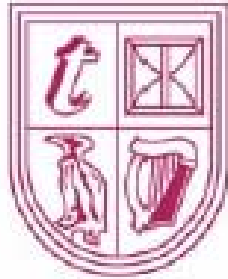
Practical issues

- Completion of QIS3 spreadsheet
 - Looks daunting, but actually very well put together and well documented
 - Accompanying instruction book
 - Helper tabs
 - Colour coding etc.
 - Fill in the blanks and it takes care of the rest
- Calculations
 - Need cash flow projection software
 - Options and guarantees – choice of 4 approaches
 - Multiple runs (best estimate, various SCR stress tests)
 - Term structure of interest rates
 - Contract classification/segmentation



Why participate?

- First chance to get some understanding of
 - practicality and suitability of calculations
 - impact on balance sheets
- Will allow early identification of any potentially serious problems
- There will be further QISs
 - Refinement of calibration etc.
- But much easier to participate in later QISs if you participate in QIS3



Questions?

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