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INSURANCE

Solvency II
Quantitative Impact Studies

ADVISORY

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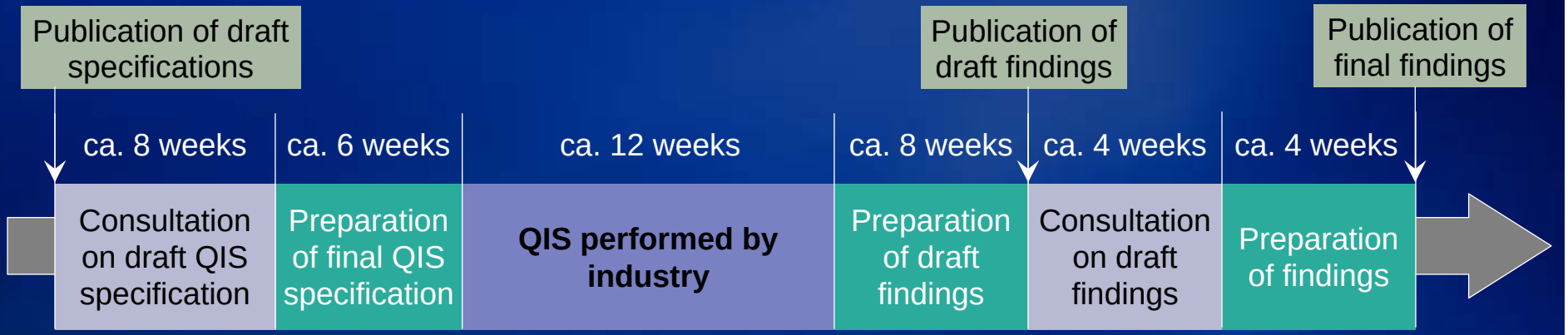
Quantitative Impact Studies
Tests for Practical Implementation and Calibration of Solvency II

Key objectives for Quantitative Impact Studies (QIS)

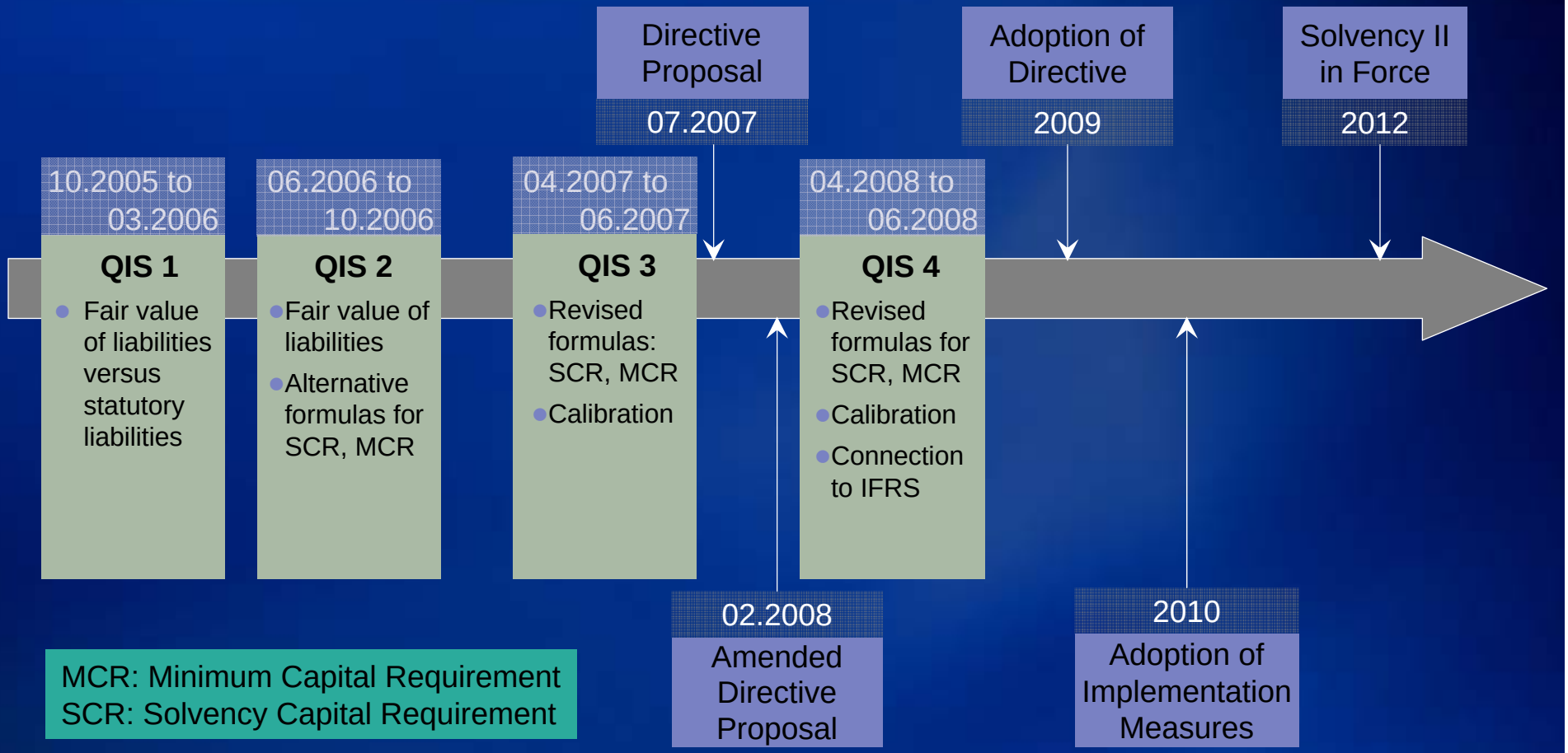
- Quantitative impact of Solvency II requirements, with focus on
  - Fair value of liabilities
  - Standard Model for pillar 1 capital adequacy calculations
- Calibration of Solvency II requirements
- Test of practicality of proposed implementation from CEIOPS

QIS time frame



… QIS are designed and communicated in an open and transparent way

Quantitative Impact Studies
Solvency II Time Line

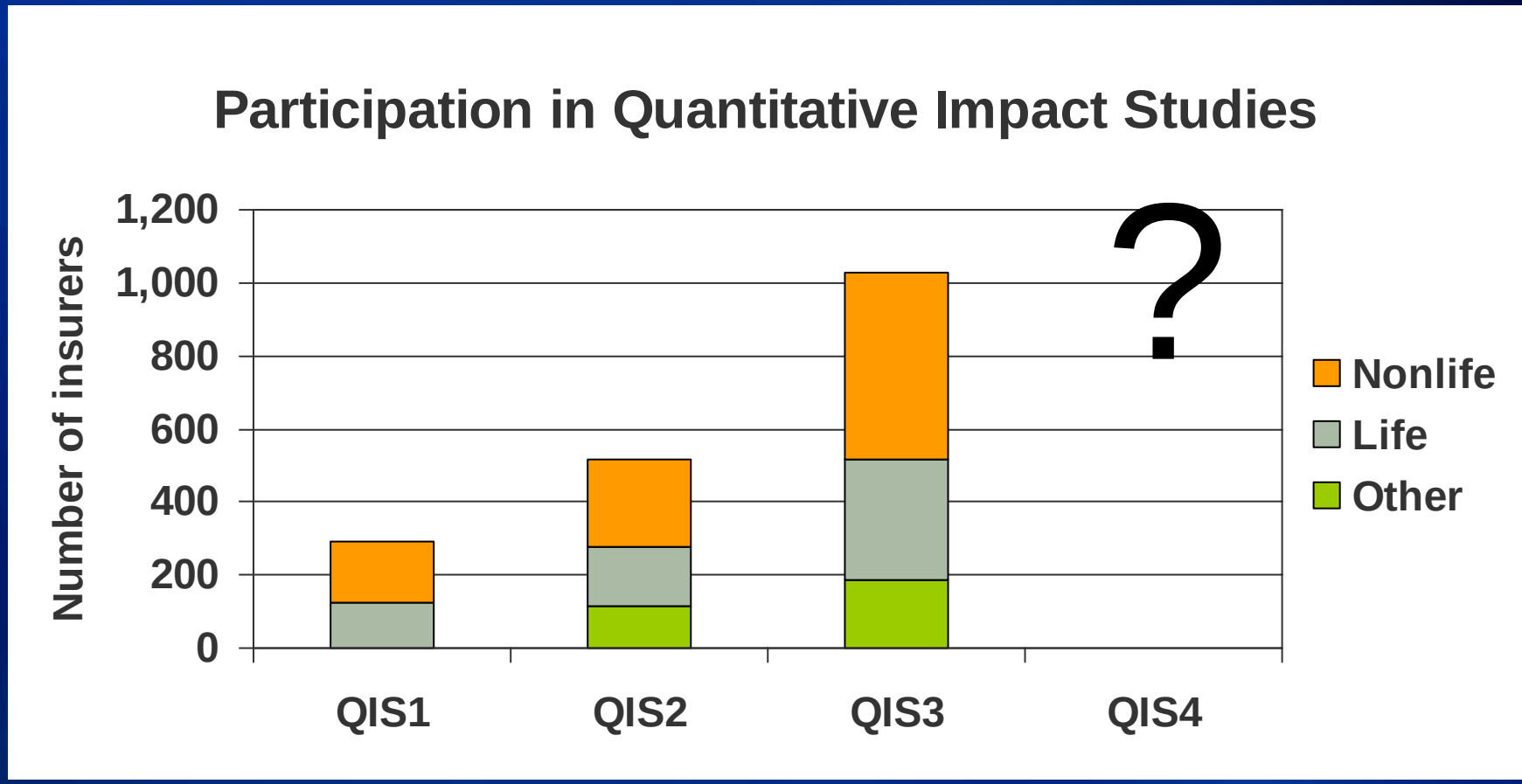


MCR: Minimum Capital Requirement
SCR: Solvency Capital Requirement

Source: CEIOPS work plan for Solvency II deliverables 2007–2012, CEIOPS-SEC-54/07

… the focus of QIS have been on the quantitative issues

Quantitative Impact Studies
European Industry Participation



Sources: QIS1 – Summary Report CEIOPS-FS-01/06
QIS2 – Summary Report CEIOPS-SEC-71/06S
CEIOPS' Report on Its Third Quantitative Impact Study (QIS3) for Solvency II, CEIOPS-DOC-19/07

…increasing level of participation from the insurance industry in preparation for final implementation

QIS 1 2 3 4

Quantitative Impact Studies
QIS1: Initial definition of fair value of liabilities

Approach to calculating the fair value of liabilities

- Reserves defined such that they are sufficient in 75percent of run-off situations

Quantitative result

- In most cases the fair value was lower than the technical provisions

Challenges

- Fair value definition required:
  - Advanced modeling techniques
  - A level of data currently not available within the insurance industry
  - A degree of resources higher than were available in many companies

Total 75% percentile liabilities as % of current provisions (QIS1)			
	Min	Average	Max
Belgium	80%	86%	95%
Finland	75%	84%	88%
France	71%	84%	95%
Netherlands	83%	86%	89%
Norway	58%	92%	114%
Poland	59%	85%	103%
Portugal	51%	96%	139%
Sweden	95%	95%	95%
Slovenia	69%	84%	98%
Great Britain	59%	82%	108%

Source: CEIOPS-FS-01/06, 17 March 2006

Quantitative Impact Studies
QIS2: Alternatives for FV of liabilities, SCR, MCR

Follow-up from QIS1	Fair value of liabilities	Findings
	• 75% percentile approach • Cost of capital approach	• Both approaches led to similar fair values • Industry had a preference for cost of capital approach • **Result:** *Supervisors dropped the percentile approach*

SCR and MCR	Findings
• Factor based formula for all risk types • Partially scenario based alternatives: negative impact of a predetermined shock in the risk variable	• For investment and life risk, a scenario based calculation was preferred • Lack of consistency in the calibration of MCR and SCR • More guidance was requested

Costs
• Preparation of QIS2 took insurers the equivalent of a few person months to a few person years

Quantitative Impact Studies
QIS3: Objectives and Focus

QIS3 is a follow-up from QIS2

Key objectives of QIS3 were to gather information about:

- The practicability and suitability of the calculations involved
- The impact on balance sheets and the amount of capital needed to cover the SCR
- The suitability of the calibration
- The effect on insurance groups

Focus of QIS3

- Further tests of Standard Model for the SCR
  - Mixture of factor based formulas and scenario based approaches
  - New more careful calibration of the standard model
- Test a new formula for the MCR
  - Newly structured factor based approach
  - Credit for risk mitigating effect of future bonus profit sharing

Quantitative Impact Studies
QIS3: Results

Financial Impact

- Solvency ratio under QIS3 is less than under Solvency I
- 98 percent of insurers can cover MCR
- New Solvency regime does not require extra capital in the European insurance market as a whole
  - For 30 percent of insurers, the available surplus would **increase** by more than 50 percent
  - For 34 percent of insurers, the available surplus would **decrease** by more than 50 percent
  - 16 percent of insurers would need to **increase** their capital in order to meet their SCR

Costs

- The preparation of QIS3 took companies one to three person months
  - Insurers spent significantly less time on preparing QIS3 than on preparing QIS2
    - QIS3 requirements more streamlined that QIS2 requirements
    - Effects of learning curve

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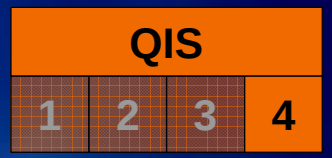
Quantitative Impact Studies
QIS3: Results

SCR and MCR	Findings
• MCR	• Modular approach yielded highly erratic results for life insurance companies due to profit-sharing issues • QIS4 will test a simplified stand-alone approach to calculating the MCR
• Internal Models	• On average 25 percent lower than SCR • CRO Forum member companies 29 percent lower than SCR • Higher credit risk than standard formula
• Groups	• No definitive results; diversification benefits vary significantly between groups



Quantitative Impact Studies
QIS4: Objectives and Focus

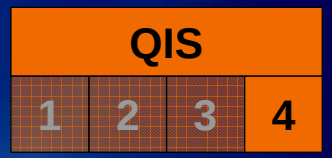
QIS4 is a follow-up from QIS3

Key objectives

- Design the technical specifications such that they are aligned with the principles and calibration target in the Directive Proposal
- Provide all stakeholders with information on detailed quantitative impact of Solvency II
- Encourage all stakeholders to begin preparations for the implementation of Solvency II

Focus of QIS4

- Proportionality principle for smaller undertakings and test of simplified methods
- Group capital requirement with respect to intra-group diversification and intra-group transactions
- Comparability of results derived from the Standard Model, partial models, and internal models
- Design and calibration of the new MCR formula



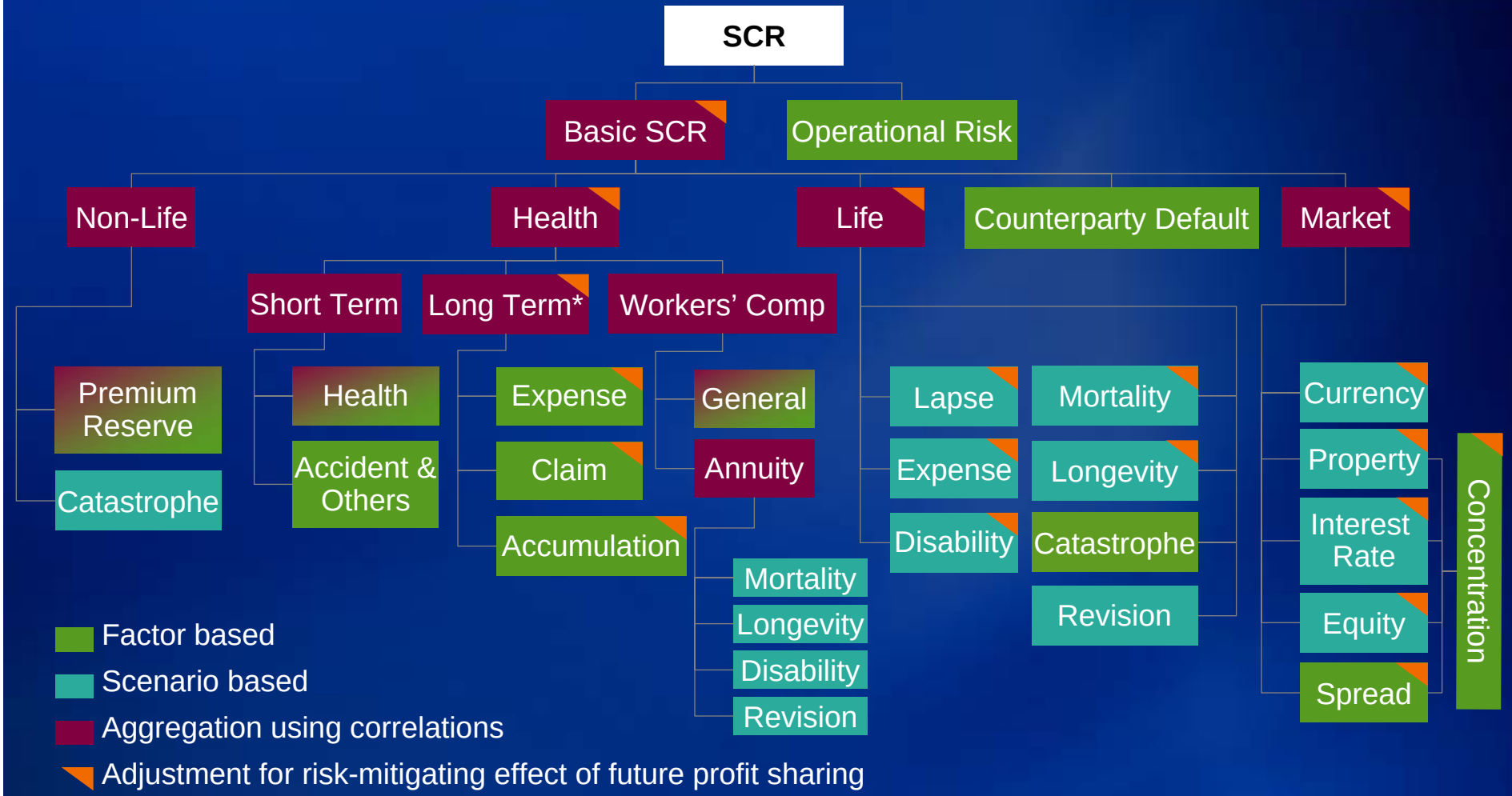
Quantitative Impact Studies
QIS4: Objectives and Focus

Highlights from technical specification

- Specific guidance to the extent to which IFRS valuation can be used
  - Typical examples include:
  - Intangible assets: to be valued as nil
  - Investment property: IAS 40 is acceptable proxy if the fair value alternative for valuation is used
- More specific guidance for the three tier systems adopted for own funds, including specific examples:
  - Tier 1 – example: excess of assets over liabilities
  - Tier 2 – example: subordinated liabilities with a duration of at least five years from the reporting date
  - Tier 3 – example: subordinated liabilities with a duration of less than five years from the reporting date
- Additional guidance on valuation of provisions according to the cost of capital approach
- Revamped standard model for health insurance
- New formula for MCR

Quantitative Impact Studies
QIS4: Structure of current SCR Standard Model

QIS 1 2 3 4



* Long term health insurance only exists in the Austrian and German markets

COMPARING PRINCIPLES-BASED APPROACH (PBA) TO SOLVENCY II

PBA at a Glance (Simplified)

	Variable Annuities	Life Insurance
Reserves	Reserve = Max (Stochastic, Deterministic) Stochastic @ CTE(70) In-force 1981 and later *Effective: 2008/2009? Implemented through actuarial guidelines*	Reserve = Max (Stochastic, Deterministic) Stochastic @ CTE(65) New business only *Effective: 2011/2012? State-by-State adoption required for SVL*
Capital *(passed by annual statement instruct)*	RBC = TAR* - Reserve TAR = Max (Stochastic, Deterministic) Stochastic @ CTE(90) All in-force business *Effective: 2005, transition rules*	RBC = TAR* - Reserve TAR = Stochastic only Stochastic @ CTE(90) All in-force business *Effective: 2008/2009?*

** TAR = Total Asset Requirement*

Commonalities between Solvency II and PBA

Item	Description
Approach	Formulas are broadly the same being: TAR – Reserve/Liability, where there is a floor to the calculation (floor is determined using differing methods)
Models	• Company-specific models are used (internal models optional under SII) • Partly based on scenario-based calculations for economic variables (SII: within standard model)
Hedging	Hedging impacts may be incorporated in the calculations under certain circumstances
Enforcement	Complicated regulatory regimes given geographic dispersion

Representative Differences between Solvency II and PBA

Item	Solvency II	Principle-Based Approach
Approach	• Target level is 99.5 percent VAR over a one-year period • TAR is determined using a combination of factor-based and scenario-based calculations • Diversification benefits • Liabilities are fair value	• Target level is CTE 90 over the life of the business • TAR is subject to a floor for VA business (not life business) • Liabilities not fair value • No diversification benefits
Assumptions	• Market consistent assumptions including risk-free rates for discounting	• Company assumptions with credibility weightings and expected earned rates for discounting
Assets	• Assets only impact liabilities for participating business	• Assets can have an impact on the value of the reserves for all business, not just participating business
Reflection of Risk	• Margins in liabilities to be based on market prices, if available; otherwise cost of capital approach	• Explicit margins expected for nonstochastic assumptions, likely to be on an assumption-by-assumption basis
ERM	• ERM represents one of the three pillars and can impact the quantification of capital	• ERM does not impact the quantification of capital (though rating agencies are increasingly focused on this aspect)

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