

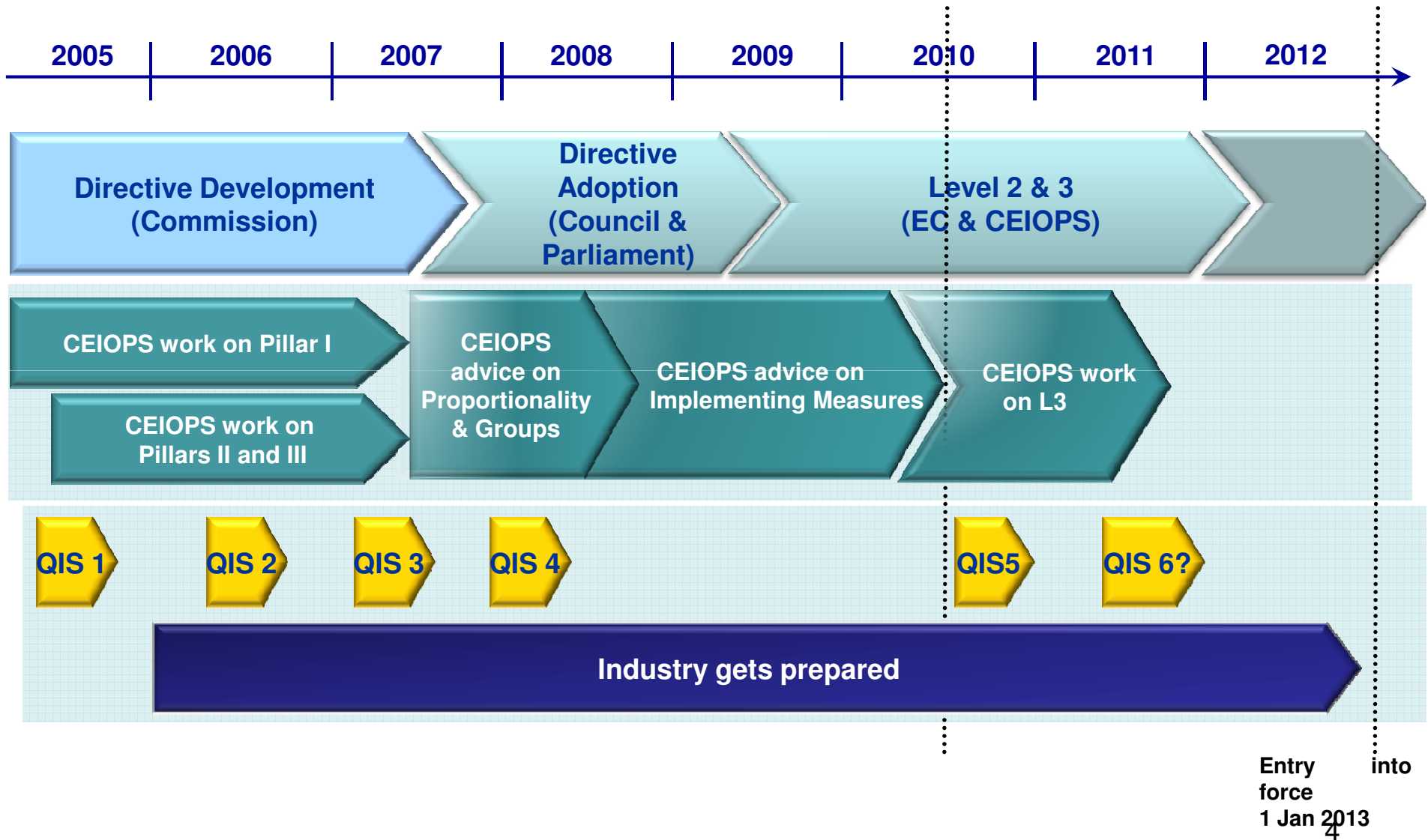
# QIS5 Workshop



Warsaw, 5 October 2010

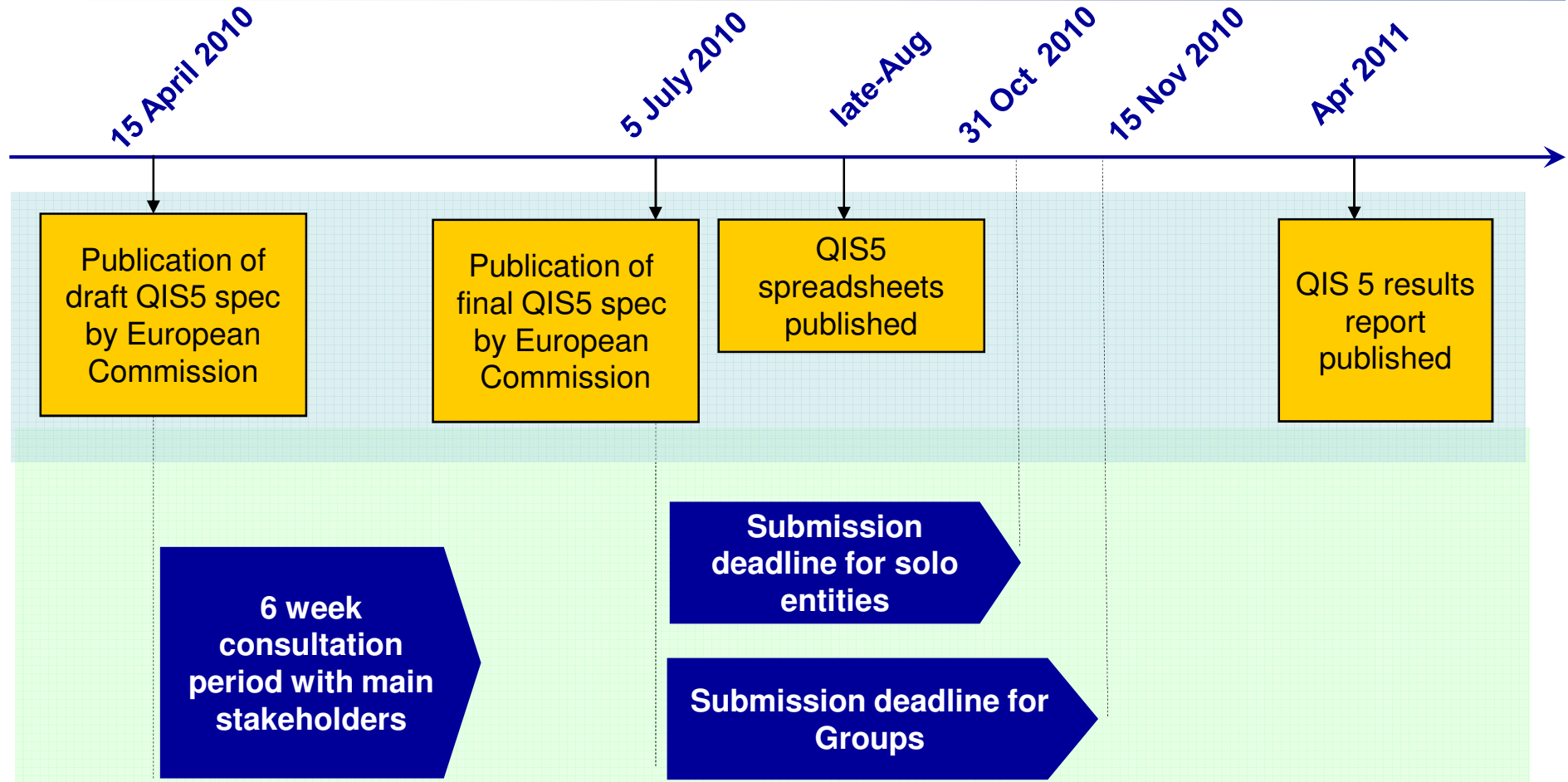
10:00 – 10:15	Introduction and opening remarks	
10:15 – 11:00	Speaker from the EC	
11:00 – 12:30	Technical Specifications QIS5 (part 1) <ul style="list-style-type: none"><li>■ Valuation</li><li>■ Own Funds</li></ul>	
12:30 – 13:30	<i>LUNCH</i>	
13:30 – 15:00	Technical Specifications QIS5 (part 2) <ul style="list-style-type: none"><li>■ SCR</li></ul>	
15:00 – 15:30	<i>BREAK</i>	
15:30 – 17:00	Technical Specifications QIS5 (part 3) <ul style="list-style-type: none"><li>■ MCR</li><li>■ Groups</li></ul>	
17:00 – 17:15	Conclusions , Next Steps, final Q&As and close	

- QIS5 Introduction
- Valuation of assets and technical provisions
- Own Funds
- Solvency Capital Requirement
- Minimum Capital Requirement
- Groups
- Conclusion



Warsaw, 5 Oct.

Entry into force  
1 Jan 2013



European Commission participation target rates:  
60% of total European insurance undertakings and 75% of groups

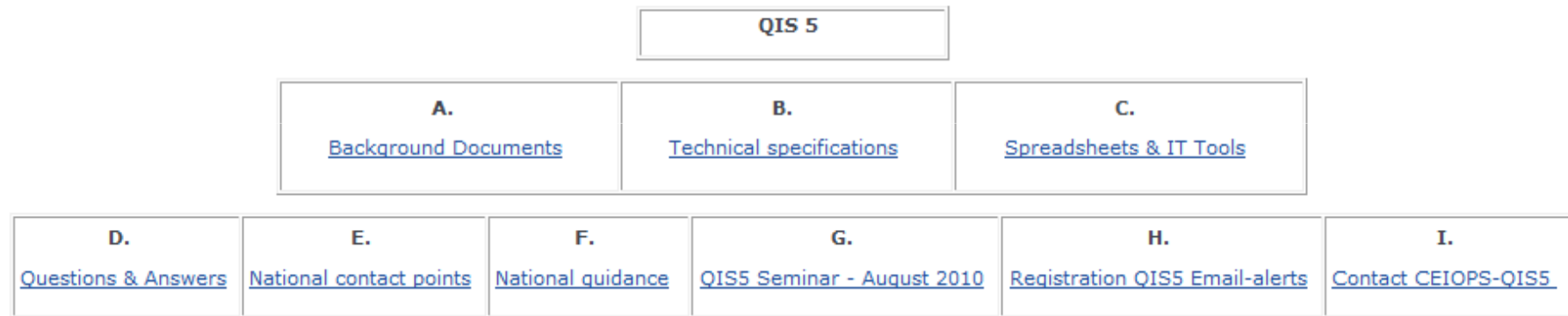
# What does the QIS5 package look like?

## Quantitative Impact Study 5

Print 

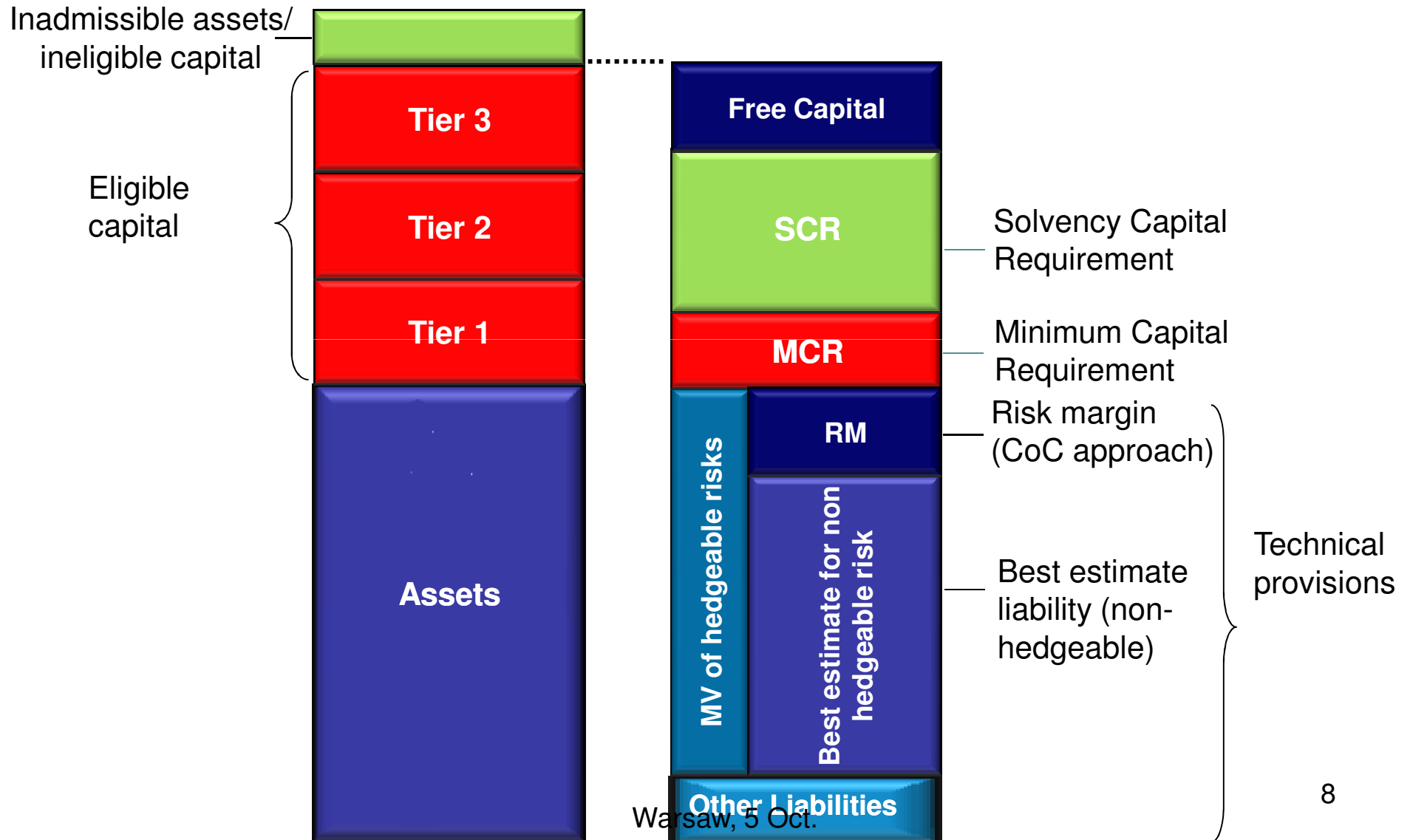
The European Commission has requested CEIOPS to run the QIS5 exercise between August and November 2010 and publish a report on the results of that exercise in April 2011 in order to provide quantitative input to the finalisation of the Commission's proposal on level 2 implementing measures for the Solvency II Framework Directive.

Below, interested parties all provided with all documents and information available and needed for the purpose of the QIS5 exercise.



*Note 1: CEIOPS also provides for enhanced support an [overview of all QIS5 documents](#) in sections above. The overview is subject to continuous change as it shall be updated as per each additional CEIOPS posting.*

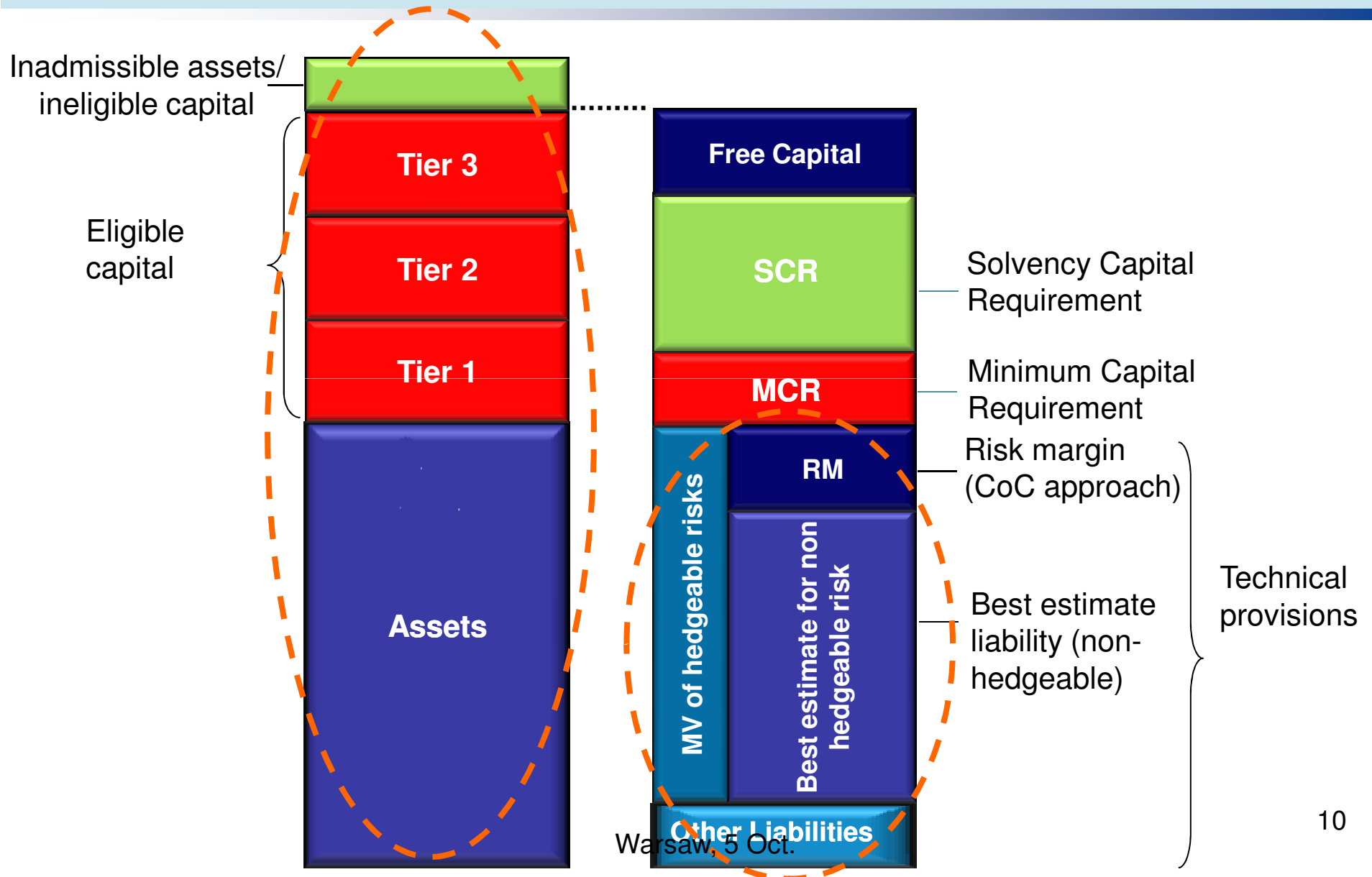
- All participants:
  - Preparedness for Solvency 2
  - Quality-assessment of inputs and results
  - Major practical difficulties when completing QIS5
  - Assessment of the QIS5 methodology
  - Simplifications
- Internal Models
- Groups:
  - Scope of the group and data
  - Group SCR
  - Group specific risks
  - Group Own funds
  - Other financial sectors
  - Group Internal Models





- QIS5 Introduction
- Valuation of assets and technical provisions
- Own Funds
- Solvency Capital Requirement
- Minimum Capital Requirement
- Groups
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# Valuation of assets and technical provisions



## TECHNICAL SPECIFICATIONS

ASSETS AND LIABILITIES	OWN FUNDS	SOLVENCY CAPITAL REQUIREMENT	MINIMUM CAPITAL REQUIREMENT	GROUP LEVEL ISSUES
------------------------	-----------	------------------------------	-----------------------------	--------------------

- Assets / liabilities based on market-consistent valuation
- Reinsurance separately identified as an asset and subject to a counterparty default adjustment
- Specified business segmentation
- Debate on risk-free rate to be used in valuation of liabilities
- Cost-of-capital approach for calculating the risk margin
- Potential limitations in recognition of future premiums

- Starting point is IFRS, then make adjustments:
- Assets
  - Participations
    - market price if traded, otherwise
    - adjusted equity method;
    - mark-to-model as final option
  - Intangible assets recognised if,
    - probable that future benefits will flow to entity
    - cost of assets can be measured
    - need evidence of exchange transactions for same or similar assets to value
- Liabilities
  - Financial liabilities – allow for own credit standing on recognition, account for subsequent changes in risk-free rate
  - IAS 19 considered a reasonable proxy for post employment benefit liabilities, e.g. own pension scheme
- Deferred tax assets and liabilities netted

- Best estimate calculated gross, without deduction of amounts recoverable from reinsurance contracts and special purpose vehicles (“SPVs”)
- Example adjustments to recoverables from expected default:

	<b>Recovery Rate</b>	<b>Probability of default (1 year)</b>	<b>Approximate adjustment (<i>duration of recoverables ~ 5 years</i>)</b>
<b>AAA</b>	<b>50%</b>	<b>0.05%</b>	<b>0.13%</b>
<b>AA</b>	<b>45%</b>	<b>0.1%</b>	<b>0.28%</b>
<b>A</b>	<b>40%</b>	<b>0.2%</b>	<b>0.60%</b>
<b>BBB</b>	<b>35%</b>	<b>0.5%</b>	<b>1.63%</b>

Assets	Current accounting bases	Solvency I valuation principles	QIS 5 Valuation Principles
Goodwill		0	
Other intangible assets		0	
Property, plant & equipment held for own use		0	
Investments (other than assets held for unit-linked funds)	0	0	0
Property (other than own use)		0	
Participations		0	
Equities/other shares (other than participations) - listed		0	
Equities/other shares (other than participations) - unlisted		0	
Bonds - Government and multilateral banks		0	
Bonds - Corporate (asset backed securities)		0	
Bonds - Corporate (other)		0	
Structured notes		0	
Investment funds		0	
Derivatives	0	0	0
<i>Futures</i>		0	
<i>Call Options</i>		0	
<i>Put Options</i>		0	
<i>Swaps</i>		0	
<i>Forwards</i>		0	
Long term bank deposits		0	
Other investments		0	
Assets held for unit-linked funds		0	
Cash deposits to cedants		0	
Mortgages and loans made	0	0	0
<i>Uncollateralized loans made</i>		0	
<i>Collateralized loans made (other than loans on policies)</i>		0	
<i>Loans on policies</i>		0	
Reinsurance recoverables	0	0	0
<i>Reinsurance share of TP - non-life excluding health</i>		0	
<i>Reinsurance share of TP - health similar to non-life</i>		0	
<i>Reinsurance share of TP - health similar to life</i>		0	
<i>Reinsurance share of TP - life excluding health and unit-linked</i>		0	
<i>Reinsurance share of TP - life unit-linked</i>		0	
<i>Other reinsurance recoverables</i>		0	

Purpose	Segmentation		
Best Estimate Assumptions	Homogeneous Groups of risk		
Risk Margin	Line of business ("LoB")		
Reporting (17 lines of life business)	With-profit participation	Further subdivision for each of these segments into risk drivers:	
	Index-linked and unit-linked life insurance		Death
	Other life insurance		Survival
	Accepted reinsurance		Disability / morbidity
	Annuities stemming from non-life business		Savings contracts

	Gross best estimate for provisions					Total
	TP excl. Risk margin	TP as a whole	Total	Premium	Claims outstandings	
<b>QIS5 insurance obligations</b>						
<b>Total</b>	0	0	0	0	0	0
<b>Life insurance obligations</b>	0	0	0			0
<b>Insurance with profit participation</b>	0	0	0			0
Life insurance with profit participation (Death)	0					0
Life insurance with profit participation (Survival)	0					0
Life insurance with profit participation (Disability/morbidity)	0					0
of which health pursued on a similar to life technique basis	0					0
Life insurance with profit participation (Saving)	0					0
<b>Index-linked and unit-linked insurance</b>	0	0	0			0
Index-linked and unit-linked life insurance (Death)	0					0
Index-linked and unit-linked life insurance (Survival)	0					0
Index-linked and unit-linked life insurance (Disability/morbidity)	0					0
of which health pursued on a similar to life technique basis	0					0
Index-linked and unit-linked life insurance (Saving)	0					0
<b>Other life insurance</b>	0	0	0			0
Other life insurance (Death)	0					0
Other life insurance (Survival)	0					0
Other life insurance (Disability/morbidity)	0					0
of which health pursued on a similar to life technique basis	0					0
Other life insurance (Saving)	0					0
<b>Accepted Reinsurance</b>	0	0	0			0
Accepted reinsurance (Death)	0					0
Accepted reinsurance (Survival)	0					0
Accepted reinsurance (Disability/morbidity)	0					0
Accepted reinsurance (Saving)	0					0
<b>Annuities stemming from non-life insurance contracts</b>	0					0
of which health pursued on a similar to life technique basis	0					0



## Non-life technical provisions - Segmentation

- Non-life direct business (incl. proportional inwards reinsurance)
  - Medical expenses
  - Income protection
  - Worker's compensation
  - Motor vehicle liability
  - Motor, other classes
  - Marine, aviation and transport
  - Fire and other damage
  - General liability
  - Credit and suretyship
  - Legal expenses
  - Assistance
  - Miscellaneous
- Non-proportional inwards reinsurance
  - Health
  - Property
  - Casualty
  - Marine, Aviation and transport

## Health technical provisions - Segmentation

- Health insurance split depends on whether on a similar technical basis to that of life insurance (SLT) or non-life insurance (non-SLT)
- SLT Health - Further split by main risk driver:
  - With-profit participation: disability/morbidity
  - Index-linked/unit-linked: disability/morbidity
  - Other insurance: disability/morbidity
  - Annuities from non-life contracts
- Non-SLT Health – Further split into:
  - Medical expenses
  - Income protection
  - Worker's compensation

# Non-life Segmentation: QIS5 spreadsheet

	Gross best estimate for provisions					
	<i>TP excl. Risk margin</i>	<i>TP as a whole</i>	Total	Premium	Claims outstanding	Total
<b>QIS5 insurance obligations</b>						
<b>Total</b>	0	0	0	0	0	0
<b>Non-Life insurance obligations</b>	0	0	0	0	0	0
Medical expense insurance	0		0			0
Income protection insurance	0		0			0
Workers' compensation insurance	0		0			0
Motor vehicle liability insurance	0		0			0
Other motor insurance	0		0			0
Marine, aviation and transport insurance	0		0			0
Fire and other damage to property insurance	0		0			0
General liability insurance	0		0			0
Credit and suretyship insurance	0		0			0
Legal expenses insurance	0		0			0
Assistance	0		0			0
Miscellaneous financial loss	0		0			0
<b>Obligations relating to accepted proportional reinsurance</b>	0	0	0	0	0	0
Medical expense insurance	0		0			0
Income protection insurance	0		0			0
Workers' compensation insurance	0		0			0
Motor vehicle liability insurance	0		0			0
Other motor insurance	0		0			0
Marine, aviation and transport insurance	0		0			0
Fire and other damage to property insurance	0		0			0
General liability insurance	0		0			0
Credit and suretyship insurance	0		0			0
Legal expenses insurance	0		0			0
Assistance	0		0			0
Miscellaneous financial loss	0		0			0
<b>Obligations relating to accepted non-proportional reinsurance</b>	0	0	0	0	0	0
Non-proportional health reinsurance	0		0			0
Non-proportional property reinsurance	0		0			0
Non-proportional casualty reinsurance	0		0			0
Non-prop. marine, aviation and transport reinsurance	0		0			0

- Solvency II specifies minimum segmentation basis...
- ...but crucially requires homogenous risk groups
- Broadly consistent with current best practice, but there may be practical challenges in satisfying the minimum requirements
- Practical challenges
  - Unbundling & proportionality
  - Data implications

## Life technical provisions - Considerations

<b>Risk factors</b>	<b>Decrements, expenses, option take-up rates. Should reflect both intrinsic and time value in respect of options and guarantees.</b>
<b>Grouping</b>	<b>Should not misrepresent cost, distort valuation or result in loss of important attributes.</b>
	<b>E.g. check for grouping of ‘in the money’ and ‘out the money’ options, restrictions on subvention between homogenous groups.</b>
<b>Policyholder behaviour</b>	<b>Dependent on financial markets &amp; firm’s strength. Recognise behaviour in and out of money will be different, increasing future awareness of options and solvency of firm.</b>
<b>Management actions</b>	<b>Objective, verifiable, reasonable. Management actions should be consistent with each other.</b>
<b>Surrender value floor</b>	<b>Should not be reflected in market-consistent liabilities</b>

- Life (described in more detail than in QIS4, very close to final advice):

Technique	Description
Simulation	Normally required for business with future discretionary benefits, the specification sets out requirements for economic scenario files (“ESFs”) underlying ALM models, etc.
Analytical	Used for non market assumptions or in some cases Black & Scholes where applicable
Deterministic	Simplifications based on stress or scenario testing
Combination of techniques	

## Guaranteed and discretionary benefits

Discretionary

Guaranteed

- Certain liabilities have a discretionary component (pure or conditional) which depends on the declaration of future bonuses, dividends etc
- Technical provisions are to be separated into the guaranteed component and discretionary component for the purpose of determining the loss absorbing capacity of liabilities
- The distinction is important for aspects of the SCR and MCR calculations
  - For SCR only the discretionary component (TP and DTL of the discretionary component) is loss absorbing and supervisors want to identify its use explicitly
  - For MCR, different factors would apply to guaranteed and discretionary components

## Calibration

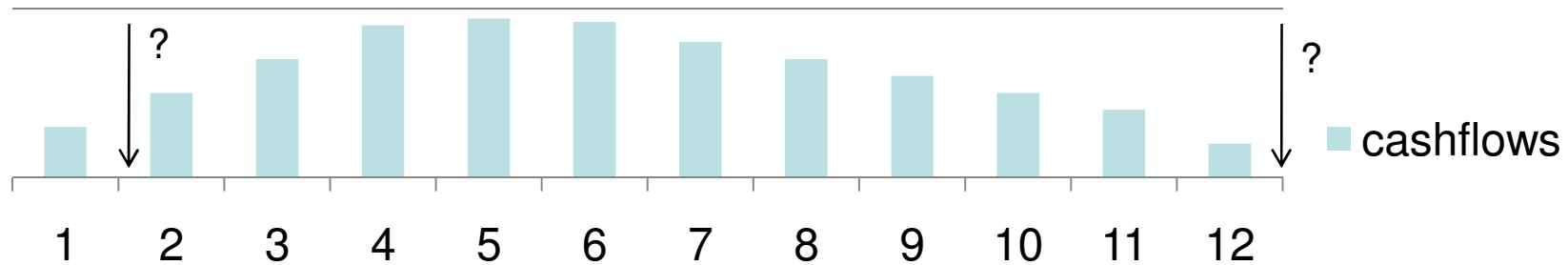
<b>Asset model</b>	<ul style="list-style-type: none"><li>■ Calibrated to risk-free term structure used to discount cash flows</li><li>■ Calibrated to replicate option prices that reflect optionality inherent in the liabilities giving rise to guarantee costs</li></ul>
<b>Volatility</b>	<ul style="list-style-type: none"><li>■ Historic volatility; or</li><li>■ Implied volatility from financial instruments</li></ul>
<b>Actuarial &amp; Statistical analysis</b>	<ul style="list-style-type: none"><li>■ Correlations between asset returns</li><li>■ Transitions probabilities between corporate bond rating classes</li><li>■ Corporate bond default rates</li><li>■ Property volatilities</li></ul>
<b>Expert Judgement</b>	<ul style="list-style-type: none"><li>■ Selecting and adjusting data</li><li>■ Selecting time period of the data</li><li>■ Selecting valuation technique</li><li>■ Adjusting calculations for business environment</li></ul>



## Calculation of technical provisions as a whole

- Future cash flows that can be replicated using financial instruments for which a market value is observable are deemed to be **hedgeable**
- Perfect hedges are not required but any basis risk must be immaterial
- Technical provisions are then set equal to market value of replicating hedges
- If in doubt, assume cashflows are non-hedgeable
- In practice few (if any) insurance cashflows are likely to be hedgeable

## Treatment of future premiums



- Future benefits and premiums can be taken into account until undertaking has right to reject the premium or unlimited ability to amend premium and/or benefits in the future
- Symmetric treatment of renewal options now permitted
- QIS5 requests details on the impact of the treatment of renewal options on the value of technical provisions
- Annex D of the QIS5 technical specifications gives examples of the treatment for certain product types:
  - suggests any ability to amend premiums (or benefits) would mean that only 1 year's cash flows could be included in calculation of technical provisions.

- Future premiums related to the insurance and reinsurance obligations of the existing contract or the guarantee or option should be allowed for
- However, future premiums should not be included if the insurer has an unlimited ability to amend the premium or benefits.
- Q+A issued by Ceiops states, for example:

<b>Conditions</b>	<b>Treatment</b>
Restriction on undertaking's ability to amend premiums is economically relevant	Include premiums
Undertaking can only amend premiums based on a published mortality table	Include premiums
Undertaking can increase policy charges to offset potential future losses	Exclude premiums

- Requirements relating to choice of valuation techniques more clearly defined than in QIS4
- P&C Premium reserve
  - Needs to include policy admin and claims handling expenses, and allow for lapses (this was previously not explicitly specified in QIS4)
- Claims outstanding & IBNR reserve
  - Needs to include policy admin and claims handling expenses
  - Annuities: separation and treatment according to life valuation principles where material

## Valuation techniques: Non-Life – choice of method

- Solvency II requirement for BEL to represent “probability weighted average of future cash flows”
- **Deterministic methods** should be appropriate for most non-life classes, at least in the short term
  - Key consideration is to use the most reliable reserving method
  - Deterministic methods are better understood, more flexible and transparent
  - Easier to integrate expert judgment
  - Can be considered to implicitly allow for all future scenarios (QIS5 tech spec supports this argument)
- **Stochastic methods** may become more important in the medium term
  - Area of ongoing research, may become more prevalent
  - Useful where complex reinsurance covers are in place
  - May still involve calibration from deterministic methods

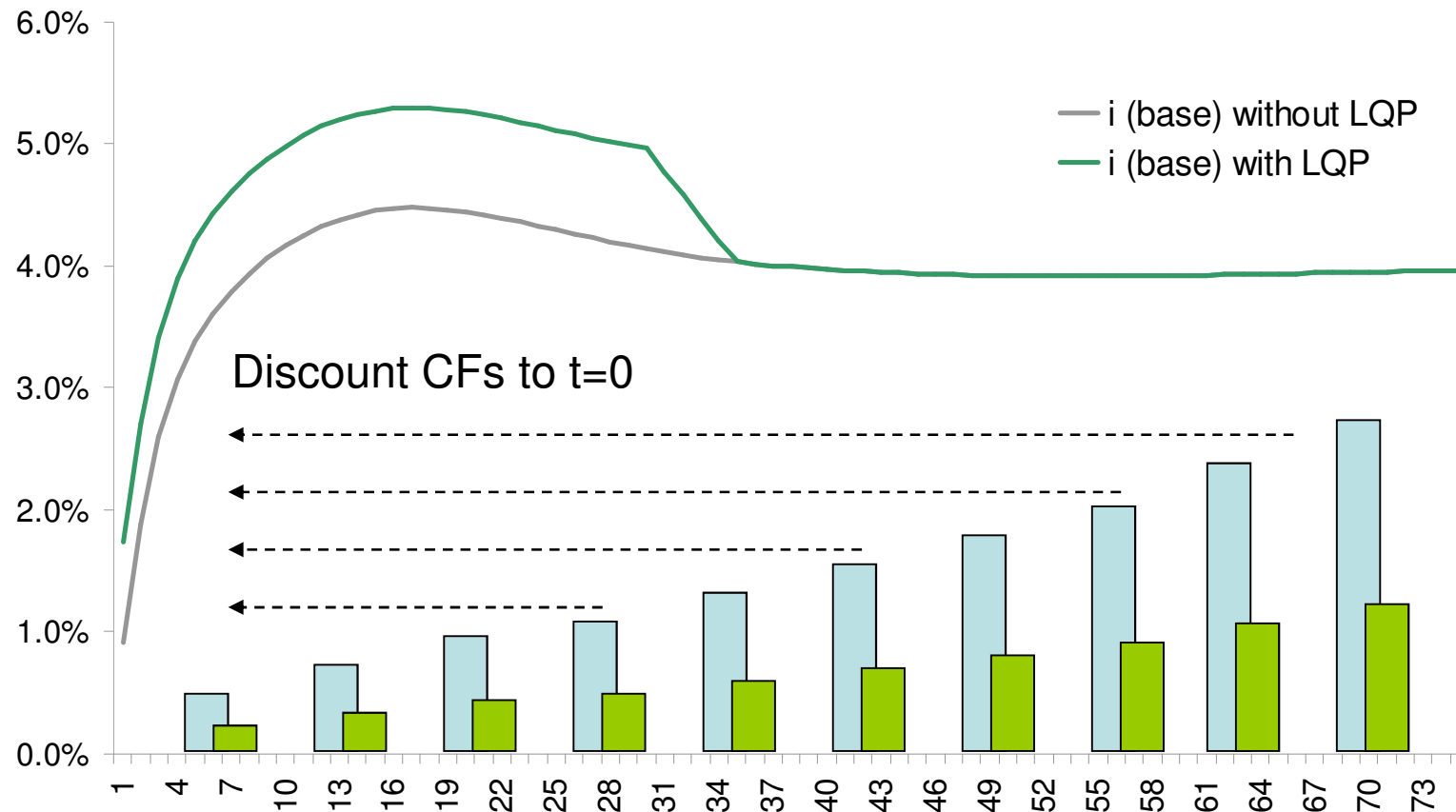
## Discount rate: QIS4 and CEIOPS' final advice

- QIS4:
  - Swap rates
  - No illiquidity premium
  - Constant forward rate extrapolation.
- CEIOPS Final Advice:
  - Government AAA Bonds
  - No illiquidity premium allowance although additional comments added that an illiquidity premium may be allowed
  - Four extrapolation techniques proposed as no single approach considered appropriate for all currencies

## **QIS5:**

- Swap rates with adjustment for credit risk (-10bps)
- Illiquidity premium (+53bps for Euro, +82bps for Sterling) added to spot rates and classified in three buckets (100%, 75% and 50%).
- Max duration for illiquidity premium varies by currency (15 yrs for Euro, 30 yrs for GBP) and then linearly reduces to 0 over the next 5 yrs
- Macroeconomic technique adopted for extrapolation:
  - Unconditional long-term forward rate (“UFR”) equal 4.2% for Euro
- QIS5 package includes reference spot rate curves for main currencies
- Data collected to assess impact of illiquidity premium

# QIS5 discount rate: 31 December 2009





## Discount rate: Illiquidity premium buckets

Illiquidity bucket	Liability characteristics
100%	Contracts exposed only to longevity and expense risks; no surrender risk; all premiums already paid
75%	Contracts with profit participation
50%	All other business
0%	N/A

### Practical modelling issues

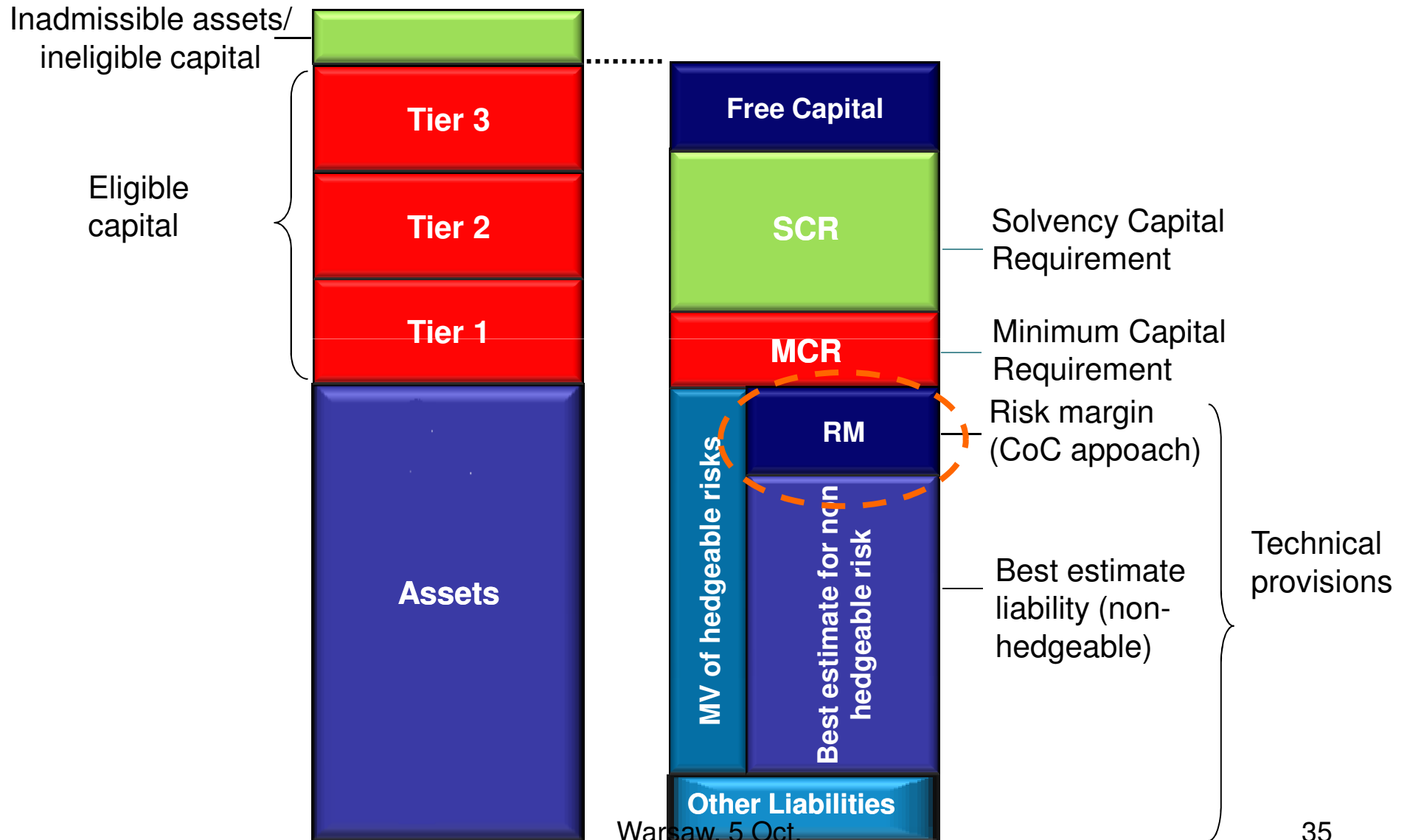
- Coding changes, liability buckets
- Interest rate ESG model
- Management actions

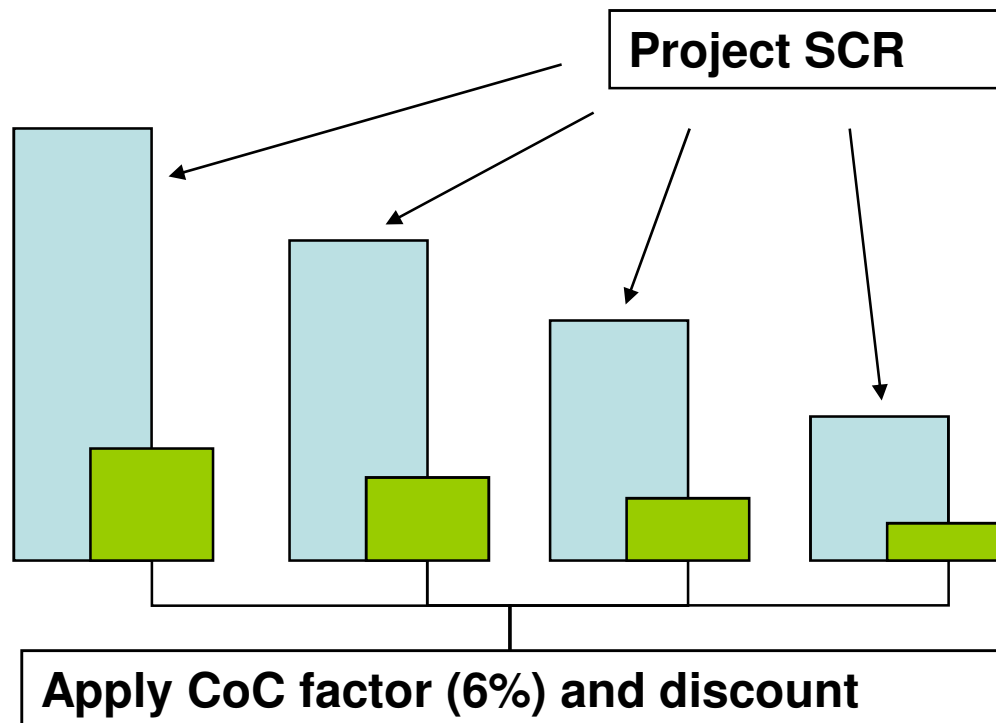
## Discount rate: Transitional Provisions

- Discount rate set to that referred in Article 20.B.a.ii (Directive 2002/83/EC):

*“...however, when the assets of the assurance undertaking are not valued at their purchase price, a Member State may stipulate that **one or more maximum rates may be calculated taking into account the yield on the corresponding assets currently held, minus a prudential margin** and, in particular for contracts with periodic premiums, furthermore taking into account the anticipated yield on future assets.”*

- Transitional provisions applies to all undertakings currently using this discount rate
- Calculate technical provisions both with and without transitional provisions

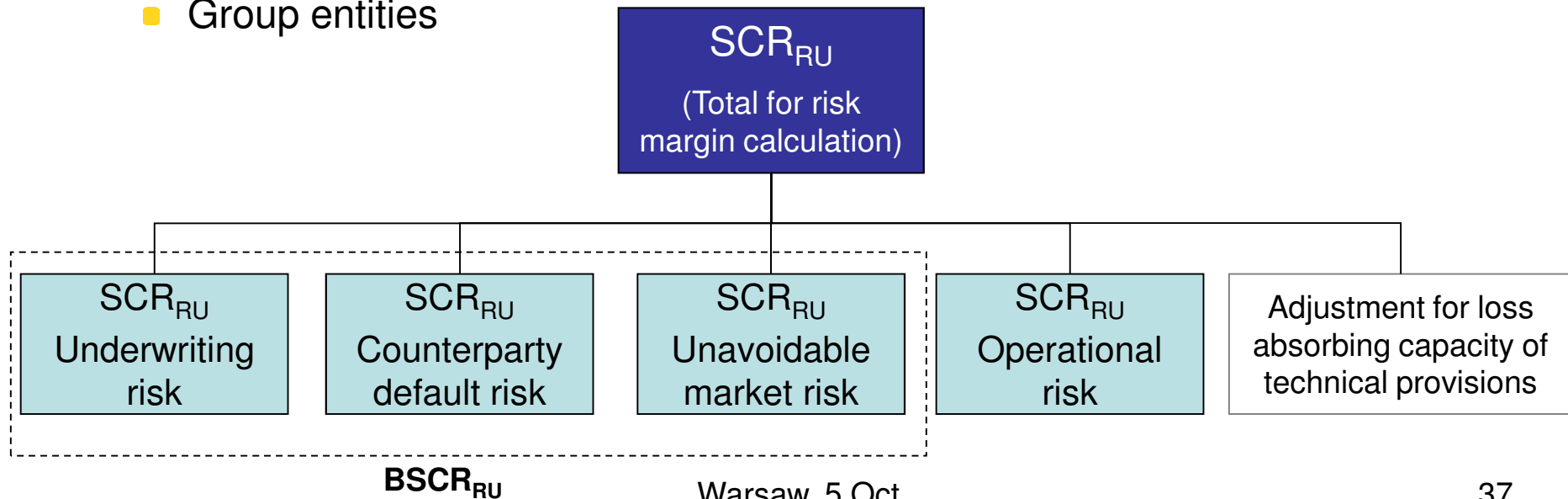




- Need to project future SCRs
- t=0 included

$$\text{CoCM} = \text{CoC} \cdot \sum_{t \geq 0} \text{SCR}_{\text{RU}}(t) / (1 + r_{(t+1)})^{t+1}$$

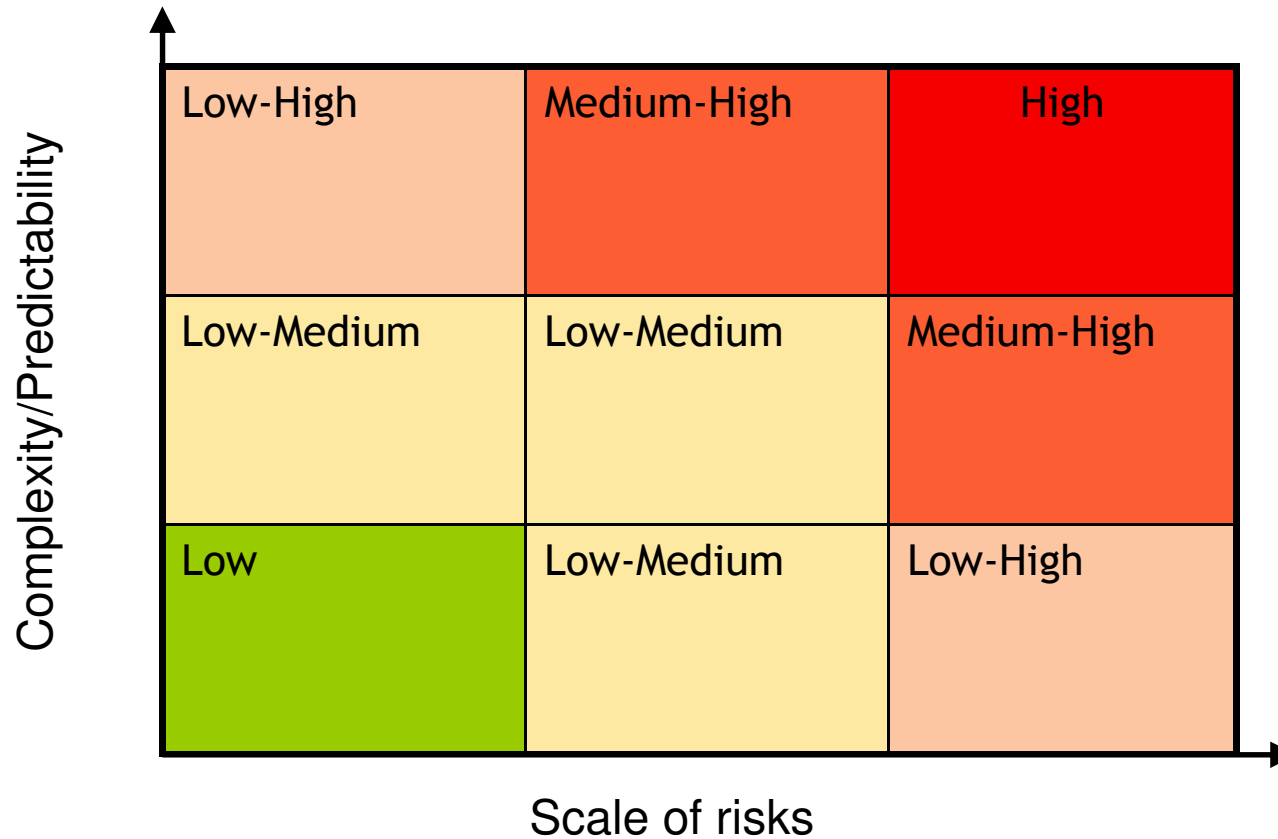
- QIS5 allow for diversification between lines of business when calculating the risk margin, but:
  - allocation of risk margin required separately for each line of business;
  - no diversification between entities in Group risk margin calculation; and
  - deferred tax asset excluded.
- Risk margin calculated net of reinsurance
- Information being collected on diversification in Risk Margin, between:
  - Lines of Business
  - Group entities



- Hierarchy of simplifications:
  - Full projection of future SCRs
  - Approximate some risks or modules
  - Approximate whole SCR for each future period
  - Approximate all future SCRs using duration based approach
  - Approximate the risk margin as a percentage of the best estimate

# Proportionality: Best estimate

- Proportionality assessment:
  - Nature, scale, complexity of risks; and
  - Model error.
- *Example* assessment:



- Biometric risk factors (e.g. neglect future changes, assume independent from other factors etc.)
- Surrender rates (e.g. assume independent of economic factors, independent of management actions, use table of surrender rates rather than dynamic policyholder decisions)
- Options and guarantees (e.g. closed form solutions)
- Future discretionary benefits (e.g. assumed business mix or deterministic economic assumptions)



### ■ Premium provisions

#### ■ First simplification:

- *(Present value of future premiums on existing Contracts + Provision for unearned premiums + Provision for unexpired risks) / (1+i/3)*

#### ■ Second simplification:

- expected claims ratio basis (similar to QIS4)

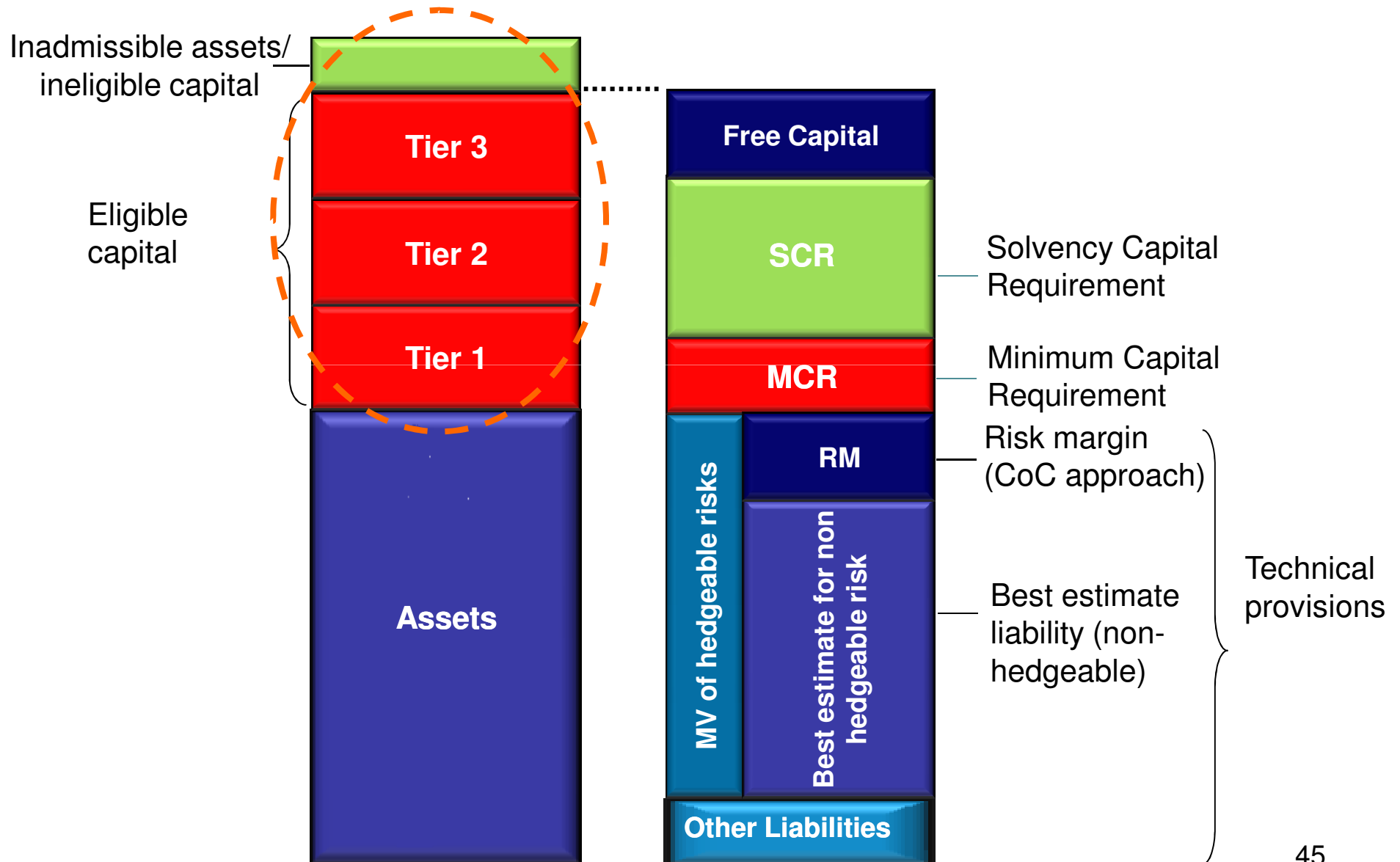
#### ■ First method is just a special case of the second method

## Simplifications: Non-Life – claims provisions

- Claims outstanding provisions (same as CEIOPS final advice)
  - First simplification:
    - $\sum_i (N_i \bullet A_i) - P_i$
  - Second simplification:
    - 'case-by-case' approach
- IBNR
  - First Simplification:
    - *IBNR reserve year  $t = C t \times N t$*
  - Second Simplification:
    - *Provision  $IBNR_{LOB} = factor_{LOB\_U} \times PCO\_reported_{LOB}$*
- Methods are uncommon and unlikely to be widely applicable

- Reinsurance recoverables:
  - Gross-to-net techniques
  - $RR = (PP_{gross} - PP_{net}) + (PCO_{gross} - PCO_{net})$ , where:
    - $RR \rightarrow$  reinsurance recoverables
    - $PP \rightarrow$  premium provisions
    - $PCO \rightarrow$  claims provisions
  - Adjustment for timing and counterparty default
  - Apply gross-to-net technique at sufficiently granular level:
    - $PP_{net,k} = GN_k(c_k) \times PP_{gross,k}$  for lob k
    - $PCO_{net,k,i} = GN_{k,i}(c_{k,i}) \times PCO_{gross,k,i}$  for lob k; u/w year i
  - Likely to be widely used in practice

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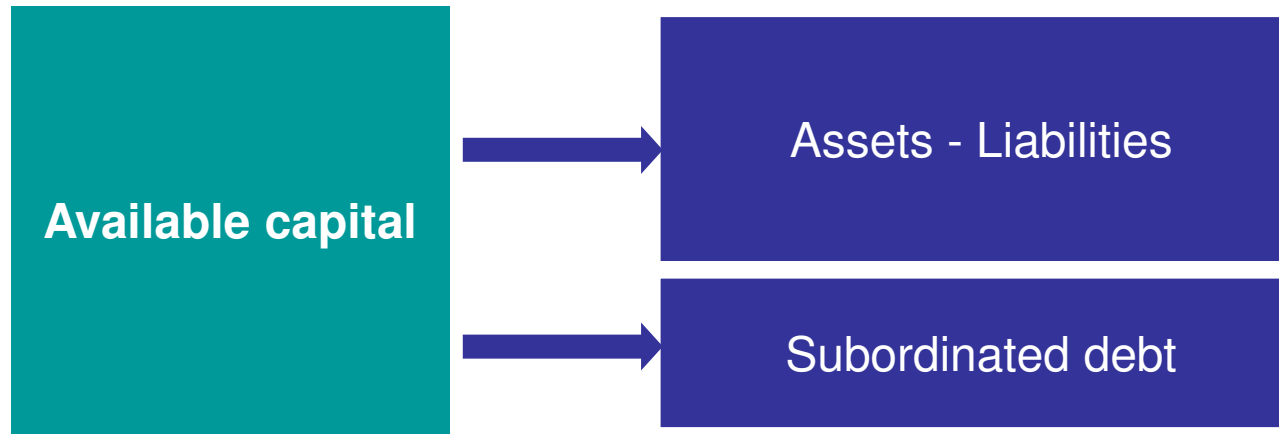


# Own Funds – Eligible elements of capital

Technical specifications				
ASSETS AND LIABILITIES	OWN FUNDS	SOLVENCY CAPITAL REQUIREMENT	MINIMUM CAPITAL REQUIREMENT	GROUP LEVEL ISSUES
<b>Basic Own Funds</b> <ul style="list-style-type: none"> <li>■ Excess of assets over liabilities</li> <li>■ Subordinated liabilities</li> <li>■ Adjustments for:               <ul style="list-style-type: none"> <li>■ restricted reserves</li> <li>■ financial/credit participations</li> <li>■ ring-fenced funds</li> <li>■ net deferred tax asset</li> </ul> </li> </ul>		<b>Ancillary Own Funds (prior supervisory approval)</b> <ul style="list-style-type: none"> <li>■ “Off balance sheet” items which can be called up to absorb losses               <ul style="list-style-type: none"> <li>■ Unpaid share capital or initial fund that has not been called up</li> <li>■ Letters of credit or guarantees</li> <li>■ Any other legally binding commitments received by (re)insurance undertakings</li> </ul> </li> </ul>		

- Capital needs to meet certain eligibility criteria
- Classifications split into 3 tiers with different eligibility criteria
- Classification will ultimately determine whether a capital item is eligible to cover MCR and/or SCR
- Eligibility limits not being tested as defined in the Framework Directive
- Grandfathering arrangements for existing capital instruments being proposed

## Key issues in Europe – Eligible Capital



### Eligibility Criteria

- Classify in 3 Tiers according to quality
  - Assets – Liabilities (i.e. Equity) is Tier 1
  - Debt depends on characteristics
  - Expected future profits is Tier 1 (but being quantified)
- SCR limits in Solvency II Directive:
  - Tier 1 greater than 33.3% of SCR
  - Tier 3 less than 33.3% of SCR
- SCR limits in final QIS5 specification:
  - Tier 1 greater than 50% of SCR
  - Tier 3 less than 15% of SCR



# Advice on tiering capital instruments (1/2)

Criteria	Tier 1	Tier 2
<b>Subordination</b>	Most Deeply subordinated	Must rank after the claims of all policyholders, beneficiaries and non-subordinated creditors
<b>Loss absorbency</b>	Fully paid in and immediately available to absorb losses	Not necessarily fully paid in
<b>Sufficient duration</b>	Undated or minimum 10 years maturity at issue.	Undated or minimum 5 years maturity at issue.
<b>On breach of the SCR</b>	Must provide for the suspension of repayment/redemption and cancellation of coupon/dividend. (full discretion on payment of dividends on ordinary shares)	Must provide for the suspension of repayment/redemption and cancellation of coupon/dividend.
<b>On breach of trigger point (set at OF=75%SCR or breach not resolved within 2 months)</b>	Must possess either one of: -automatically convert into ordinary capital or the initial fund. - Principal is written down by amount of breach	N/A
<b>Free from incentives to redeem</b>	No step-ups	moderate incentives to redeem permissible (100bp of 50% of initial credit spread)

## Advice on tiering capital instruments (2/2)

- Tier 3 includes:

- Net deferred taxes =  $\max(0, \text{DTA} - \text{DTL})$
- Other capital instruments including preference shares, subordinated mutual members accounts and subordinated liabilities

- Criteria:

- Rank after claims of policyholders, creditors
- Not cause or accelerate insolvency
- Maturity of at least 3 years
- Suspended repayment and deferral of coupon/dividend payments if undertaking breaches its SCR
- Deferral of coupons/dividend payments if undertaking breaches MCR
- Free of encumbrances

### Expected Profits in Future Premiums (“EPIFP”)

- EPIFP calculated using 100% “paid-up” scenario
- Difference between technical provision including and excluding future premiums
- Only relevant for regular premium business, i.e. ignore single premium business
- Currently classified as Tier 1, although political discussions are on-going on this topic.

- Practical calculation difficulties, for example:
  - Not currently a calculation carried out by insurers – usually only model lapses in lapse risk SCR and not paid-up
  - Text requires insurers to model paid-up, even if not allowed contractually in the contract
  - Term assurances - difficult to establish a paid up value
  - Contracts with guarantees - paid up value may lead to some absorption of expected losses
  - Associated future expenses on a premium paying contract and non premium paying contract may be different

- The grandfathering criteria generally differ from the Solvency II criteria in three respects:
  - Any reference to SCR is excluded as it is not reflected in current capital instrument criteria.
  - Tier 1 paid in capital instrument must be undated (dated instruments grandfathered as Tier 2)
  - Some of the criteria have been modified in order to include current instruments which are widely used and satisfy most, but not all, Solvency II criteria.
- Grandfathering criteria also different to Solvency I criteria
- Other paid in instruments and the total of Tier 1 grandfathered basic own fund items shall not be greater than 20% of total Tier 1 own funds. Items in excess of this limit may be counted as Tier 2 own funds.
- Classification of own fund items should be carried out with and without application of transitional provisions for paid-in capital instruments.

## Advice on grandfathering criteria

Criteria	Into Tier 1	Into Tier 2
<b>Subordination</b>	Deeply subordinated	Must rank after the claims of all policyholders, beneficiaries and non-subordinated creditors
<b>Loss absorbency</b>	Fully paid in and immediately available to absorb losses	<b>Fully paid in</b>
<b>Sufficient duration</b>	<b>Undated only</b>	Undated or minimum 5 years maturity at issue.
<b>Incentives to redeem</b>	Moderate incentives to redeem permissible	Moderate incentives to redeem permissible
<b>In “period of stress”</b>	<b>Coupons / dividends can be cancelled or deferred in period of stress</b>	<b>N/A</b>
<b>No encumbrances</b>	Unconnected with other transactions and no restrictions, charges or guarantees	Unconnected with other transactions and no restrictions, charges or guarantees

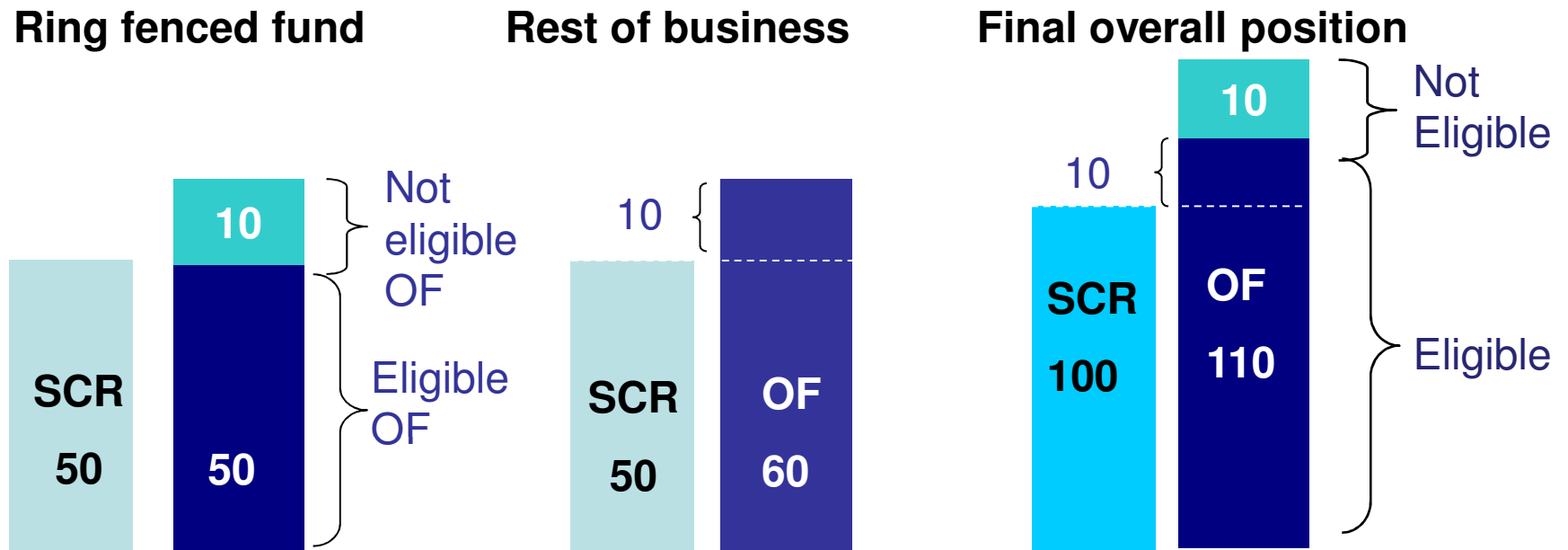


## Definition

*“A fund of assets and liabilities in respect of profit participation (“with profits”) business that is only available to cover losses arising in respect of particular policyholders or in relation to particular risks...”*

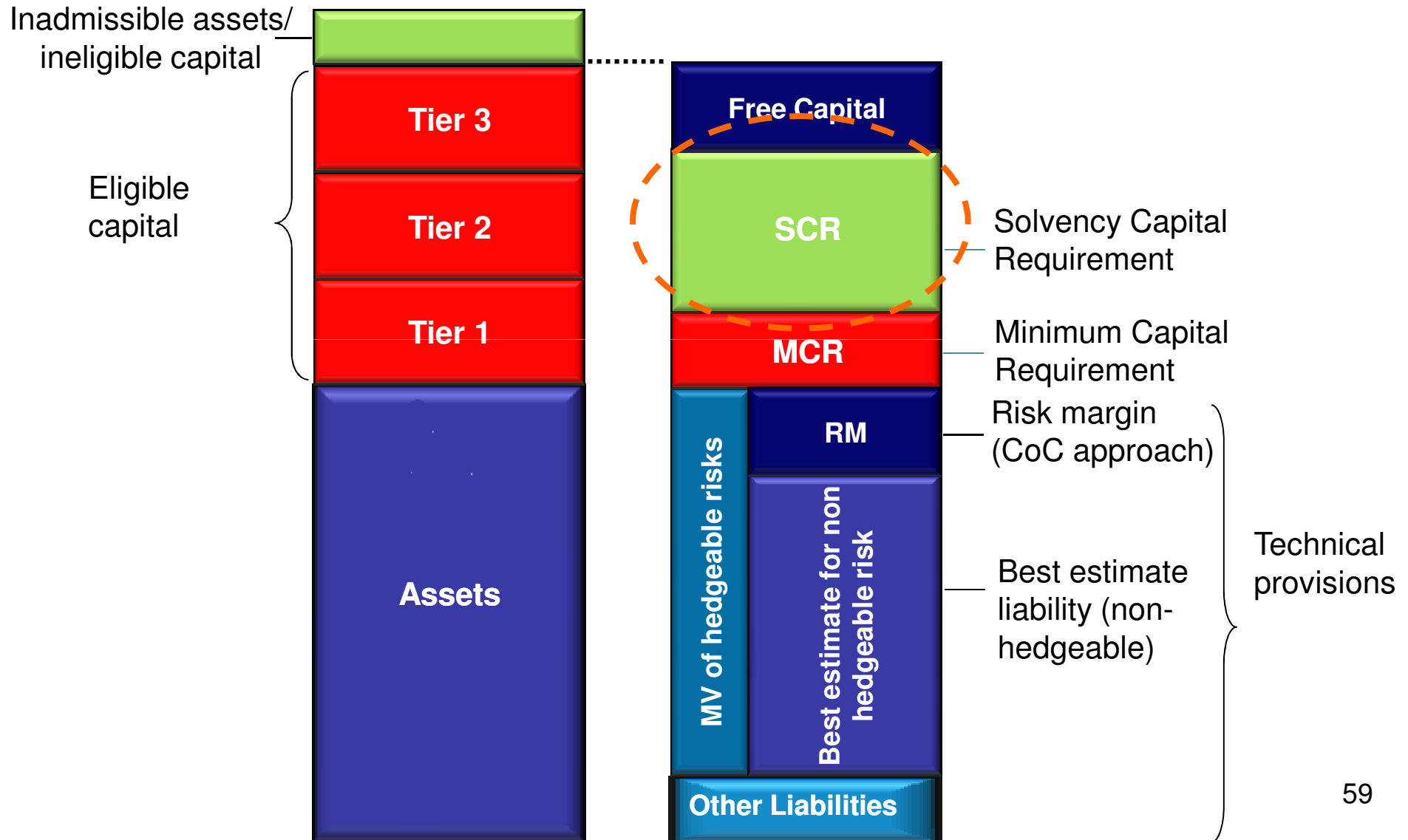
- Policyholders of ring-fenced fund have distinct rights relative to other policyholders
- Often funds with profit participation, but not necessarily
- Restrictions on reserves or provisions currently existing in financial statements **not** considered to be ring-fenced
- Unit-linked business is **not** considered to be ring-fenced





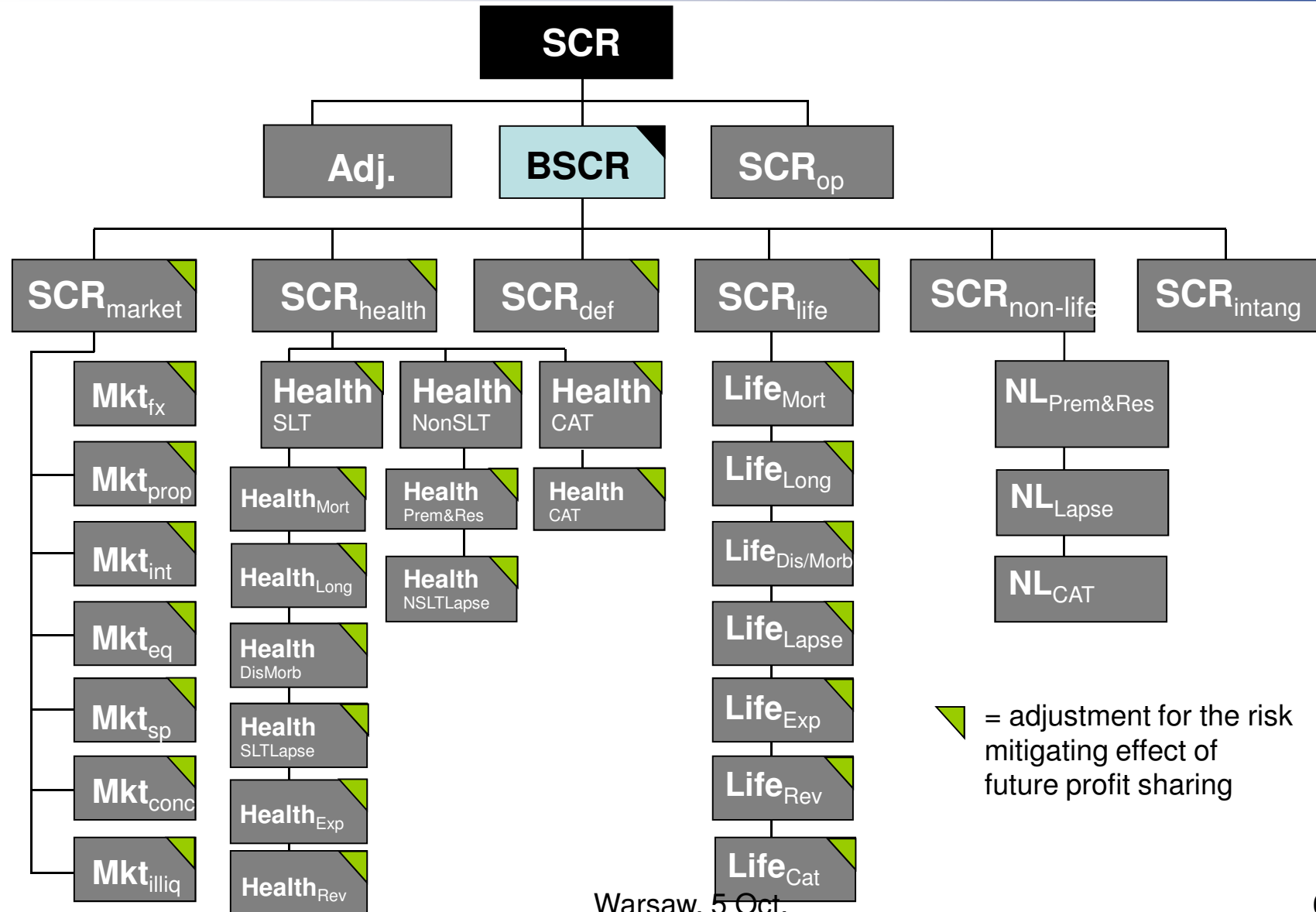
- Eligible ring-fenced own funds set equal to ring-fenced SCR
- SCR for the undertaking as a whole = sum of notional SCR on ring-fenced funds + SCR on remaining part of business
- Shareholder share of profit participation **not** ring-fenced


- QIS5 Introduction
- Valuation of assets and technical provisions
- Own Funds
- Solvency Capital Requirement
- Minimum Capital Requirement
- Groups
- Conclusion



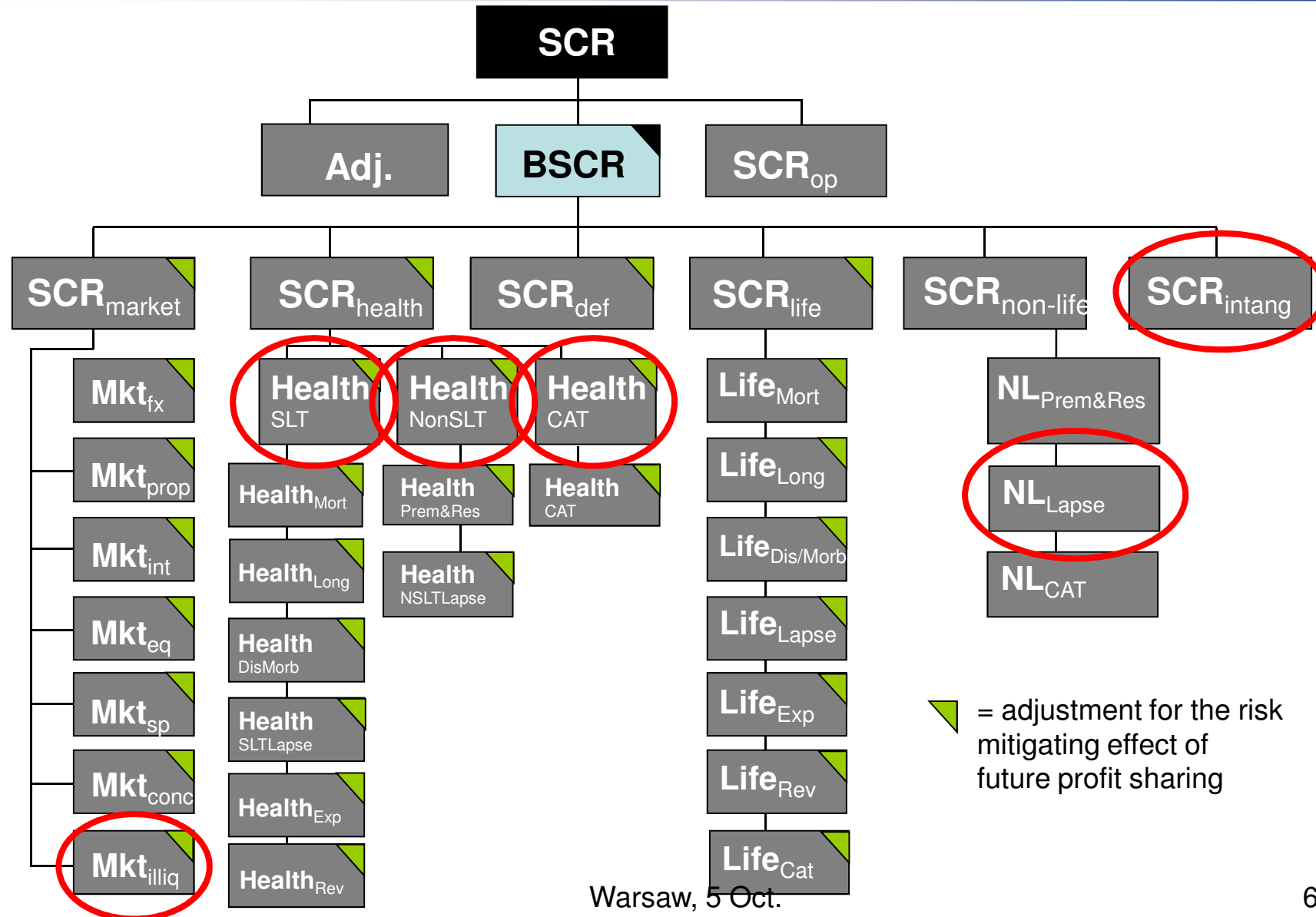


- **SCR standard calculation approach**
- **Individual stress tests applied for each risk**
  - Calibration 99.5th percentile VaR over 1 year
  - Modular approach looking at each risk individually
- **Results of individual stress tests are aggregated using a correlation matrix to allow for diversification**



 = adjustment for the risk mitigating effect of future profit sharing

# Main changes in structure since QIS4



## Applying individual stress tests

Main changes in structure since QIS4 include:

- Health Underwriting risk
  - Split into three sub modules (SLT health, Non SLT health and health catastrophe risk)
- Non Life risk
  - Split into three sub modules (now also include Lapse Risk)
- Market risk
  - Illiquidity shock
- Intangible asset risk
  - Risk inherent to intangible assets should be considered in the standard calculation of the SCR

$$\text{SCR} = \text{BSCR} - \text{Adj} + \text{SCR}_{\text{OP}}$$

### Basic SCR

Aggregate risk capital for:

- Life
- Non-life
- Health
- Market
- Counterparty
- Intangibles

### Adj

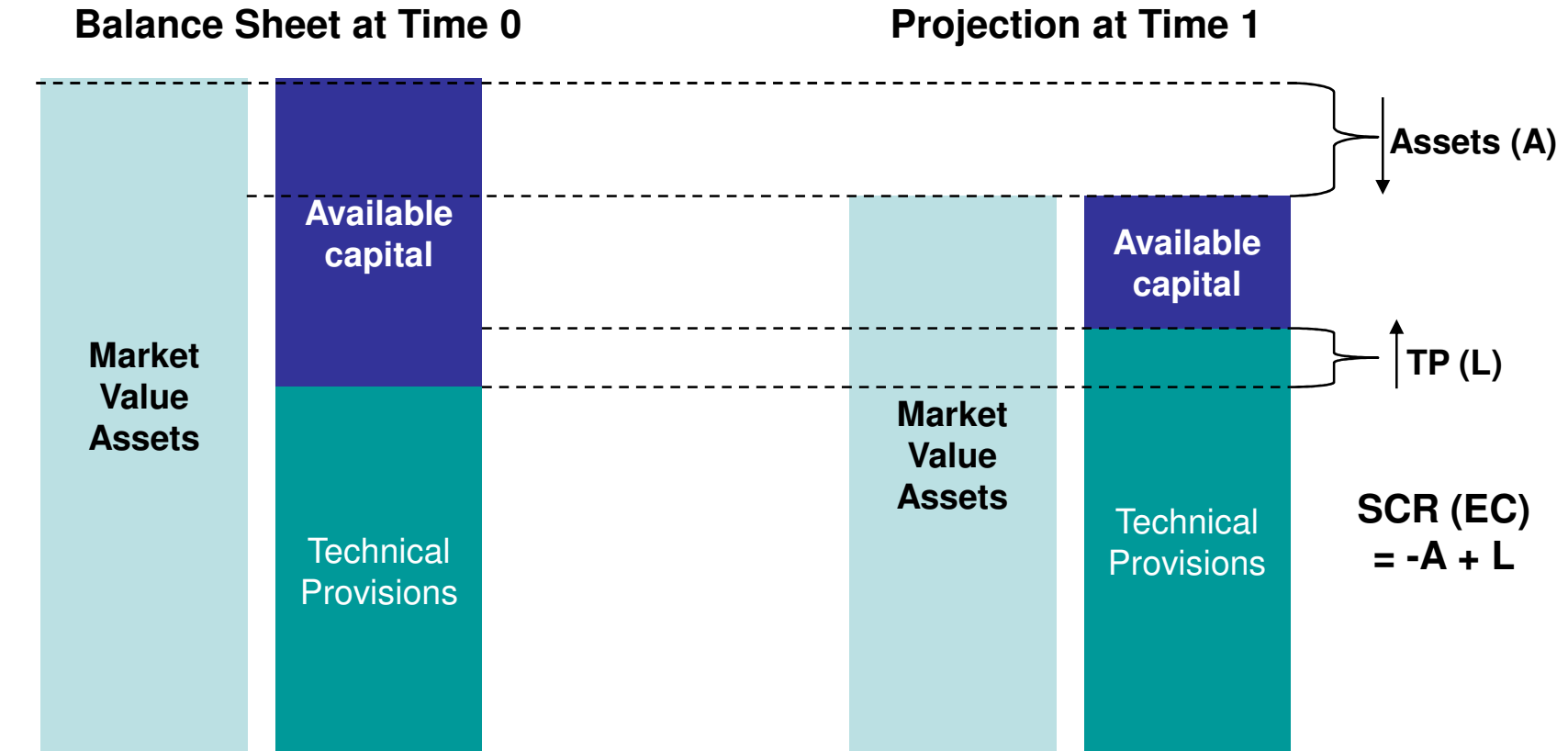
Adjustment for the risk absorbing effect of:

- 1) future profit sharing
- 2) deferred taxes

### SCR<sub>OP</sub>

Capital charge for operational risk (which does not benefit explicitly from diversification)





## Changes to the correlations (Market & Life)

	Int	Eq	Prop	Sp	Cur	Conc	Illiq
Int	1						
Eq*	0.5 / 0	1					
Pro*	0.5 / 0	0.75	1				
Sp*	0.5 / 0	0.75	0.5	1			
Cur	0.25	0.25	0.25	0.25	1		
Con	0	0	0	0	0	1	
Illiq	0	0	0	-0.5	0	0	1

\*Where the insurer is exposed to a fall in interest rate risk, a correlation parameter of 50% should be applied. Otherwise, a correlation parameter of 0% should be applied.

**Key: Previously zero,**  
**Previously 0.25,**  
**Previously 0.5,**  
**New risk.**

	Mort	Long	Dis	Lap	Exp	Rev	CAT
Mort	1						
Long	-0.25	1					
Dis	0.25	0	1				
Lap	0	0.25	0	1			
Exp	0.25	0.25	0.5	0.5	1		
Rev	0	0.25	0	0	0.5	1	
CAT	0.25	0	0.25	0.25	0.25	0	1

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# Changes to the correlations (Non-Life & Health)

■ Non-Life:

**QIS4**

vs.

**QIS5**

	NL <sub>pr</sub>	NL <sub>CAT</sub>
NL <sub>pr</sub>	1	
NL <sub>CAT</sub>	0	1

	NL <sub>pr</sub>	NL <sub>lapse</sub>	NL <sub>CAT</sub>
NL <sub>pr</sub>	1		
NL <sub>lapse</sub>	0	1	
NL <sub>CAT</sub>	0.25	0	1

■ Health:

**QIS4**

vs.

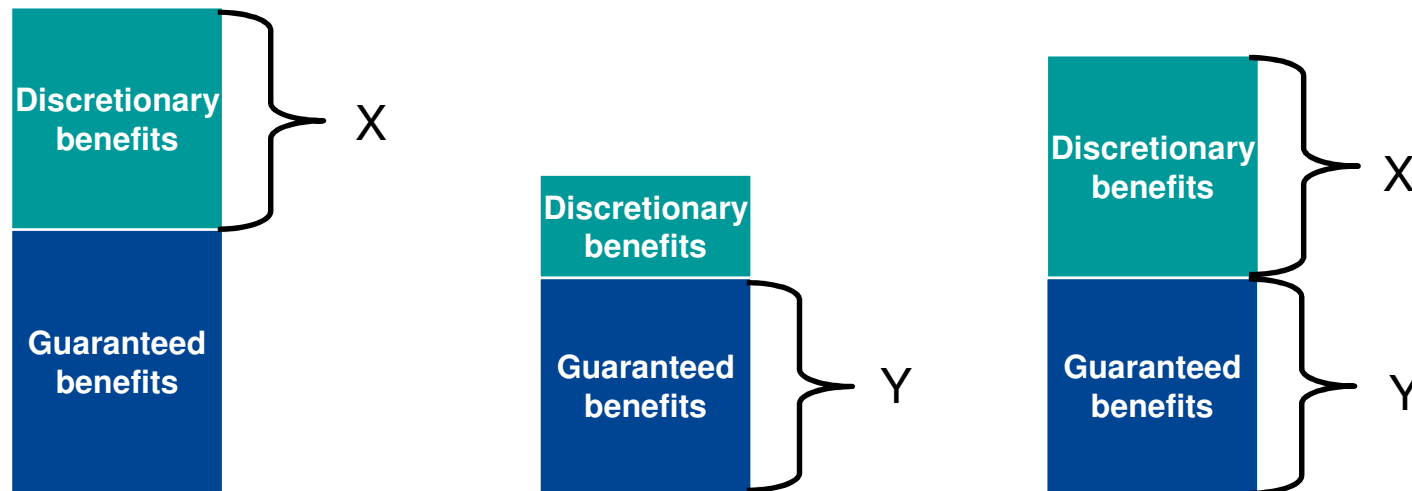
**QIS5**

	Health <sub>LT</sub>	A&H <sub>ST</sub>	Health <sub>WC</sub>
Health <sub>LT</sub>	1		
Accident & Health <sub>ST</sub>	0	1	
Health <sub>WC</sub>	0	0.5	1

	Health <sub>SLT</sub>	Health <sub>non-SLT</sub>	Health <sub>CAT</sub>
Health <sub>SLT</sub>	1		
Health <sub>non-SLT</sub>	0.5	1	
Healt <sub>CAT</sub>	0.25	0.25	1

## Gross and net SCR calculations

- For each risk sub-module, need to calculate capital charge both gross and net of loss absorbing effect of discretionary benefits
  - Method has changed, but not perfect:



**Base: Best Estimate**

**Interest rate up shock:  
Net scenario**

**Interest rate up shock:  
Gross scenario**

- Once gross and net capital charges have been calculated, QIS5 requests a test of the modular method and single equivalent scenario

**Step 1**

**Aggregate individual risk capital amounts assuming that bonuses cannot be reduced to absorb losses to derive “gross” gSCR**

**Step 2**

**As step 1 but assume that bonuses can be reduced to absorb losses to derive “net” nSCR**

**Step 3**

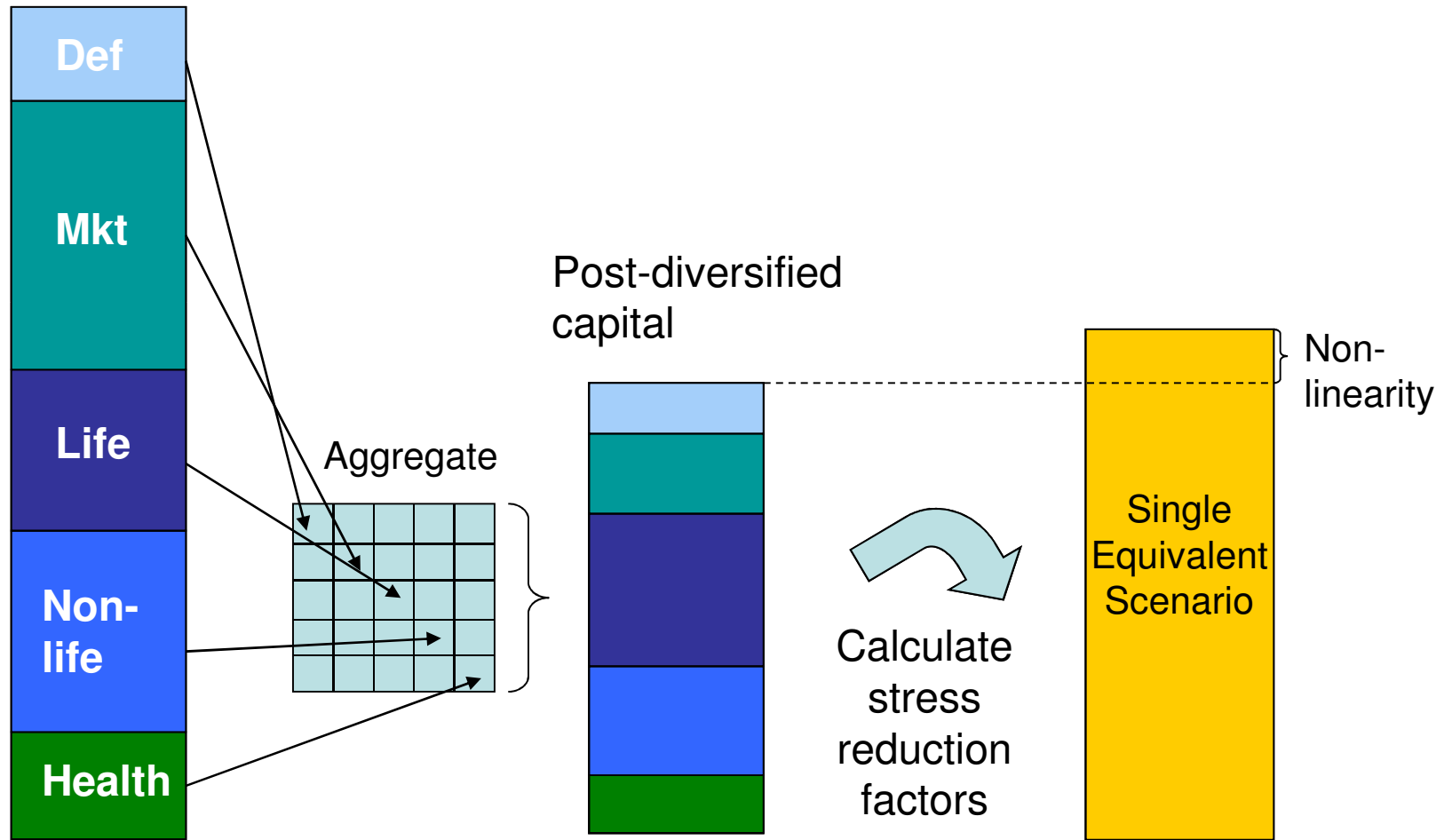
**Determine the adjustment for loss absorption as:  
minimum of (gSCR – nSCR) and  
value of future discretionary bonuses (FDB)**

## Option 2 – Single Equivalent Scenario

- Risk absorbing impact = Total gross SCR – Total SCR calculated using a single scenario under which all the risks covered by the standard formula occur simultaneously
- Equivalent overall scenario based on the relative importance of each risk to the undertaking
- Based on the gross capital charges
- Adjustment limited to total value of future discretionary bonuses in calculation of base Technical Provisions

# Option 2 – Single Equivalent Scenario

1-in-200 capital requirements



Warsaw, 5 Oct.

- Risks {Interest ↓**3%** , Equity ↓**39%** , Mortality ↑**15%** }:

- Capital Matrix 'U' = 

50
100
100

 Matrix 'Correl' = 

1.0	0.5	0.0
0.5	1.0	0.0
0.0	0.0	1.0

- Capital: BSCR(gross):

- $\{MMULT(MMULT(TRANSPOSE(U), Correl), U)^{0.5}\} = \mathbf{166}$

- Calculate factors ( $w_i$ ):

- $\{MMULT(Correl, U) / SCR (gross)\} =$ 

60%
75%
60%

- $\sum w_i \times SCR_i$ :

- $50 \times 60\% + 100 \times 75\% + 100 \times 60\% = \mathbf{166}$

- Apply reduction factors ( $w_i$ ) to stress tests:

- Combined scenario = {Interest ↓**1.8%** , Equity ↓**29.4%** , Mortality ↑**9.0%** }

- Determine appropriate management actions in combined scenario



	gross SCR	Weightings step 1 diversification within risk area	Weightings step 2 diversification between risk areas
<b>Market risks</b>			
Mkt <sub>int</sub>	50	0.474	0.455
Mkt <sub>eq</sub>	100	0.861	0.825
Mkt <sub>prop</sub>	20	0.896	0.859
Mkt <sub>sp</sub>	25	0.483	0.463
Mkt <sub>conc</sub>	10	0.070	0.067
Mkt <sub>fx</sub>	5	0.378	0.362
Total	210		
Post-diversification	142		
<b>Counterparty default risk</b>			
	0	1.000	0.000
<b>Life underwriting</b>			
Life <sub>mort</sub>	15	0.192	0.099
Life <sub>long</sub>	40	0.850	0.436
Life <sub>dis</sub>	5	0.331	0.170
Life <sub>lapse</sub>	5	0.385	0.198
Life <sub>exp</sub>	6	0.545	0.280
Life <sub>rev</sub>	3	0.310	0.159
Life <sub>cat</sub>	10	0.214	0.110
Total	84		
Post-diversification	47		

## Property risk

	standard shock (99.5%)	Calculated equivalent scenario (Gross)
Property shock	20%	17.2%

## Spread risk

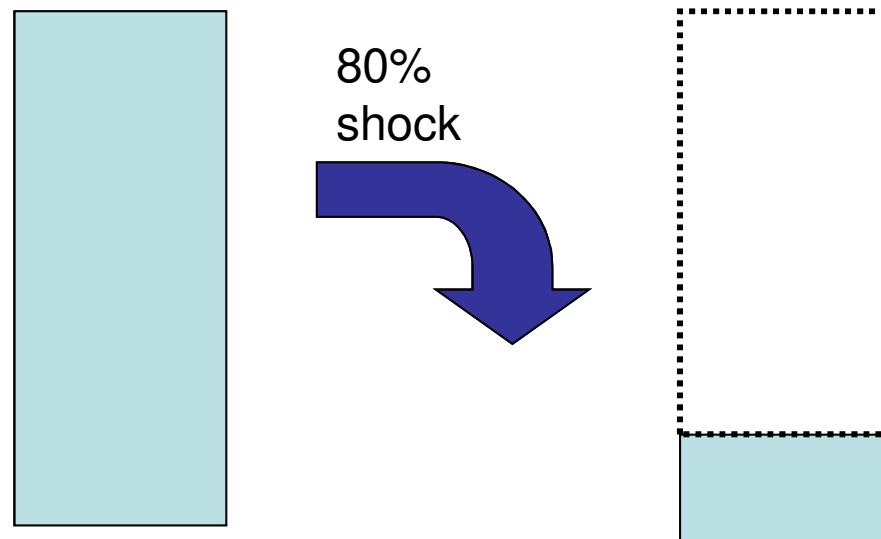
Rating class	standard shock (99.5%)		Calculated equivalent scenario (Gross)	
	F(Rating)	G(Rating)	F(Rating)	G(Rating)
AAA	0.25%	2.13%	0.12%	0.99%
AA	0.25%	2.55%	0.12%	1.18%
A	1.03%	2.91%	0.48%	1.35%
BBB	1.25%	4.11%	0.58%	1.90%
BB	3.39%	8.42%	1.57%	3.90%
B	5.60%	13.35%	2.59%	6.18%
CCC or lower	11.20%	29.71%	5.19%	13.76%
Unrated	2.00%	100.00%	0.93%	46.31%

- $\sum \text{weighting}_i \times \text{SCR}_i = \text{BSCR}(\text{gross}) \neq \text{SCR}(\text{gross})$  in single equivalent scenario due to non-linearity

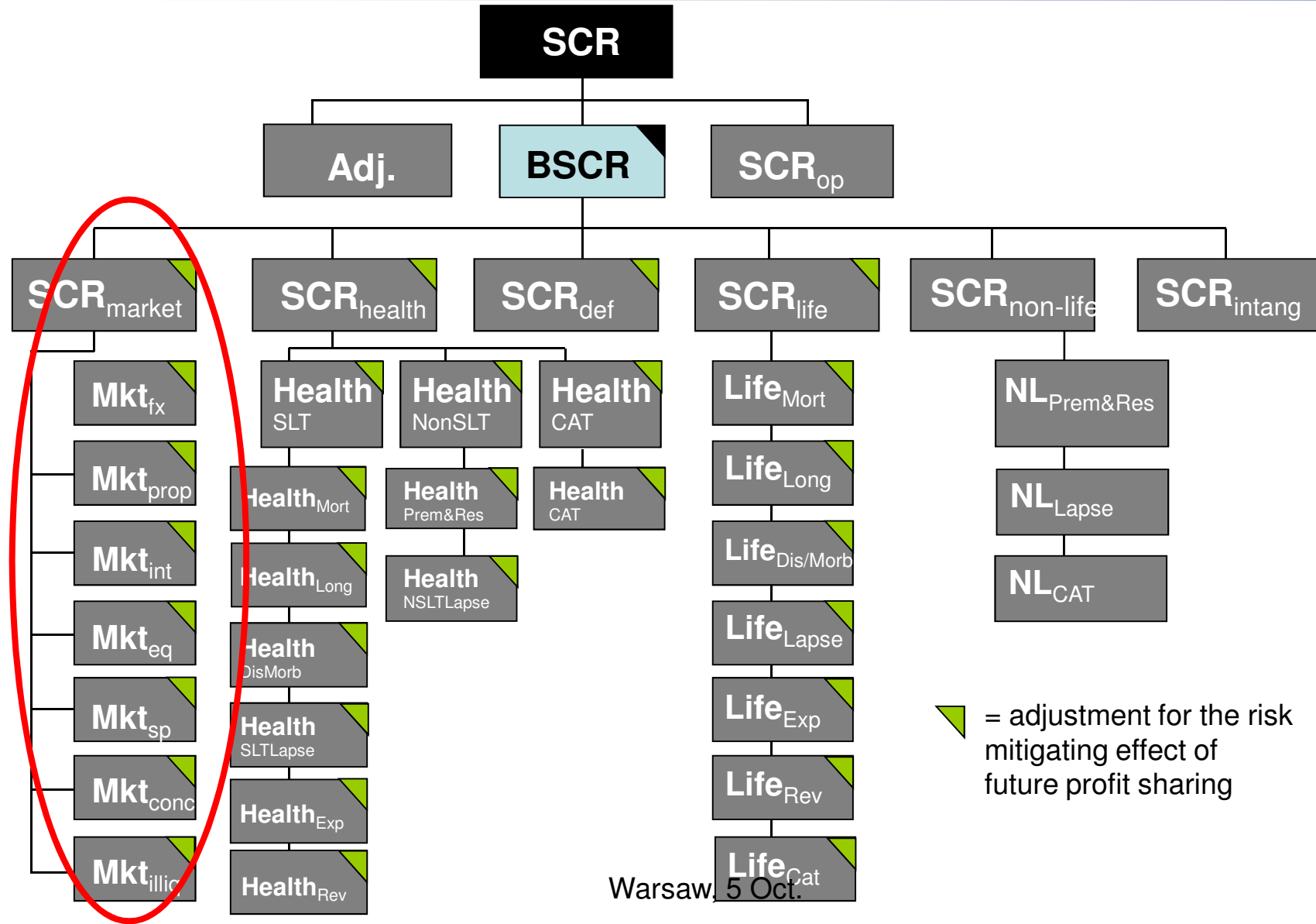
$$\text{SCR}_{\text{op}} = \text{Min} ( 30\% \text{BSCR}, \text{Op} ) + 25\% \text{Exp}_{\text{UL}}$$

- $\text{Op} = \max(\text{Op}_{\text{provisions}}, \text{Op}_{\text{premiums}})$ 
  - Reserve calculation = Mainly 0.45% of non-linked life and health reserves and 3% of non-life reserves (additional allowance where reserves are growing more than 10% per annum removed in final QIS5 spec)
  - Premium calculation = Mainly 4% of non-linked life and health premiums and 3% for non-life premiums but some additional allowance where premiums are growing more than 10% per annum
- Unit linked calculation = 25% of unit linked management expenses (excluding acquisition expenses)

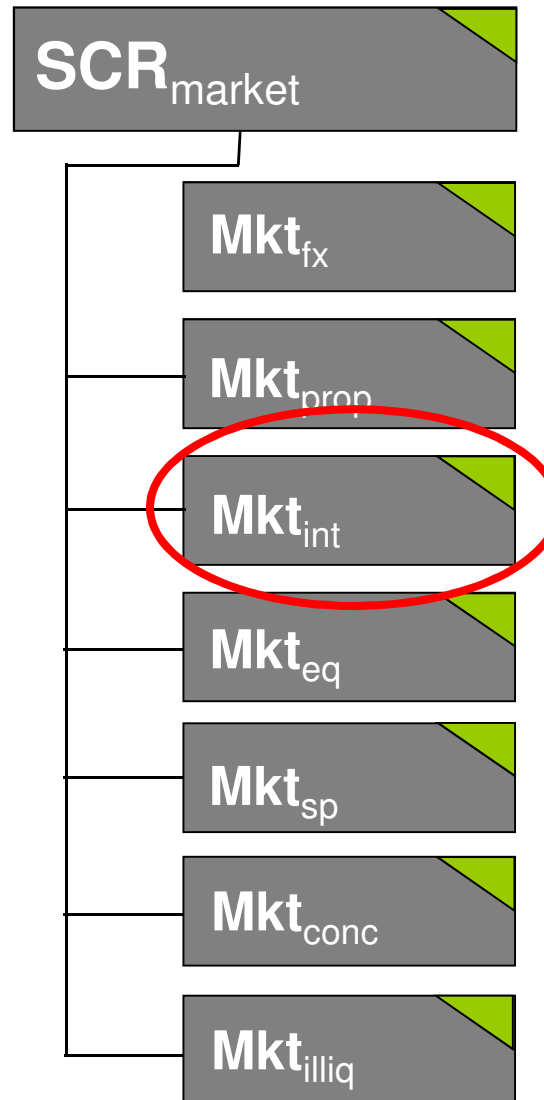
- Fair value of intangible asset in base balance sheet
- $SCR_{\text{intangible}} = 80\% \times \text{intangibles}$




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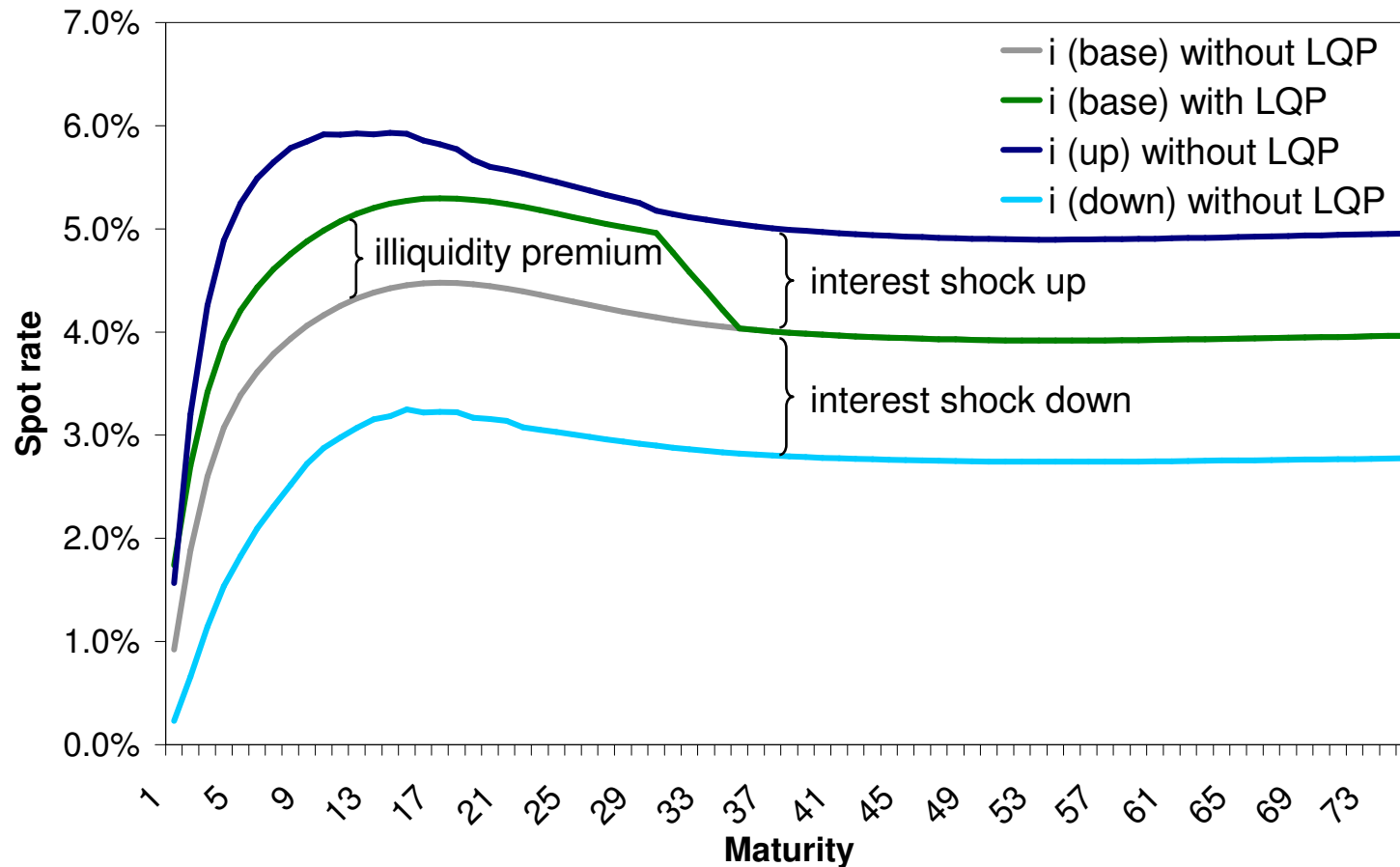
- Free assets need to be stressed
- Derivatives bought for hedging purposes should be taken into account
- Allowance made for rolling hedge programs provided certain conditions are met
- However, impact of future actions that would be taken under existing processes and controls to manage investment risk should be excluded
  - E.g. dynamic investment strategies to hedge guarantee costs
- Risk exposures of collective investment schemes should be allocated to sub-modules on a look-through basis



 = adjustment for the risk mitigating effect of future profit sharing

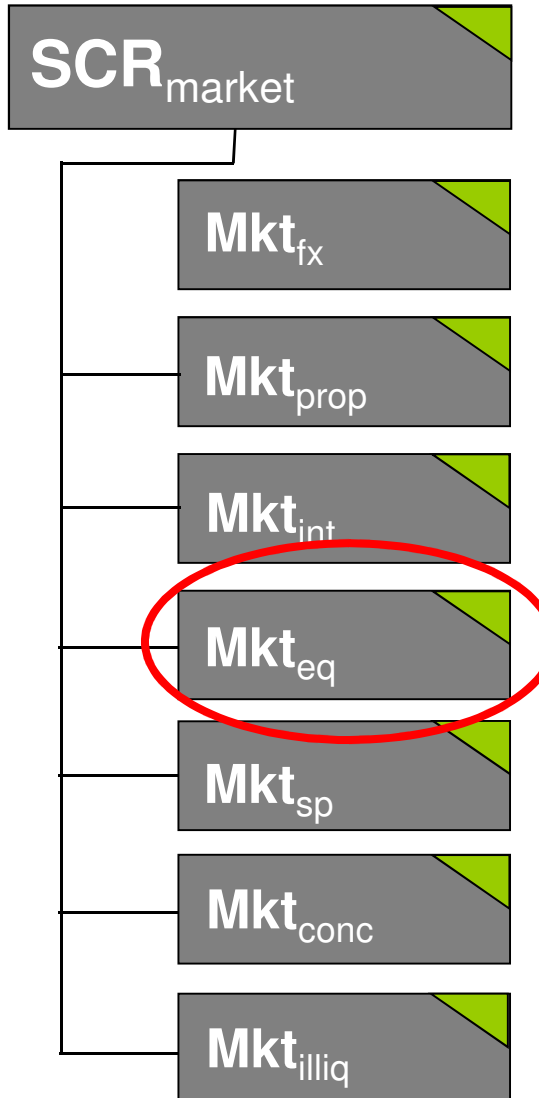
## Market risk: Interest rate risk


- Two interest rate scenarios ( $Mkt_{int}$  up and  $Mkt_{int}$  down):



- Volatility shock removed (*was  $\sigma$  up 12% /  $\sigma$  down 3% in draft QIS5 spec*)





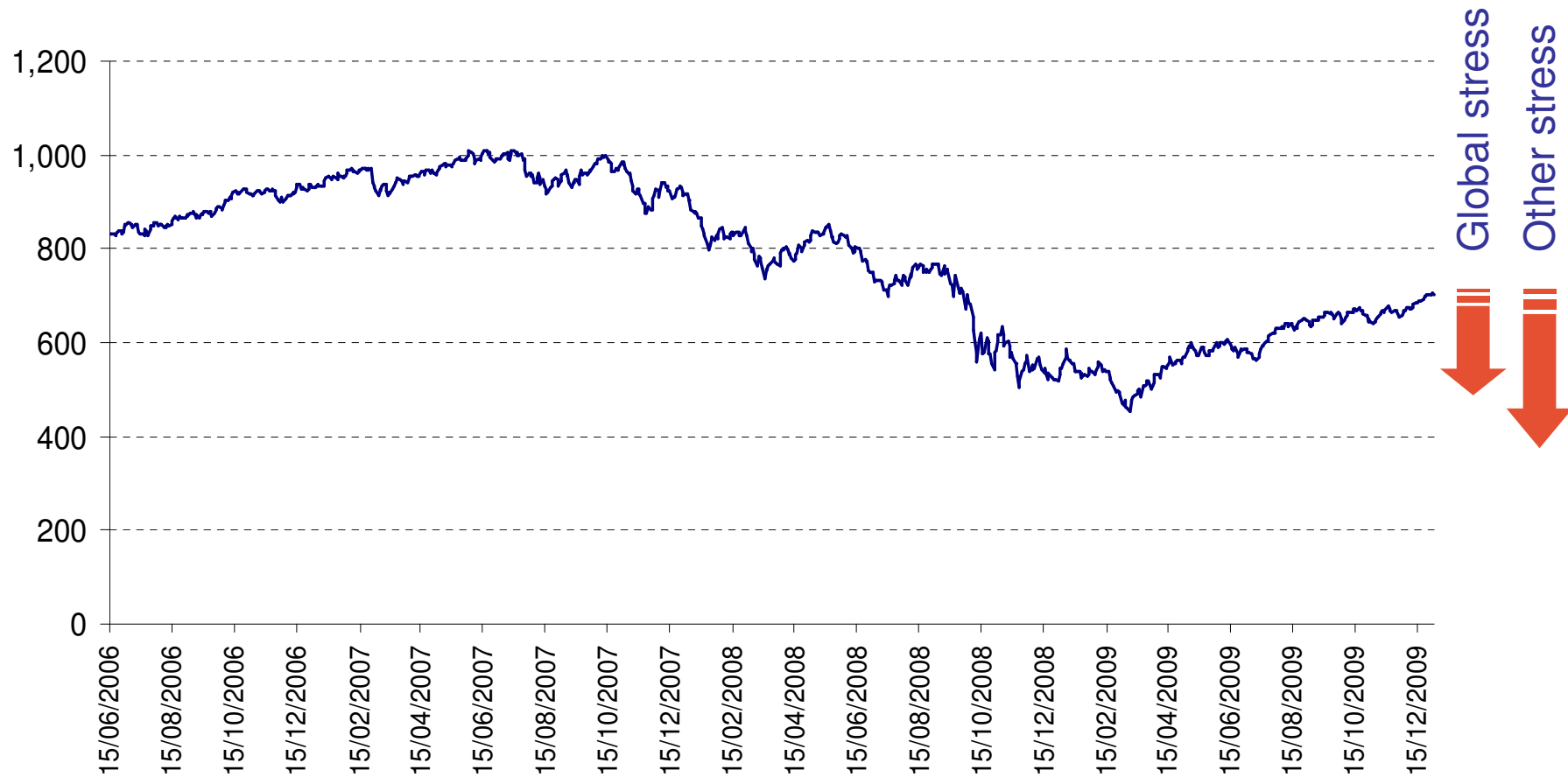
 = adjustment for the risk mitigating effect of future profit sharing

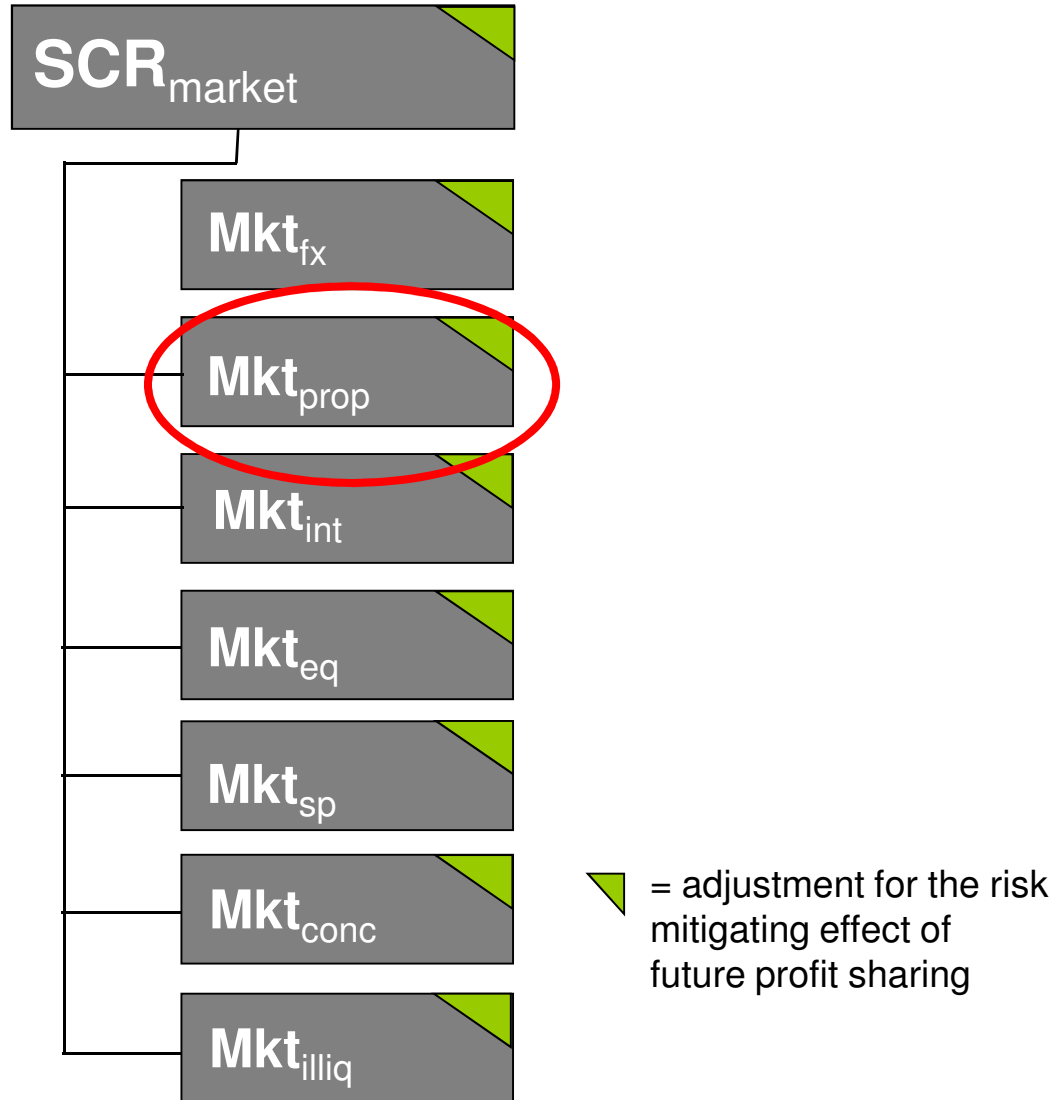
■ Equity stress ( $Mkt_{eq}$ ):

	QIS 4	CEIOPS final advice	QIS5
Global stress	-32%	-45%	-39%
Other stress	-45%	-55%	-49%
Volatility	None	+50%/-15% multiplicative stress	None

- -9% symmetric adjustment for year end 2009, resulting in stresses of 30% and 40% respectively, due to change in symmetric adjustment period to be over 3 years

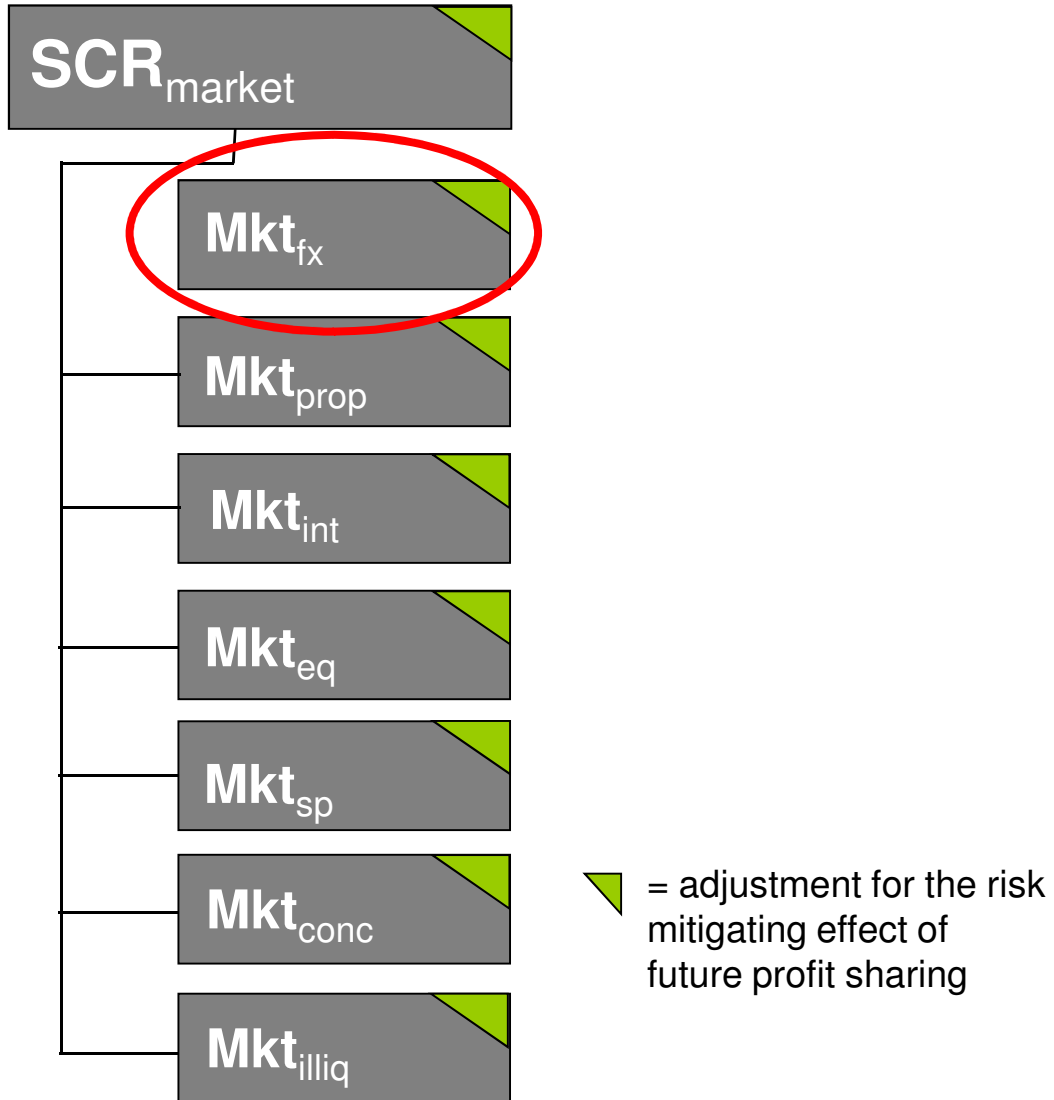
AC WORLD INDEX IMI (Large+Mid+Small Cap)



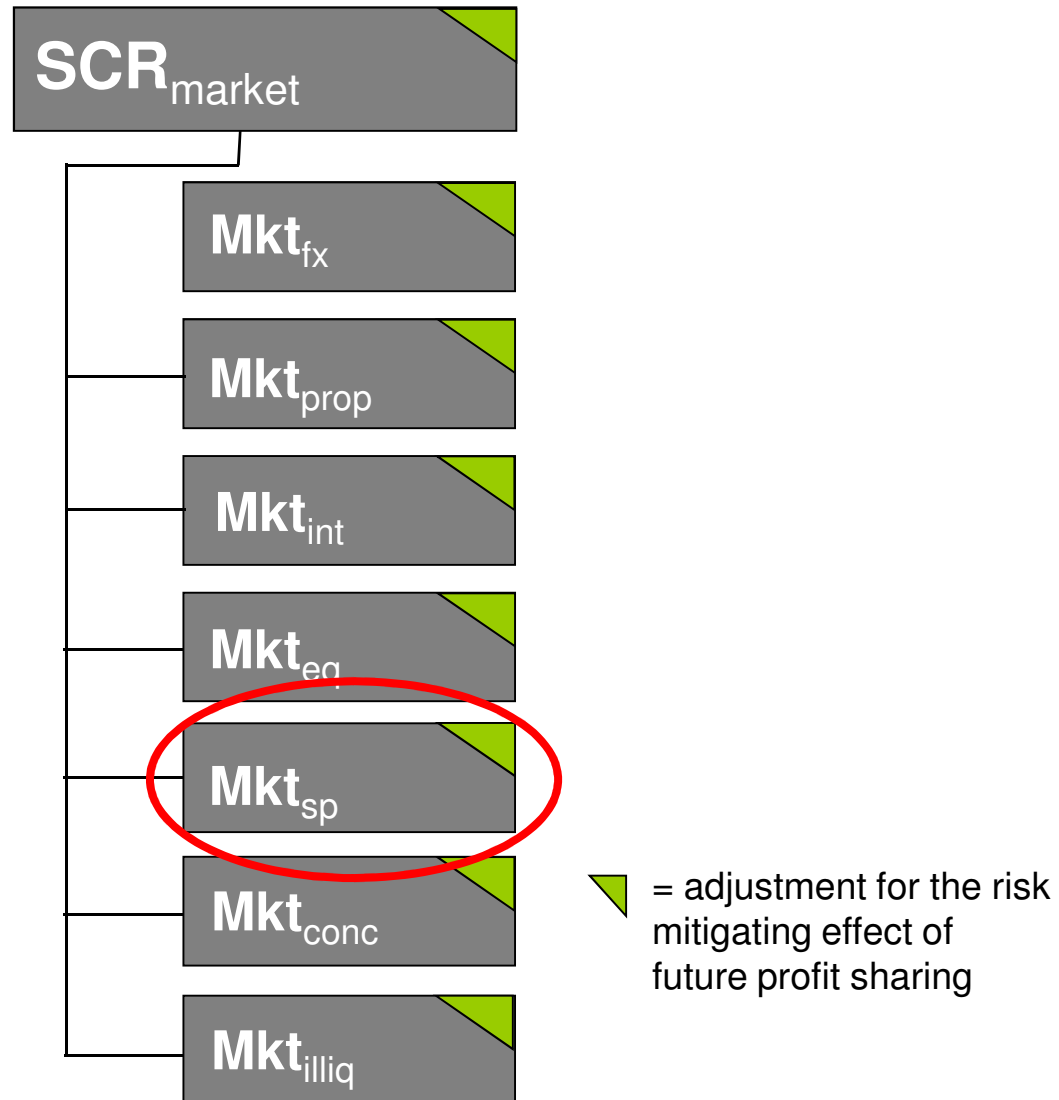


## Market risk: Property risk

- Property risk ( $Mkt_{prop}$ ) arises from the level or volatility of market prices of property
- Property risk is the immediate effect on the net value of asset and liabilities expected in the event of a 25% fall in real estate benchmarks
- The property shock should take into account of the specific investment policy including e.g. hedging arrangements or gearing

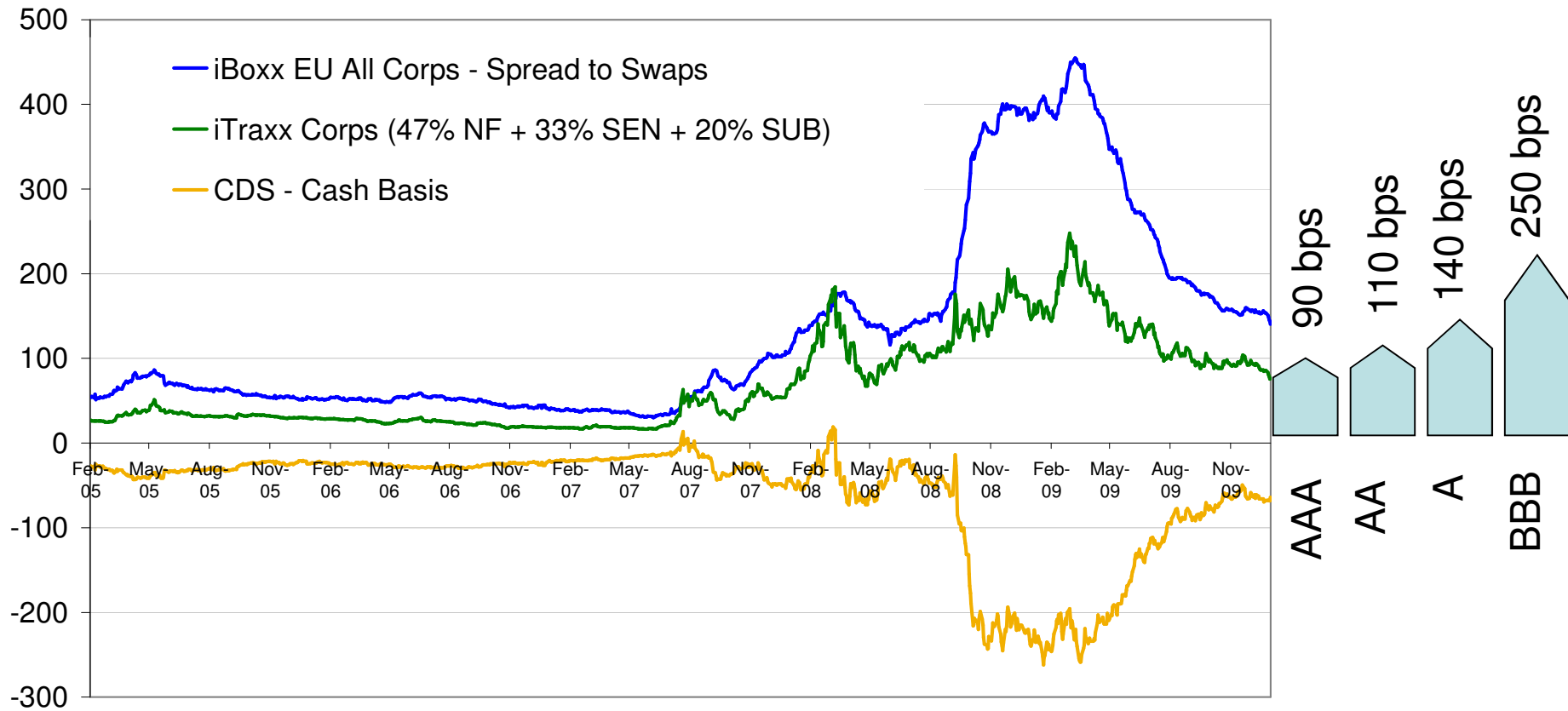


- Shock is the immediate effect expected on the net value of asset and liabilities in the event of a 25% change ( $Mkt_{cur}$ )
  - More onerous of a rise or fall in value of all other currencies against the local currency in which the undertaking prepares its local regulatory accounts (Groups)
  - Take account of all the participant's individual currency positions and its investment policy (e.g. hedging arrangements, gearing etc.)
- Reduced stresses for ERM II currencies, i.e. Estonian Kroon, Danish Krone, Latvian Lats, Lithuanian Litas





- Corporate bonds and exposures to non-EEA governments: stress factor up based on rating
- Structured credit: stressed factor based on rating, asset pool tenure, and default recovery
- Credit derivatives worst of:
  - 130bp (AAA) to 1620bp (B or lower) widening; or
  - 75% reduction in spreads
- Mortgage loans removed



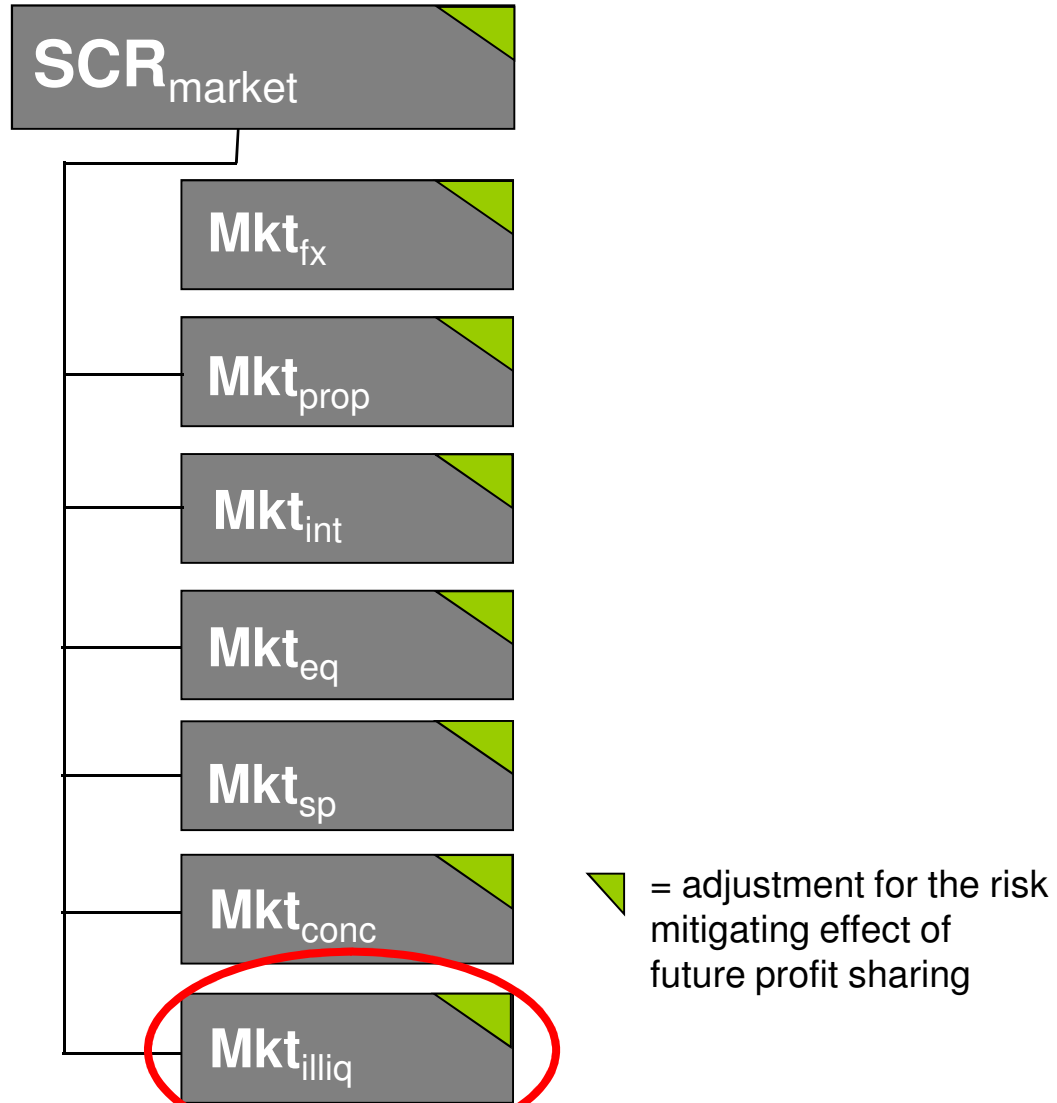
- Example impact of changes: Spread risk (bonds)
  - Change in calibration: lower spread widening for higher quality corporate bonds compared to CEIOPS' final advice
  - Change in approach since draft QIS5 technical specification – now have separate illiquidity premium shock, negatively correlated with spread risk

Rating	Factors for widening of spreads			
	QIS4	CEIOPS final advice	Draft QIS5	Final QIS5
AAA	0.25%	1.30%	1.00%	0.90%
AA	0.25%	1.50%	1.50%	1.10%
A	1.03%	1.80%	2.60%	1.40%
BBB	1.25%	2.50%	4.50%	2.50%
<b>SCR/BEL for sample bond portfolio* matching liabilities with duration of 10 years</b>	<b>9%</b>	<b>19%</b>	<b>18%</b>	<b>16%**</b>

\*Based on model portfolio: AAA (2.10%), AA (20.70%), A (47.90%) and BBB (29.30%) with mod duration = 10 years

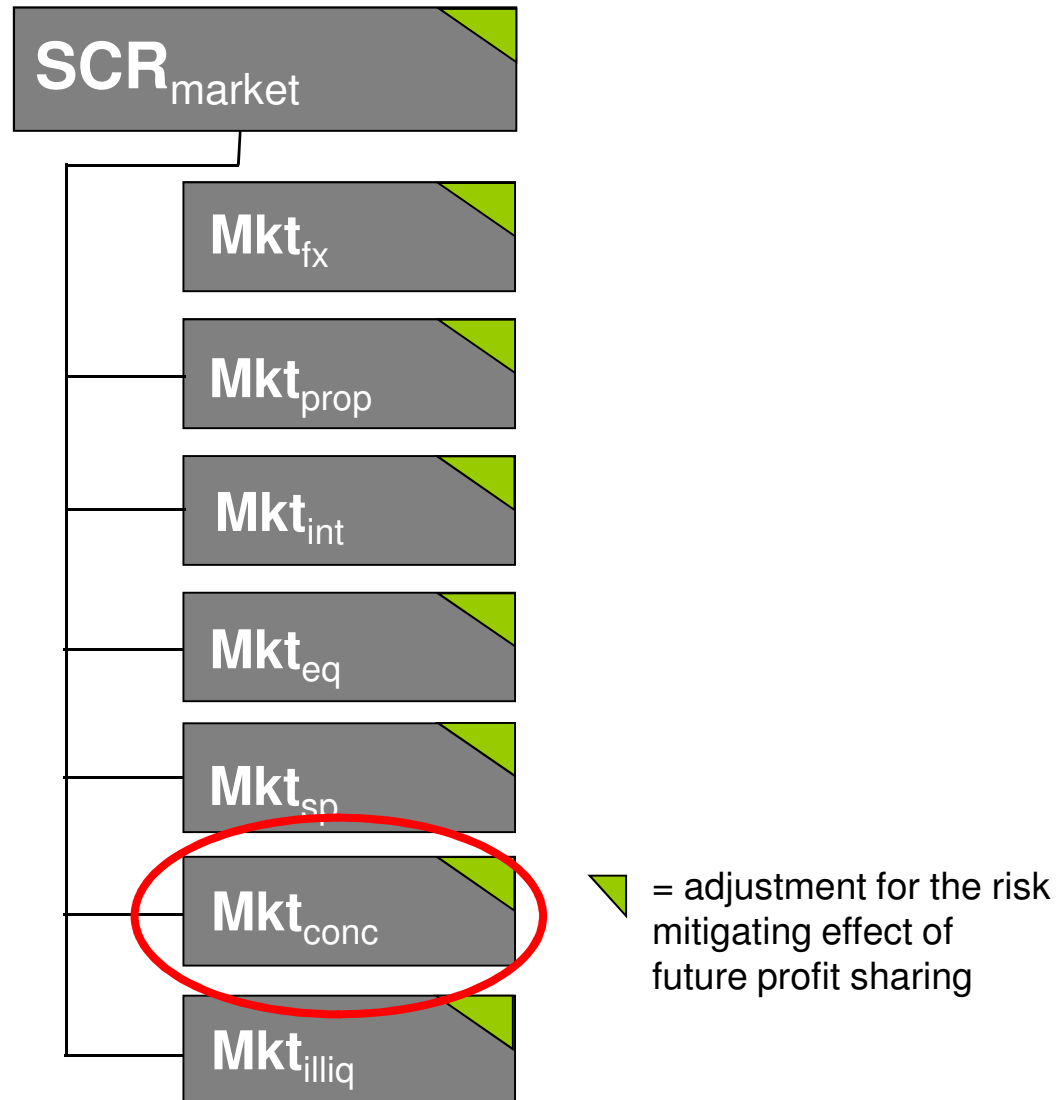
\*\*Excludes impact of separate illiquidity premium shock

# Market risk: illiquidity premium risk



- New risk module, whereas draft QIS5 specification allowed for the change in illiquidity premium within spread risk module
- Final QIS5 stress calibration based on change in 2008 and 2009 illiquidity premiums
- 65% reduction in illiquidity premium tested (no increase considered)
- $Mkt_{ip} = \max\{\Delta NAV \mid \textit{illiquidity premium shock}; 0\}$ 
  - subsequently clarified that only  $\Delta TP$  considered
- Negative correlation (-50%) with spread risk

## Market risk: Concentration risk



- External rating of counterparty  $i$ : rating $_i$
- Net exposure at default to counterparty  $i$  in asset class  $k$ :  $E_i \rightarrow$  “look-through” approach
- Amount of total assets ( $Assets_{xI}$ ) covered exclude:
  - those where the policyholder bears investment risk;
  - where counterparty belongs to same Group; and
  - where assets already covered in counterparty default risk module (e.g. bank deposits).

- Exposures are grouped by:

Type of Exposure	Threshold
EEA government bonds	no capital charge
Participations	no capital charge
Mortgage covered bonds/public sector covered bonds	15% threshold
Property exposures	10% of total assets
Non-EEA government bonds	10% threshold (only lower than AA rated has a capital charge)
All other assets	3% or 1.5% threshold (dependant on rating)

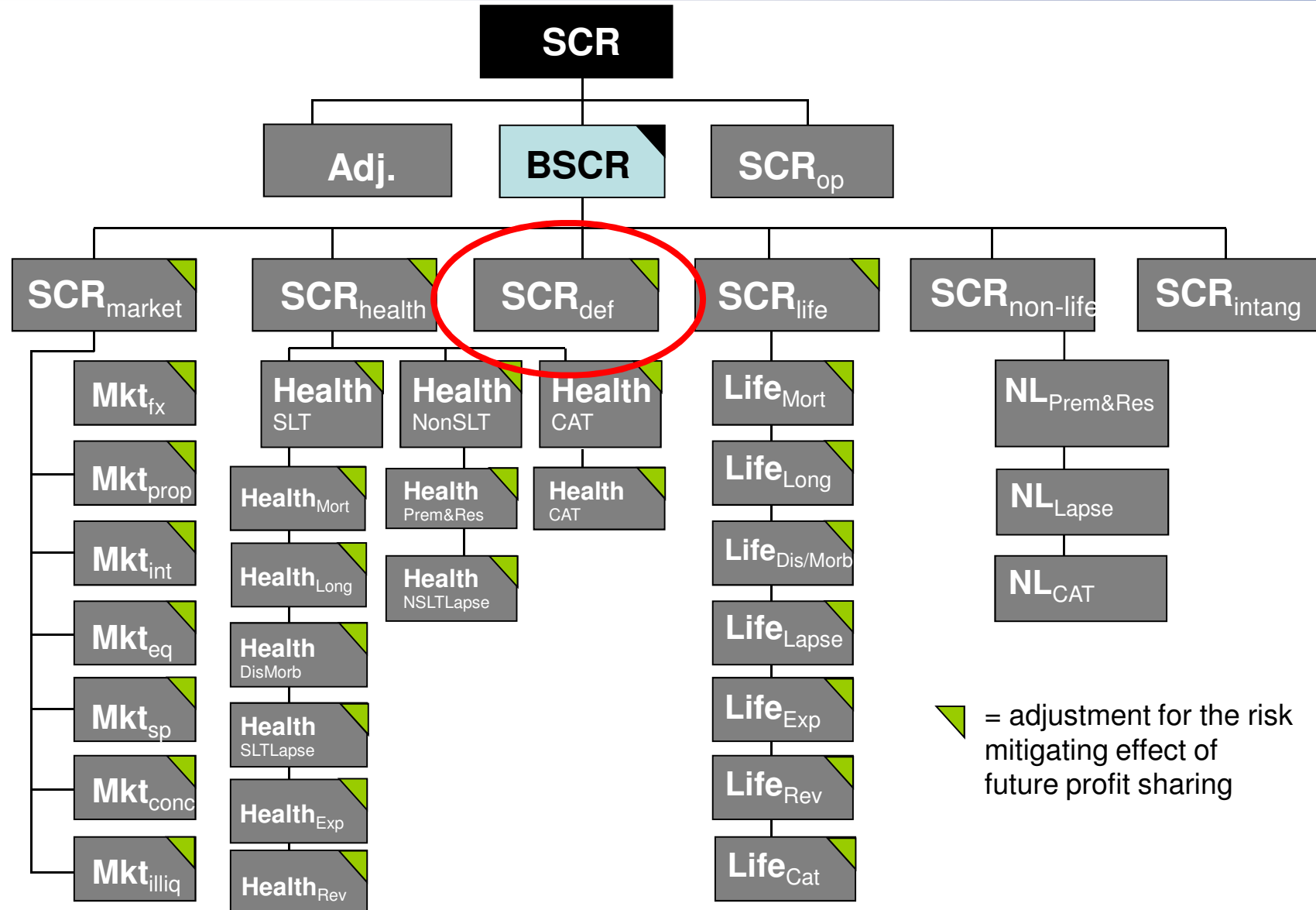


## Concentration risk – Calculation

- Aggregation assumes independence: 
$$Mkt_{conc} = \sqrt{\sum_i Conc_i^2}$$
- Individual concentration charges: 
$$Conc_i = Assets_{xl} \cdot XS_i \cdot g_i + \Delta Liab_{ul}$$
- Excess exposure: 
$$XS_i = \max\left\{0; \frac{E_i}{Assets_{xl}} - CT\right\}$$

Rating <sub>i</sub>	CT (QIS4)	CT (QIS5)	Rating <sub>i</sub>	Credit Quality Step	g <sub>i</sub> (QIS4)	g <sub>i</sub> (QIS5)
AA-AAA	5%	3%	AA -AAA	1	0.15	0.12
A	5%	3%	A	2	0.18	0.21
BBB	3%	1.5%	BBB	3	0.30	0.27
BB or lower	3%	1.5%	BB or lower,	4 – 6	0.73	0.73

- Treatment of unrated insurance companies based on solvency
- Mortgage\Public sector covered bonds: CT = 15%
- Property exposures > 10% of total assets: 12% shock to exposure
- Non-EEA government (lower than AAA-AA): g<sub>i</sub> based on credit quality



Type 1	Type 2
Usually undiversified and rated risks	Usually diversified and unrated risks
Reinsurance; securitisation; Derivatives; Cash at banks; Deposits with ceding institutions; Guarantees, Letters of credit	Intermediary receivables, policyholder debtors (including <b>mortgage loans</b> ), various instruments where counterparties exceed a specified threshold
Loss Given Default (LGD) and rating class parameters for each counterparty	Simple factor-based approach based on net risk exposures
LGD for reinsurance/derivatives is based on stressed positions and allows for collateralisation	
Simplifications are possible but these tend to be conservative	
Entities belonging to the same group should be considered as one counterparty	
The total SCR allows for diversification between the two types via a correlation of 0.75	

Credit exposures to OECD or EEA governments or institutions covered by guarantees of these governments are exempted.

- Reinsurance / Securitisations:

$$\text{LGD}_i = \max(50\% \cdot (\text{Recoverables}_i + \text{RM}_{\text{re},i} - \text{Collateral}_i); 0)$$

- Derivatives:

$$\text{LGD}_i = \max(90\% \cdot (\text{Market Value}_i + \text{RM}_{\text{fin},i} - \text{Collateral}_i); 0)$$

- Capital requirement – Type 1 exposures:

$$\text{SCR}_{\text{def},1} = \min(\sum_i \text{LGD}_i; q \cdot \sqrt{V}); q \in \{3,5\}$$

- Capital requirement – Type 2 exposures:

$$\begin{aligned} \text{SCR}_{\text{def},2} &= 15\% \cdot E_{\text{(except those due more than 3 months)}} \\ &+ 90\% \cdot E_{\text{due more than 3 months}} \end{aligned}$$

■ Type 1 exposures:

$$V = \sum \sum u_{j,k} * y_j * y_k + \sum v_j * z_j$$

Where

$$y_j = \sum \text{LGD} \text{ and } z_j = \sum (\text{LGD})^2$$

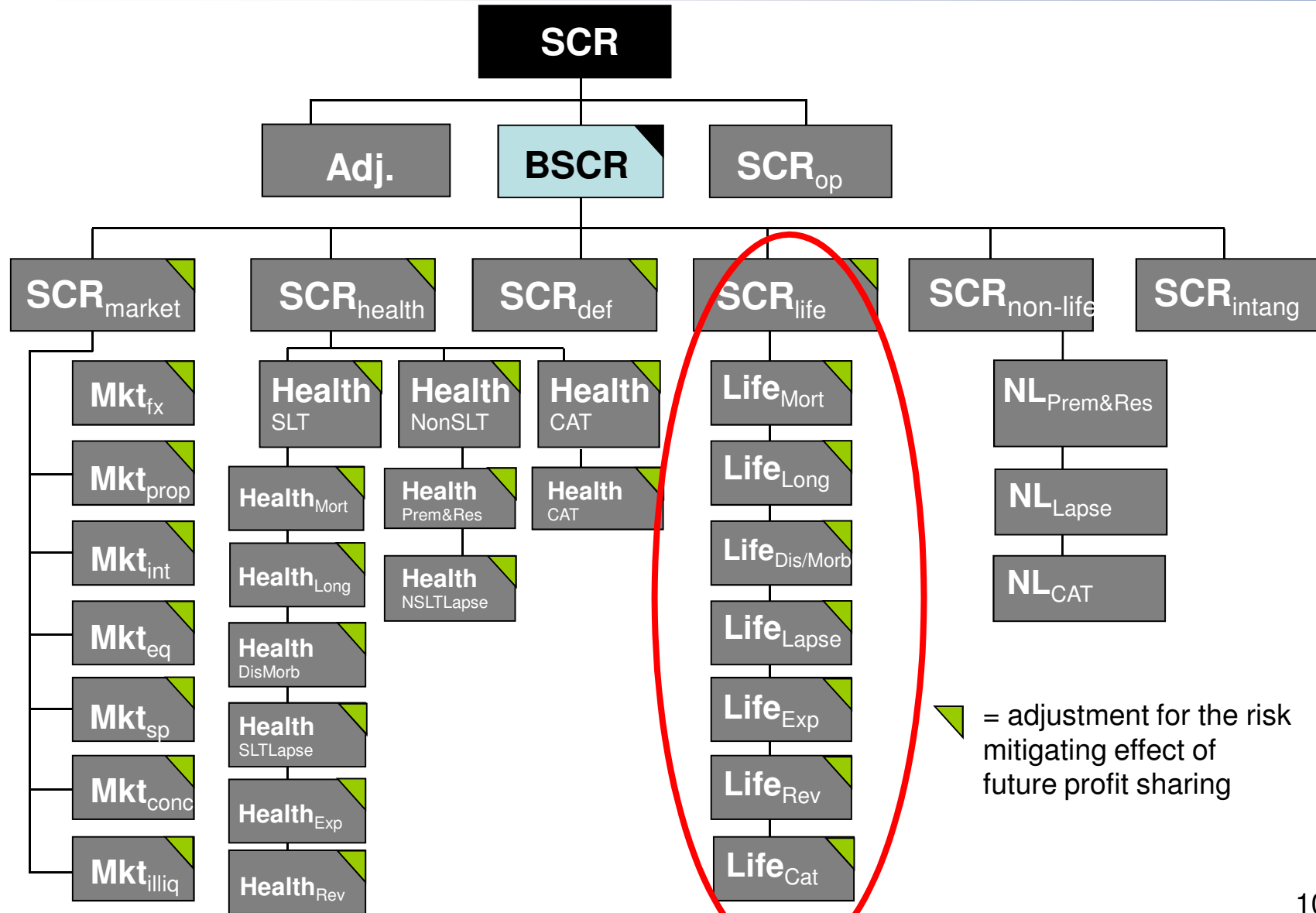
$$u_{i,j} = p_i * (1-p_i) * p_j * (1-p_j) / [(1+\gamma)(p_i+p_j) - p_i * p_j]$$

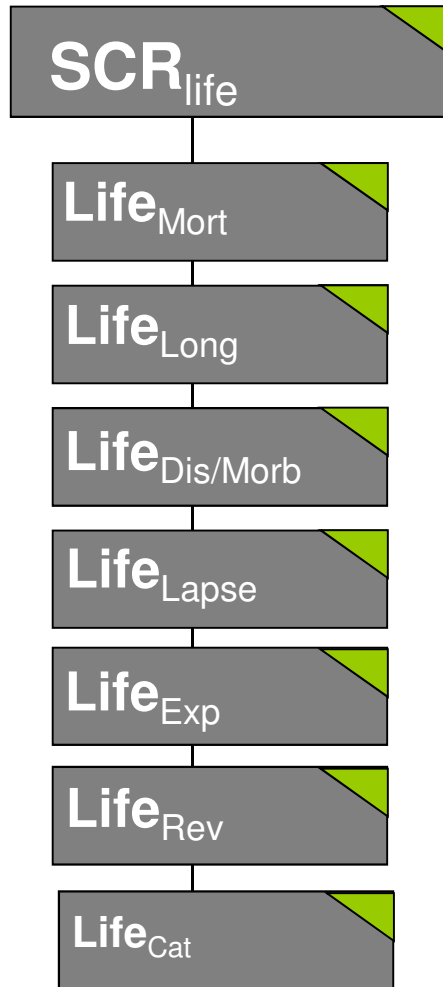
$$v_i = (1+2\gamma) * p_i * (1-p_i) / [2+2\gamma - p_i]$$


$$\gamma = 0.25$$

p – probability of default, which varies by rating

- QIS5 final spec, type 2 counterparty default shock:
  - 15% x type 2 exposures
  - Take into account collateral
- Additional information requested on secured and unsecured exposures
- Haircut to secured exposures:
  - 25% for residential real estate; and
  - 50% for commercial real estate.



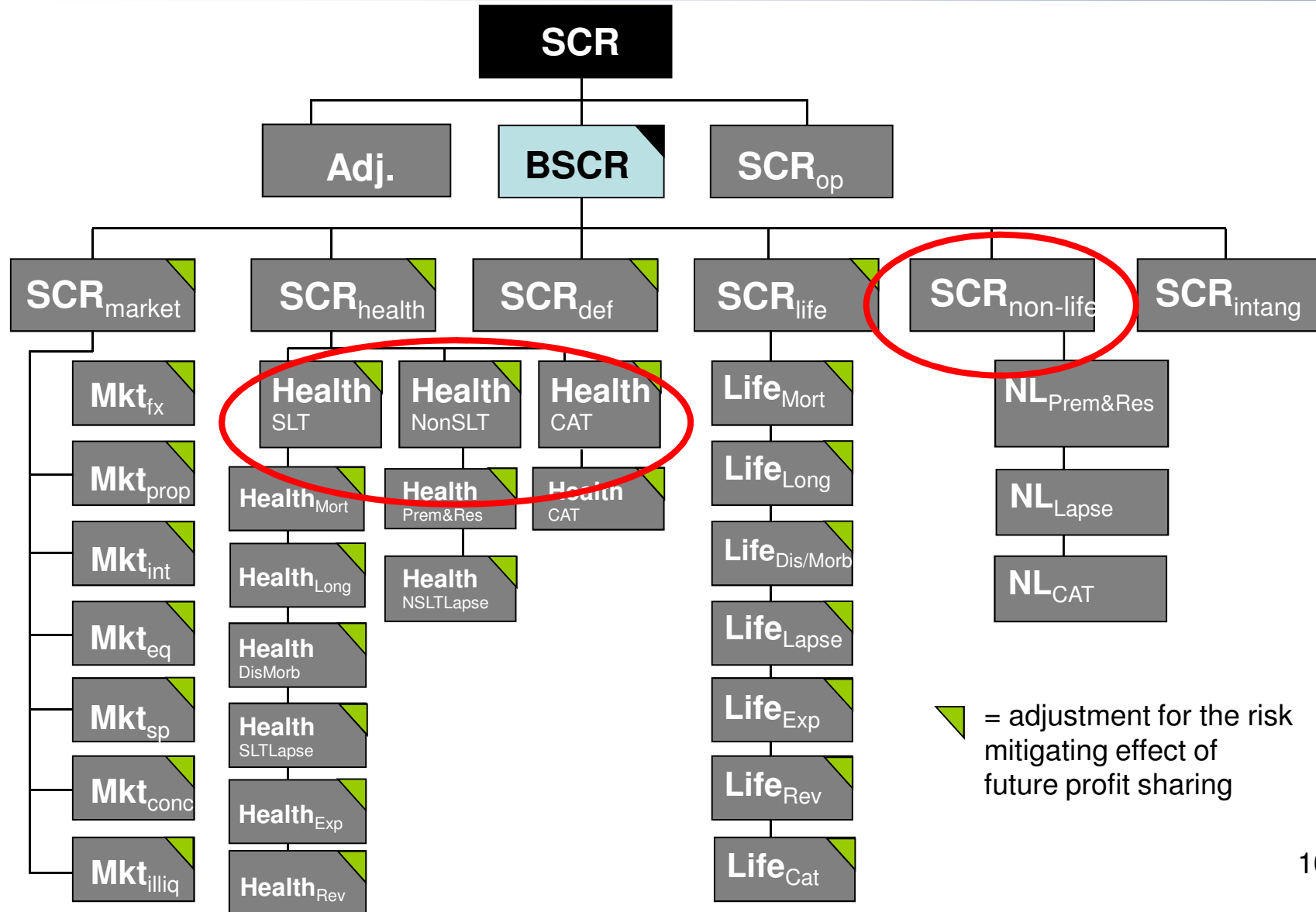


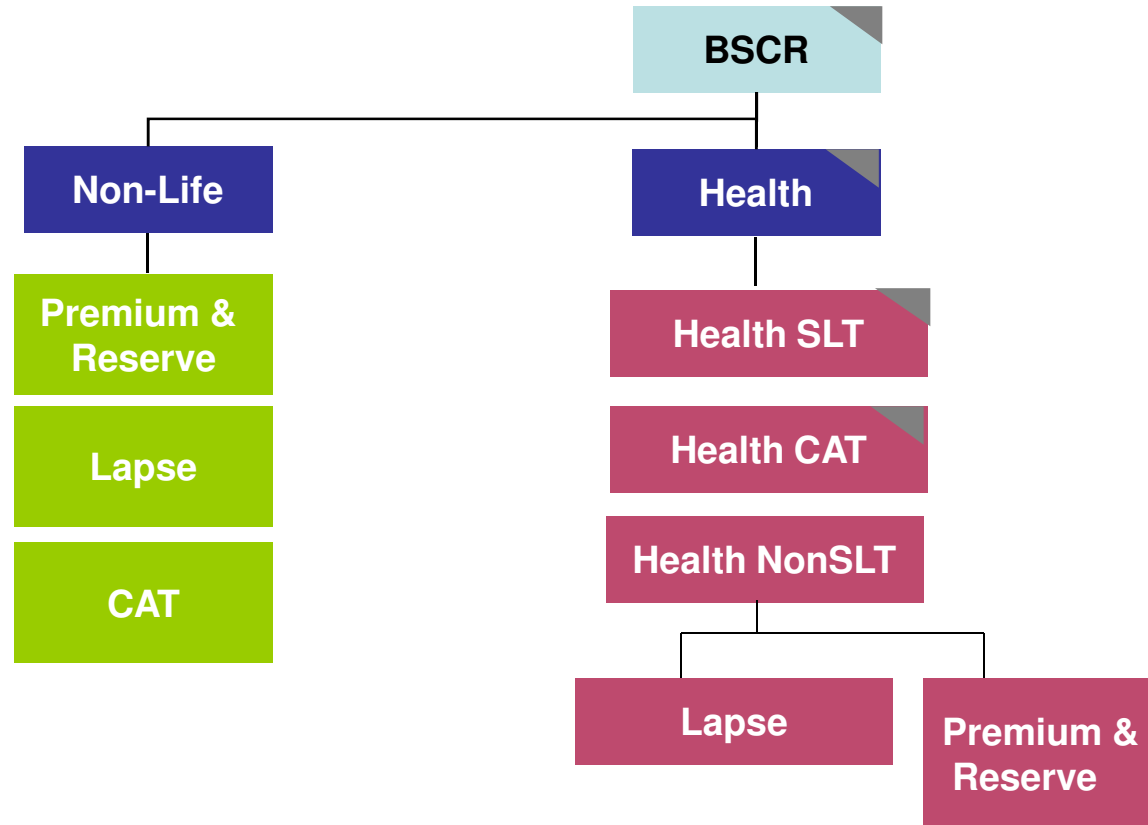
 = adjustment for the risk mitigating effect of future profit sharing



- Mortality: 15% shock (10% in QIS4)
- Longevity: 20% shock (25% in QIS4)
- Expense: 10% increase in expenses + 1 % additional inflation (QIS4 additionally allowed for recovery on adjustable loadings)
- Revision: 3% increase in annual annuity amount
- Life catastrophe: 1.5 per mille (as QIS4)
- Lapse: 50% up/down; 30% mass lapse, but 70% for non-retail (QIS4 shock was 30% for all business)
- Difficulties around calculations remain
  - No allowance for natural diversification that might apply within a group of products
  - Need to identify those policies which would be negatively affected by the stress, then stress only these products

<b>Mortality</b>	<ul style="list-style-type: none"> <li>15%*Capital at Risk*Expected deaths for next year weighted by SA* (Duration)*<math>\{1.1^{(Duration-1)/2}\}</math></li> </ul>
<b>Longevity</b>	<ul style="list-style-type: none"> <li>20%*best estimate for relevant policies*Expected deaths for next year weighted by SA* (Duration)*<math>\{1.1^{(Duration-1)/2}\}</math></li> </ul>
<b>Disability</b>	<ul style="list-style-type: none"> <li>35%*disability capital (yr1)*transition healthy/sick +</li> <li>25%*dis capital (yr2)*trans healthy/sick*(Duration)*<math>\{1.1^{(Duration-1)/2}\}</math></li> <li>+ 20%*technical provisions for contracts subject to disability claims *transition healthy/dead *(Duration) * <math>\{1.1^{(Duration-1)/2}\}</math></li> </ul>
<b>Lapse</b>	<ul style="list-style-type: none"> <li><math>Lapse_{Up/Down} = 50\% \cdot I_{up/down} \cdot n_{up/down} \cdot S_{up/down}</math></li> <li>I = avg. lapse rate; n = avg. period; S = sum of surrender strains</li> </ul>
<b>Expense</b>	<ul style="list-style-type: none"> <li><math>Life_{exp} = 0.1 \cdot n \cdot E + \left( \frac{1}{k} \cdot \frac{(1+k)^n - 1}{(1+i)^n - 1} \right) \cdot E</math></li> <li>E = Expenses; n = avg. period; i = expected inflation; k = 1 + 1%</li> </ul>
<b>CAT</b>	<ul style="list-style-type: none"> <li><math>Life_{CAT} = \sum_i 0.0015 \cdot Capital\_at\_Risk_i</math></li> <li><math>Capital\_at\_Risk_i = SA_i + AB_i \cdot Annuity\_factor - BE_i</math></li> </ul>





- Premium risk and reserve risk factors were revised between CP71 and the final CEIOPS advice
- Premium risk and reserve risk factors have been re-revised in the final QIS5 specification
- Introduction of a net - gross ratio for premium risk:
  - Relatively simple approach in final CEIOPS advice
  - Much more **complex** approach in QIS5 specification
- Re-introduction of allowance for geographical diversification

$$\frac{NCR_i}{GCR_i} = \sqrt{\frac{1 + \left(\frac{\Omega_{lob}^{net}}{M_{lob}^{net}}\right)^2}{1 + \left(\frac{\Omega_{lob}^{gross}}{M_{lob}^{gross}}\right)^2}}$$

where

$$M_{lob}^{net} = M_{lob}^{gross} \cdot [1 - F_{m+\sigma^2, \sigma}(a+b) + F_{m+\sigma^2, \sigma}(a)] + a \cdot [F_{m, \sigma}(a+b) - F_{m, \sigma}(a)] - b \cdot [1 - F_{m, \sigma}(a+b)]$$

$$\Omega_{lob}^{net} = \left( \begin{aligned} & \left( \Omega_{lob}^{gross^2} + M_{lob}^{gross^2} \right) [1 - F_{m+2\sigma^2, \sigma}(a+b) + F_{m+2\sigma^2, \sigma}(a)] + a^2 \cdot [F_{m, \sigma}(a+b) - F_{m, \sigma}(a)] \\ & - 2b \cdot M_{lob}^{gross} \cdot [1 - F_{m+\sigma^2, \sigma}(a+b)] + b^2 \cdot [1 - F_{m, \sigma}(a+b)] - M_{lob}^{net^2} \end{aligned} \right)^{1/2}$$

$$\sigma = \sqrt{\ln \left( 1 + \left( \frac{\Omega_{lob}^{gross}}{M_{lob}^{gross}} \right)^2 \right)}$$

$$m = \ln M_{lob}^{gross} - \frac{\sigma^2}{2}$$

SCR standard formula: Premium risk factors

Line of business (LOB)	QIS4	CP73	Final CEIOPS advice	QIS5 before adjustment
Motor TPL	9%	10%	11.5%	10%
Motor Other	9%	10%	8.5%	7%
MAT	12.5%	20%	23%	17%
Fire and other damage	10%	12.5%	15%	10%
TPL	12.5%	17.5%	17%	15%
Credit & Suretyship	15%	20%	28%	21.5%
Legal expenses	5%	7.5%	8%	6.5%
Assistance	7.5%	10%	5%	5%
Miscellaneous	11%	20%	15.5%	13%
NPL Property	15%	30%	20%	17.5%
NPL MAT	15%	30%	18.5%	17%
NPL Casualty	15%	30%	16.5%	16%
<b>Index</b>	<b>100%</b>	<b>159%</b>	<b>137%</b>	<b>114%</b>

## SCR standard formula: Reserve risk factors

Line of business (LOB)	QIS4	CP73	Final CEIOPS advice	QIS5
Motor TPL	12%	12.5%	9.5%	9.5%
Motor Other	12%	12.5%	12.5%	10%
MAT	10%	17.5%	17.5%	14%
Fire and other damage	10%	15%	12%	11%
TPL	15%	20%	16%	11%
Credit & Suretyship	15%	20%	25%	19%
Legal expenses	10%	12.5%	9%	9%
Assistance	10%	12.5%	12.5%	11%
Miscellaneous	10%	20%	20%	15%
NPL Property	15%	30%	25.5%	20%
NPL MAT	15%	30%	25%	20%
NPL Casualty	15%	30%	25%	20%
<b>Index</b>	<b>100%</b>	<b>156%</b>	<b>141%</b>	<b>114%</b>



- Re-introduced in QIS5 specification
- Based on a methodology proposed by Lloyd's

$$V_{lob} = (V_{lob}^{prem} + V_{lob}^{res}) \times (0.75 + 0.25 \times DIV_{lob})$$

- Maximum diversification benefit available would be 25%

## Non-life: Treatment of new business

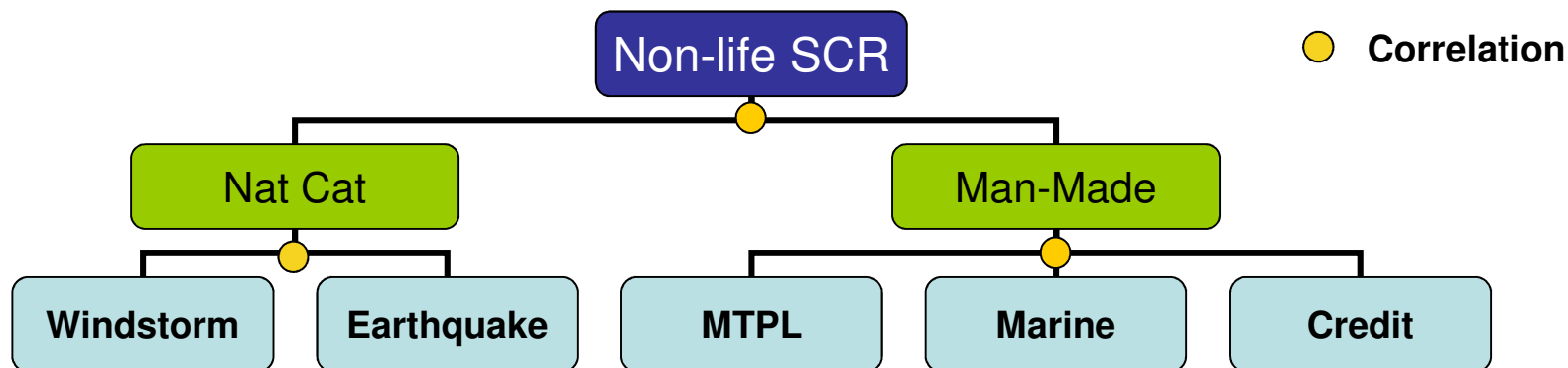
- QIS5 states “*volume measure for [the premium] risk component is based on the expected premiums earned and written during the following twelve months*”
- Inconsistent with technical provisions?
- Inconsistent with life SCR?

- Some companies not able to use standardised scenarios (“SSs”), and will have to apply for partial internal model
- Those not able to use SSs or internal models will need to use factor based approach, which is conservatively calibrated
- SSs cannot be used for non-proportional inwards reinsurance business or non-EEA exposures
- SSs are exposure-based and tailored to company’s particular risk profile
- Net down gross losses based on actual outwards reinsurance programmes
- Requires data on total insured values at the relevant geographical and peril levels – calculation intensive
- Geographical diversification is embedded in non-life SSs

## Non-life catastrophe risk

- Method 1: Standardised EEA-based scenarios

- Example:



- Method 2: Factor-based method

- Almost identical factors to draft CP 71, but significant increase on QIS4

Insurers who write material inwards catastrophe reinsurance are expected to seek at least partial model approval.

METHOD 1	METHOD 2	QIS4 METHOD 3
<ul style="list-style-type: none"> <li>• Standardised scenario approach</li> <li>• Nat Cat scenarios</li> <li>• Man-made scenarios</li> <li>• Only EEA scenarios developed</li> </ul>	<ul style="list-style-type: none"> <li>• Factors applied to premiums by class</li> <li>• Prescribed aggregation basis</li> <li>• Significant underlying increase in factors</li> <li>• Results unlikely to be suitable for international catastrophe writers</li> </ul>	<ul style="list-style-type: none"> <li>• Personalised scenarios</li> <li>• Most sophisticated method</li> <li>• Company specified scenarios</li> </ul>

- Only applies if future premium is allowable as credit against reserves
- Insured must have unilateral right to cancel the contract
- Scenario based stress test with increase or decrease of 50% in lapse rates, or mass lapse event
- $NL_{\text{lapse}} = \max(\text{Lapse}_{\text{down}}; \text{Lapse}_{\text{up}}; \text{Lapse}_{\text{mass}})$
- In practice most insurers will just need to demonstrate lapse risk is immaterial

## Methodology and company specific data

- Three methods for premium risk and three methods for reserve risk specified in CP75, based largely on methods documented in CP71
- Methodology for calculating USPs has not been modified to reflect net-to-gross ratios underlying latest standard formula for premium risk in Ceiops' final advice and QIS5 specification
- Credibility factors in QIS5 for external data and pooled data are now the same as for internal data:
  - 15 years for third-party liability, motor vehicle liability and credit & suretyship
  - 100% after 10 years for other lines of business

## Treatment of participations – at solo level

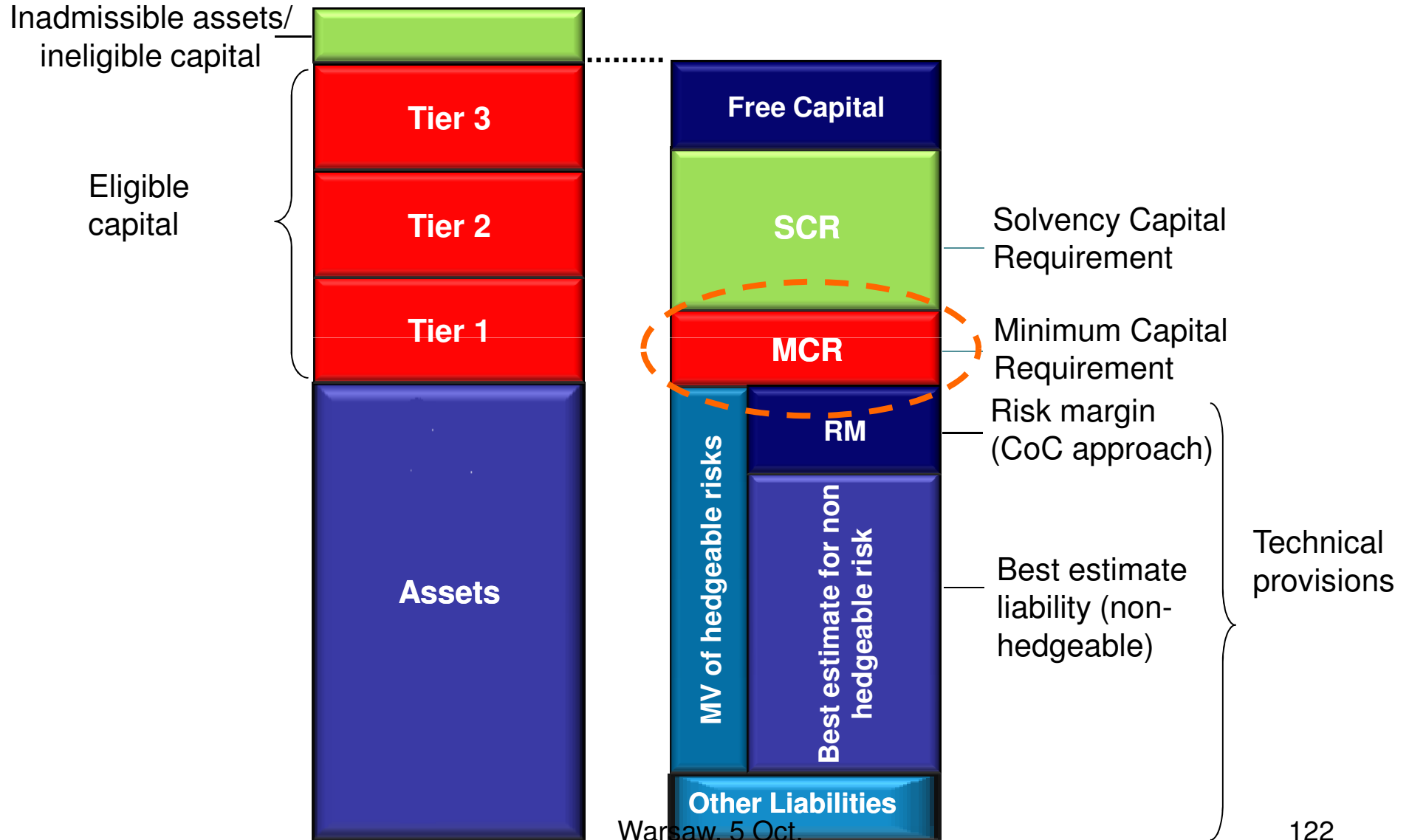
- *Participation*: ownership, directly or by control, of **20%** or more of the **voting rights** or **capital** of an undertaking

Nature of participation	Treatment
Financial and credit institutions	Deducted from own funds
Participations excluded from scope of group supervision	100% market risk charge
Participations in (re)insurance undertakings	Standard equity charge for non-strategic 22% adjusted equity charge for strategic
Other strategic related undertakings	22% adjusted equity charge
Other related undertakings (not included above)	Standard equity charge (i.e. 30% for EEA/OECD listed, 40% for other)

- Additional information will be collected to analyse approaches where the shock is based on the SCR of participations.



- QIS5 Introduction
- Valuation of assets and technical provisions
- Own Funds
- Solvency Capital Requirement
- Minimum Capital Requirement
- Groups
- Conclusion



## MCR – Combined approach



- Key criteria for MCR
  - Legal certainty
  - Auditable
  - Safety net
- MCR bases on percentages applied to combination of:
  - Premiums
  - Technical provisions and sum assured at risk
  - With a cap and floor linked to SCR
- Subject to a cap (45%) and floor (25%) of the SCR and an absolute minimum

Non-Life (excl non-life business similar to life insurance)

- Sum across each line of business
- For each LOB, the **Maximum** of:

**Factor x Technical Provisions**

- Excluding risk margin
- Net of reinsurance
- Minimum of zero

**AND**

**Factor x Written Premiums**

- Net of reinsurance
- Minimum of zero

MCR could be based on technical provisions and written premiums for different lines of business

## MCR: Technical provision risk factors

Line of business (LOB)	QIS4	CP73	Final CEIOPS advice	QIS5
Motor TPL	16%	18%	12%	12%
Motor Other	9%	18%	15%	13%
MAT	13%	25%	21%	18%
Fire and other damage	13%	22%	15%	14%
TPL	20%	29%	19%	14%
Credit & Suretyship	20%	29%	30%	25%
Legal expenses	13%	18%	11%	12%
Assistance	13%	18%	15%	14%
Miscellaneous	13%	29%	24%	20%
NP Reins Property	20%	42%	30%	26%
NP Reins MAT	20%	42%	30%	26%
NP Reins Casualty	20%	42%	30%	26%
<b>Index</b>	<b>100%</b>	<b>175%</b>	<b>133%</b>	<b>116%</b>

## MCR: Premium risk factors

Line of business (LOB)	QIS4	CP73	Final CEIOPS advice	QIS5
Motor TPL	12%	14%	14%	13%
Motor Other	12%	14%	10%	9%
MAT	16%	29%	27%	22%
Fire and other damage	13%	18%	18%	13%
TPL	16%	25%	21%	20%
Credit & Suretyship	20%	29%	33%	28%
Legal expenses	6%	11%	10%	9%
Assistance	10%	14%	6%	7%
Miscellaneous	14%	29%	19%	17%
NP reins Property	20%	42%	24%	23%
NP reins MAT	20%	42%	22%	21%
NP reins Casualty	20%	42%	20%	22%
<b>Index</b>	<b>100%</b>	<b>173%</b>	<b>125%</b>	<b>114%</b>

$$\bullet \text{ MCR} = \max\{\alpha_{c.1.1} \cdot TP_{c.1.1} + \alpha_{c.1.2} \cdot TP_{c.1.2}; WP\_Floor \cdot TP_{c.1.1}\} + \sum_{j \in \{c.2.1, c.2.2, c.3\}} \alpha_j \cdot TP_j + \alpha_4 \cdot CAR$$

Index	Segment	Factor
Volume measure: technical provisions		
C.1.1	participating contracts, guaranteed benefits	5%
C.1.2	participating contracts, discretionary benefits	-8.8%
C.2.1	unit-linked contracts without guarantees	0.5%
C.2.2	unit-linked contracts with guarantees	1.8%
C.3	non-participating contracts	2.9%
C.4	Capital at risk for all contracts	0.1%

- QIS5 Introduction
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- Conclusion



**TECHNICAL SPECIFICATIONS**

<b>ASSETS AND LIABILITIES</b>	<b>OWN FUNDS</b>	<b>SOLVENCY CAPITAL REQUIREMENT</b>	<b>MINIMUM CAPITAL REQUIREMENT</b>	<b>GROUP LEVEL ISSUES</b>
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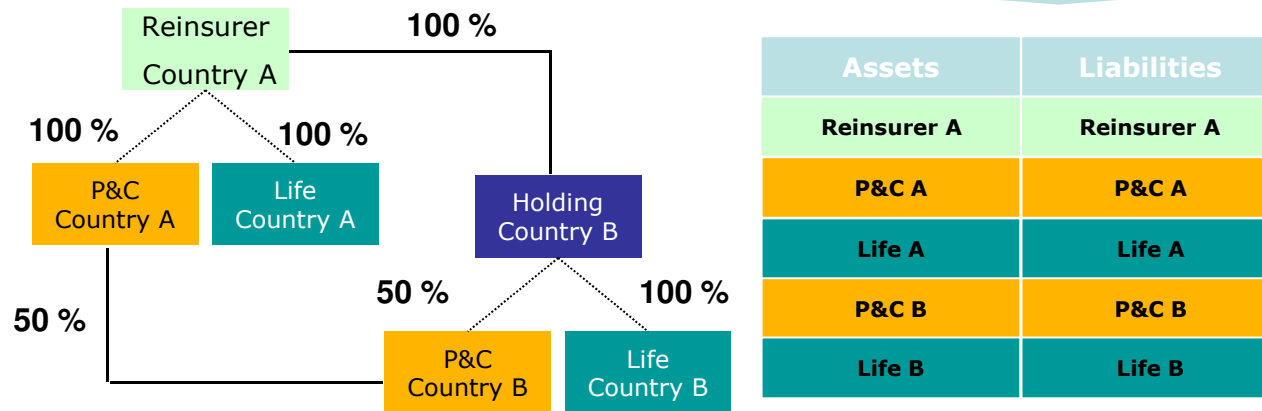
- Calculations should be carried out at the level of the ultimate EEA parent undertaking
- Scope of the group defined by Solvency II Directive, exemptions from Insurance Groups Directive may be carried over
- Treatment of 3<sup>rd</sup> Country Entities:
  - EEA group with related undertaking in 3<sup>rd</sup> country
  - 3<sup>rd</sup> country headquartered group with sub-group in EEA
  - Non-EEA undertaking reinsures EEA undertaking or group

Scope of group solvency assessment under QIS 5

Summary of methods and expected answers			
	EEA groups <b>without</b> non-EEA entities	EEA groups <b>with</b> non-EEA entities	EEA subgroup(s) of non-EEA groups
S1 – current calculations	<b>Already available</b>	<b>Already available</b>	<b>Already available</b>
S2 – default method	<b><u>Expected</u></b>	<b><u>Expected</u></b>	<b><u>Expected</u></b>
S2 – D&A (SII applied to the non-EEA entities)	<b><u>Expected</u></b>	<b><u>Expected</u></b>	<b><u>Expected</u></b>
S2 – D&A (local rules applied to the non-EEA entities)		Invited	
S2 – combination of methods	<u>Optional if relevant</u>	<u>Optional if relevant</u>	<u>Optional if relevant</u>
S2 – Internal Model	<u>If relevant</u>	<u>If relevant</u>	<u>If relevant</u>
S2 – default and D&A – subgroup calculations	<u>Optional if relevant</u>	<u>Optional if relevant</u>	

**Focus on**  
**accounting consolidation-based method (“default” method)**  
**and deduction and aggregation method (“D&A”)**

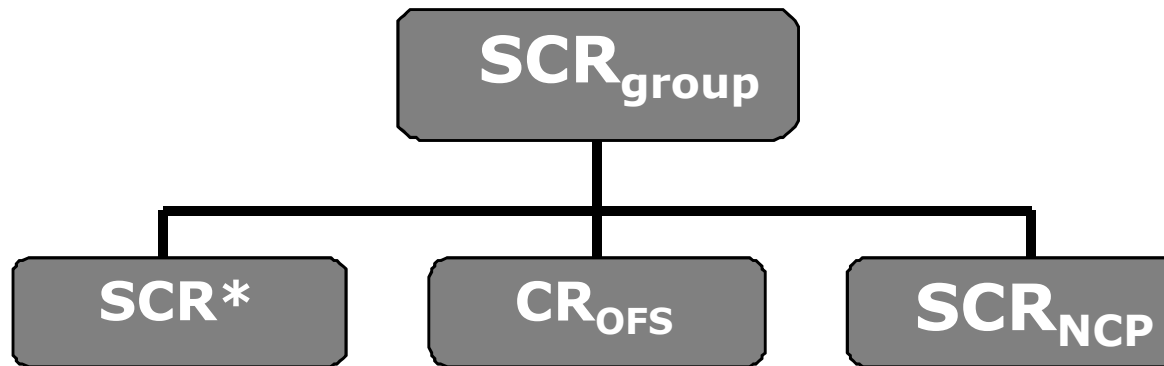
# What is meant by Accounting Consolidation-based method?



- All QIS5 solo balance sheet items are considered in a consolidated balance sheet as if the group were a single entity
- Double Gearing is eliminated, i.e. participation assets of the parent or the sub-holding are not counted
- Non transferable items only contribute to the group available capital up to the amount of the (adjusted) solo SCR
- Elimination of intra-group transactions
- Diversification benefits can be leveraged when calculating group SCR

**Group SCR is calculated like a solo SCR**

## Calculation of group SCR using default method



- $SCR_{Group}$  = sum of capital requirements:
  - $SCR^*$  on participating (re)insurance undertakings
  - $CR_{OFS}$  on other financial sectors based on sectoral rules, including IORPs
  - $SCR_{NCP}$  on non-controlled (significant influence) participations
- $SCR^*$  allow for diversification between (re)insurance entities

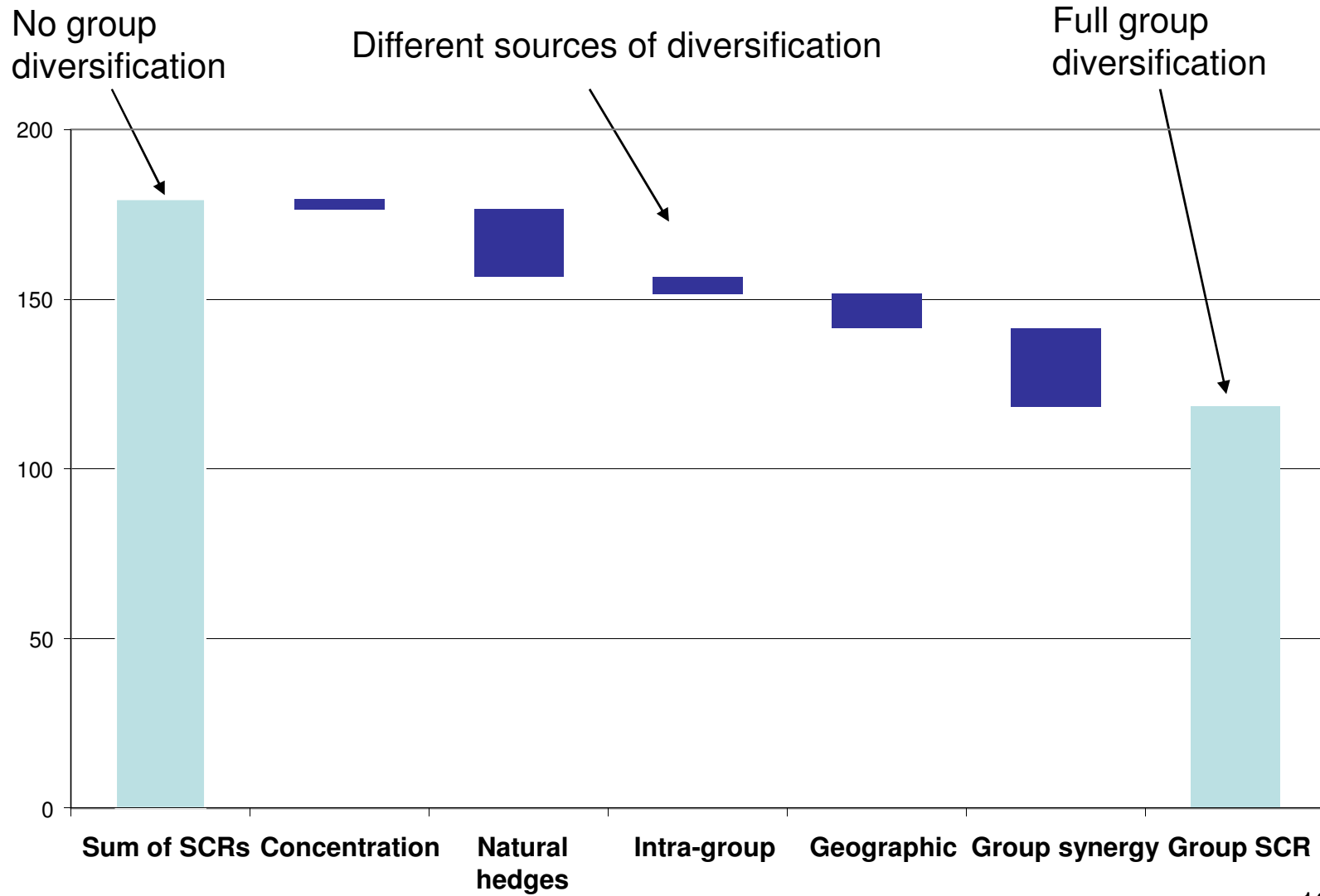
## Treatment of participations in default method

- The default method varies by:

<b>Influence</b>	}	<b>Type of participation</b>
Dominant		Insurance entities
Significant		Insurance holding companies
< 20%		Ancillary insurance entities
		Other financial sector entities and IORPs
		Non financial sector

- full/proportional integration
- sectoral/notional capital requirement
- equity method

# Understanding group diversification effects



- The group SCR floor is equal to the sum of:
  - MCR of participating (re) insurance undertaking; and
  - proportional share of the MCR of related insurance undertakings
- Only relevant for the default method
- As regards non-EEA entities and other financial sector entities, the local capital requirement corresponding to the final intervention point should be used (further guidance given in the specifications)

## **Assessment of consolidated group own funds**

- **Step 1** – Elimination of intra-group transactions and internal creation of capital
- **Step 2** – Derivation of regulatory group own funds according to solo specification for the insurance undertakings and relevant sectoral rules for other financial sectors and IORPs (according to FCD)
- **Step 3** – Calculation of non available solo excess own funds (including adjustment for diversification benefits)
- **Step 4** – Deduct non-available own funds from group own funds
- **Step 5** – The tier limits for each tier of capital are finally applied.



## Restrictions on availability of Own Funds

- Eligible own funds related to participating business and ring fenced funds
  - Some undertakings have capital buffers which are only available to policyholders within the fund
- Eligible ancillary own funds
- Hybrid capital and subordinated liabilities
  - In principle, cannot be considered as available to cover the SCR of subsidiaries if it is not issued or guaranteed by the parent
- Eligible own funds related to deferred tax assets
- Participations in non-EEA (re)insurance entities
  - Local regulatory requirements in other jurisdictions represent a restriction on the ability to transfer capital across the group
- Minority interests

## Calculation of Group SCR using D&A method

- The aggregated group SCR is the sum of the following:
  - The SCR of the participating undertaking
  - The proportional share of the SCR of the related undertakings



- The deduction and aggregation method needs to eliminate intra-group transactions in order to produce an accurate group solvency position.
  - Unadjusted SCR used to compare diversification against consolidated SCR
  - Adjusted SCR required to give accurate solvency position

## Assessment of aggregated group own funds

**Aggregated group own funds are the sum of the following:**

- The own funds eligible for the SCR of the participating undertaking
- The proportional share of the participating undertaking in the own funds eligible for the SCR of related undertakings

- QIS5 Introduction
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- QIS5 is only a test, but participation is extremely important:
  - Contributes to internal education and preparedness
  - Informs Commission for Level 2
  - Unique opportunity to influence final requirements
  - Necessary for internal model approval process
- Main focus should be on producing balance sheet and SCR standard formula as close as possible to technical specifications





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