The Actuarial Profession
making financial sense of the future

Solvency II: Quantitative Impact Study II

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Solvency II - 3 Pillar Approach

Measurement of Assets, Liabilities and Capital

- Eligible capital
- Technical provisions
- Capital requirements
- Asset valuation
- Risks to be included
- Risk measures and assumptions
- Risk dependencies
- Calculation formula
- Internal model approach

Supervisory Review Process

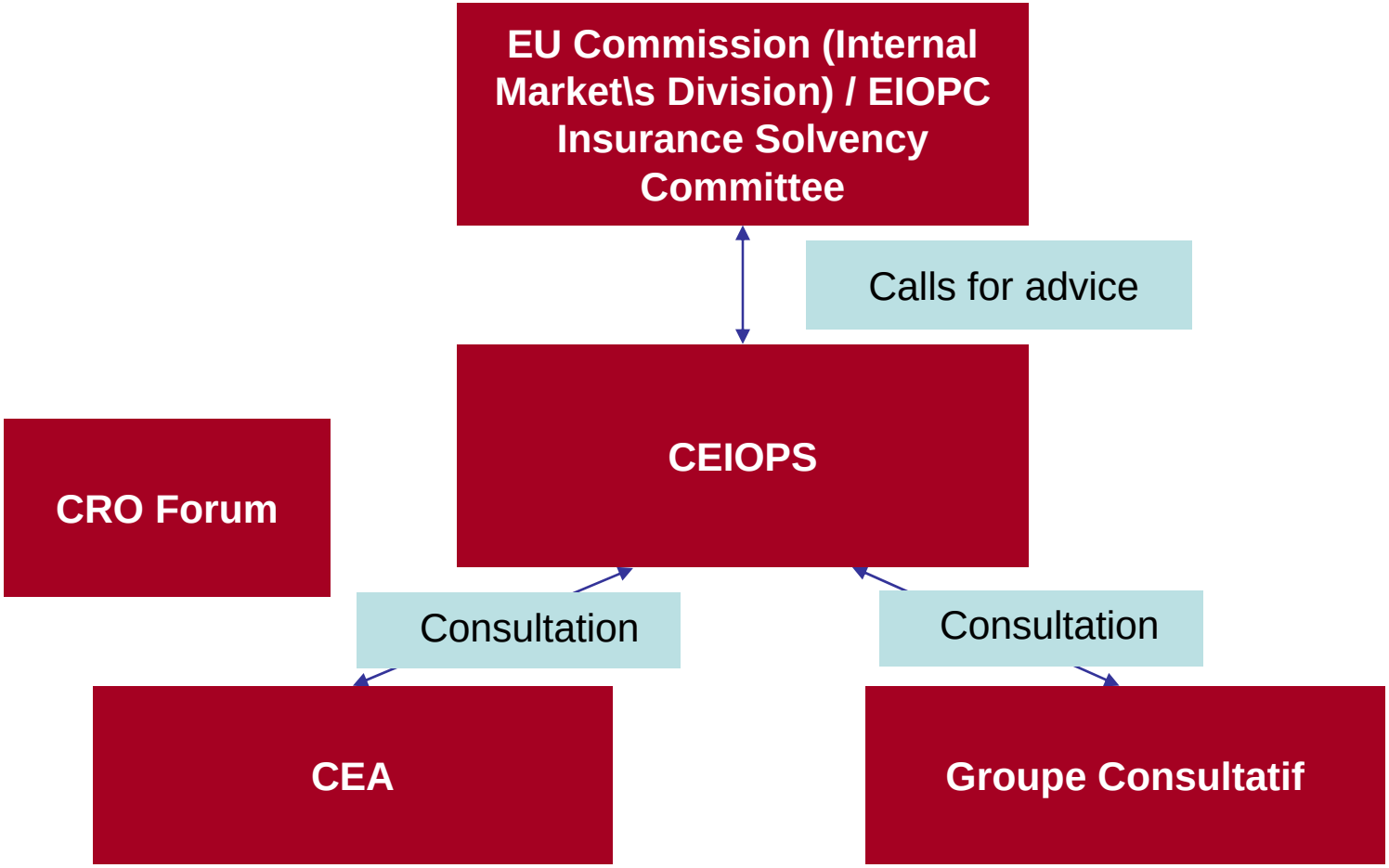
- Internal control
- Risk management
- Corporate governance
- Stress testing
- Continuity testing

Disclosure Requirements

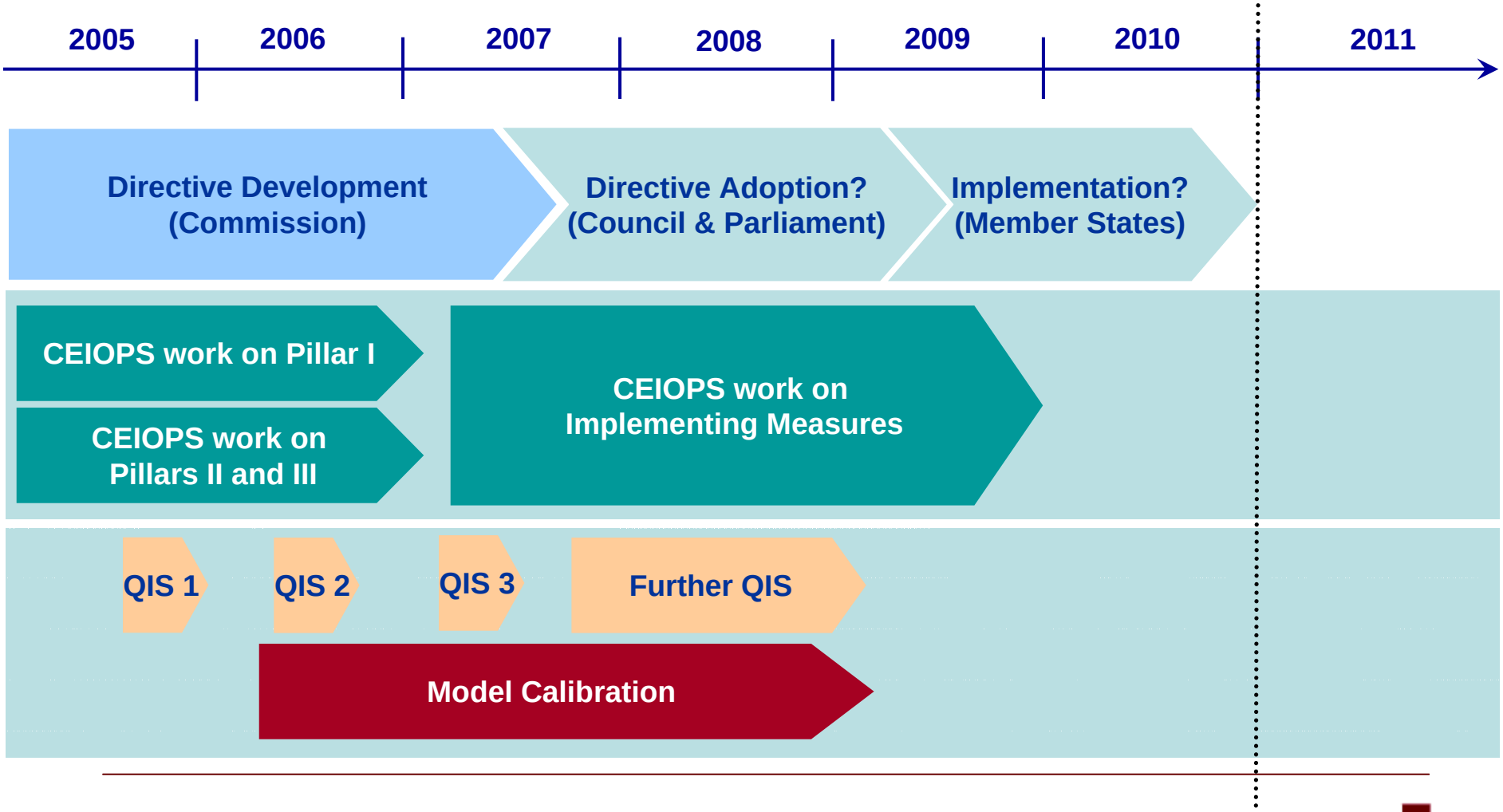
- Current disclosure requirement
  - National GAAP
  - National regulatory reporting
  - Basel II
  - IAIS
  - IFRS 4
  - ED 7
- Future disclosure requirements
  - IFRS Phase 2
  - Great Unifying Theory
  - Private disclosure to the regulator

Align risk, capital and value

Solvency II - structure of project



Where do we stand in the project?



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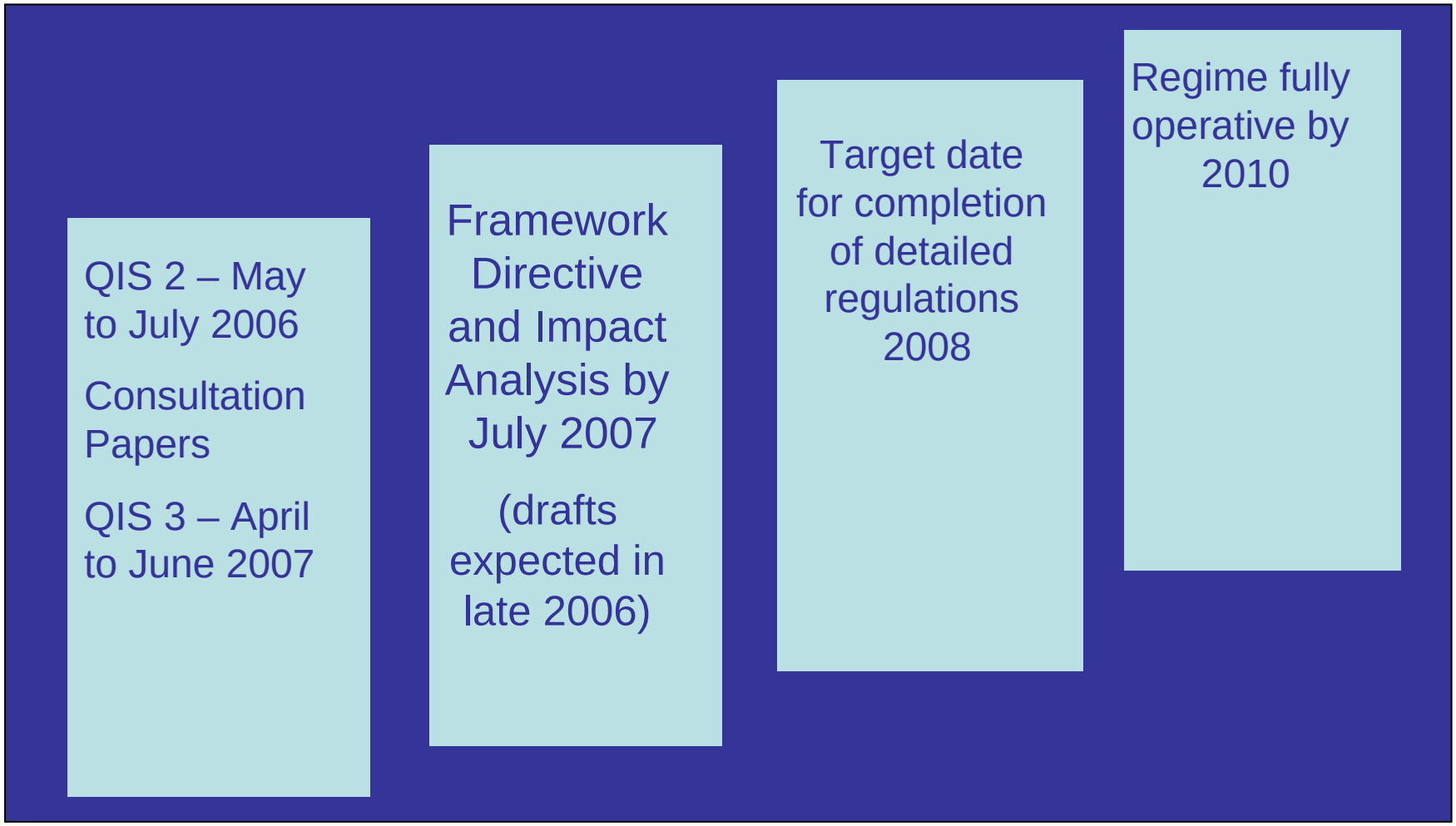
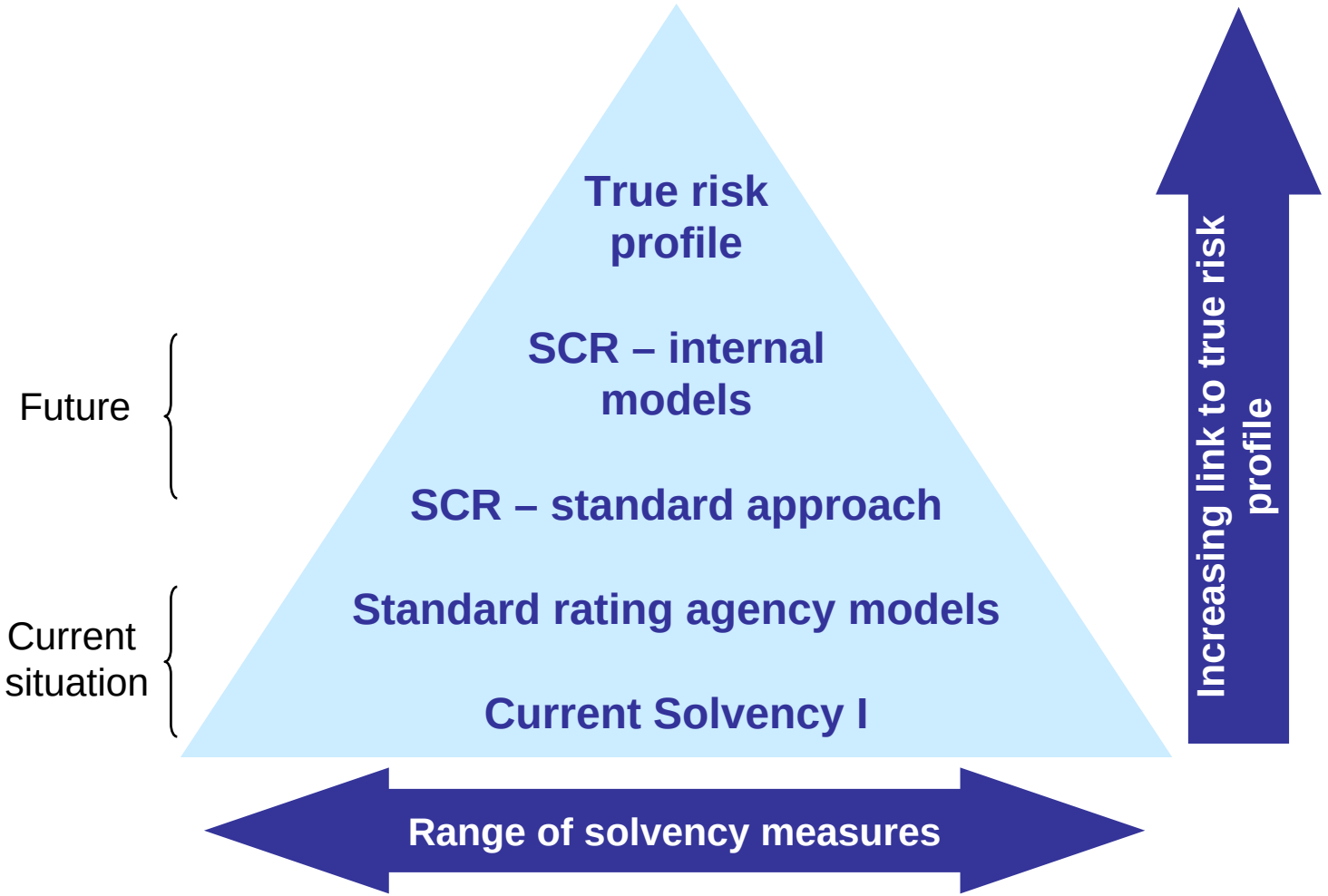
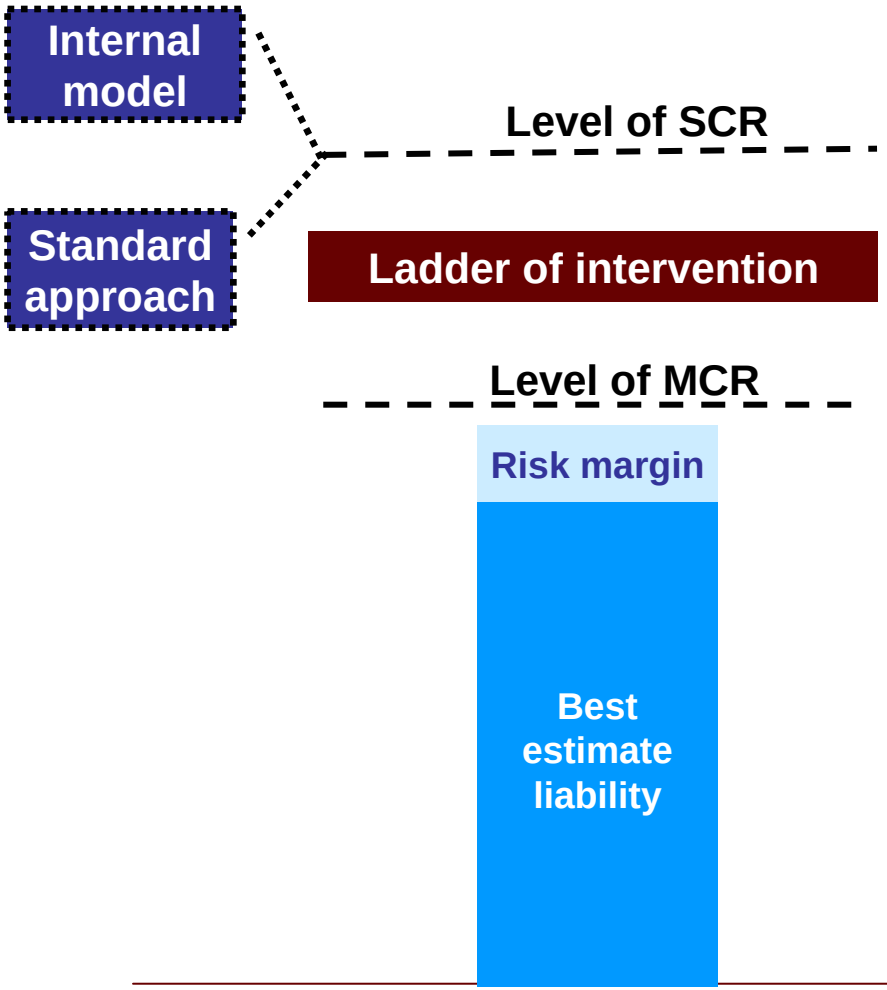
Solvency II – future timetable



A risk based solvency framework



The major components of the framework..



- Technical Provisions – amounts set aside in order for an insurer to fulfil its obligations towards policyholders and other beneficiaries; includes a risk margin
- Solvency Capital Requirement (SCR) –level of capital that enables an institution to absorb significant unforeseen losses and gives reasonable assurance to policyholders and beneficiaries
- Minimum Capital Requirement (MCR) – a safety net that reflects a level of capital below which ultimate supervisory action would be triggered
- SCR is the first potential trigger point for supervisory intervention. The industry advocates a ladder of intervention as available capital falls from SCR towards MCR

What is a Quantitative Impact Study?

- **The Framework Directive must be accompanied by an Impact Assessment**
  - Quantitative Impact Studies form part of the Impact Assessment
- **QIS 2 is the second QIS that ran from May to July 2006**
  - Allows supervisors to understand the practicality of the calculations, potential impact on firms and suitability of the approaches suggested
  - It covers the main elements of the Solvency II framework including technical provisions, asset values, other liabilities, SCR and MCR

QIS is also an opportunity for companies to respond to emerging ideas

Challenges in designing a Standard Approach..

- Differences in products and company structures
- Differences in management discretion and policyholder expectations for participating business
- Technical challenges
  - Differences in quality and availability of data
  - How to adhere to the economic fundamentals?
  - Pragmatic but not overly complicated
- Systems / expertise challenges
  - Actuarial techniques / systems may not be as embedded in companies across Europe as it is in the UK
- Political challenges
  - Balance the requirements of the various stakeholders

Participation UK market

	Life		Non-life	
	No. of companies	**Market share**	**No. of companies**	**Market share**
QIS1	9	35%	15	47%
QIS2	19	65%	23	67%

- QIS2 participation included 6 London market insurers, 4 reinsurers, 6 mutuals
- Only 2 small companies participated

QIS 2 - Structure

TECHNICAL SPECIFICATIONS

VALUATION ASSUMPTIONS	ELIGIBLE ELEMENTS OF CAPITAL	SOLVENCY CAPITAL REQUIREMENT	MINIMUM CAPITAL REQUIREMENT

QIS 2 COVERED THE FOLLOWING

- Focus is on DESIGN and STRUCTURE
- Tentative calibration used
- Based on the legal entity level
- Employed both scenarios and factors
- QIS 2 spreadsheet plus additional information request

QIS 2 DID NOT ADDRESS

- Group level issues
- Fund structure and fungibility of capital
- Internal models
- Innovative forms of capital

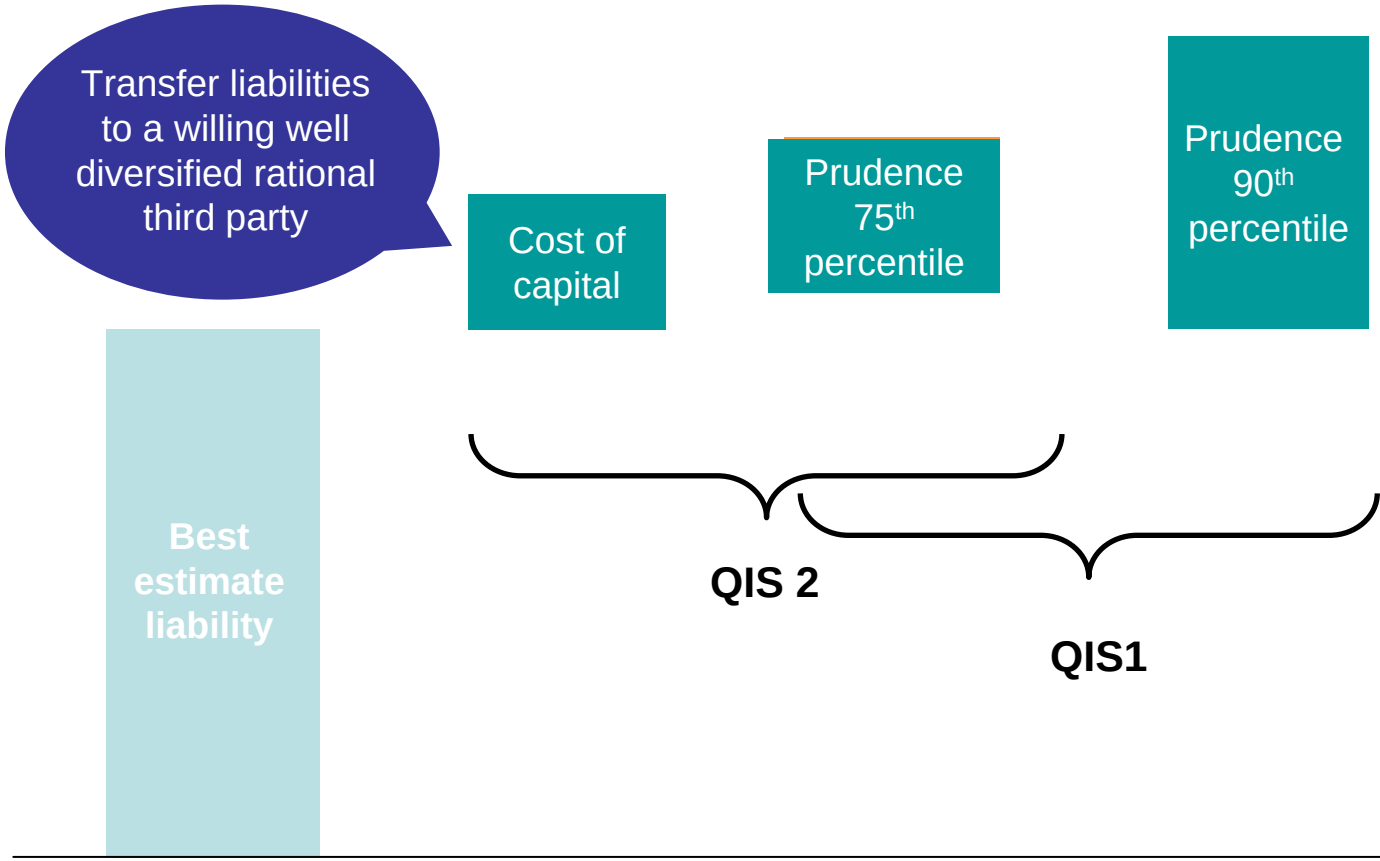
QIS 2 - Structure

TECHNICAL SPECIFICATIONS

VALUATION ASSUMPTIONS	ELIGIBLE ELEMENTS OF CAPITAL	SOLVENCY CAPITAL REQUIREMENT	MINIMUM CAPITAL REQUIREMENT

DESCRIPTION	ISSUES ARISING
Assets ▪ Market value or market-consistent techniques **Technical provisions** ▪ Market-consistent value for hedgeable risks (i.e. financial risks) including value of O&G ▪ Best estimate + risk margin using risk neutral discount rate ▪ Other liabilities on regulatory or GAAP basis	**Risk Margin** ▪ Percentile approach ▪ Cost of capital approach **Other Liabilities** ▪ Treatment of occupational pension schemes

Percentile or cost of capital approach?



How to apply the cost of capital approach?

▪ Quantum of capital	▪ Amount for non-hedgeable risks only
	  ▪ Exclude market and certain items of credit risk
	  ▪ Allowance for diversifiable risk

▪ Length of time for which capital is required	▪ Various options
	  ▪ Run-off of the liabilities
	  ▪ Run-off of the underlying risk drivers
	  ▪ Run-off based on internal models

▪ Cost	▪ Swiss solvency test = 6% per annum before tax

QIS 2 - Structure

TECHNICAL SPECIFICATIONS

VALUATION ASSUMPTIONS	ELIGIBLE ELEMENTS OF CAPITAL	SOLVENCY CAPITAL REQUIREMENT	MINIMUM CAPITAL REQUIREMENT

DESCRIPTION

- Available capital is equal to Solvency I requirements with the following adjustments:
  - Difference between QIS 2 value of assets and Solvency I assessment
  - Difference between QIS 2 value of liabilities and Solvency I assessment

ISSUES ARISING

- Fund structure
- Treatment of discretionary participating feature
  - Available capital or liability?
- No allowance for innovative forms of capital

QIS 2 implies a different presentation of the Realistic Balance Sheet for participating business

QIS 2 - Structure

TECHNICAL SPECIFICATIONS

VALUATION ASSUMPTIONS	ELIGIBLE ELEMENTS OF CAPITAL	SOLVENCY CAPITAL REQUIREMENT	MINIMUM CAPITAL REQUIREMENT

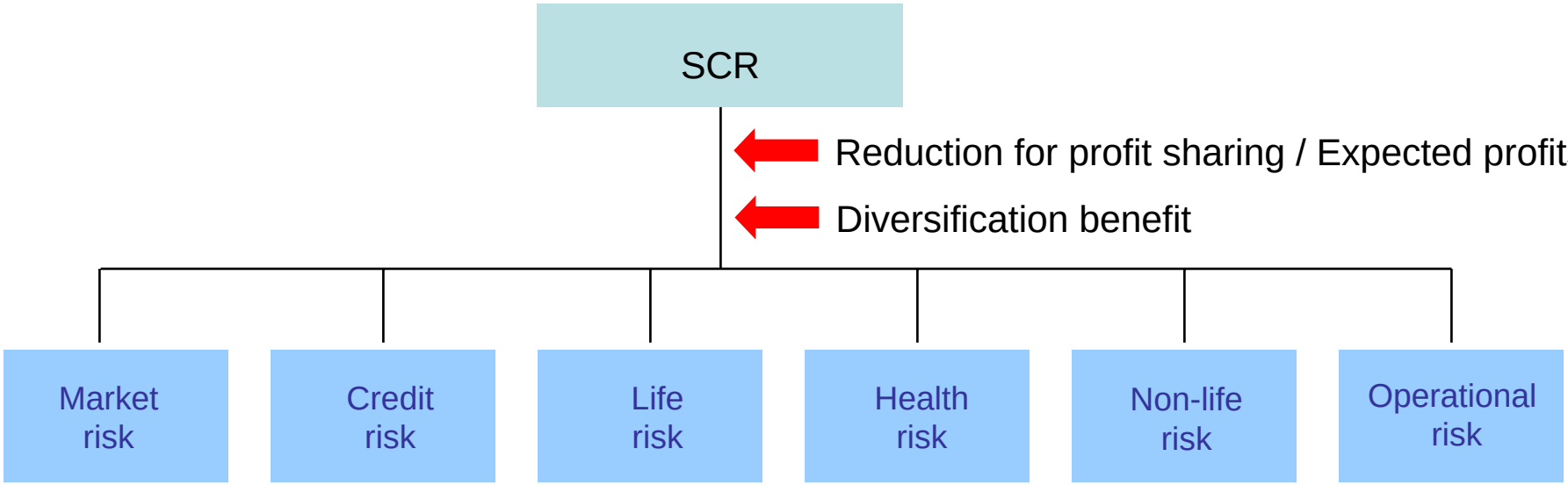
DESCRIPTION

- Divided into modules by risk type
- Factors and scenarios
- Full recognition for risk mitigation
- Capital requirements aggregated through correlation matrix
- The ability of future discretionary bonuses to absorb risk recognised through reduction in the SCR

ISSUES ARISING

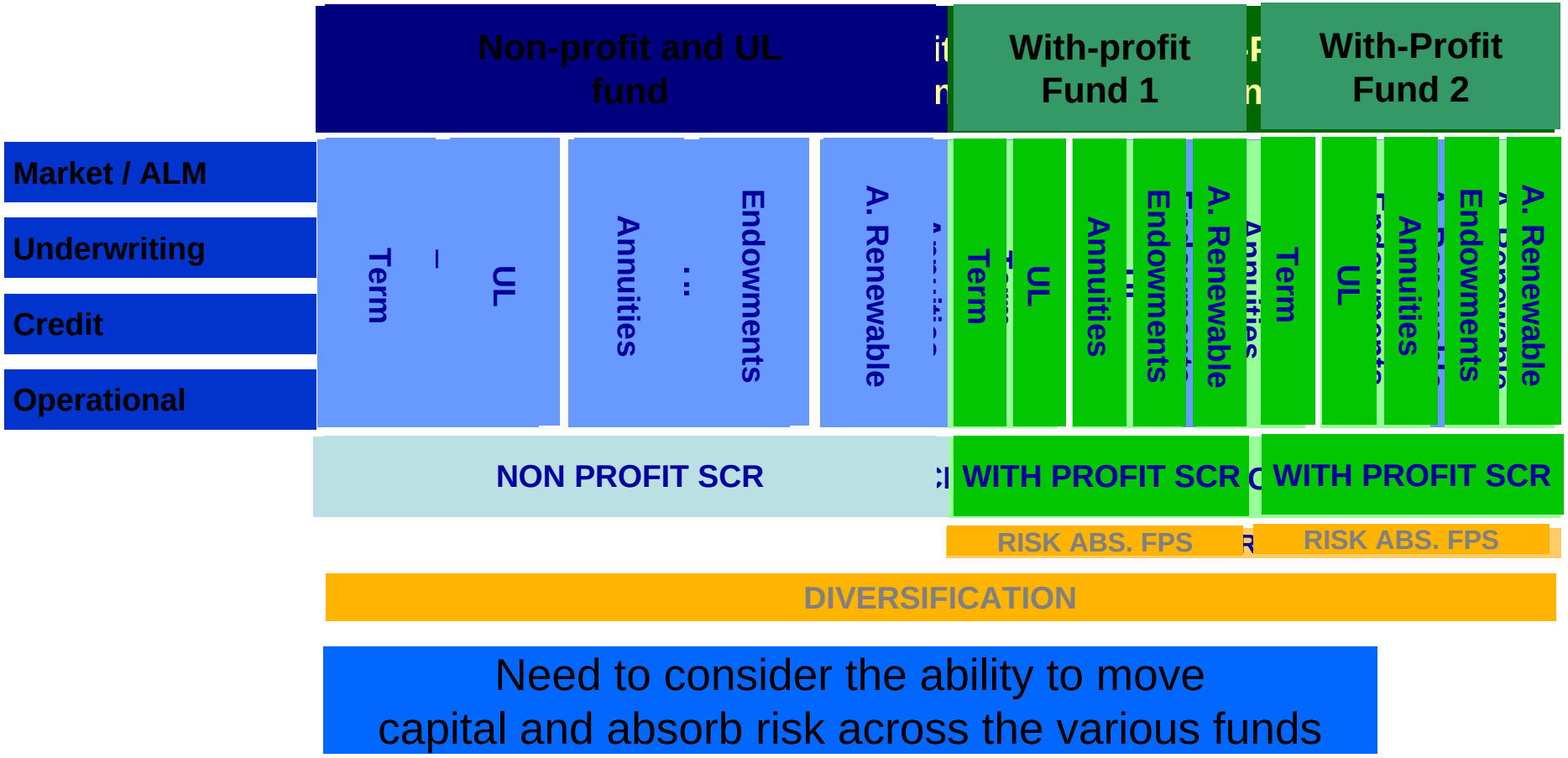
- Scenarios / Factors and the possibility of partial models
- Market stress as applied to the free assets and Unit linked business
- How to calculate the ”K factor” ?

Structure of the SCR



In many cases both factor and scenario approaches are outlined but placeholders are generally factor approach

Fund structure for UK life companies can be complex



Need to consider the ability to move capital and absorb risk across the various funds

Factor and scenario approaches

Factor Approach

- A model is factor based if the risk capital calculation uses a formula which applies fixed factors or ratios to pre-defined size drivers which act as a proxy to risk exposure

Scenario Approach

- Company specific risk profile is taken into account as the impact of the scenario is measured on the company's own balance sheet

- Why the debate?

Market Risk – Factors and Scenario

	Factor	Scenario
Equity Risk	-40% * Non linked Equities	Change in NAV following 40% equity shock
Property Risk	-20% * Property	Change in NAV following 20% property shock
Interest Rate Risk	Bucket approach up and down	Change in NAV for up and down scenarios
Currency Risk	0.25 * net foreign exchange position	Change in NAV following 25% foreign exchange shock

	Equity	Property	Interest Rate	Currency
Equity	1			
Property	1	1		
Interest Rate	0.75	0.75	1	
Currency	0.25	0.25	0.25	1

CORRELATIONS

Market risk - issues arising

- Stressing the free assets
  - Factors and stress tests are applied to all free assets
  - Very different from ICA, RCM and Resilience test (although consistent with ECR)
  - Tends to overstate capital requirements particularly if the company has significant free assets
  - A higher SCR may result in supervisory action earlier than necessary
- Treatment of unit linked business
  - Market-consistent liability takes credit for future charges
  - Equity factors exclude the unit linked business
  - Tend to understate capital requirements for unit linked companies

Credit Risk – Factor approach

SCR Credit Risk = MV of Exposure * Duration * Factor

Rating	CEIOPS rating bucket	Factor
AAA	I – Extremely Strong	0.008%
AA	II – Very Strong	0.056%
A	III - Strong	0.66%
BBB	IV - Adequate	1.312%
BB	V - Speculative	2.032%
B	VI – Very speculative	4.446%
CCC or lower	VII – Extremely speculative	6.95%
Unrated	VIII - Unrated	1.6%

Life underwriting risk – Factor approach

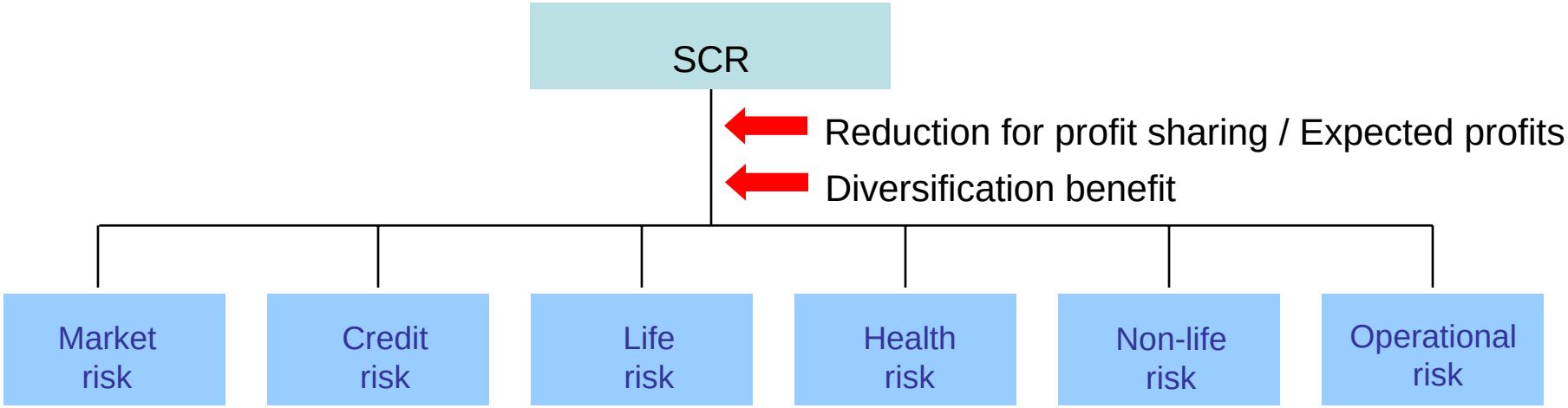
	Volatility	Trend	Catastrophe
Mortality	✓	✓	✓
Longevity	✓	✓	✗
Morbidity	✓	✓	✓
Disability	✓	✓	✓

- Lapse risk
  - .005 * technical provisions + .1 * clawback claims
- Expense Risk
  - 0.1 * fixed expenses
- Aggregation
  - Individual underwriting components are combined using a correlation matrix

Operational Risk

- Operational risk component = max (A, B) where
  - A = .06 * Life earned premium + .03 * non-life earned premium + .03 * health earned premium
  - B = .006 * Life technical provisions + .03 * non-life technical provisions + .003 * health technical provisions
  - Where factors are reduced to one tenth for linked business
- Problem areas include large one off premiums

Combining the individual components



	Market	Credit	Life	Non Life	Health	Op
Market	1					
Credit	MH	1				
Life	ML	ML	1			
Health	ML	ML	ML	1		
Non Life	ML	M	L	L	1	
Operational	M	ML	ML	ML	M	1

- Correlation Matrix
- Fully independent
- Fully correlated

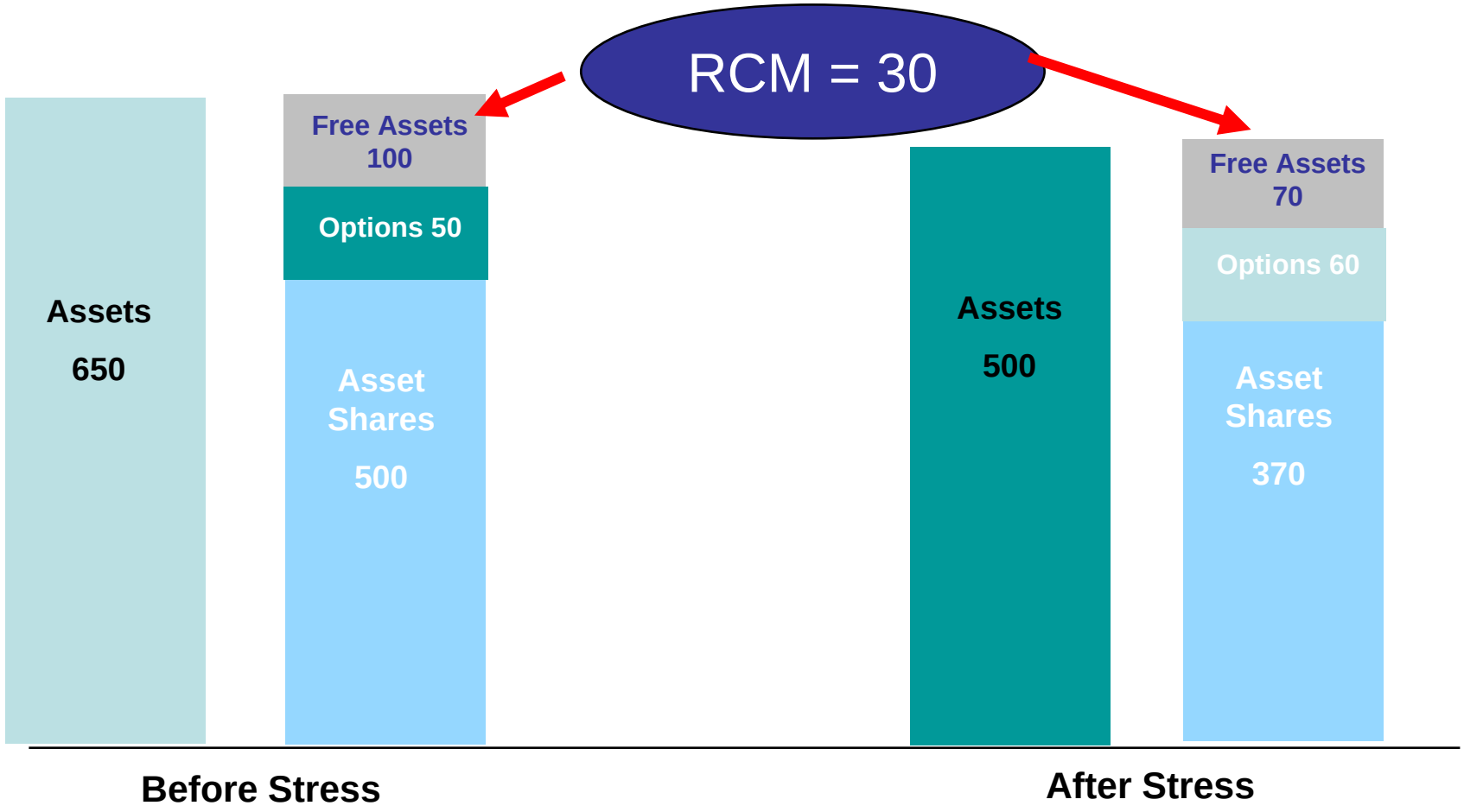
Risk absorbing elements…

SCR = Basic SCR – Reduction for profit sharing
– Profit/loss on next year's non life business

Reduction for profit sharing = K x provision relating to future discretionary benefits

Expected profit/loss from next year's non life business comprises profit/loss on premiums and surplus/deficit on run-off result

Realistic Balance Sheets and stress tests



Realistic Balance Sheet – Alternative presentation

Realistic Balance Sheet – Alternative presentation

	Before Stress	After Stress	Change
Assets	650	500	(150)
Guaranteed liabilities	300	320	20
Future profit sharing	250	110	(140)
Free assets	100	70	(30)

In this scenario K
= 140 / 250 = 56%

How to calculate k in the absence of agreed scenarios?

QIS 2 - Structure

TECHNICAL SPECIFICATIONS

VALUATION ASSUMPTIONS	ELIGIBLE ELEMENTS OF CAPITAL	SOLVENCY CAPITAL REQUIREMENT	MINIMUM CAPITAL REQUIREMENT

DESCRIPTION

- Transitional MCR based on a formula based on the Solvency I requirements is used to calculate the MCR:
  - A factor of 0.5 is applied to the result
- Post transitional MCR based on a simplification of the SCR standard formula using lower factors (around 50% of the SCR calculation for life)

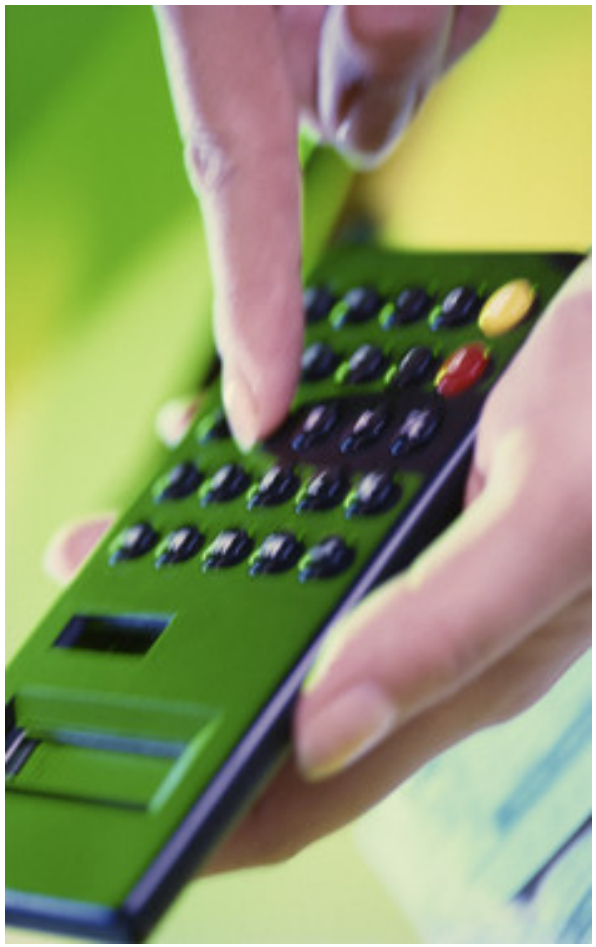
ISSUES ARISING

- Does the formula meet the MCR requirements for
  - Simple
  - Robust
  - Objective
- Treatment of “K factor” in the MCR
- In some cases, the MCR exceeds the SCR so ladder of intervention is inverted

QIS 2 – A step in the right direction ?

	Solvency I	QIS 2 specification	Risk based economic approach
Assets	Book or market values	Market value	Market value
Liabilities	Prudent	Percentile/ COC	Market-consistent value
Eligible elements	Partial	Partial	Based on ability to absorb risk
Risk analysis	Basic	Comprehensive	Comprehensive
Diversification	Not addressed	Various options	Fully recognised
Risk mitigation	Partial	Recognised	Fully recognised
Calibration	Artificial	Further work required	Fully recognised
Group issues	Not addressed	Not addressed	Economic basis

Concern on the calibration…



- How to set k factor in absence of an agreed stress scenario?
- Relationship between factors and scenarios
- There is currently no justification or analysis behind the diversification assumptions provided
  - Perfect correlation between equity and property risk
  - High correlation between interest rate and equity risk
- Relationship between MCR and SCR unsatisfactory
- Allowance for operational risk unsatisfactory

QIS 2: What happens next?

- FSA to assimilate results from UK companies on QIS 2 and develop a country level report
- CEIOPS anticipates releasing a Consultation Paper on Design and Structure of the standard approach by late October / early November
- QIS 3 is planned for April to June 2007 which would pick up on issues identified within QIS 2 as well as Group Issues and eligible elements of capital

Conclusions

Solvency II regime could differ from current UK approach

Solvency II regime will likely be fully operative by 2010
but many key decisions will be taken in the next 12 months

QIS: Opportunity for individual companies to affect outcome
and provide feedback to CEIOPS

Solvency II is a negotiation