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making financial sense of the future

Solvency II

A look at the current proposals and impact on health insurance

16 May 2008

Clayton Balkind, KPMG

Solvency II - Agenda

- Background to Solvency II
- Issues arising from QIS3
- QIS4 developments
- Internal Models
- Modelling results – a numerical example
- Key messages



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Background to Solvency II

Objectives of Solvency II

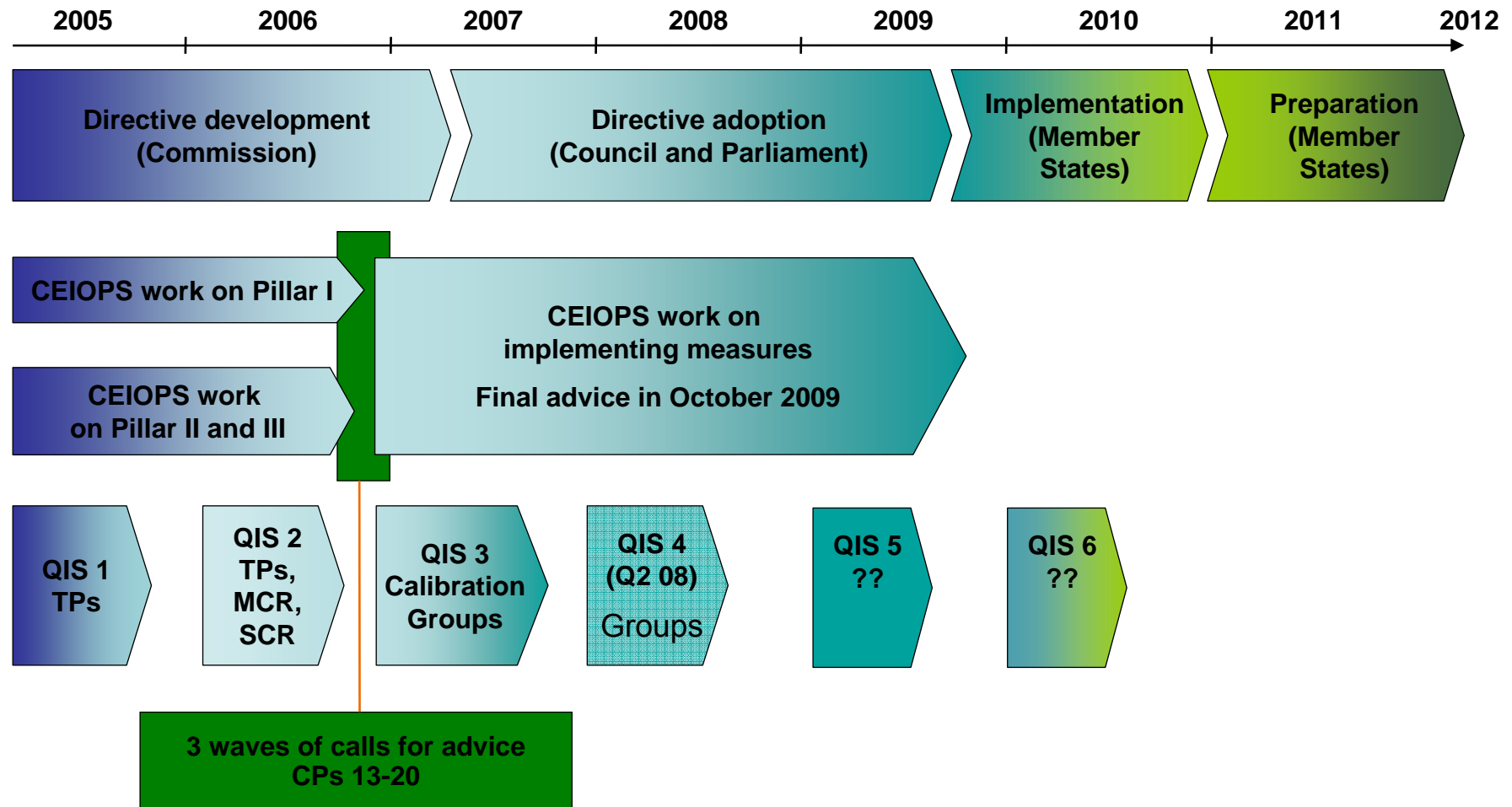
Consultation Paper 7 sets out the following objectives for Solvency II:

The new system should:

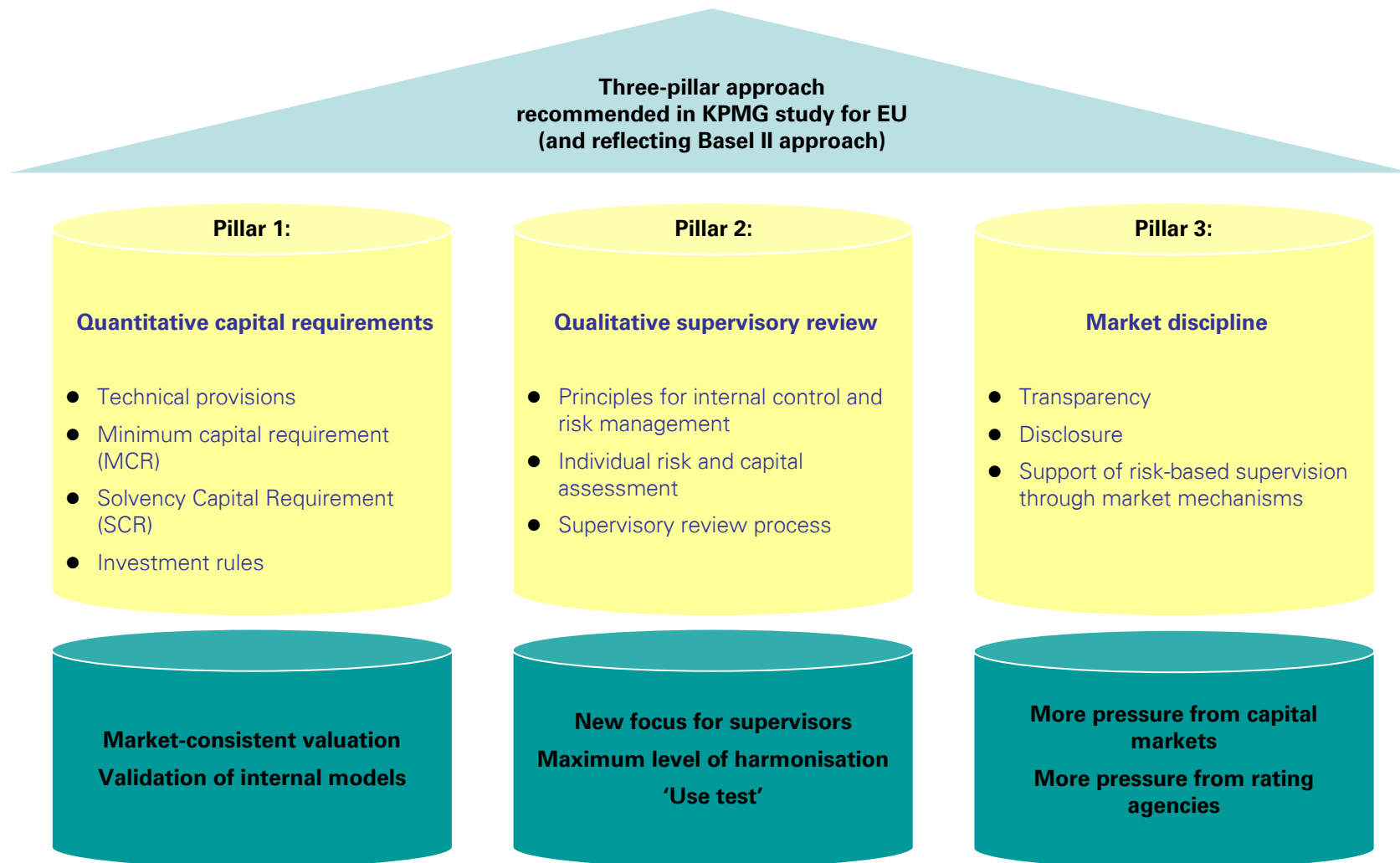
- Assess overall solvency
- Be based on a three pillar structure, adapted to insurance
- Be built on a more risk sensitive approach, with incentives for proper risk management
- Increase harmonisation of quantitative and qualitative supervisory methods
- See more efficient and effective supervision of insurance groups and financial conglomerates
- Employs Lamfalussy or comitology techniques to adopt / adapt legislation efficiently
- Ensure consistency between financial sectors
- Be developed in parallel with international developments, and in particular be compatible with the estimated outcome of the international accounting standards board (IASB) work.



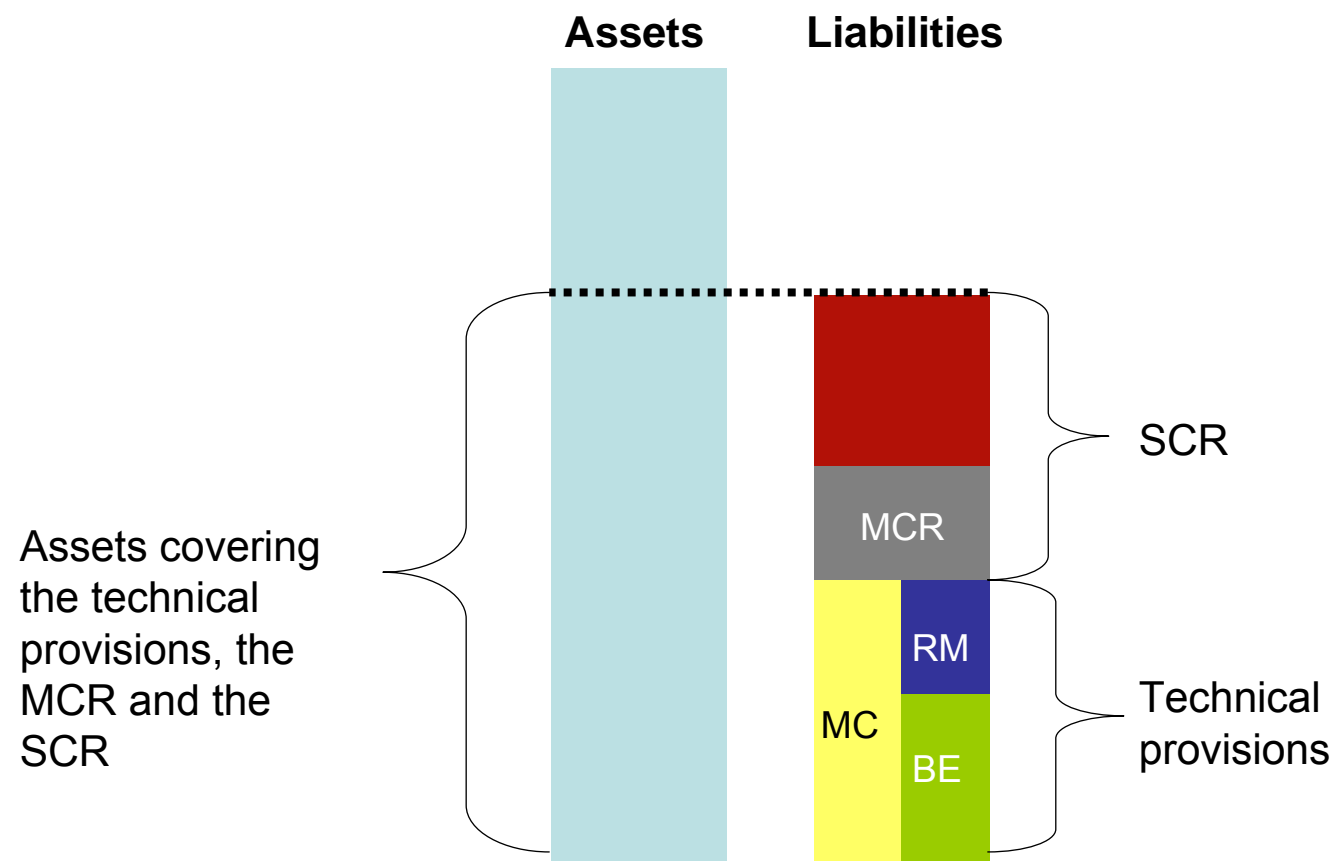
Solvency II regulatory timeline



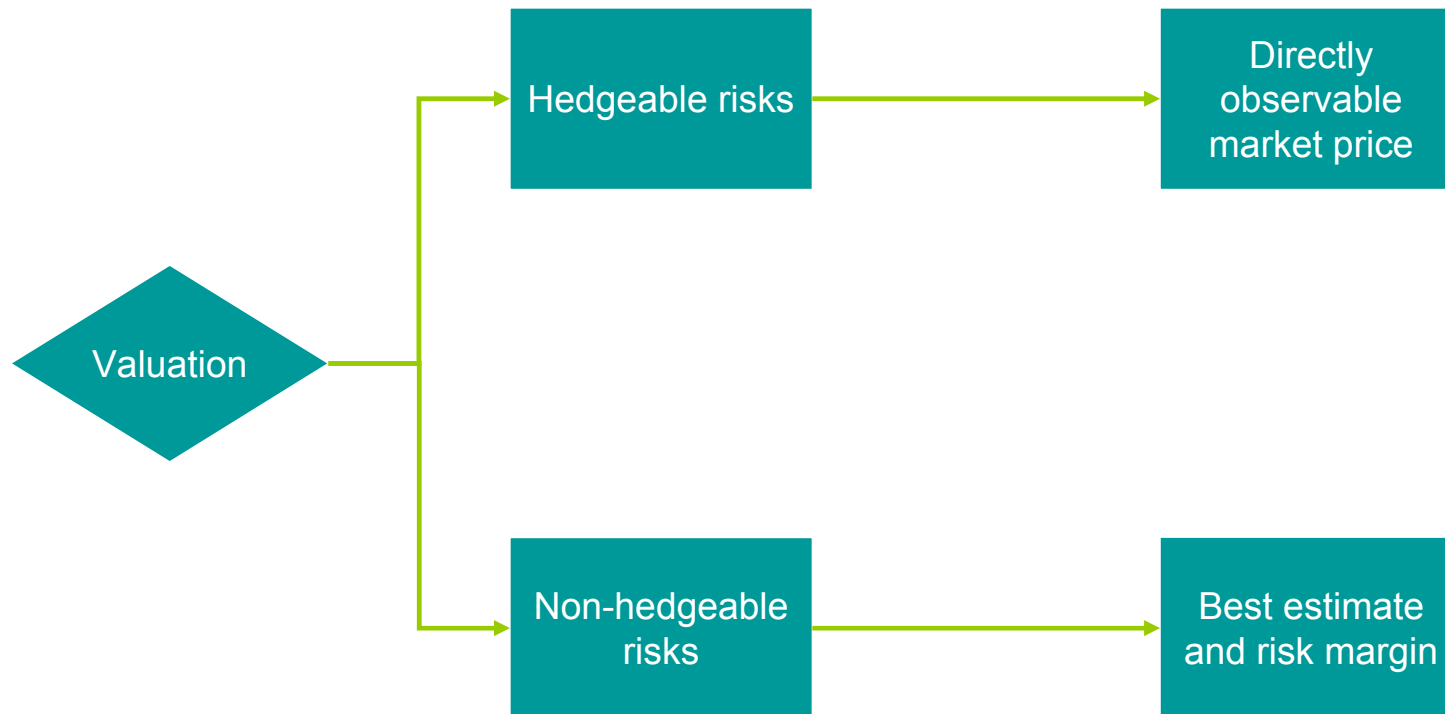
Solvency II – Three-Pillar Approach



The Building Blocks

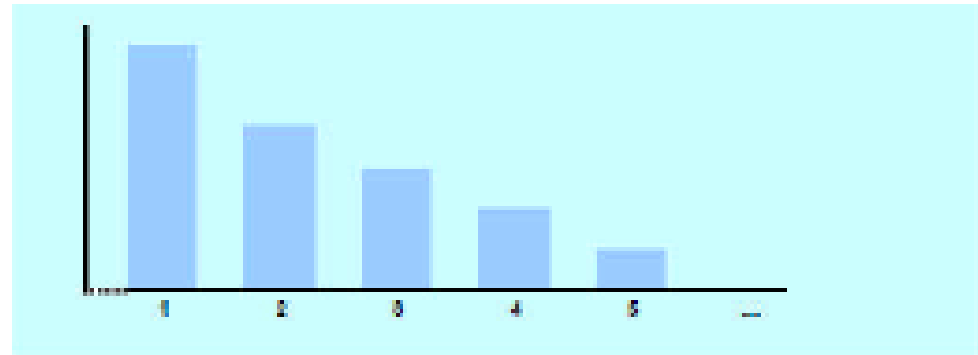


Technical Provisions – Market Consistent



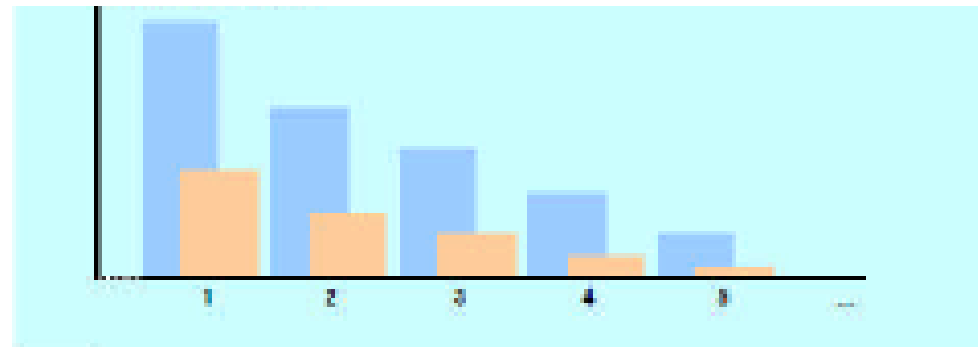
Risk Margin – the Cost of Capital Approach

(1) Project the SCR for non-hedgeable risks

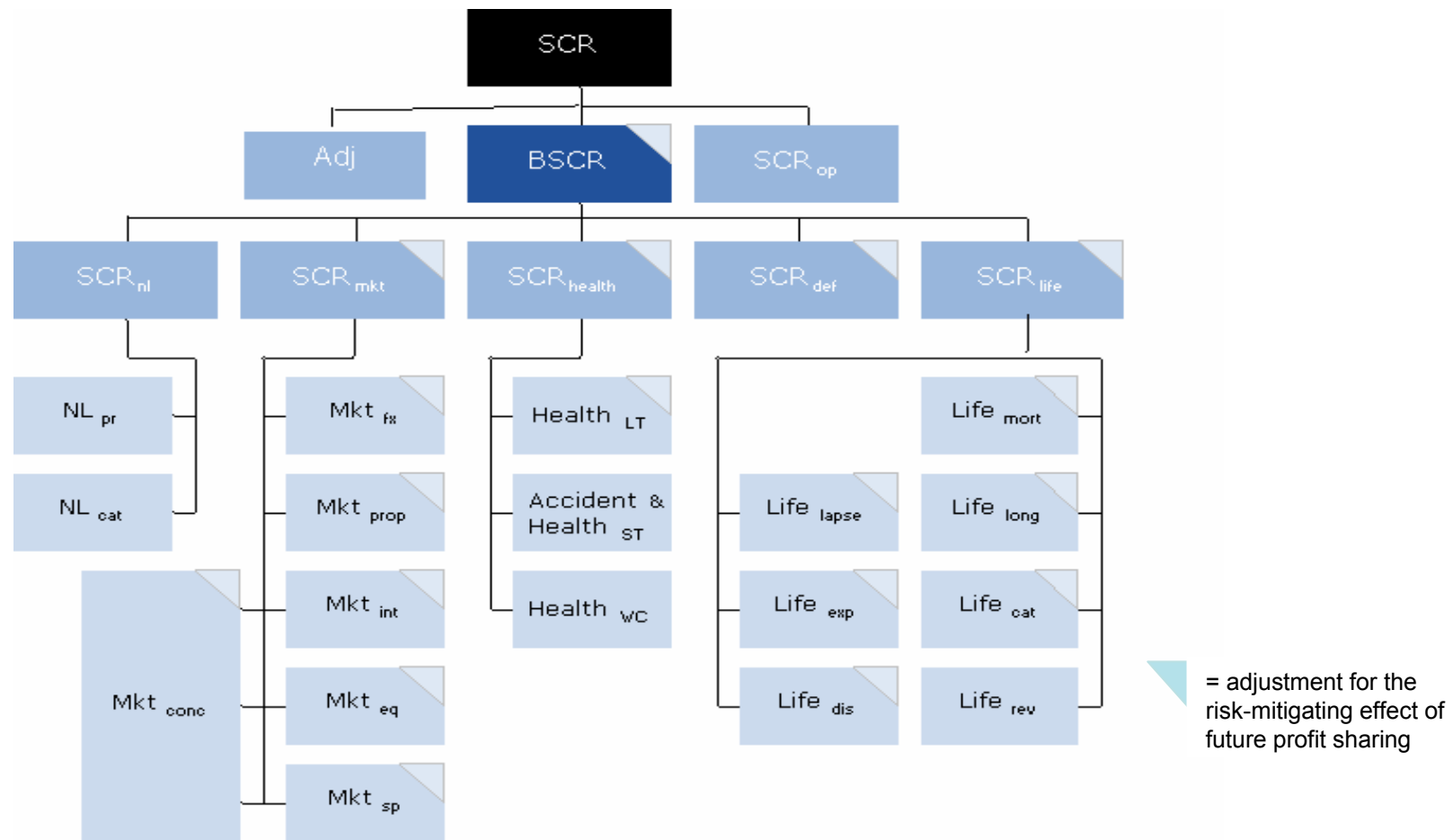


(2) Risk margin
 $= \sum (\text{CoC factor}) \times \text{SCR}_i \times v$

CoC= 6%



SCR: The Standard Formula





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Issues arising from QIS3

Key findings:

- Good levels of UK involvement
- Generally lower reported solvency ratios
- Difficulties with MCR
- Difficulties with SCR
- Confusion over the calculation of the risk margin



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QIS4 developments

Developments in QIS4

- The MCR calculation and design
 - Review of stress tests applied
 - Developments of health care module
 - Investigating the impact on insurance groups' balance sheets
 - Comparability and calibration of the standard formulae and internal models
-

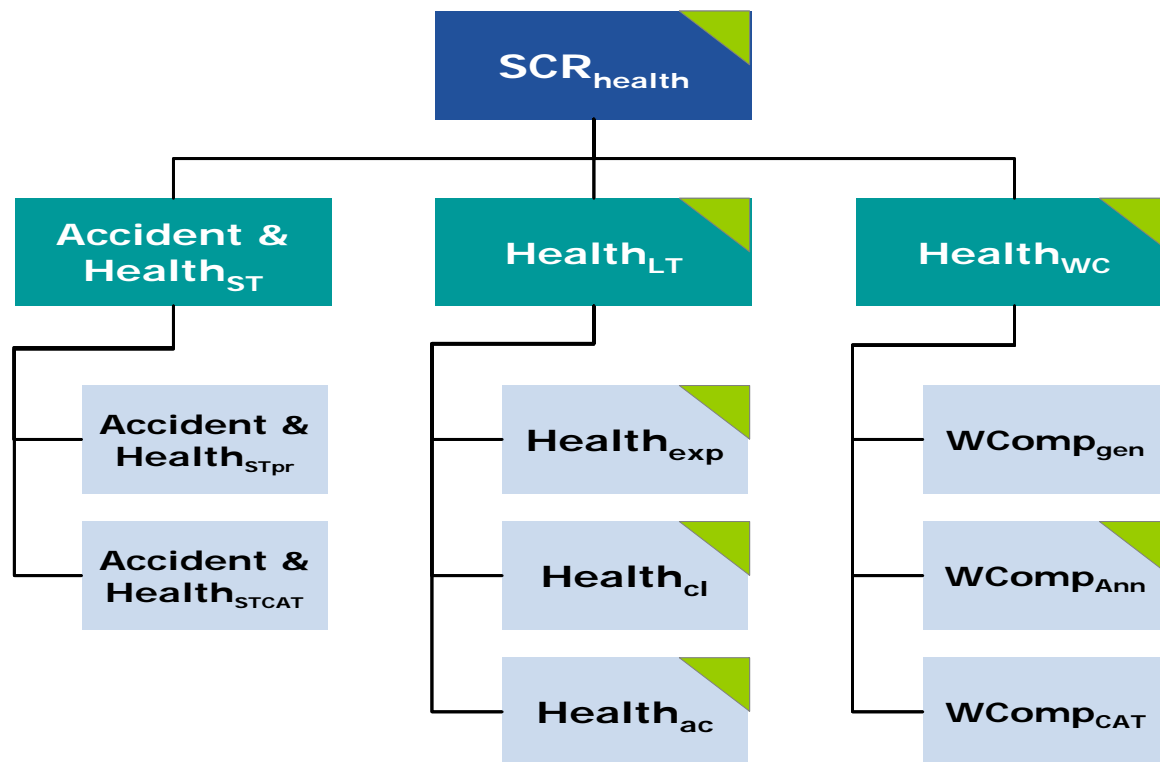
Minimum Capital Requirement

- $MCR < SCR$
- 2 approaches tested in QIS 3:
 - Modular approach - underwriting risk + market risk @ 90% VaR
 - Compact approach - percentage of the SCR
- QIS 4 testing new 'linear approach' based on percentage of technical provisions and capital at risk.

QIS 4 tests for the life risk modules: SCR_{life}

SCR _{life}							
Risk	Mortality	Longevity	Disability	Lapse	Expense	Catastrophe	Revision
Calculation	10% increase in mortality rates	25% decrease in mortality rates	35% increase in disability rates for next year; 25% in subsequent years	The maximum of a permanent 50% fall, a permanent 50% increase or 30% of the surrender strain.	Higher by 10%. Inflation higher by 1%. Loadings can recover expenses (up to 75%) from year 2	Mortality and disability up 1.5‰ over 1 year	3% increase in annuity

The healthcare capital module



 = Adjustment for the risk-mitigating effect of future profit sharing



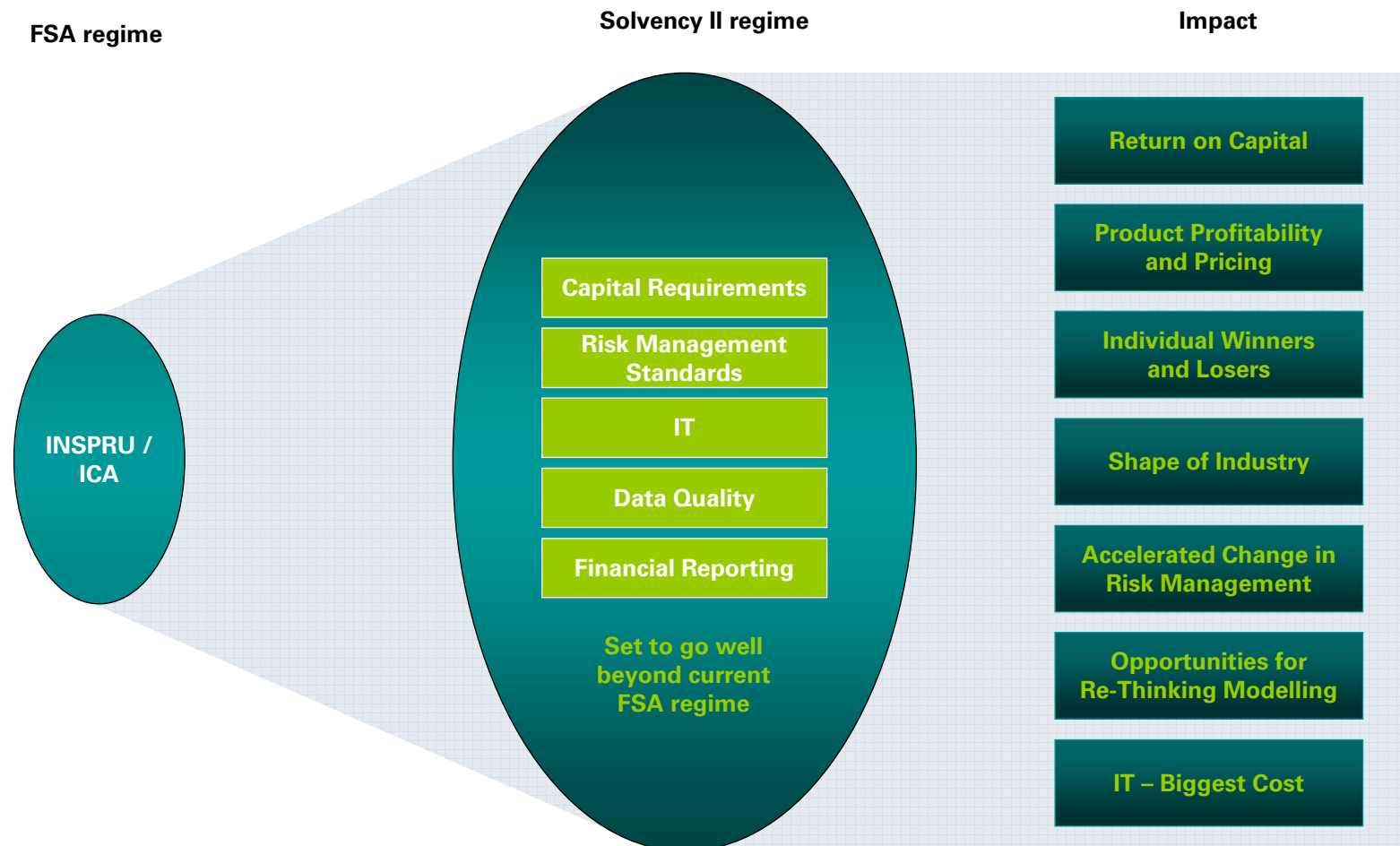
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Internal Models

ICAS to Solvency II - Considerations

Solvency II overview - The potential impact of Solvency II



Internal Models

- Article 110 of the Framework Directive allows companies to calculate their SCR using an internal model “as approved by the supervisory authorities.”
- This can be a full or partial model.
- However the FSA has indicated it does not believe any existing ICAs are good enough to be used as internal models.

Reasons for Developing an Internal Model

- The standardised approach will most likely be calibrated conservatively suggesting that internal models will produce lower capital requirements.
- The improved risk modelling and additional insights provided by internal models should give those firms which use them a competitive advantage.
- An internal model should be an important part of a company's Enterprise Risk Management (ERM) framework.

Model Validation

- The Framework Directive sets out the high level principles for model validation:
 - Use test (article 117)
 - Statistical quality standards (article 118)
 - Calibration standards (article 119)
 - Profit and loss attribution (article 120)
 - Validation standards (article 121)
 - Documentation standards (article 122)

Key Requirements of Internal Models:

- Model widely used
- Plays important role in risk management and decision-making
- Sound actuarial and statistical techniques
- Data accurate, complete and appropriate
- Reflective of the business and covers all material risks
- Analysis of causes and sources of profits and losses
- Demonstrate how the categorisation of risk explains the causes
- Regular cycle of model validation
- Documentation
- No reliance on external model providers

Validation Principles

- The Committee of European Banking Supervisors (CEBS) published the GL10 which set out the six principles to be applied to model validation in the context of credit risk models and Basel II. It is expected that a similar framework will be developed under Solvency II for insurance and other risks.

Principle 1	Validation is fundamentally about assessing the predictive ability of an institution's risk estimates.
Principle 2	The institutions itself has primary responsibility for validation.
Principle 3	Validation is an iterative process.
Principle 4	There is no single validation method.
Principle 5	Validation should encompass both quantitative and qualitative elements.
Principle 6	Validation processes and outcomes should be subject to independent review.

Embedding Internal Models:

- Used in pricing – no proxies
- Used in setting economic capital
- Staff understanding
- Board understanding/training
- Formal, detailed reconciliation of results
- External review of model and processes
- Documentation
- Processes in place to keep models up to date

“State of Play” of current models

CURRENT MODELS	SOLVENCY II MODELS
<ul style="list-style-type: none"> • Different models used for <ul style="list-style-type: none"> - Pricing, Pillar 1, Pillar 2, Economic Capital, Management Information - In different business units • Predefined risk measures for some risks • Only key factors affecting risk modelled • Analysis of Surplus on key lines <ul style="list-style-type: none"> - Large unexplained items not uncommon • Documentation of key processes of model • Reliance on external providers, e.g. ESGs, stochastic models 	<ul style="list-style-type: none"> • One model (or at least models that are consistent) used throughout the business to run the company! • Ability to look at various risk measures and levels of confidence • Detailed granular assessment of risk • Review causes of profit and loss for each major business unit and demonstrate how categorisation of risk explains causes of profit and loss • Documentation of model covering theory, design, operational, compliance and shortcomings of model • No black boxes

A Practical Compromise?



- Improvements are required
 - Same model used in pricing, determining and allocating capital
 - More granular assessment of risk
 - All material risks captured
 - Model kept up to date in all areas
 - Better governance and documentation
- Benefits should outweigh costs!

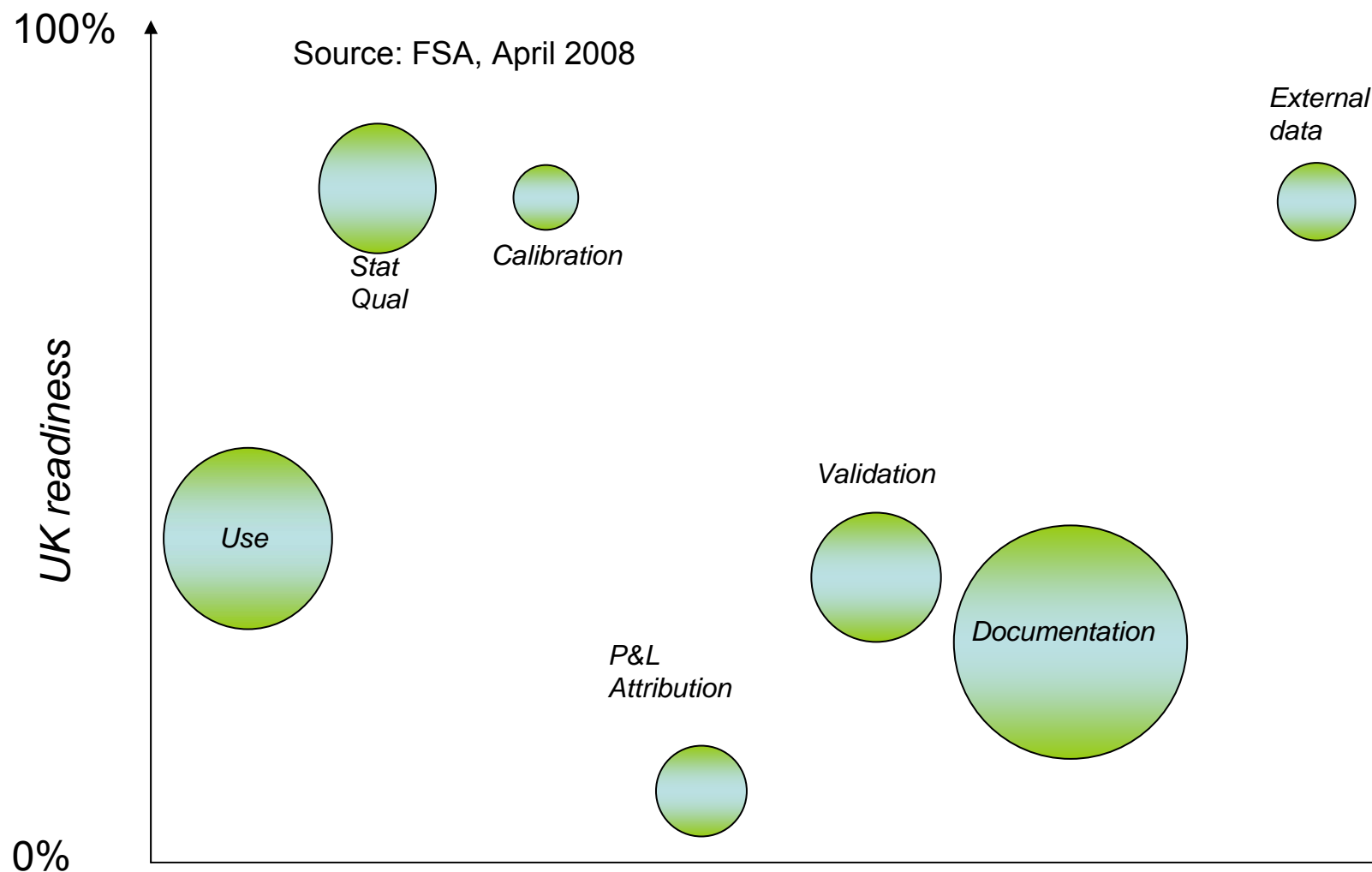
Requirements of Internal Models:

- Internal model does not need to be a fully stochastic model
- Should cover all risks to which a capital value can be assigned
- Complex models may be run infrequently, updating parts of it more frequently where necessary
- Detailed disclosure requirements for each parameter within the model
 - Distribution, variability
 - Underlying data, calibration
 - Appropriateness and fit of model

Requirements of Internal Models (2):

- Alignment of pricing and capital models but not granularity
- Emphasis on proportionality
- Back-testing
 - Rework using historic experience and compare to actual
 - Level of granularity explains results?
 - Assess whether historic experience within agreed tolerance levels
 - Trends

UK Firms readiness for Internal Models





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Modelling Results – a numerical example

Our Approach

- We constructed four portfolios each consisting of one of the following products: accelerated and standalone critical illness; income protection and private medical expense insurance.

Accelerated CI	Standalone CI	Income protection	Private medical
A portfolio of 25, 25-year term assurances with CI cover sold 1 year apart to lives aged 35	A portfolio of 25, 25-year CI only policies sold 1 year apart to lives aged 35	A portfolio of 30 Income protection policies sold 1 year apart to lives aged 35	A portfolio of 1-year policies sold to individuals and through company schemes
Sum assured: £250,000	Sum assured: £250,000	Income provided: 65% of £65,000	
Annual Premium: £1176	Annual Premium: £1150	Annual Premium: £160	

Our Assumptions

Assumption	Accelerated CI	Standalone CI	Income Protection
Valuation interest rates	Best estimate: - Risk free rates Prudent: - 5.07% pa before year 12, 4.03% after	Best estimate: - Risk free rates Prudent: - 5.07% pa before year 12, 4.03% after	Best estimate: - Risk free rates Prudent: - 4.03% pa
Mortality	Best estimate: - 54% of blended TMN00 / TSF00 table Prudent: - 96% of blended TMN00 / TSF00 table	Best estimate: - 93% of blended CIBT93 table Prudent: - 116% of blended CIBT93 table	No mortality assumptions
Morbidity	Best estimate: - 54% of blended CIBT93 table Prudent: - 96% of blended CIBT93 table	Best estimate: - 64% of blended CIBT93 table Prudent: - 80% of blended CIBT93 table	Best estimate: - 30% (inception) and 42% (termination) of blended CMIR12 table Prudent: - 48% (inception) and 33% (termination) of blended CMIR12 table
Expenses	Best estimate: - £20 per policy Prudent: - £30 per policy	Best estimate: - £20 per policy Prudent: - £30 per policy	Best estimate: - £20 per policy Prudent: - £30 per policy
Inflation	4% (expense)	4% (expense)	4% (expense and benefit)
Commission	5%	5%	5%
Lapses	Best estimate: - 11% p.a. Prudent: - 13% up to year 12 and 9% after	Best estimate: - 11% p.a. Prudent: - 13% up to year 12 and 9% after	Best estimate: - 11% p.a. Prudent: - 5.5%
Asset allocation	Gilts:Corporates: Equities:Cash 40:40:10:10	Gilts:Corporates: Equities:Cash 40:40:10:10	Gilts:Corporates: Equities:Cash 40:40:10:10

- For private medical expenses insurance we assumed a steady portfolio, no reinsurance and backing assets of cash and short term bonds.

Pillar 1 results

£ amount	Accelerated CI	Standalone CI	Income protection	Private medical expense insurance
Case reserves and IBNR				21,434
Outstanding claims				232
UPR				88,744
Mathematical reserves	146,273	86,692	548,563	110,410
Claims amount				34,969
LTICR	24,162	21,958	21,943	
RCR	3,557	2,189	16,762	
Total	173,992	110,839	587,268	145,379

ICA calculation: stress tests

Category	Shock	
Interest Rate	Interest rates up	1.70%
	Interest rates down	-1.43%
Lapses	Percentage decrease	45%
Mortality	Mortality rate up	20%
	Catastrophe shock	4 per mille
Morbidity	Morbidity rate up	35%
Longevity	Mortality rate down	21%
Expenses	Renewal expenses (non- commission)	17.75%
	Renewal expenses annual inflation up	2.41%
Assets	Equity fall	-41%
	Interest rate up	1.70%
	Interest rate down	-1.43%
	"A" rated credit spread widening	1.20%

ICA calculation: correlation

	Insurance	Market	Credit	Operational
Insurance	1	0.17	0.24	0.31
Market	0.17	1	0.62	0.25
Credit	0.24	0.62	1	0.25
Operational	0.31	0.25	0.25	1

ICA calculation: Accelerated critical illness

Total Liability Breakdown	£ amount
Best estimate liability	68,424
ICA	77,636
Total Liability	146,060

ICA Breakdown	£ amount
Equity Risk	2,190
Interest rate risk	1,440
MR Diversification benefit	-855
Market Risk	3,496
Credit Risk	1,804
Mortality and catastrophe risk	27,786
Morbidity risk	45,829
Lapse risk	34,181
Expense risk	870
IR Diversification benefit	-35,542
Insurance Risk	73,124
Operational risk	8,539
Undiversified capital	86,962
Diversification benefit	-9,326
ICA	77,636

ICA calculation: Standalone critical illness

Total Liability Breakdown	£ amount
Best estimate liability	32,157
ICA	62,347
Total Liability	94,504

ICA Breakdown	£ amount
Equity Risk	1,368
Interest rate risk	808
MR Diversification benefit	-454
Market Risk	1,722
Credit Risk	1,033
Mortality and catastrophe risk	0
Morbidity risk	54,853
Lapse risk	22,006
Expense risk	871
IR Diversification benefit	-18,472
Insurance Risk	59,258
Operational risk	6,836
Undiversified capital	68,850
Diversification benefit	-6,503
ICA	62,347

ICA calculation: Income protection

Total Liability Breakdown	£ amount
Best estimate liability	148,824
ICA	127,754
Total Liability	276,578

ICA Breakdown	£ amount
Equity Risk	6,330
Interest rate risk	5,203
MR Diversification benefit	-2,571
Market Risk	8,962
Credit Risk	3,532
“Longevity” risk	62,796
Morbidity risk	56,708
Lapse risk	57,975
Expense risk	1,681
IR Diversification benefit	-60,018
Insurance Risk	119,142
Operational risk	14,009
Undiversified capital	145,646
Diversification benefit	-17,892
ICA	127,754

ICA calculation: Private medical

Total Liability Breakdown	£ amount
Best estimate liability	110,410
ICA	36,553
Total Liability	146,963

ICA Breakdown	£ amount
Market Risk	4,591
Insurance Risk	34,979
Operational risk	3,323
Undiversified capital	42,893
Diversification benefit	-6,340
ICA	36,553

QIS 4 calculation: stress tests

Category	SCR Shock	
Interest Rate	Interest rates up	Prescribed
	Interest rates down	Prescribed
Lapses	Percentage change	Max (50% fall or 50% rise)
Mortality	Mortality rate up	10%
	Catastrophe shock	0.15% up over 1 year
Morbidity	Morbidity rate up -1 year - all subsequent years	35% 25%
	Catastrophe shock	0.15% up over 1 year
Longevity	Mortality rate down	25%
Expenses	Renewal expenses (non-commission)	10%
	Renewal expenses annual inflation up	1%
Assets	Equity fall	-32%
	Interest rate up	Prescribed
	Interest rate down	Prescribed
	"A" rated spread	1.03% of Sum(MV*dur)

Category	ICA Shock	
Interest Rate	Interest rates up	1.70%
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Lapses	Percentage decrease	45%
Mortality	Mortality rate up	20%
	Catastrophe shock	4 per mille
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Longevity	Mortality rate down	21%
Expenses	Renewal expenses (non-commission)	17.75%
	Renewal expenses annual inflation up	2.41%
Assets	Equity fall	-41%
	Interest rate up	1.70%
	Interest rate down	-1.43%
	"A" rated credit spread widening	1.20%

QIS 4 calculation: correlation

- **SCR**

	Insurance	Market	Credit
Insurance	1		
Market	0.25	1	
Credit	0.25	0.25	1

- **ICA**

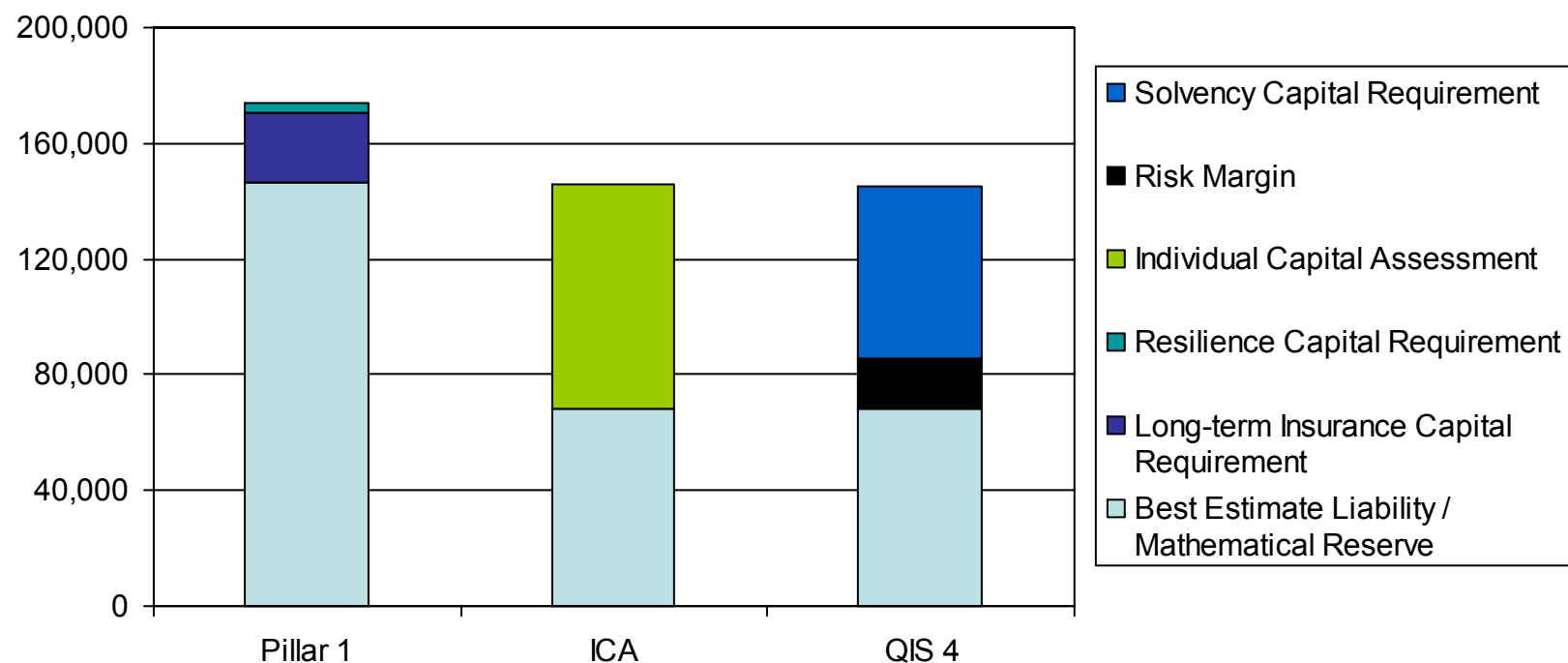
	Insurance	Market	Credit	Operational
Insurance	1			
Market	0.17	1		
Credit	0.24	0.62	1	
Operational	0.31	0.25	0.25	1

QIS 4 calculation: Critical illness

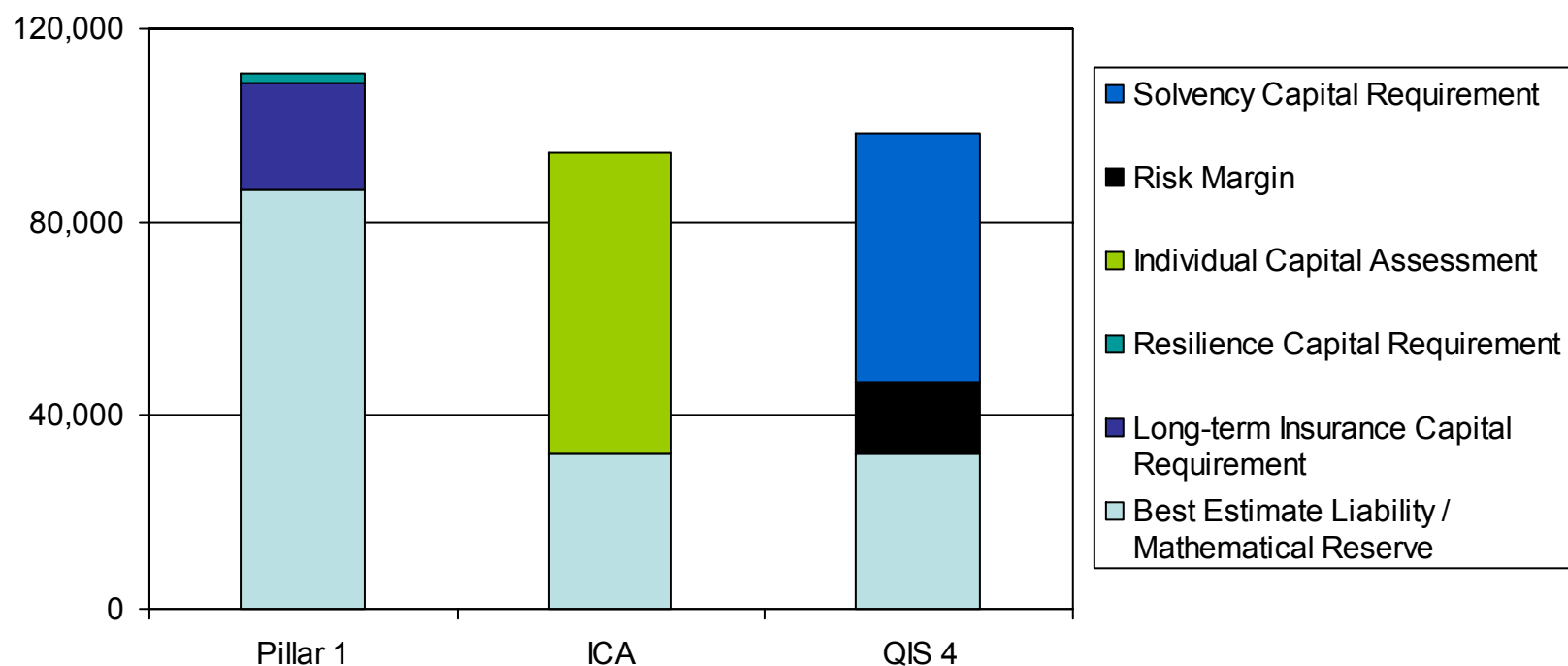
Accelerated CI	£ amount
Best estimate liability	68,424
Risk margin	19,237
MCR	11,943
SCR	59,714
Total = BEL + RM + max(MCR, SCR)	147,375

Standalone CI	£ amount
Best estimate liability	32,157
Risk margin	16,868
MCR	10,281
SCR	51,403
Total = BEL + RM + max(MCR, SCR)	100,429

QIS 4 calculation: Accelerated CI results



QIS 4 calculation: Standalone CI results



QIS 4 calculation: The SCR calculation – Accelerated CI

SCR

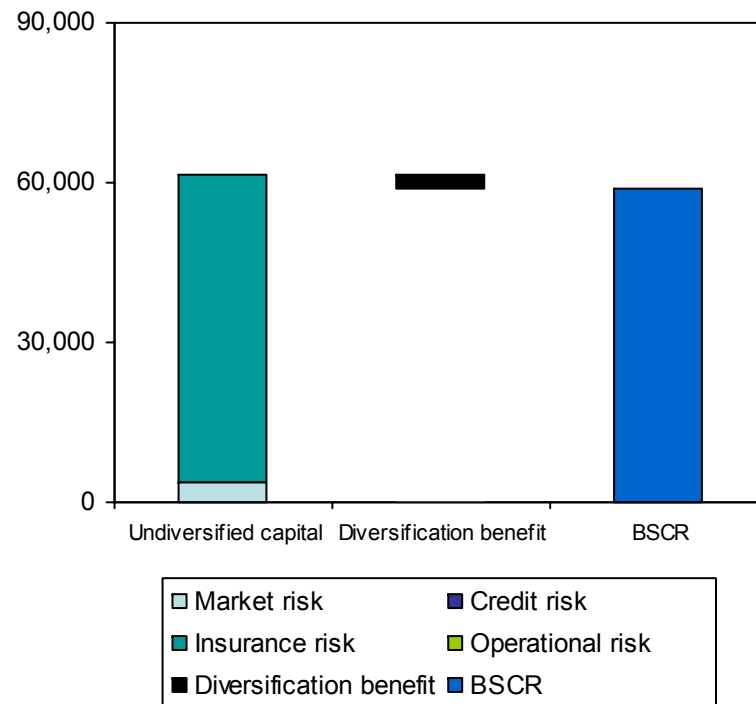
Item	£ amount
Equity	2,262
Interest rate	1,778
Spread	1,602
MR Diversification	-1,889
Market Risk	3,753
Mortality	6,344
Morbidity	35,076
Lapse	39,237
Expense	417
Catastrophe	16,543
IR Diversification	-39,835
Insurance Risk	57,782
Pre diversification	61,535
Diversification benefit	-2,703
BSCR	58,832
Operational Risk	882
SCR	59,714

ICA

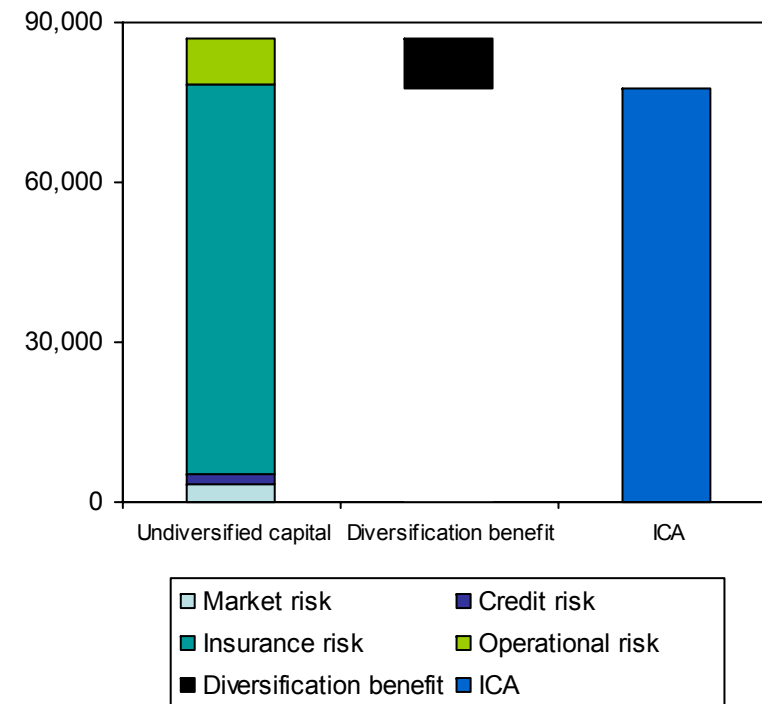
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Insurance Risk	73,124
Operational risk	8,539
Undiversified capital	86,962
Diversification benefit	-9,326
ICA	77,636

QIS 4 calculation: The SCR calculation – Accelerated CI

SCR



ICA



QIS 4 calculation:

The SCR calculation – Standalone CI

SCR

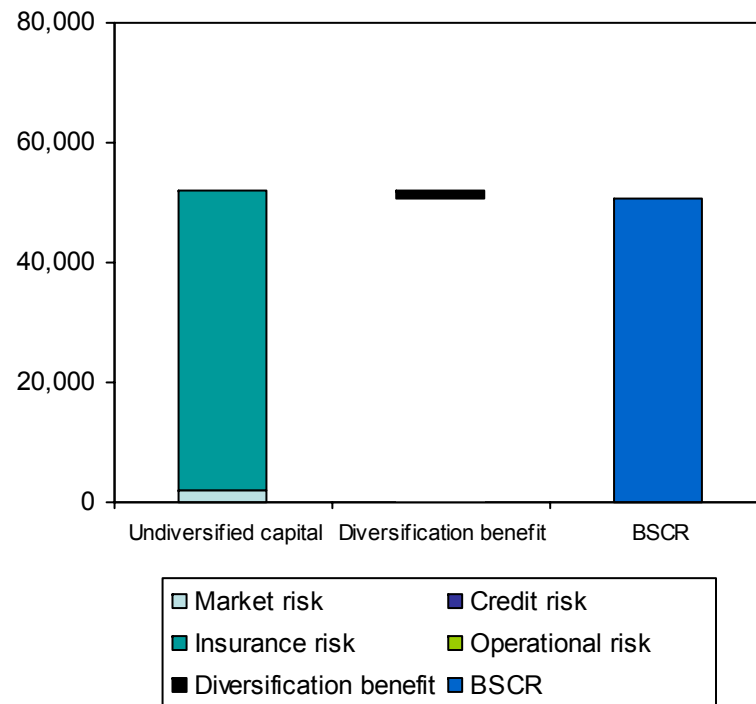
Item	£ amount
Equity	1,063
Interest rate	970
Spread	917
MR Diversification	-989
Market Risk	1,961
Mortality	0
Morbidity	41,996
Lapse	25,321
Expense	417
Catastrophe	8,272
IR Diversification	-25,991
Insurance Risk	50,015
Pre diversification	51,976
Diversification benefit	-1,435
BSCR	50,541
Operational Risk	863
SCR	51,403

ICA

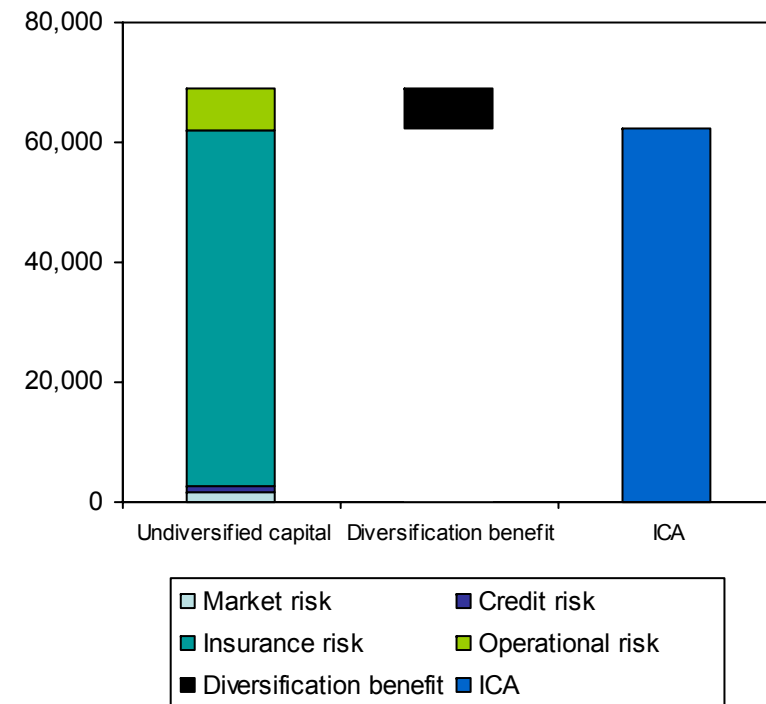
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Equity Risk	1,368
Interest rate risk	808
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Morbidity risk	54,853
Lapse risk	22,006
Expense risk	871
IR Diversification benefit	-18,472
Insurance Risk	59,258
Operational risk	6,836
Undiversified capital	68,850
Diversification benefit	-6,503
ICA	62,347

QIS 4 calculation: The SCR calculation – Standalone CI

SCR



ICA

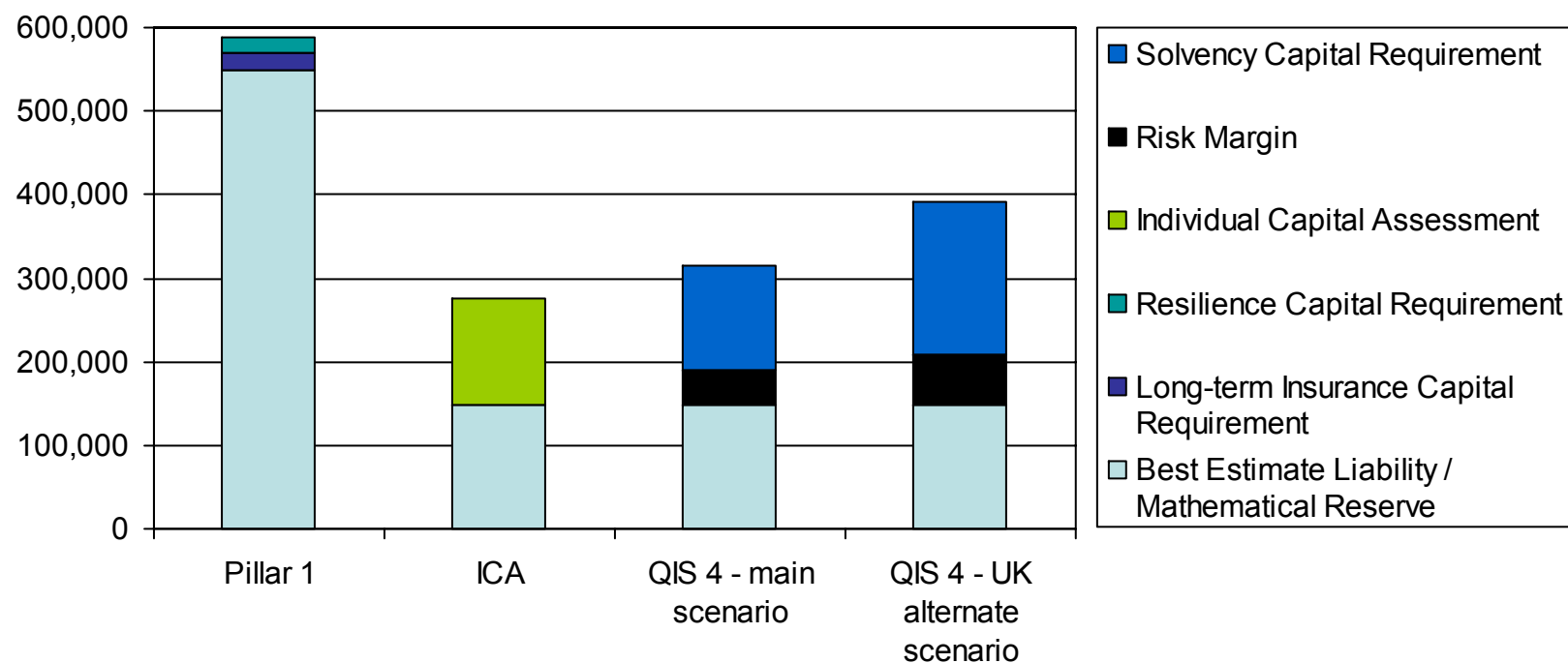


QIS 4 calculation: Income protection results

Main QIS4 proposals	£ amount
Best estimate liability	148,824
Risk margin	40,309
MCR	25,237
SCR	126,185
Total = BEL + RM + max(MCR, SCR)	315,318

Alternative UK scenario	£ amount
Best estimate liability	148,824
Risk margin	58,963
MCR	36,917
SCR	184,583
Total = BEL + RM + max(MCR, SCR)	392,370

QIS 4 calculation: Income protection results



QIS 4 calculation:

The SCR calculation – Income protection

SCR

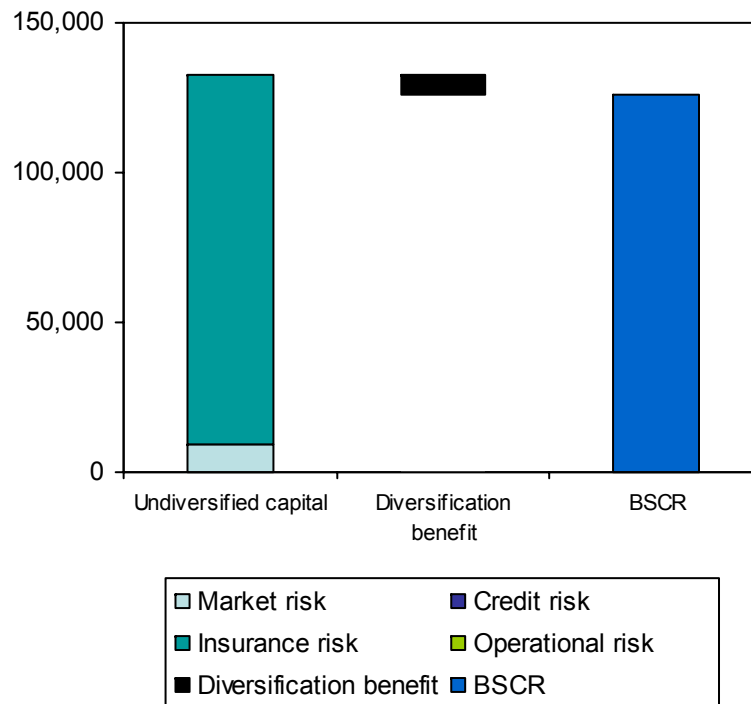
Item	£ amount
Equity	4,920
Interest rate	6,068
Spread	3,138
MR Diversification	-4,740
Market Risk	9,386
Longevity	76,897
Morbidity	43,216
Lapse	66,515
Expense	765
Catastrophe	6,963
IR Diversification	71,293
Insurance Risk	123,063
Pre diversification	132,449
Diversification benefit	-6,710
BSCR	125,739
Operational Risk	446
SCR	126,185

ICA

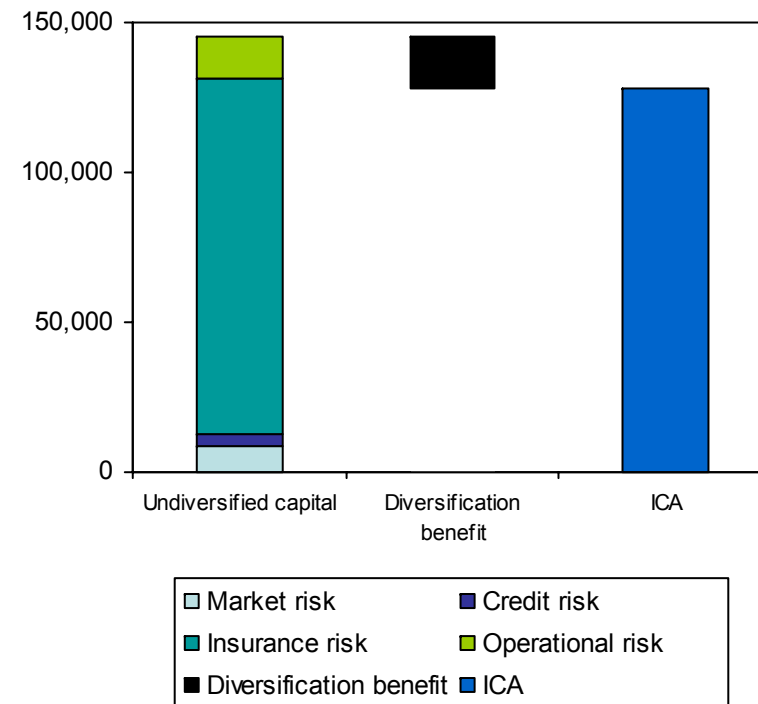
Item	£ amount
Equity Risk	6,330
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“Longevity” risk	62,796
Morbidity risk	56,708
Lapse risk	57,975
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Insurance Risk	119,142
Operational risk	14,009
Undiversified capital	145,646
Diversification benefit	-17,892
ICA	127,754

QIS 4 calculation: The SCR calculation – Income protection

SCR



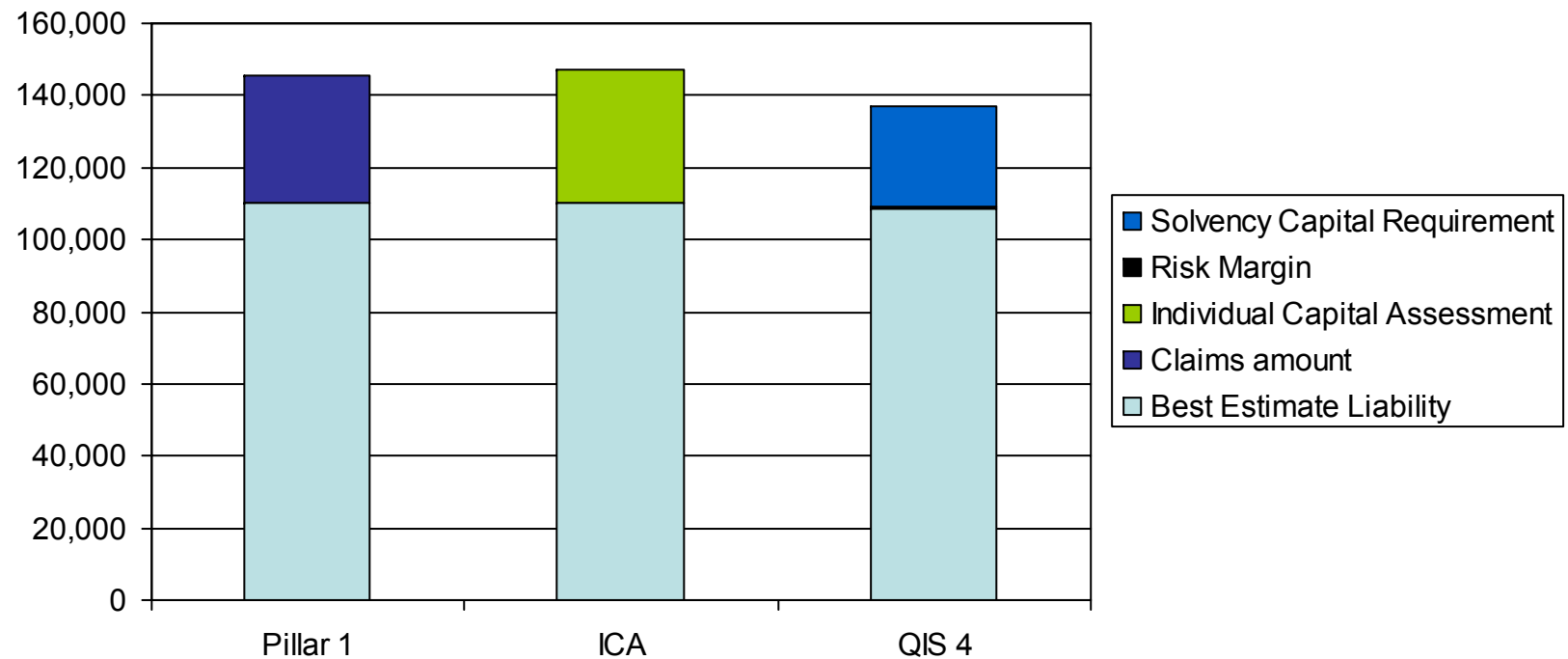
ICA



QIS 4 calculation: Private medical results

Break down of liability	£ amount
Best estimate liability	108,796
Risk margin	320
MCR	7,100
SCR	27,785
Total = BEL + RM + max(MCR, SCR)	136,901

QIS 4 calculation: Private medical results



QIS 4 calculation:

The SCR calculation – Private medical

SCR

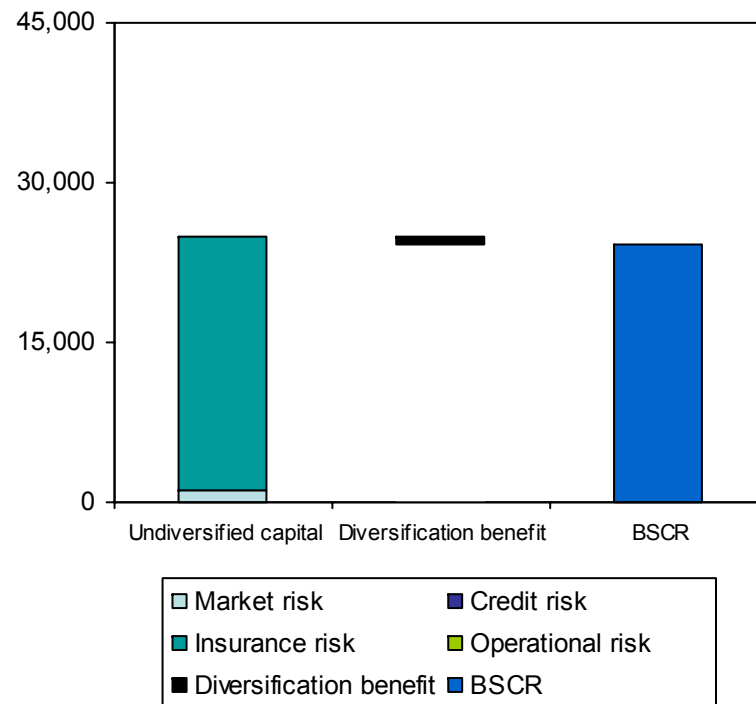
Item	£ amount
Market Risk	1,034
Premium and reserve risk	16,090
Catastrophe	17,749
IR Diversification	9,883
Insurance Risk	23,956
Pre diversification	24,990
Diversification benefit	754
BSCR	24,236
Operational Risk	3,549
SCR	27,785

ICA

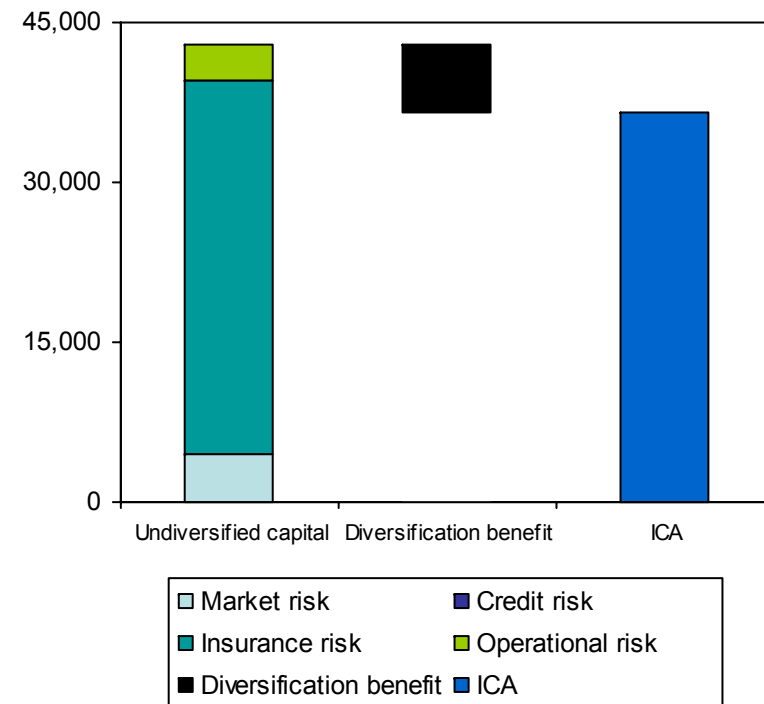
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Operational risk	3,323
Undiversified capital	42,893
Diversification benefit	6,340
ICA	36,553

QIS 4 calculation: The SCR calculation – Private medical

SCR



ICA





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Solvency II – Key Messages

Solvency II – Key messages

- The QIS process is the best way to influence the Solvency II proposals
- The current proposals have significant implications for some types of contracts
- High validation standards are expected for internal models
- Data and embedding requirements => long lead-time for use of internal models

Presenter's contact details

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