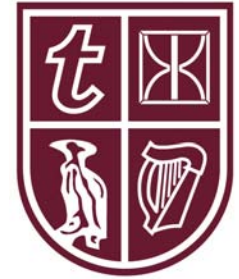


Society of Actuaries in Ireland



**Solvency II -
Technical Provisions**

Alexander Hotel, 5 November 2009

Dick Tulloch and Brian Morrissey

Agenda



slide 2

- The Solvency II Balance Sheet
- Directive requirements
- Consultation Papers
- Issues
- Quantitative Impact Studies
- SAI Solvency II Committee & Further events

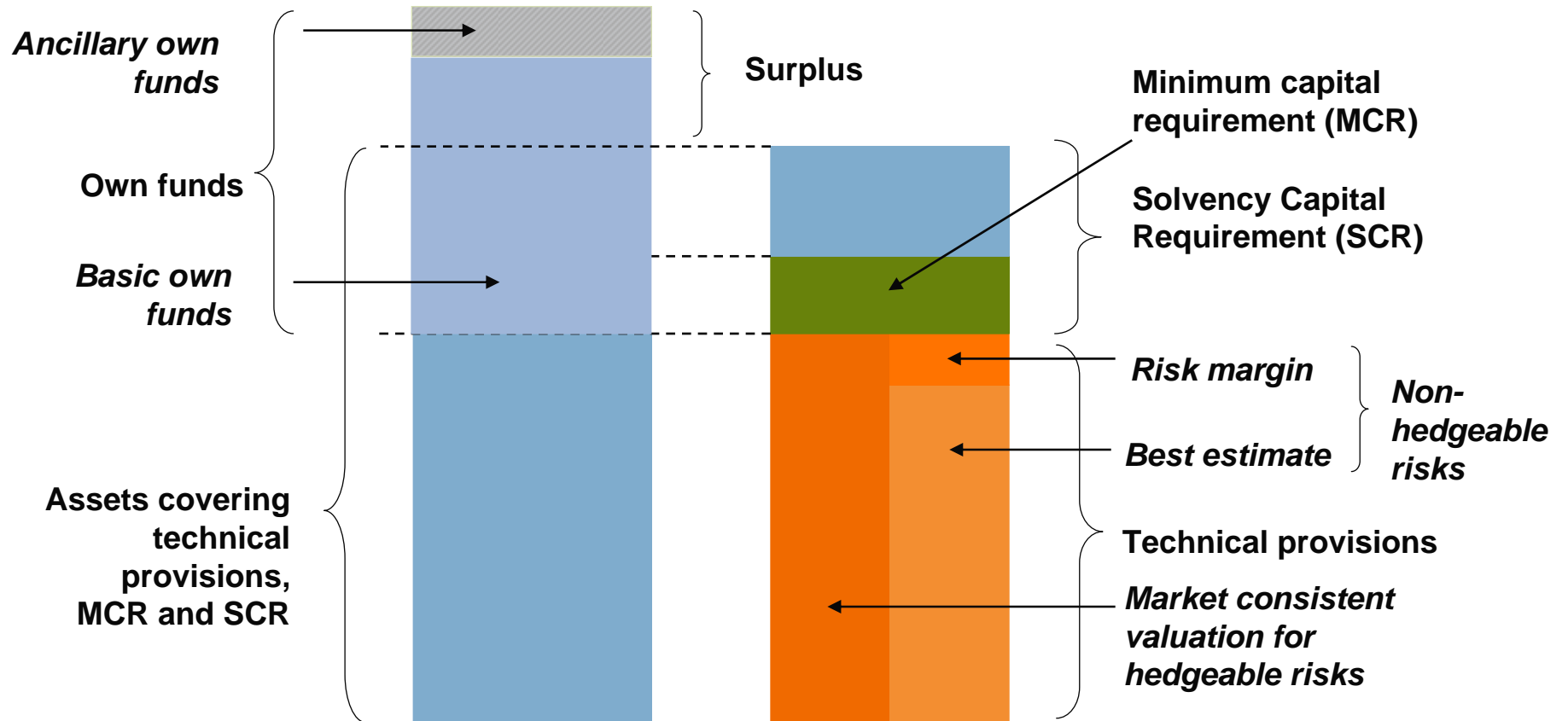
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Overview

Pillar 1 – Building blocks of the new regime



slide 3



Technical Provisions

Directive requirements



slide 4

- Article 47 Actuarial Function

1. Insurance and reinsurance undertakings shall provide for an effective actuarial function to undertake the following:
 - a) to coordinate the calculation of **technical provisions**;
 - b) to ensure the appropriateness of the methodologies and underlying models used as well as the assumptions made in the calculation of **technical provisions**;
 - c) to assess the sufficiency and quality of the data used in the calculation of **technical provisions**;
 - d) to compare best estimates against experience;
 - e) to inform the administrative or management body of the reliability and adequacy of the calculation of **technical provisions**;
 - f) to oversee the calculation of **technical provisions** in the cases set out in Article 81;
 - g) to express an opinion on the overall underwriting policy;
 - h) to express an opinion on the adequacy of reinsurance arrangements;
 - i) to contribute to the effective implementation of the risk management system referred to in Article 43, in particular with respect to the risk modelling underlying the calculation of the capital requirements set out in Chapter VI, Sections 4 and 5 and the assessment referred to in Article 44.
2. The actuarial function shall be carried out by persons who have knowledge of actuarial and financial mathematics, commensurate with the nature, scale and complexity of the risks inherent in the business of the insurance or reinsurance undertaking, and who are able to demonstrate their relevant experience with applicable professional and other standards.

Technical Provisions

Directive requirements



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- **Article 21 Policy conditions and scales of premiums**
 - Member States shall not require the prior approval or systematic notification of general and special policy conditions, of scales of premiums, of the technical bases, used in particular for calculating scales of premiums and **technical provisions**.....
 - However,the home Member State may require systematic notification of the technical bases used for calculating scales of premiums and **technical provisions**. That requirement shall not constitute a prior condition for the authorisation of a life insurance undertaking.
- **Article 29 & 36**
 - Supervisors will undertake a qualitative review and evaluation of **technical provisions**.....
- **Article 44 ORSA**
 - ORSA to include at least.....assessment of compliance with Articles 75 to 85 on **technical provisions**...
- **Article 50 SFCR**
 - A description ... for **technical provisions** ... of the bases and methods used for their valuation and ... differences..... used in the valuation in financial statements



Technical Provisions

Directive requirements

- Chapter IV - Rules relating to the valuation of assets and liabilities, technical provisions, own funds, solvency capital requirement, minimum capital requirement and investment rules
- Article 75
 - Technical provisions valued at the amount for which they could be transferred, or settled, between knowledgeable willing parties in an arm's length transaction. Based on "current exit value"
- Article 76
 - Best estimate: probability-weighted average of future cash flows, discounted using risk-free term structure
 - Risk margin: margin required by a third-party to take over the obligation (Cost of Capital)
 - TP can be valued directly if a market instrument exists that replicates the cash flows under the policy
- Article 77
 - Shall take account of all expenses in servicing insurance and reinsurance obligations claims inflation discretionary payments
- Article 78
 - Need to value financial guarantees and contractual options
- Article 79
 - Segment into homogeneous risk groups (minimum by lob)

Technical Provisions

Directive requirements

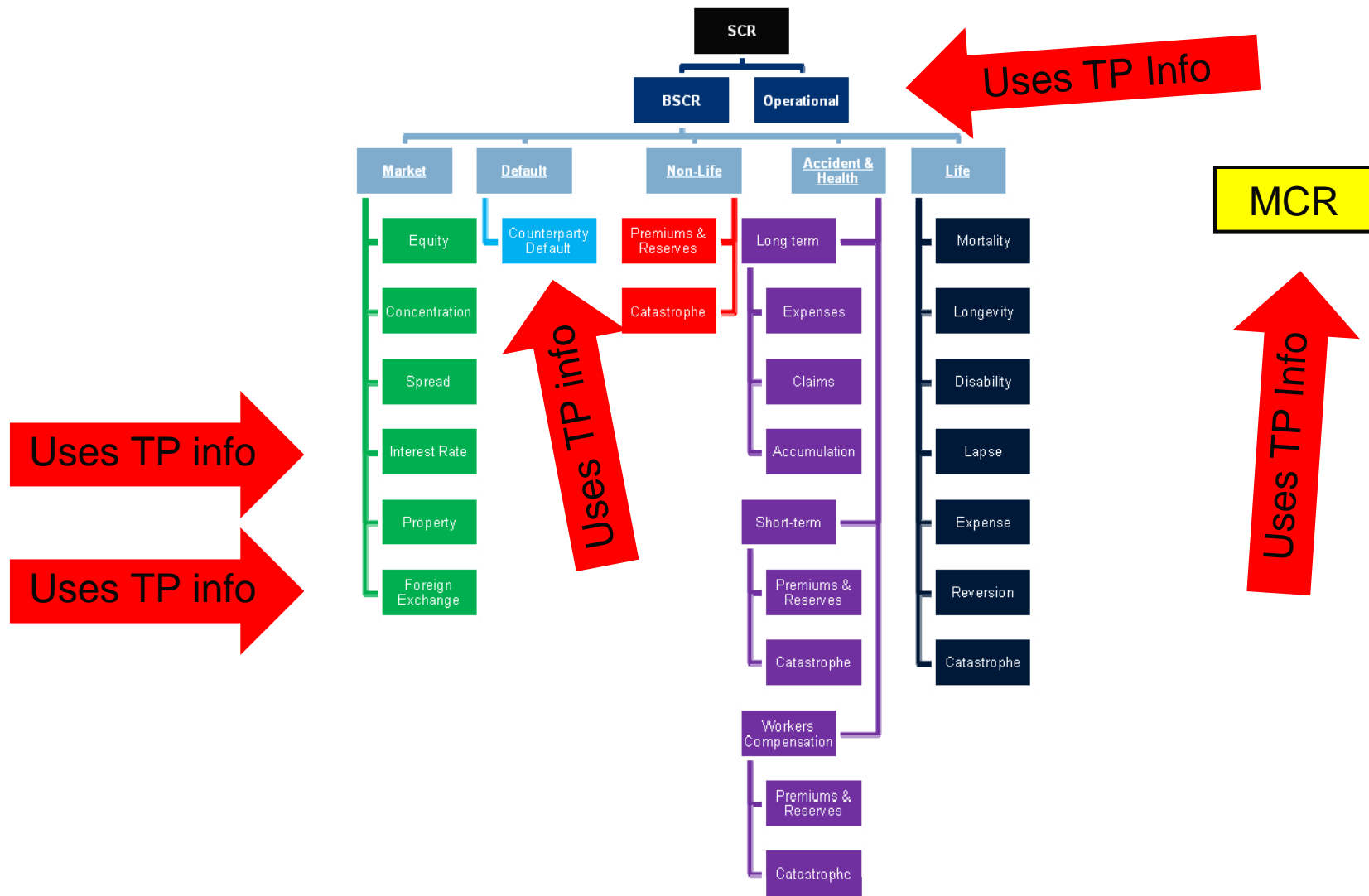


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- **Article 80**
 - Recoverables to be calculated in the same manner as TPs
 - Adjust for probability of expected default
- **Article 81**
 - Data quality insufficient then approximations including case-by-case approaches may be used
 - But, Actuarial Function (Article 47) to oversee use of case-by-case approximations
- **Article 82**
 - Best estimates & assumptions to be regularly compared against experience
 - If systemic deviation occurs adjustments are to be made..
- **Article 83**
 - Upon request shall demonstrate appropriateness, applicability and relevance of methods and adequacy
- **Article 84**
 - Supervisor can require undertaking to increase level of technical provisions
- **Article 85**
 - Directive requirements to be supplemented by Level 2 implementing measures

Overview

Pillar 1 – SCR and impact of Technical Provisions



Solvency II: Level II CEIOPS – implementing measures



Consultation Papers on Level 2 implementing measures (April 2009)

- **Governance**
- **Approval of internal model**
- **SPV**
- **Valuation of assets and other liabilities**
- **Transparency and accountability**
- **Future mitigation techniques**
- **Criteria for supervisory approval of ancillary own funds**
- **Counterparty default risk**
- **Technical provisions**
 - Future management actions (CP32)
 - Treatment of future premiums (CP30)
 - Segmentation (CP 27)
 - Methods and statistical techniques for calculating the best estimate (CP 26)

Consultation Papers on Level 2 implementing measures (July/ August 2009); more in November 2009

- **Cooperation and Colleges of Supervisors**
- **Intra-group Transactions and Risk Concentration**
- **Group Solvency Assessment**
- **Advice on Supervisory Reporting and Disclosure**
- **Advice on Capital add-on**
- **Tests and Standards for Internal Model Approval**
- **MCR calculation**
- **SCR Standard Formula**
 - Loss Absorbing Capacity of Technical Provisions;
 - Operational Risk;
 - Reinsurance Mitigation;
 - Counterparty Default Risk;
 - Health Underwriting Risk;
 - Life Underwriting Risk;
 - Non-life Underwriting Risk;
 - Market Risk
- **Own Funds - Classification and Eligibility**
- **Technical Provisions**
 - Simplifications (CP45)
 - Counterparty Default Adjustment (CP44)
 - Standards for Data Quality (CP43)
 - Risk Margin (CP42)
 - Calculation as a whole (CP 41)
 - Risk Free Interest Rate (CP 40)
 - Best Estimate (CP39)

Solvency II: Level II CEIOPS – implementing measures



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Consultation Papers on Level 2 implementing measures
(Nov 2009)

- Repackaged loans investments (CP63)
- Advice on Extension of Recovery Period (CP64)
- Partial Internal Models (CP65)
- Solvency for Groups with centralised risk - management (CP66)
- Treatment of Participations (CP67)
- Treatment of ring fenced Funds (CP68)
- Design of the Equity risk sub-module (CP69)
- Calibration of the market risk sub-module (CP70)
- Calibration of the non-life underwriting risk (CP71)
- Calibration of the health- underwriting risk (CP72)
- Calibration of the MCR (CP73)
- Correlation parameters (CP74)
- Undertaking Specific Parameters for SCR (CP75)
- Simplifications for Technical Provisions (CP76)
- Simplification for SCR (CP77)
- Simplifications for Captives (CP79)



- **CP26: Methods and techniques for calculating the best estimate**
 - Deterministic or stochastic methods can be used depending on complexity or materiality of the business
- **CP27: Segmentation**
 - Segmentation of best estimate liabilities into homogeneous risk groups
 - 11 Non life insurance/ Non life proportional reinsurance LOB
 - 3 Non proportional non life reinsurance LOB
 - 16 Life insurance LOB
- **CP30: Future Premiums**
 - Criteria on recognising future premiums in the TPs – potential issues with possible restriction on future premiums



- CP32: Future Management Actions
 - Sets out criteria for the inclusion of management actions in the valuation of TPs
 - CP doesn't discuss the types of management actions which are expected to be used
 - Further detail will need to be provided
 - Pushes companies down the route of internal models to make full use of management actions



- CP39: Best Estimate (67 pages)
 - Best estimate corresponds to the “probability weighted average of future cashflows” discounted using a risk free term structure
 - Value life and non-life obligations separately
 - Valuation should be overseen by an expert with sufficient knowledge of actuarial and financial mathematics as well as insurance risk
 - Need to take account of:
 - Expenses incurred in servicing the obligations
 - Contractual future premiums
 - Options and guarantees within contracts
 - Policyholder behaviour
 - Management Actions
 - Distribution of extra benefits
 - Inflation, including expense and claim inflation
 - Taxation payments charged to policyholders

Technical Provisions

Level 2 Implementing Measures – CEIOPS CPs



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- CP39: Best Estimate (cont)
 - General principles:
 - Calculated gross of reinsurance
 - No surrender value floor so negative reserves possible *
 - * SV floor is effectively applied in determining the winding up gap which can only be counted as Tier 3 capital and therefore of limited benefit in covering the SCR
 - Risk free discount rates
 - Non-life
 - Valuation should consider claims outstanding and premium provisions separately
 - Premium provisions relate to claim events occurring after valuation date but during remainder of the in-force period
 - Claims outstanding relate to claim events prior to the valuation date both reported and not reported
 - Substance over Form to dictate use of life or non-life approach, including health
 - Currency:
 - Best estimate should be calculated separately for each currency



- CP39: Best Estimate (cont)
 - Options and guarantees
 - Identify and value all options and financial guarantees
 - Market consistent valuation
 - Stochastic approaches preferred
 - Reflect time and intrinsic value
 - Should not assume policyholder behaviour independent of financial market
 - Volatility – implied vs historical?
 - Policyholder behaviour
 - Assumptions based on historic data
 - Future take up rates should allow for possibility of policyholder rationality improving

Technical Provisions

Level 2 Implementing Measures – CEIOPS CPs



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- **CP39: Best Estimate (cont)**
 - **With Profits**
 - Future discretionary bonuses valued on a realistic basis
 - Future management actions in accordance with CP32
 - Future asset returns consistent with risk free yield curve
 - **Reinsurance**
 - Separate asset
 - Valued according to same principles as best estimate TPs
 - Counterparty risk factored in (CP44)
 - Reduce recoverable to reflect expected counterparty defaults
 - **Discretionary payments**
 - Must allow for even though not guaranteed

Technical Provisions

Level 2 Implementing Measures – CEIOPS CPs



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- **CP39: Best Estimate (cont)**
 - Appropriateness of assumptions
 - Derived consistently
 - Across homogeneous groups and LoB
 - Credible and relevant information
 - Reflect uncertainty, trends and legal/social/economic/environmental factors
 - **Validation processes to ensure**
 - Relevant and frequent
 - Proportionate
 - Back testing, analysis of results and actions
 - Peer review

Technical Provisions

Issues raised by SAI Solv II sub ctee on CPs



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- CP39 Issues

- More guidance needed on the criteria for implied vs historic volatilities – either approach could be used, but need to ensure overall approach appropriate
- Guarantees and Options addressed but further detail required to ensure consistent treatment across CPs (best estimate/ risk margin/ risk free etc)
- Basis for expenses – open to new business or run off (and internal or market based)
- Criteria around formal internal and external review

Technical Provisions

Level 2 Implementing Measures – CEIOPS CPs



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- CP40: Risk Free Rate
 - TPs calculated using a risk free discount rate
 - Defined for each currency and valuation date by the regulator
 - Follow uniform methodology and based on relevant market data
 - Criteria:
 - No credit risk
 - Realism
 - Reliability
 - High liquidity
 - No technical bias (no supply and demand issues)
 - Government bonds of AAA rated governments should be considered as the benchmark (i.e. Euro area yield curve)
 - Extrapolation techniques beyond last available point of sufficient liquidity

Technical Provisions

Issues arising from feedback on CPs



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- CP40 Issues

- Risk Free Rates (CP40):

- ABI: “We agree that the risk-free rate should be set using a series of principles, however we strongly disagree with CEIOPS’s conclusion that only AAA-rated Government Bonds can fulfil these criteria. If applied this would contradict the principles of Solvency II and the Single Market and would have highly damaging consequences for Europe’s economy and financial stability.”
 - CFO Forum: “The CFO Forum fundamentally disagrees with the proposal to use risk-free interest rates based on AAA government bonds.”

- Liquidity Premium (CP40):

- ABI: “We fundamentally disagree with the majority view ... which dismisses the liquidity premium without any proper consideration of the issue...We urgently call upon CEIOPS to reverse this decision.”
 - CFO Forum: “The CFO Forum disagrees with the view that no allowance should be made for illiquidity premia...Solvency II proposals are inconsistent with IFRS Phase II proposals which have suggested a discount rate consistent with the characteristics of the liabilities.”
 - May cause flight from non AAA government bonds e.g. Ireland
 - Noted issues re swaps/ liquidity premia etc
 - Introduces swap spread basis risk even if guarantees are hedged



- **CP42: Risk Margin**

- RM ensures that the value of the TPs is equal to the amount that an undertaking would require to take over and meet the obligations
- Strict definitions on what is considered hedgeable so more business falls within risk margin calculation *
- Calculated using a cost of capital approach
 - Funding cost of the SCR as policies run off
 - QIS4 RM calculation
 - Future SCR's projected by LOB
 - Cost of holding future SCR's calculated and discounted at risk free rate
 - RM = sum of discounted cost of SCR's by LOB
- Difficult to project future SCR so proxies likely to be used
- Cost of capital rate - at least 6% to be used with rate (reviewed periodically)
- Ignores some diversification benefit

- **Issues**

- Support for 6% cost of capital appears weak
- No credit for diversification above LOB level
- Inclusion of market risk where the risk can't be fully hedged when projecting the SCR to calculate the risk margin



- **CP41: Calculation as a whole**
 - If cashflows can be reliably replicated
 - Excludes cashflows dependent on biometric development or policyholder behaviour
 - Issues
 - Difficult to see how you could categorise business as hedgeable i.e. need to calculate a risk margin for most/ all business
- **CP43: Standards for data quality**
 - Monitor the quality of data
 - Have adequate processes and procedures
 - Actuarial Function decide how much faith to place on historical data and prospective assumptions
 - Issues
 - Challenging for reinsurers to meet the criteria as set down



- **CP44: Counterparty default (Expected losses)**
 - Adjustment to be calculated separately for each LOB and counterparty (grouping possibly if undue burden)
 - Based on current, reliable and credible information
 - If no reliable estimate of recovery rate, then not higher than 40%
 - If collateral or LOCs then need to consider credit risk of those instruments
 - E.g. recoverable €1m, PD 1%, LGD 60%, Adjustment = €1m x 1% x 60% = €6k
 - Issues
 - Fine in theory but practically very onerous
 - 40% recovery rate seems low

Technical Provisions

Level 2 Implementing Measures – CEIOPS CPs



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- CP45: Simplifications
 - Advice on simplified methods and techniques to calculate TPs to ensure that actuarial and statistical methods are proportionate to the nature, scale and complexity of the risks.
 - Role of proportionality in the valuation of technical provisions.
 - Three step process for assessing proportionality
 - Calculation of risk margin based on simplified techniques, and outlines a hierarchy for calculating projected future SCRs for each line of business.
 - Issues
 - Appropriate – depends on how implemented in practice
 - Risk margin while complex is typically a small component of the TPs so a good candidate for simplified approaches

QIS4

Objectives



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- Quantitative Impact Studies
- Objectives
 - Quantitative impact on solvency balance sheets
 - Check that the Tech Spec aligned with draft Directive
 - Collect data to support analysis of options for Level 2 measures
 - Encourage preparation for Solvency II
- Particular attention in QIS4 on:
 - Suitability & practicality of TS especially simplified methods / entity specific parameters
 - MCR
 - Additional data on own funds
 - Internal models
 - Insurance Groups



- Generally accepted that approach appropriate and practicable
- Criticism that 6% cost of capital factor overstates the true cost of capital for risk margin
- Criticism of lack of diversification benefit in risk margin calculation
- Reduction in technical provisions i.e. Solvency I TP x Solvency II TP + Risk Margin
 - Now valued at best estimate, lapses and no surrender value floor
- Discount rates
 - Some arguments for swap rates (liquidity less affected by supply and demand)

QIS4

Findings in respect of Life Technical Provisions



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LIFE	Min	25th	Med	75th	Max
Ratio of QIS4TP to S1 TP	35.4%	86.7%	94.6%	98.1%	104.9%
CoC RM / QIS4 TP	0.1%	0.4%	0.9%	4.6%	21.6%

LIFE	25th	Med	75th
Linked	93.5%	96.05	98.1%
Without Profits	31.6%	64.7%	85.2%

QIS4

Findings in respect of Non-Life Technical Provisions



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Non-Life	Min	25th	Med	75th	Max
Ratio of QIS4TP to S1 TP	23.1%	82.7%	88.6%	95.1%	109.5%
CoC RM / QIS4 TP	1.0%	3.9%	5.8%	10.3%	29.7%

Non-Life	25th	Med	75th
Health	41.1%	83.2%	98.1%
Motor, 3rd Pty	85.5%	88.1%	95.4%
Motor, other	79.3%	88.9%	96.0%
MAT	74.7%	95.9%	104.7%
Fire	83.0%	94.7%	98.6%
Liability	80.1%	90.9%	95.3%
Credit	74.7%	83.8%	91.7%
Misc	56.5%	92.9%	94.6%



- No use of explicit probability weighted average of future cash flows
- Traditional methods should not be regarded as proxy
- Guidance needed to align choice of methods
- Segmentation inconsistent with current reporting
- Geographical segmentation not practical – (now removed)
- Discounting problem where no cash flow patterns
- Few used economic valuation of premium provision
- Changes in reinsurance programmes made it difficult to estimate cash flow patterns
- Difficult to establish accurate best estimate on extreme long tail classes



- New factors for Premium and Reserve Risk

LOB	Premium factor		Reserve Factor	
	Proposed	QIS 4	Proposed	QIS 4
Accident	10%	5.0%	17.50%	15.0%
Sickness	7.50%	3.0%	12.50%	7.5%
Workers compensation	10%	7.0%	12.50%	10.0%
Motor vehicle liability	10%	9%	12.50%	12%
Motor Other	10%	9%	12.50%	12%
MAT	20%	12.50%	17.50%	10%
Fire and Other damage	12.50%	10%	15%	10%
Third party liability	17.50%	12.50%	20%	15%
Credit and suretyship	20%	15%	20%	15%
Legal expenses	7.50%	5%	12.50%	10%
Assistance	10%	7.50%	15%	10%
Miscellaneous	20%	11%	20%	10%
NPL Property	30%	15%	30%	15%
NPL MAT	30%	15%	30%	15%
NPL Casualty	30%	15%	30%	15%
CP79				
Captive Simplification	30%		30%	

Calibration of non-life underwriting risk



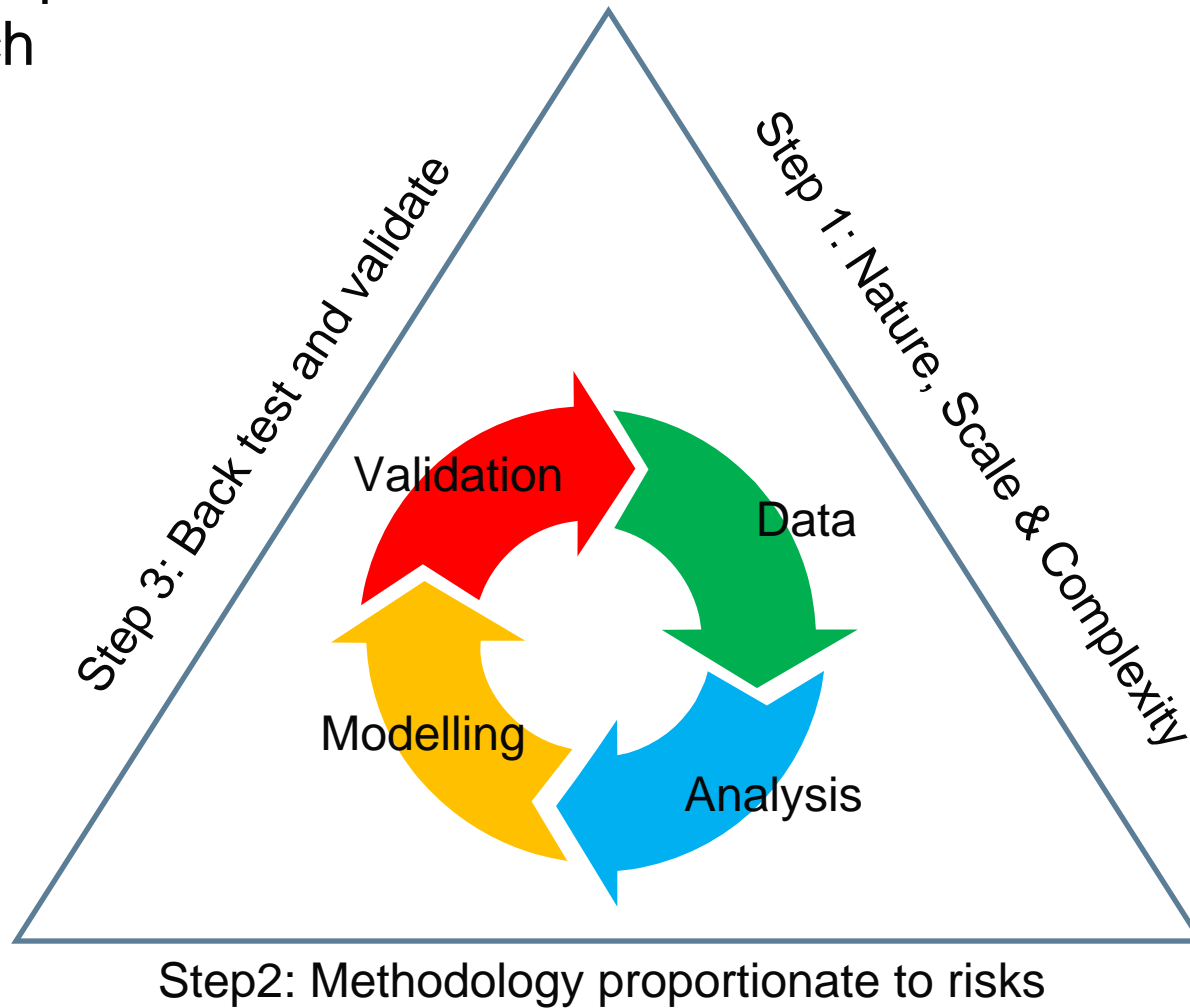
- New factor method for CAT risk
- $\text{Gross premium}^{\text{lob}} \times \text{Factor}^{\text{lob}}$
– Reinsurance Limit^{lob}

Lines of business affected	Factor
Storm - Fire and property; Motor, other classes	175%
Flood - Fire and property; Motor, other classes	113%
Earthquake - Fire and property; Motor, other classes	120%
Hail - Fire and property; Motor, other classes	30%
Fire and property	175%
MAT	100%
Motor vehicle liability	40%
Third party liability	85%
Miscellaneous	40%
NPL Property	250%
NPL MAT	250%
NPL Casualty	250%

Captives Line of business	Factor
Motor vehicle liability	225%
Other Motor / Hail	540%
Property	920%
General Liability	450%
Accident	450%
Health	200%
Transport	920%
Miscellaneous	920%



- Three steps approach



CP 76

Non-Life Simplifications



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Method	For	Approach	When	Note
1	OSLR	(No Claims Reported x Average cost per claim) - payments made	Where No is large and claim size variation is small	load for IBNR and ULAE
2	OSLR	Case estimates	Small portfolios and small claims numbers	load for IBNR and ULAE
3	IBNR	(Average cost of IBNR claims x Average no of IBNR claims)	For above OSLR simplifications	use multiple years data (min four)
4	IBNR	IBNR = factor x OSLR	less than 4 yrs data for Method 3	different for each lob
5	ULAE	ULAE = R x (IBNR + a x OSLR)	Expenses stable and proportionate to provisions	R = average (Expenses / (Gross claims)) prior yrs
6	Premium Provision	(UPR +AURR +AUER)/ (1 +(risk free rate 1yr)/3)		different for each lob

SAI Solvency II Committee



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- Dervla Tomlin (Chair)
- John Armstrong
- Michael Culligan
- Mike Frazer
- Declan Lavelle
- John McCrossan
- Brian Morrissey
- Jim Murphy
- Arran Nolan
- Dick Tulloch

Upcoming SAI Solvency II Events



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- Solvency II: Solvency Capital Requirement
(November 18th, 4.30 pm)
- Solvency II: Governance and Actuarial Function
(November 23rd, 4.30 pm)
- Participate in review of 3rd wave of CEIOPS
Consultation Papers
 - Contact any member of the Solvency II Committee