ACTUARIAL SOCIETY OF SOUTH AFRICA

The Business of Change: 2010 and Beyond

An Introduction to Solvency II

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Agenda

1. Background to Solvency II
2. Pillar 1: Quantitative Pillar
   - Basic building blocks
   - Assets
   - Technical Reserves
   - Solvency Capital Requirement
   - Internal Models
   - Groups
3. Pillar 2: Qualitative pillar
4. Pillar 3: Disclosure
5. Implications for South Africa

Abstract

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- The presentation is aimed at actuaries who do not have practical working experience with Solvency II but wish to know more about Solvency II. The presentation will be a high level introduction to Solvency II covering the history behind it and the elements making up Solvency II.

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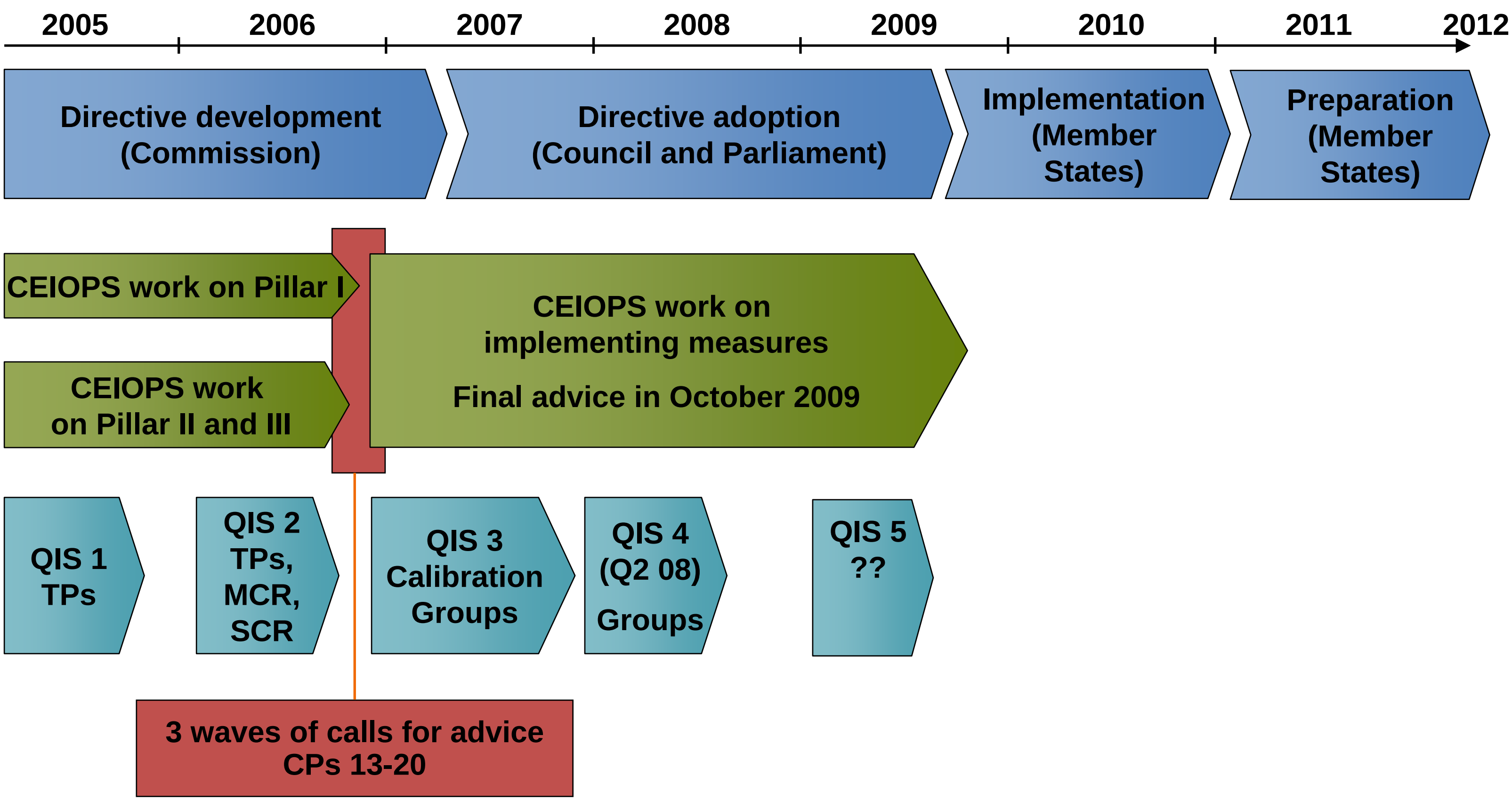
Solvency II – what is it

- Fundamental and wide-ranging review of the current insurance Directives. Aims to enhance policyholder protection and increase competition in the EU insurance market and enhance the supervisory review process.
- Introduces a common European approach based on economic principles for the measurement of assets and liabilities.
- A risk-based system, meaning that risk is measured on consistent principles and that capital requirements are aligned with the underlying risks of the company.

Source: CEA web site

Solvency II regulatory timeline



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Solvency II – Three-Pillar Approach

Pillar 1: Quantitative capital requirements

- Investments
- Technical provisions
- Own funds
- Capital requirement (SCR & MCR)
- Groups
- Internal Models

Pillar 2: Qualitative supervisory review

- Internal controls and risk management
- Own risk and solvency assessment (ORSA)
- Supervisory review
- Capital add-ons

Pillar 3: Market discipline

- Transparency
- Disclosure
- Support of risk-based supervision through market mechanisms

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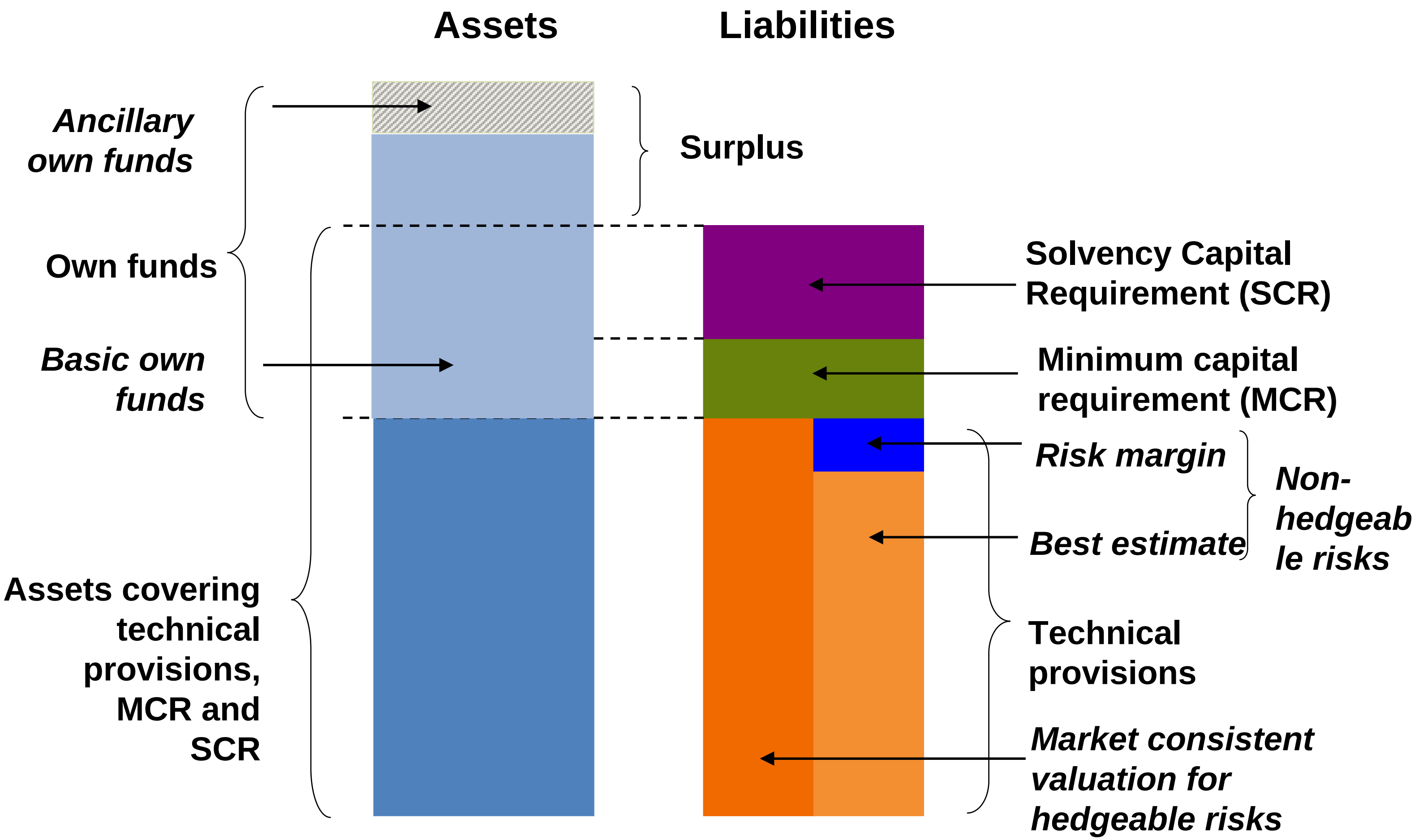
Pillar 1 – building blocks



Pillar 1 - Assets

Valuation guidelines	
Market type	Value
• Reliable, observable prices. • Liquid market	• Set equal to their market values. • Long/Short position in assets: use bid/offer price
• Observable but not reliable	• Reasonable proxies can be used (description of proxies should be disclosed)
• No readily available market	• Alternative approach should be adopted, but should still be consistent with any market information.
• Illiquid or non-tradable assets	• Prudent basis, taking into account credit and illiquidity risks

- In absence of any sufficient evidence, value of assets should not be higher than acquisition cost minus sellers profit margin.

Pillar 1 - Technical provisions

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- Participants should value technical provisions at the amount for which they could be transferred, or settled, between knowledgeable willing parties in an arm's length transaction.
    - Discounted using risk free interest rates
    - Projecting future cash flows (incl expenses, future premiums, options & guarantees)
    - Best estimate assumptions plus risk margin

- Hedgeable risks can be valued by reference to the market value of the financial instrument that replicates the risk
    - Hedgeable risks = *"capable of being fully hedged in a sufficiently deep, liquid and transparent market" where "deep, liquid and transparent markets are defined as markets where participants can rapidly execute large-volume transactions with little impact on prices"*

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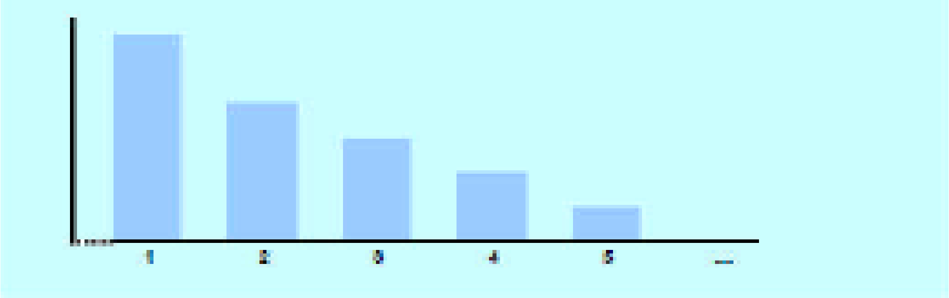
Pillar 1 - Determination of Risk Margin

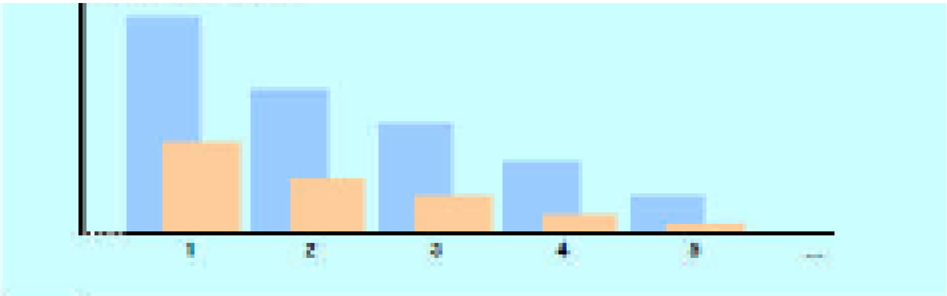
Estimate capital required in respect of non-hedgeable risks over lifetime of contract. The risk margin is the cost of holding this capital, charged at 6% pa, and discounted to balance sheet date

(1) Project the SCR for each of the non-hedgeable risks



(2) Risk margin
= Σ (CoC factor) x SCR_i x v^t

CoC factor = 6% charge



• Consistent with Swiss Solvency Test

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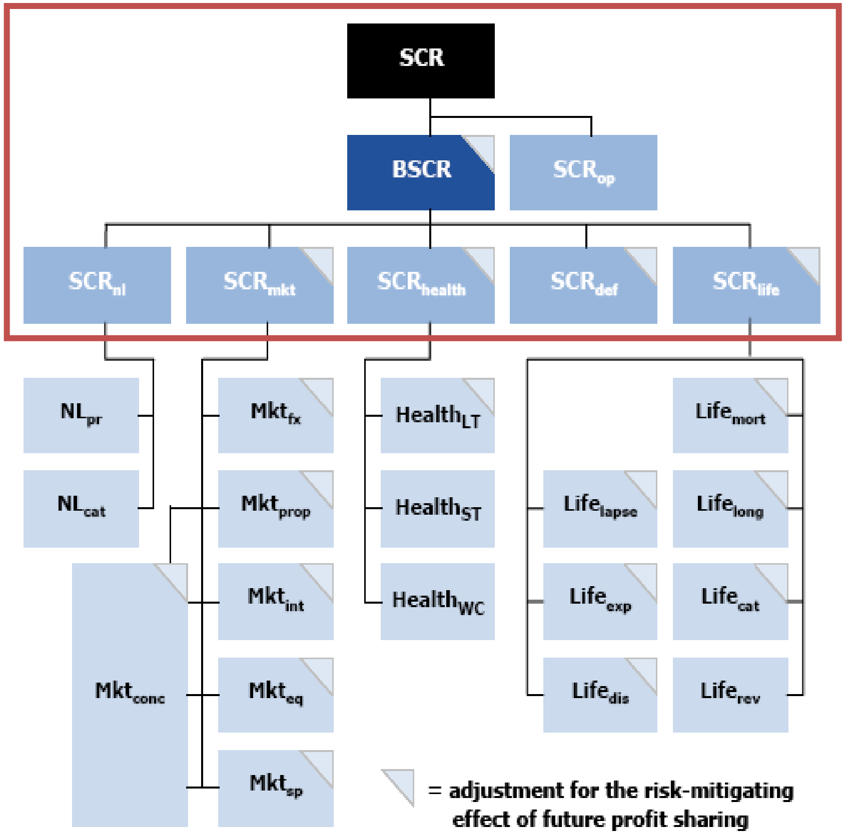
Pillar 1 – Capital Requirements

- Solvency Capital Requirement (SCR)
  - Risk based capital approach
  - Intended as a buffer for adverse movements in own funds over a 1 year time horizon
  - Based on the ability to survive a 1 in 200 year event
- Minimum Capital Requirement (MCR)
  - 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 % of technical provisions and capital at risk

Pillar 1 – SCR: standardised approach



Source: QIS 4 technical specification

- Total SCR is made up of Basic SCR plus SCR for Operational Risk
- Basic SCR based on five main risk modules:
  - Non-life underwriting risk
  - Market risk
  - Health underwriting risk
  - Counterparty default risk
  - Life underwriting risk
- Allowance for correlation
- Operational risk is a straight add-on
- Simplifications allowed in certain circumstances

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Pillar 1 – BSCR: aggregation

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- $BSCR = \sqrt{\sum\sum CorrSCR_{r,c} \cdot SCR_r \cdot SCR_c}$

- Correlation matrix under QIS 4:

$CorrSCR =$	SCR_{mkt}	SCR_{def}	SCR_{life}	SCR_{health}	SCR_{nl}
SCR_{mkt}	1				
SCR_{def}	0.25	1			
SCR_{life}	0.25	0.25	1		
SCR_{health}	0.25	0.25	0.25	1	
SCR_{nl}	0.25	0.5	0	0,25	1

- Allowance for risk mitigation effect of future profit sharing

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Pillar 1 – Operational Risk

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- Risk of loss arising from inadequate or failed internal processes, people, systems or external events.
  - Includes legal risks.
  - Excludes Reputation risks and risks arising from strategic decisions
- Designed to address operational risks to the extent that these have not been explicitly covered in other risk modules
- $SCRop = \min\{30\%\ BSCR\ ;\ OP_{non\ ul}\} + 25\%\ Exp_{ul}$
- $OP_{non\ ul} = \max\{3\%\ Earnings_{non\ ul}\ ;\ 0.3\%\ Tech\ Prov_{non\ ul}\}$

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Pillar 1 – SCR: standardised approach

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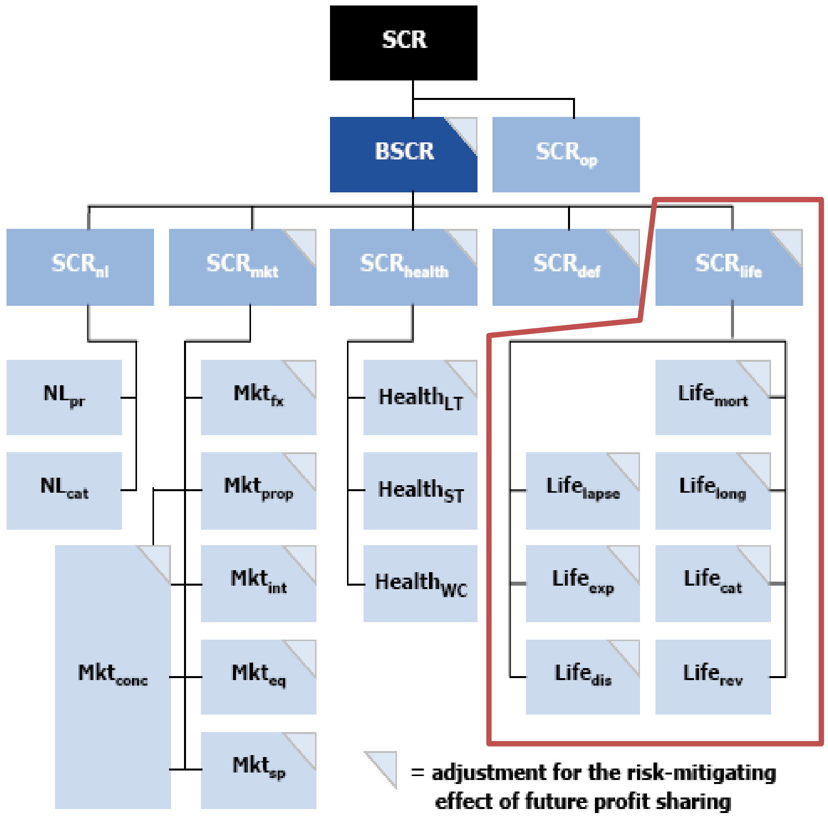

- Each module has sub-modules that represent more granular risks
- Correlation to take account of diversification benefits
- Mostly based on stress and scenario calculations
- The amount is generally the change in the NAV of the entity as a result of the shock

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Draft Framework Directive – Annex IV / QIS 4 technical specification

Pillar 1 - SCR_{life} : QIS 4 stress tests

Mortality	10% increase in mortality rates
Longevity	25% decrease in mortality rates
Disability	35% increase in disability rates for next year; permanent 25% in subsequent years
Lapse	50% reduction in lapse rate where surrender strain negative Plus Max of - 50% increase in lapse rate where surrender strain is positive - 30% of surrender strain where surrender strain is positive
Expense	Higher by 10% and Inflation higher by 1% Loadings can recover expenses (up to 75%) from year 2
Catastrophe	Mort/ Disability: 0.0015 of Capital at Risk
Revision	3% increase in annuity

Pillar 1 – SCR_{life}: aggregation

- $BSCR = \sqrt{\sum\sum CorrLife_{r,c} \cdot Life_r \cdot Life_c}$

- Correlation matrix under QIS 4:

CorrLife =	$Life_{mort}$	$Life_{long}$	$Life_{dis}$	$Life_{laps e}$	$Life_{exp}$	$Life_{rev}$	$Life_{CAT}$
$Life_{mort}$	1						
$Life_{long}$	0	1					
$Life_{dis}$	0.5	0	1				
$Life_{lapse}$	0	0.25	0	1			
$Life_{exp}$	0.25	0.25	0.5	0.5	1		
$Life_{rev}$	0	0.25	0	0	0.25	1	
$Life_{CAT}$	0	0	0	0	0	0	1

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Pillar 1 - SCR_{mkt} : QIS 4 stress tests

Foreign Exchange	Greater of effect of 20% change in value of local currency up and down.
Property [Real Estate]	20% fall
Interest rates	Greater of effect of up and down stress tests. Schedule of stresses applied to yield curve on a term dependent basis.
Equity	32% fall; (45% fall for emerging markets, non-listed equities and alternative investments) – Aggregation formula applied
Spread Risk	Stress applied to non-government bonds based on credit rating and duration
Concentration	Stress applied to excess exposure to any one counterparty, exposure and stress dependant on counterparty credit rating

Pillar 1 – SCR_{mkt}: aggregation

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- $BSCR = \sqrt{\sum\sum CorrMkt_{r,c} \cdot Mkt_r \cdot Mkt_c}$

- Correlation matrix under QIS 4:

CorrMkt	Mkt_{int}	Mkt_{eq}	Mkt_{prop}	Mkt_{sp}	Mkt_{conc}	Mkt_{fx}
Mkt_{int}	1					
Mkt_{eq}	0	1				
Mkt_{prop}	0.5	0.75	1			
Mkt_{sp}	0.25	0.25	0.25	1		
Mkt_{conc}	0	0	0	0	1	
Mkt_{fx}	0.25	0.25	0.25	0.25	0	1

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Pillar 1 - SCR_{def}

- risk of default of
  - a counterparty to risk mitigating contracts, such as reinsurance arrangements, securitisations and derivatives, and
  - receivables from intermediaries, and
  - other credit exposures which are not covered in the spread risk sub-module
- main inputs are
  - estimated loss-given-default (LGD) of an exposure
  - probability of default (PD) of the counterparty

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Pillar 1 - Internal models

- Article 110 of the Framework Directive allows companies to calculate their SCR using an internal model “as approved by the supervisory authorities.”
- Can be a full or partial model.
- Make use of existing models?
  - FSA (UK) has indicated it does not believe any existing models used to calculate ICA’s are good enough to be used as internal models.

What is an Internal model?

- Definition: “a risk management system developed by an insurer to analyse the overall risk position, to quantify risks and to determine the economic capital required to meet those risks”
- One of the main purposes of an internal model is to assist the insurer in better integrating its risk and capital management processes and practices.
  - determine the economic capital needed by the insurer
  - to determine the amount of the insurer’s regulatory capital requirements (if approved)
  - should use the same methodologies to determine regulatory and economic capital

Source: International Association of Insurance Supervisors guidance paper on the use of internal models for risk and capital management by insurers (October 2008)

Why develop an internal model

- The standardised approach will most likely be calibrated conservatively.
  - This suggests that internal models will produce lower capital requirements.
- The additional insights provided by internal models should give those firms which use them a competitive advantage.
- Rating agencies increasingly focussed on companies' internal models and their risk management framework.

Approval of Internal Models

- The Framework Directive (Feb 2008) does give some indication of what the process will entail
  - Use test (article 118)
  - Statistical quality standards (article 119)
  - Calibration standards (article 120)
  - Profit and loss attribution (article 121)
  - Validation standards (article 122)
  - Documentation standards (article 123)

Internal Models: Use test

- Internal model widely used and important role in
  - System of governance
  - Risk management and decision-making
  - Capital assessment and allocation
- Embedded in risk strategy and operational processes
- Control of model and understanding of outputs at senior management and board level
- Adequate governance and internal controls in place

Internal Models: Statistical quality standards

- Sound actuarial and statistical techniques
- Based upon up to date, credible information and realistic assumptions
- Accurate and appropriate data
- No particular method but must cover all material risks
- Diversification allowed as long as justified
- Risk mitigation allowed as long as resultant risks modelled
- Accurate assessment of options and guarantees
- Future management actions allowed as long as consistent with expectations

Internal Models: Calibration standards

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- SCR Value-at-Risk measure at a confidence level of 99.5% over a one-year period.
- Approximations can be used in SCR calculation provided equivalent to required standard
- Regulator requirements – benchmark portfolios and assumptions to verify calibration

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Internal Models: Profit and loss attribution

- Annual analysis of the profits and losses of each business unit.
- The risk model must be able to explain the cause and source of each profit / loss.
  - Must be linked to the risk profile of the company

Internal Models: Validation standards

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- Regular cycle of model validation
  - Monitoring performance
  - Ongoing review
  - Back-testing
- Demonstrate statistical validity to regulators
- Must be valid for historical **and** new data
- Analysis of model stability including sensitivity testing for key parameters
- Data integrity analysis

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Internal Models: Documentation standards

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- Insurance and reinsurance undertakings shall document the design and operational details of their internal model.
  - demonstrate compliance with previous points
  - detailed outline of the theory, assumptions, and mathematical and empirical basis underlying the model
  - indicate any circumstances under which the model does not work effectively.
  - document all major changes

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Pillar 1: Groups

- Recognition of diversification within the Group
- Location of capital within Group
  - Only have to hold capital equal to MCR within each company
  - Additional capital required can be held at Group level

Pillar 2: Qualitative tests

- Supervisory review
  - assess strategies, processes, & reporting procedures to comply
  - assess adequacy to identify potential risks
- Capital add-ons
  - May require additional capital under specific circumstances arising from review
- Governance system
  - Robust governance is key to adequate management of insurer and an efficient solvency system
    - Includes fit & proper persons, risk management, own risk & solvency assessment (ORSA), internal control, internal audit, actuarial function
    - Written policies in place for risk management, internal control, etc
    - ORSA – internal, embedded in strategic decisions, internal model if used for SCR

Pillar 3: Disclosure

- Annual publicly available report on solvency & financial condition
  - specific items
    - descriptions of business and performance, governance system, risk exposures, valuation bases & methods (assets & liabilities), capital management, including structure & amount of own funds MCR, SCR and information on own models
  - policy and approvals required
  - update where appropriate
  - voluntary information
- Disclosures to regulatory authorities and CEIOPS
- Disclsoures by regulatory authorities
-

Some implications: Internal models

CURRENT MODELS	SOLVENCY II MODELS
Different models used for different purposes and in different business units	One model used throughout the business to run the company!
Predefined risk measures for some risks	Ability to look at various risk measures and levels of confidence
Only key factors affecting risk modelled	Detailed granular assessment of risk
AoS on key lines (large unexplained items not uncommon	More detailed review causes of profit and loss for each major business unit
Documentation of key processes	More thorough documentation of model
Reliance on external providers	No black boxes

Implications for South Africa

- Solvency II seems to be developing as the “gold standard” for capital requirements. Will SA follow?
- Recent changes in PGN104 have drawn on Solvency II developments (Credit risk and operational risk)
- Solvency II more complex and detailed than PGN104 so more work will need to be done
- Will add to changes at and around the implementation timetable (e.g. IFRS PhaseII)
- Internal Models likely to need work
- Supervisor Capacity to review and analyse

Further information on Solvency II

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- European Commission

  http://ec.europa.eu/internal_market/insurance/solvency/index_en.htm

- European Insurance Federation (CEA)

  http://www.cea.assur.org/index.php?page=solvency-ii

- CEIOPS http://www.ceiops.org/

- ABI, CRO Forum, FSA (UK regulator)

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