

Society of Actuaries in Ireland

Solvency II – Introduction to Pillar 1

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Agenda

1	Solvency II Balance Sheet
2	Valuation of Assets
3	Best Estimate Liability
4	Risk Margin
5	Internal Model v Standard Formula
6	SCR details
7	MCR
8	Own Funds



Three Pillar Approach

Measurement of assets, liabilities and capital	Supervisory review process	Reporting & Disclosure
Eligible capital	Corporate governance	Public Disclosure
Technical provisions	Internal control	
Capital requirements	Risk management	Supervisory Reporting
Asset and liability valuation	ORSA	
Pillar 1	Pillar 2	Pillar 3



Balance Sheet





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Asset Valuation





Market Principles











Valuation Hierarchy





Other valuation rules

Goodwill

Intangibles

DAC

Related undertakings



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Technical Provisions





Segmentation

- Segment insurance liabilities into homogeneous risk groups
- $\circ~$ Or by line of business at a minimum
- Nature of risks not legal form
- Unbundling required for contracts split across lines of business





Lines of Business

Life

Insurance with profit participation

Index-linked & unit-linked

Other life insurance



Health similar to Life (SLT)

Health not similar to Life (NSLT)

Non Life

Medical Expense insurance Income protection insurance

Workers compensation insurance

Motor Vehicle Liability

Other Motor insurance

Marine, Aviation, and Transport insurance

Fire and other damage to property insurance

General Liability insurance

Credit & Suretyship insurance

Legal Expenses insurance

Assistance

Miscellaneous Financial Loss



- Calculation:
 - Cash flow projection
 - All cash flows included
 - Present value of cash flows
 - Probability weighted uncertainty of future cashflows
 - No restrictions i.e. positive or negative





Technical Provisions – Best Estimate liability

t	Premiums	Claims	Expenses	Investment return	Net Cashflow	Discount Factor	Discounted Cashflow
1	10.0	(4.0)	(0.5)	1.0	6.5	99.0%	6.44
2	9.5	(3.5)	(0.5)	1.0	6.5	98.0%	6.37
3	9.0	(3.0)	(0.5)	1.0	6.5	97.1%	6.31
4	8.5	(2.5)	(0.5)	1.0	6.5	96.1%	6.25
5	8.0	(2.0)	(0.5)	1.0	6.5	95.1%	6.18
6	7.5	(2.0)	(0.5)	1.0	6.0	94.2%	5.65
BEL						Sum	(54.68)



Assumptions





Contract Boundaries

Is new premium considered new business?

If Yes, exclude premiums & associated liabilities

Consider unbundling





t	Premiun	ns	Related BEL
1	100		(15)
2	100		(15)
3	100		(15)
4	100		(15)
5	100		(15)
6	100		(15)
BEL	\smile		(90)

t	Premiums	Related BEL
1	100	(15)
2	0	0
3	0	0
4	0	0
5	0	0
6	0	0
BEL		(15)



Reinsurance Asset

Consistent with BEL calculation Difference between Gross and Net BEL

Allow for expected loss due to default Separate for LOB and reinsurers



- Nature, Scale, & Complexity of undertaking
- Deterministic
- Claim counts not amounts
- Not splitting premium and claim provisions
- Duration or factor-based approaches



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Risk Margin







Risk Margin

• Calculation:

- Cost of capital calculation
- CoC rate defined as 6% (in excess of risk free)

$$RM = CoC \cdot \sum_{t \ge 0} \frac{SCR(t)}{\left(1 + r(t+1)\right)^{t+1}}$$





Risk Margin

t	SCR	6%	Discounted	Sum
1	100	6.0	5.9	42.5
2	95	5.7	5.6	
3	90	5.4	5.2	
4	85	5.1	4.8	
5	80	4.8	4.4	
6	75	4.5	4.0	
7	70	4.2	3.7	
8	65	3.9	3.3	
9	60	3.6	3.0	
10	55	3.3	2.6	



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Balance Sheet





- Three ways to calculate the SCR
 - Standard Formula
 - Internal Model
 - Partial Internal Model
- Every company has a model for calculating the BEL
 - "Internal Model" simply means the SCR shocks have been tailored to that company instead of using the standard ones
 - All shocks must be calibrated to be equivalent to a 1-in-200 event (99.5% VAR scenario) at a minimum



- Why use an Internal Model?
 - Standard formula does not capture the specifics of your business
 - Regulatory requirement
 - Capital efficiencies



SCR Calculation

- Allocate capital to each of the risks your Company faces
- Should have enough capital to survive a 1-in-200 year event (i.e. 99.5% VaR)
- The capital requirements for each of these risks are combined using correlation matrices (to capture diversification benefits)
- This gives you the overall Solvency Capital Requirement!



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SCR – Octopus View





SCR – Octopus View





SCR – Standard Formula





SCR – Standard Formula





Sub Module Calculations

- Building blocks of the SCR Calculation
- For each sub module calculate a capital amount to cover a
 1-in-200 risk event for that risk category



- Types of Calculations
 - "Delta NAV"
 - Factor based



- Delta NAV (or Δ NAV) is the change in net asset value resulting from a particular shock
- Types of "Delta NAV" shocks
 - Asset shock
 - Financial Assumption change
 - Decrement change
 - Expense change
- Many of the SCR components are calculated on this basis



- Property Risk Sub-Module
 - Recalculate your NAV (i.e. the assets and liabilities) assuming a shock to property prices of 25%

Scenario	Assets	Liabilities	Net
BEL	€100m	€100m	€0m
Property Risk	€75m	€100m	€-25m
			∆ NAV = €25m

- Expense Risk Sub-Module
 - Recalculate your NAV assuming a 10% increase in expenses and a 1% increase in inflation rates

Scenario	Assets	Liabilities	Net
BEL	€100m	€100m	€0m
Expense Risk	€100m	€112m	€-12m
			∆ NAV = €12m



- Formula provided by EIOPA
- Most are based on premiums/reserves





• Premium & Reserves Risk



- Standard Deviation σ_{nl}
- Volume measure V_{rl}
- With prescriptive rules on how both of these variables are derived for various lines of business



"Delta NAV" Sub Modules





"Factor based" Sub Modules





Market Risk Module

Risk drivers	SCR shock	
Interest Rate risk	Increase/decrease in interest rates	
Equity risk	Equity prices fall (22% to 49% shock +/- adjustment of up to 10%)	
Property risk	25% fall in property prices	
Spread risk	Stress to value based on credit quality	
Currency risk	25% movement up/down in exchange rates	
Concentration risk	Formula based on total exposure and credit quality	



Life Underwriting Risk Module

Risk drivers	SCR shock	
Mortality risk	15% increase in mortality rates	
Longevity risk	20% reduction in mortality rates	
Disability risk	35% increase in year 1, 25% increase later years, 20% decrease in recovery rates	
Lapse risk	Max (50% increase in rates, 50% decrease in rates, immediate 40%* mass lapse)	
Expense risk	10% increase in expenses and 1% increase to expense inflation	
Revision risk	3% increases in annuity benefits	
Catastrophe risk	0.15% increase in mortality rates in year 1 of projection	



Non-Life Underwriting Risk Module

Risk drivers	SCR shock		
Premium & Reserve risk	Formula based on volumes and standard deviation. Inputs by class of business		
Lapse risk	Discontinuance of 40% of business		
Catastrophe risk	 Formula based approach from several sub-modules Natural catastrophe Non-proportional property reinsurance Man-made catastrophe Other non-life catastrophe 		



- Two approaches:
 - Health that is like Life business
 - Health that is like Non-life business
- Classification is based on the <u>nature of the underlying risks</u> as opposed to the form of contracts
- SCR calculations follow a very similar format to the corresponding Life or Non-Life section
- Diversification benefits if risk is spread across sub-modules



Health Underwriting Module





- Covers the risk of financial loss through a counterparty default
- The capital requirement is calculated from a complicated formula using:
 - Probabilities of default
 - "Loss Given Default"
 - Collateral arrangements/risk mitigation
- Separate formulas for Type 1 and Type 2 exposures
 - Formula to combine SCR for classes 1 and 2 into a total SCR for counterparty default



Intangible Assets

- If intangible assets are recognised on the balance sheet, then there may be risks attached (and therefore capital requirements)
- A simple formula is used:
 SCR for intangible assets = 80% of the value of intangible assets



"BSCR" – Basic Solvency Capital Requirement





• Correlation Matrices

i j	Market	Default	Life	Health	Non-life
Market	1	0,25	0,25	0,25	0,25
Default	0,25	1	0,25	0,25	0,5
Life	0,25	0,25	1	0,25	0
Health	0,25	0,25	0,25	1	0
Non-life	0,25	0,5	0	0	1

- Captures Diversification Benefits
 - All submodules shocks occurring at one time would be much less likely than a 1-in-200 year event
 - Risks can be positively or negatively correlated



- Factor-based formula
- For unit-linked business (where the investment risk is borne by the policyholder):
 - Ops risk is 25% of the unit-linked expenses
- For everything else:
 - calculate an operational risk component based on premiums and one based on reserves, and use the higher,
 - with a cap of 30% of the Basic SCR



Adjustments

- The loss absorbing capacity of technical provisions
 - e.g. company changing the bonuses they might pay to with-profit policyholders in shocked scenarios
- The loss-absorbing capacity of deferred tax
 - SCR shocks could result in losses (or reduced future profits)
 - This could reduce the Deferred Tax liability or increase the Deferred Tax asset, resulting in a negative adjustment to the SCR



SCR Calculation

- Sum of:
 - Basic SCR
 - Operational Risk Sub Module
 - Adjustments
- Finished the SCR!





...but what about the MCR?



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- Factor-based formula calibrated using a Value-at-Risk measure, with an 85% confidence level, over a one-year period
 - Uses premiums, technical provisions, capital at risk as inputs
- The MCR is then adjusted to bring it up to 25% of the SCR, or to bring it down to 45% of the SCR if it falls outside those parameters
- Absolute Minimum level ("AMCR"):
 - €3.7m for Life
 - €2.5m for Non-Life
 - €3.6m for Reinsurers



MCR is a subset of SCR





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- Own Funds
 - = Capital (amount available to meet capital requirements)





- Own Funds include: Basic Own Funds + Ancillary Own Funds
- Basic Own Funds

= Excess of Assets over Liabilities + subordinated liabilities

• Ancillary Own Funds

= Contingent Capital (unpaid share capital, letters of credit, guarantee etc.)

 Use of Ancillary Own Funds requires prior supervisory approval



- Own Funds are classified into 3 Tiers
 - Availability to absorb losses
 - Liquidity
 - Permanent
 - Subordination
 - Claim on assets in wind-up situation
- Examples
 - Tier 1: Ordinary Share Capital, Debt
 - Tier 2: Preference Shares
 - Tier 3: Anything that doesn't meet tier 2 or 3 requirements



• Tiering of eligible items:

	"Basic Own Funds" (on Balance Sheet)	"Ancillary Own Funds" (off Balance Sheet)
High Quality	Tier 1	Tier 2
Medium Quality	Tier 2	Tier 3
Low Quality	Tier 3	N/A

• Limits/restrictions:

	Condition 1	Condition 2	Condition 3
Solvency Test	$T1 + T2 + T3 \ge SCR$	N/A	N/A
For SCR	Tier $1 \ge 50\%$ of SCR	Tier 3 < 15% of SCR	Tier 2 + Tier 3 \leq 50% of SCR
For MCR	Tier $1 \ge 80\%$ of MCR	Tier 2 < 20% of MCR	No Tier 3 allowed



Balance Sheet





• Level 1: Directive

http://eur-lex.europa.eu/legalcontent/EN/TXT/PDF/?uri=CELEX:02009L0138-20140523&from=EN

• Level 2: Delegated Acts

<u>http://eur-lex.europa.eu/legal-</u> <u>content/EN/TXT/PDF/?uri=OJ:L:2015:012:FULL&from=EN</u>

• Level 3: Guidelines

https://eiopa.europa.eu/publications/eiopa-guidelines



Questions

