Introduction to Solvency II SCR Standard Formula for Market Risk
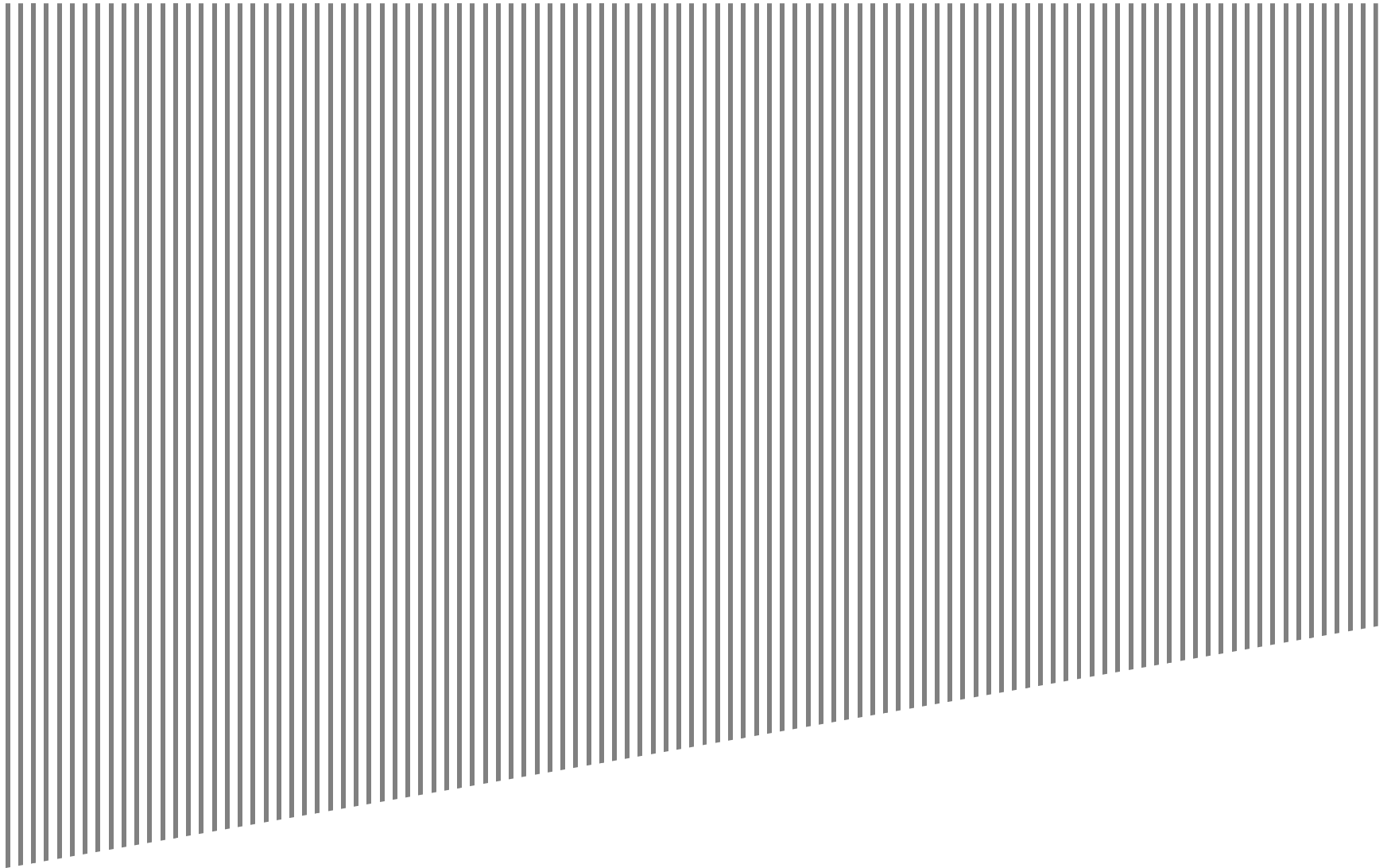
Erik Thoren

11 June 2015

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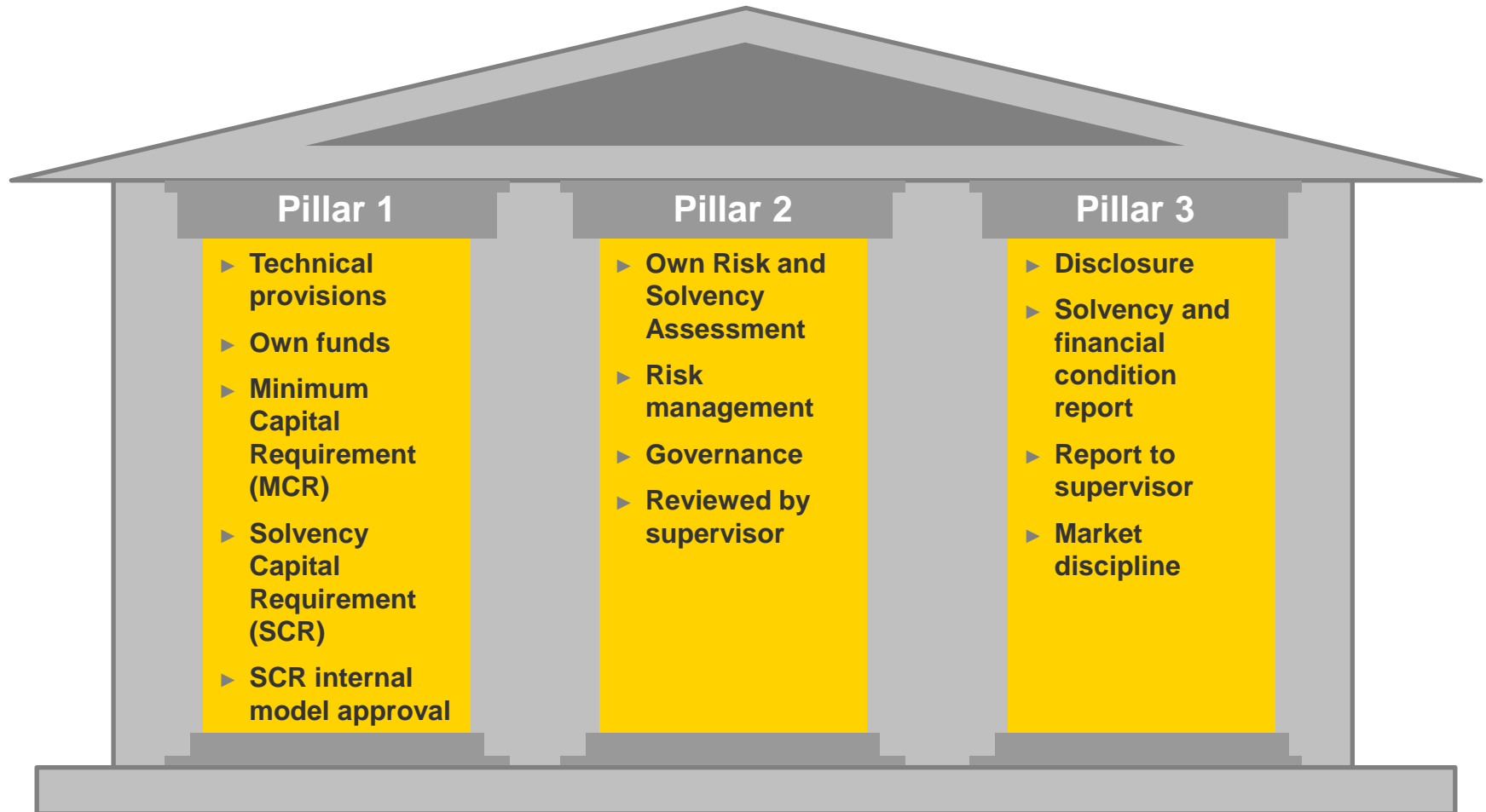Building a better
working world

Agenda

- ► Introduction to Solvency II

- ► Market risk module

- ► Asset allocation considerations

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Introduction to Solvency II

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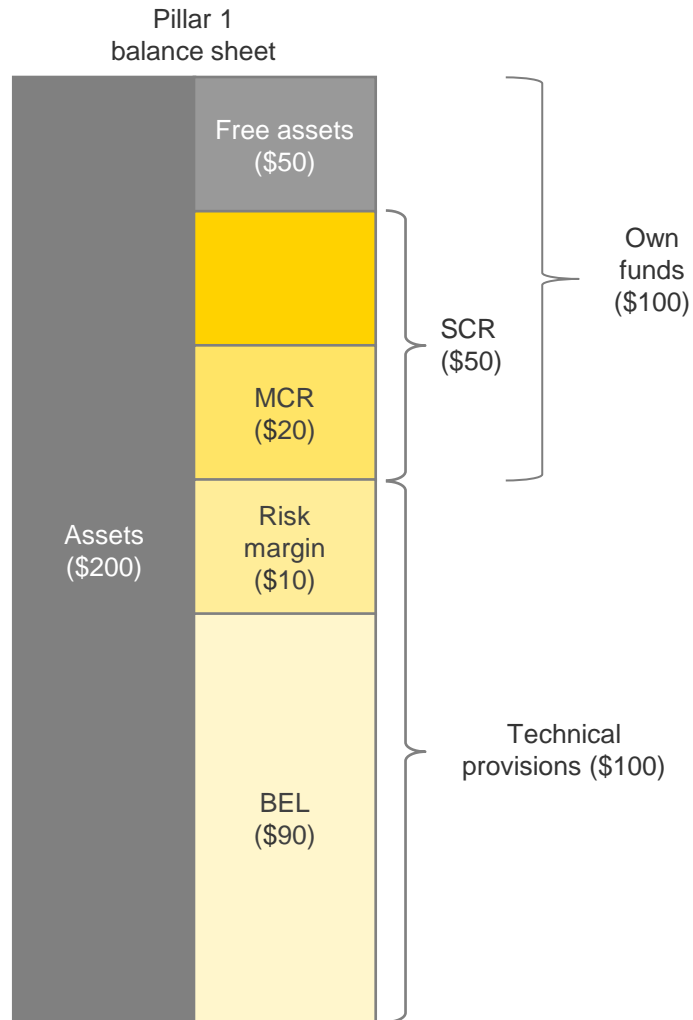
Introduction to Solvency II
Three pillar structure

Pillar 1

- ▶ **Technical provisions**
- ▶ **Own funds**
- ▶ **Minimum Capital Requirement (MCR)**
- ▶ **Solvency Capital Requirement (SCR)**
- ▶ **SCR internal model approval**

Pillar 2

- ▶ **Own Risk and Solvency Assessment**
- ▶ **Risk management**
- ▶ **Governance**
- ▶ **Reviewed by supervisor**

Pillar 3

- ▶ **Disclosure**
- ▶ **Solvency and financial condition report**
- ▶ **Report to supervisor**
- ▶ **Market discipline**

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Introduction to Solvency II
SCR and MCR calculation approach

Pillar 1
balance sheet

Assets ($200)	Free assets ($50)
	(yellow block)
	MCR ($20)
	Risk margin ($10)
	BEL ($90)

Own funds ($100)

SCR ($50)

Technical provisions ($100)

SCR

► 99.5% one-year Value at Risk (VaR) measure

► Enables insurer to withstand significant loss

► Accounts for several separate risks

► Standard Formula / Internal Model, or a combination of both (Partial Internal Model)

MCR

► Solvency II has a minimum capital requirement

► Represents lowest acceptable capital level

► Corridor of 25% - 45% of total SCR

► Non-coverage of MCR triggers supervisory intervention

*Discount rate used in BEL calculation may include matching adjustment or volatility adjustment

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Introduction to Solvency II
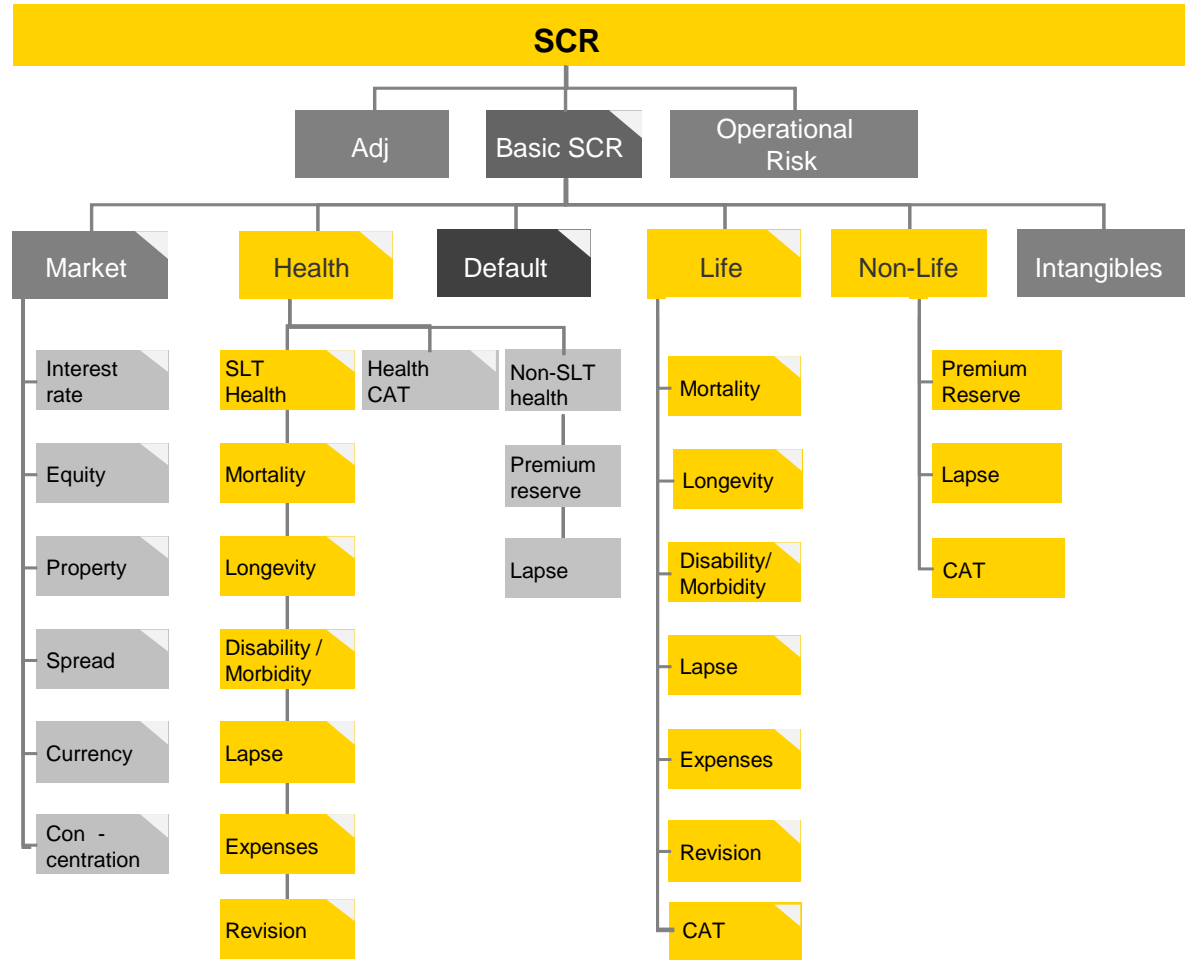## SCR basic concept: Shock approach

SCR can be described as the change of basic own funds in a shock scenario

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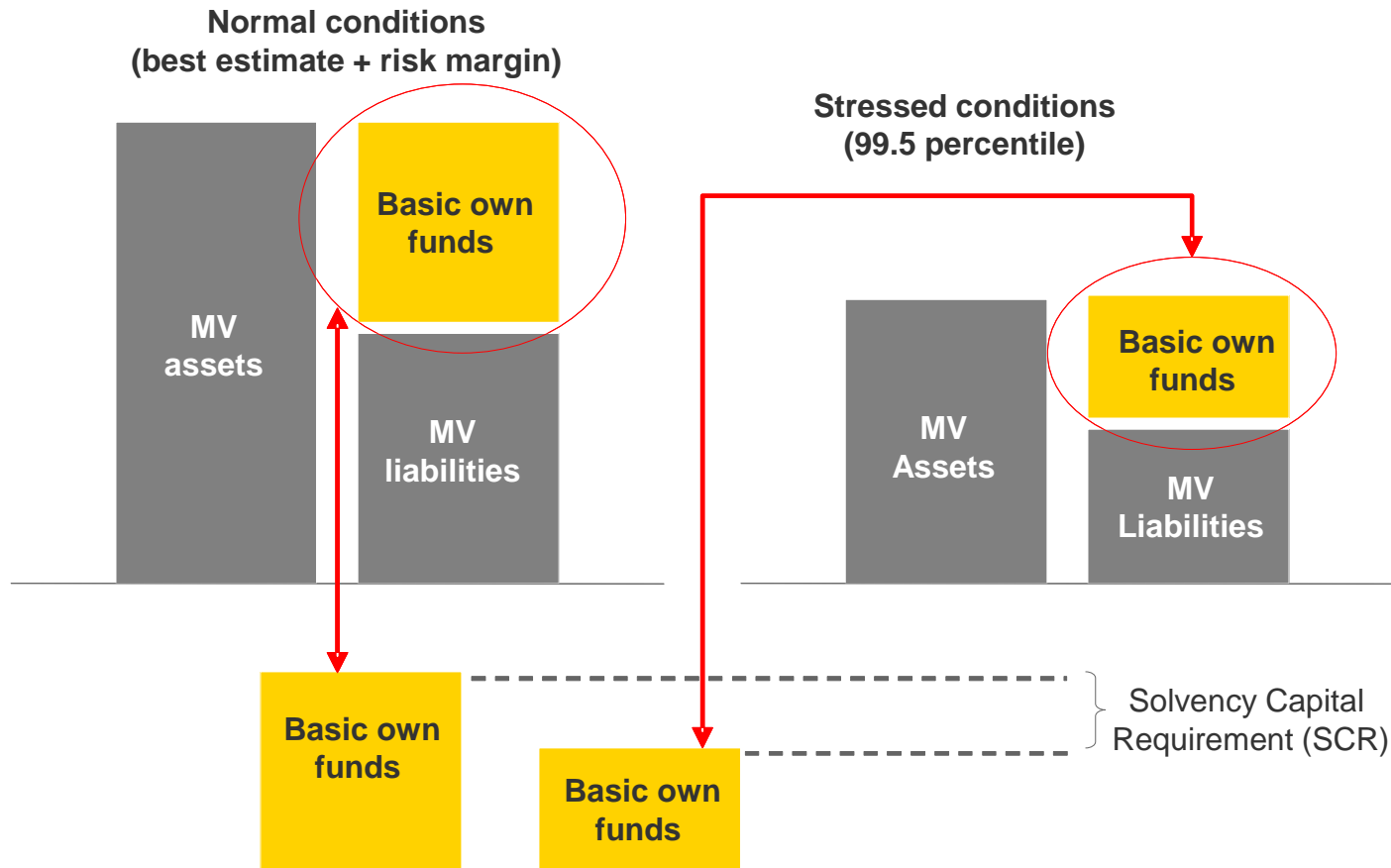
Introduction to Solvency II
Overview of SCR standard formula

► Comprises individual risk modules, aggregated using correlation matrices

► Each of the risks modules will be calibrated with a 99.5% confidence level over a one-year period

    ► i.e., capital held for the possibility of a 1 in 200-year event happening in 12 months

► Same design and specifications for risk modules used for all companies

► SCR is calculated on solo entity level and group level separately (group level usually based on the consolidated balance sheet)

► The standard formula is likely to be required for a number of reasons

SCR

- Adj
- Basic SCR
- Operational Risk

Market
- Interest rate
- Equity
- Property
- Spread
- Currency
- Con-centration

Health
- SLT Health
  - Mortality
  - Longevity
  - Disability / Morbidity
  - Lapse
  - Expenses
  - Revision
- Health CAT
- Non-SLT health
  - Premium reserve
  - Lapse

Default

Life
- Mortality
- Longevity
- Disability/ Morbidity
- Lapse
- Expenses
- Revision
- CAT

Non-Life
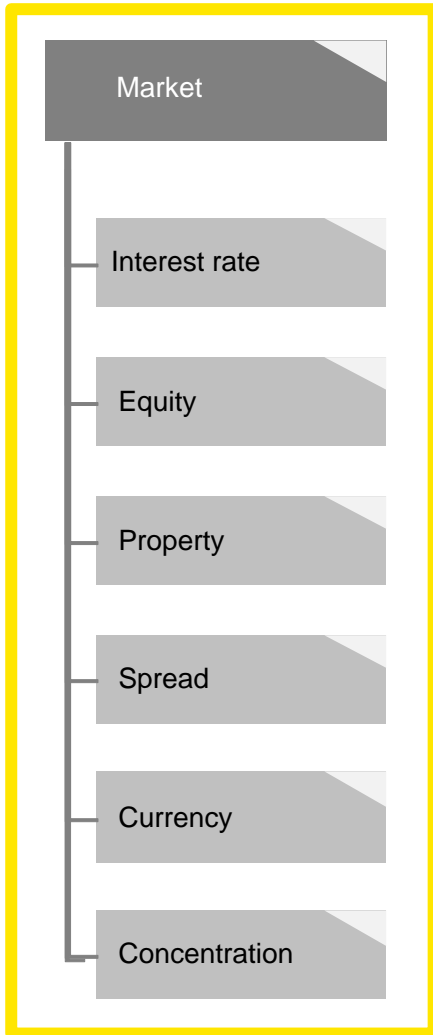- Premium Reserve
- Lapse
- CAT

Intangibles

◥ = included in the adjustment for loss absorbing capacity of technical provisions of future profit sharing

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Market risk module

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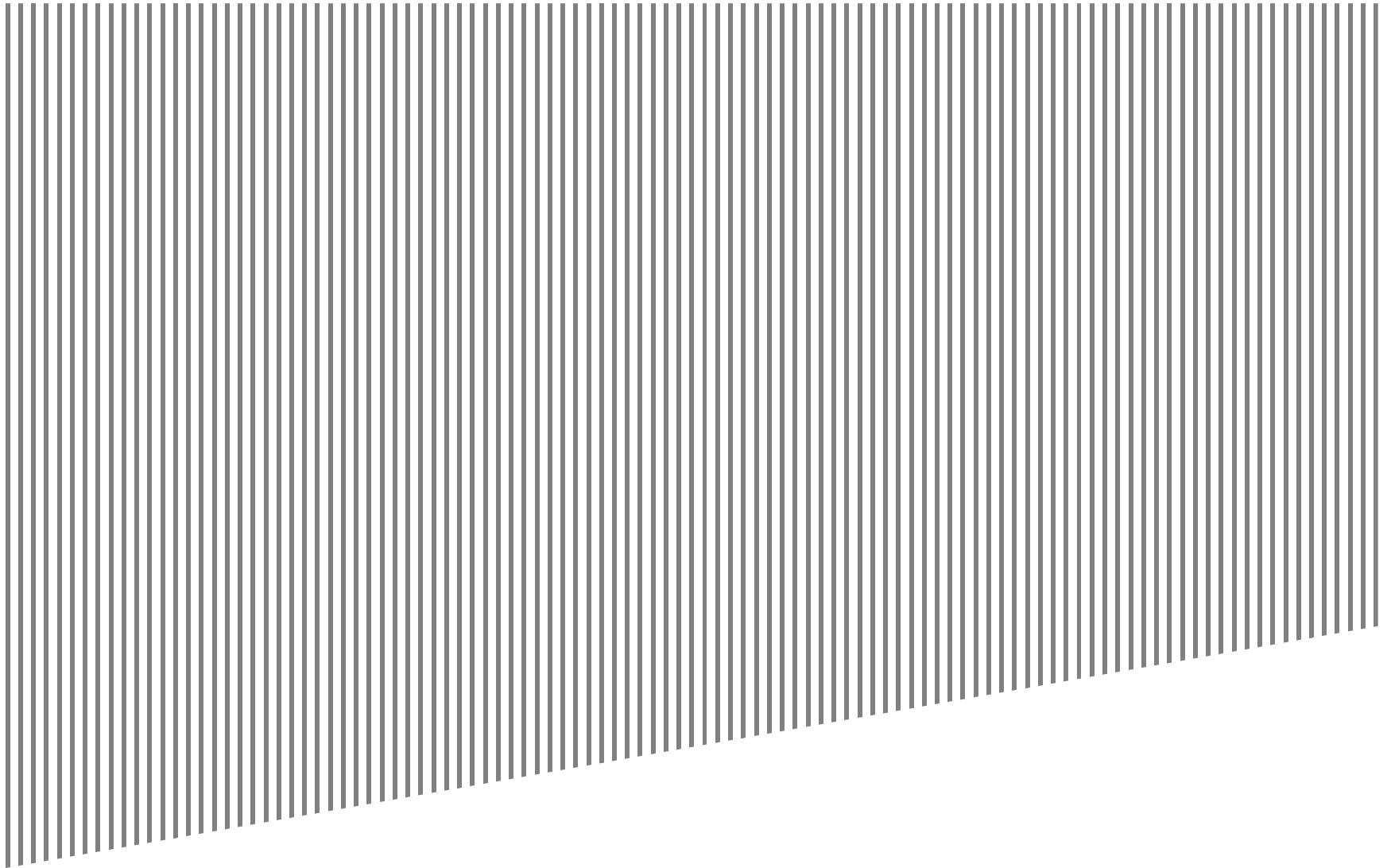
Market risk module
Overview

Market
- Interest rate
- Equity
- Property
- Spread
- Currency
- Concentration

Risk definition

► Risk of loss or of adverse change in the financial situation resulting, directly or indirectly, from fluctuations in the level and in the volatility of market prices of assets, liabilities and financial instruments.

Summary of approach

► Modular-based approach
► Correlation matrix to aggregate components

Market risk module aggregation

$$SCR_{market} = \sqrt{\sum_{i,j} Corr_{ij} \; x \; SCRi \; x \; SCRj}$$

Risk	Interest rate	Equity	Property	Spread	Concentration	Currency
Interest rate	1	A	A	A	0	0.25
Equity	A	1	0.75	0.75	0	0.25
Property	A	0.75	1	0.5	0	0.25
Spread	A	0.75	0.5	1	0	0.25
Concentration	0	0	0	0	1	0
Currency	0.25	0.25	0.25	0.25	0	1

► A = 0 (0.5) where the capital requirement for interest rate risk is given by an upward (downward) shock in the interest rate term structure

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Market risk module
Interest rate risk

Risk definition
► Risk that the value of an asset or liability will change due to a change in term structure of interest rates or interest rate volatility.

Summary of approach
► Instantaneous increase/decrease to basic risk-free interest rates for each currency at different maturities (shown at right).
► Capital requirement equals the larger of the sum, over all currencies, of the capital requirements for the risk of an <u>increase</u> or <u>decrease</u> in the term structure of interest rates.

Technicalities/practicalities
► Interest rates also directly affect the value of liability cash flows, as the present value of cash flows is dependent on the yield a riskless investment can achieve up to the time the cash flow is expected.
► Rate increases shall be at least 1% in absolute terms.
► No rate decreases shall be applied where rates are negative.
► For maturities not specified in the table at right, the value of the increase/decrease shall be linearly interpolated.
► For maturities shorter than one year, the increase shall be 70% and the decrease shall be 75%.
► For maturities longer than 90 years, the increase/decrease shall be 20%.

Maturity in (years)	Increases	Decreases
1	70%	75%
2	70%	65%
3	64%	56%
4	59%	50%
5	55%	46%
6	52%	42%
7	49%	39%
8	47%	36%
9	44%	33%
10	42%	31%
11	39%	30%
12	37%	29%
13	35%	28%
14	34%	28%
15	33%	27%
16	31%	28%
17	30%	28%
18	29%	28%
19	27%	29%
20	26%	29%
90	20%	20%

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Market risk module
Equity risk

Risk definition
► Risk that the value of an asset or liability will change due to fluctuations in the level or volatility of the market prices for equities.

Summary of approach

► Classify equities as Type 1 or Type 2
   ► Type 1 – Equities listed in regulated markets in the countries that are members of the EEA or OECD
   ► Type 2 (Other equities) – Equities listed only in emerging markets, non-listed equity, hedge funds and any other investments not included elsewhere in the market risk module
► Instantaneous decrease based on type, symmetric adjustment and potentially other considerations

Technicalities/practicalities

► Base shock of 46.5% and 56.5% for Type 1 and Type 2, respectively
   ► Strategic participation or duration-based equity approaches may instead apply (22% shock)
   ► Transitional measure may instead apply (22% shock grading to full stress over time)
► Symmetric adjustment included to avoid pro-cyclical effects of regulatory requirements (+7.5% as of 12/31/13)
   ► Increases/decreases shock based on current index value compared with its average over the last three years
 	
► Calculation formula: $SCR_{equity} = \sqrt{SCR_{type1equities}^2 + 2 \cdot 0.75 \cdot SCR_{type1equities} \cdot SCR_{type2equities} + SCR_{type2equities}^2}$

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Market risk module
Property risk

Risk definition
► Risk that arises as a result of sensitivity of assets, liabilities and financial investments to the level or volatility of market prices of property.

Summary of approach
► Immediate effect on the net value of asset and liabilities expected in the event of an instantaneous decrease of 25% in the value of investments in real estate.

Technicalities/practicalities

► The following are considered to be property:
  ► Land, buildings, immovable-property rights
  ► Property investment for the own use of the insurance undertaking
  ► Investment in real estate through collective investment undertakings, or other investments packaged as funds. This should be done via the look-through approach.
► Investment in a company engaged in real estate management, or investment in a company engaged in real estate project development or similar activities are <u>excluded</u> from property risk and are included under equity risk.
 	
► Calculation formula: $Mkt_{prop} = \max(\Delta NAV \mid property\ shock; 0)$

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Market risk module
Spread risk

Risk definition
► Risk that arises from the sensitivity of the value of assets and liabilities to changes in the level or in the volatility of credit spreads over the risk-free interest rate term structure

Summary of approach

► Classify source of spread risk (sub-module for each)

  ► Bonds and loans (other than residential mortgage loans)

  ► Securitizations

  ► Credit derivatives (such as CDSes and TRSes)

► Apply methodology specific to source

► No diversification between components

$$SCR_{spread} = SCR_{bonds} + SCR_{securitisation} + SCR_{cd}$$

Technicalities / practicalities

► Bonds and loans capital charge = MV * risk factor (which is based on duration and credit quality)

  ► Risk factor stress may be impacted by availability of collateral, issuer (e.g., EEA sovereign)

► Securitizations capital charge = MV * modified duration * risk factor (which is based on type and rating)

  ► Classified as Type 1, Type 2 and Re-securitizations

► Credit derivative capital charge = max (loss in BOF from instantaneous absolute increase in credit spread of underlying; loss in BOF from instantaneous relative decrease of 75% of credit spread of underlying)

  ► Magnitude of spread widening depends on credit rating

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Market risk module
Currency risk

Risk definition
► Risk that arises from changes in the level or volatility of currency exchange rates

Summary of approach
► For each foreign currency, the contribution to the capital requirement is determined as the maximum of the currency up-shock and the currency down-shock relative to the local currency

Technicalities/practicalities

► Shocks up and down are 25% and (25%), respectively

  ► Factors can be reduced for currencies pegged to Euro

► The local currency is the currency in which the undertaking prepares its financial statements.

► All of the participant's individual currency positions and its investment policy (e.g., hedging arrangements, gearing, etc.) should be taken into account

  ► Includes any investment in foreign instruments where the currency risk is not hedged.

  ► Investments in listed equity should be assumed to be sensitive to the currency of its main listing. Non-listed equity and property should be assumed to be sensitive to the currency of its location

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Market risk module
Concentration risk

Risk definition
► Risk that arises from large investment in individual counterparties and single name exposures.

Summary of approach
► Determine excess exposure per single name exposure (XS_i)
► Determine risk concentration requirement per single name exposure (Conc_i), which is the loss in basic own funds caused by an instantaneous decrease in the value of assets corresponding to single name exposure *i*
► Aggregate across single name exposures (SCR_conc)

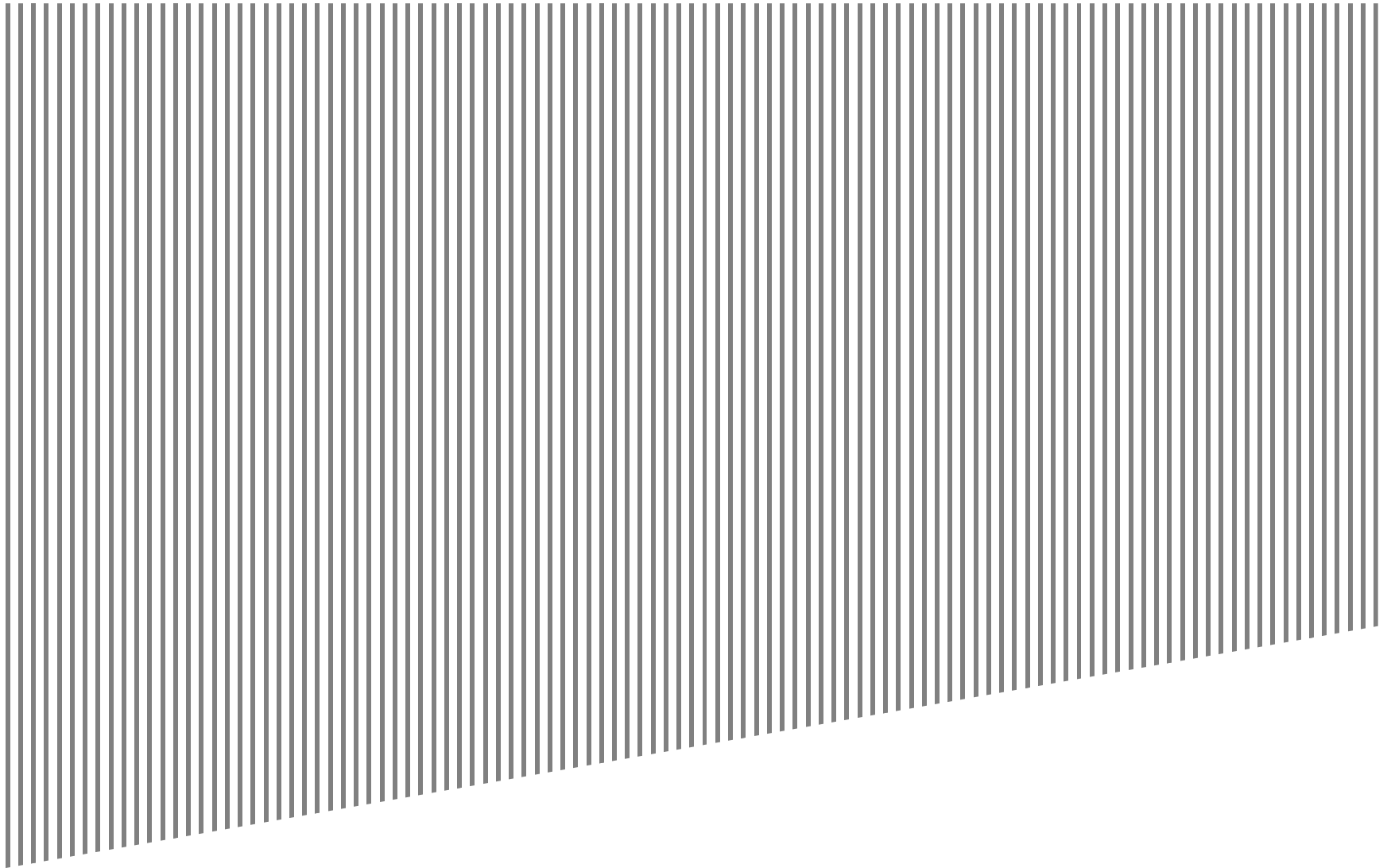| Technicalities/practicalities |
| --- |

$$XS_i = Max(0; E_i - CT_i \cdot Assets)$$

- ► E_i = Total exposure at default to single name i out of assets less counterparties with g_i = 0
- ► Assets = Total value of all assets held by the undertaking with some exclusions
- ► CT_i = Exposure threshold, which varies between 15% and 1.5% depending on credit quality step and asset class

$$Conc_i = g_i \times XS_i$$

- ► g_i = Risk factor which varies between 0% and 73% by credit quality step or undertaking's solvency ratio where no External Credit Assessment Institutions credit rating is available, as well as asset class
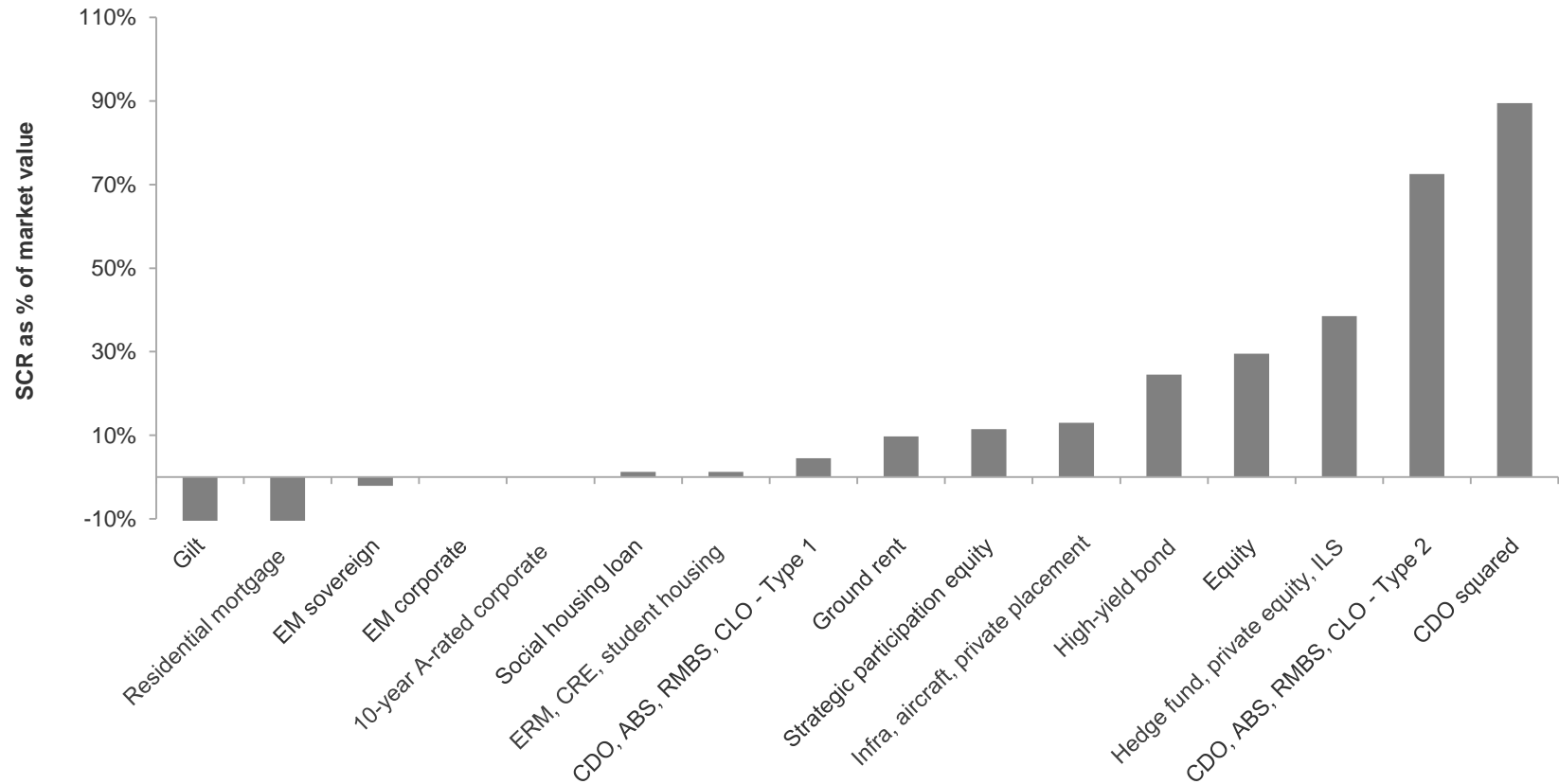
$$SCR_{conc} = \sqrt{\sum_i Conc_i^2}$$

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Asset allocation considerations

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Asset allocation considerations
Indicative SCR charges on investments

SCR as % of market value

Gilt	
Residential mortgage	
EM sovereign	
EM corporate	
10-year A-rated corporate	
Social housing loan	
ERM, CRE, student housing	
CDO, ABS, RMBS, CLO - Type 1	
Ground rent	
Strategic participation equity	
Infra, aircraft, private placement	
High-yield bond	
Equity	
Hedge fund, private equity, ILS	
CDO, ABS, RMBS, CLO - Type 2	
CDO squared	

Source: Non-traditional investments Key Considerations for Insurers,
Institute and Faculty of Actuaries Non-Traditional Investments Working Party

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Asset allocation considerations
Spread risk SCR comparison – January 2014

Spread risk ($B_i * duration_i$)

Credit quality	Commercial real estate loans			Securitizations (New Type 1 and Type 2)			Covered bonds		
	5y	10y	15y	2y	4y	6y	5y	10y	15y
AAA	4.5%	7.2%	9.7%	8.6% **25.0%**	17.2% **50.0%**	25.8% **75.0%**	3.5%	6.0%	8.5%
AA	5.5%	8.4%	10.9%	17.0% **26.8%**	34.0% **55.6%**	51.0% **78.9%**	4.5%	7.0%	9.5%
A	7.0%	10.5%	13.0%	29.6% **33.2%**	59.2% **66.4%**	88.8% **99.6%**	Charges equal to commercial real estate loans		
BBB	12.5%	20.0%	25.0%	34.0% **39.4%**	68.0% **78.8%**	100.0% **100.0%**			
Unrated	15.0%	23.5%	29.5%	100%	100%	100%			

► Commercial real estate loans treated in line with corporate bonds. Unrated could get some reduced capital charge, depending on collateral

► Retail real estate loans treated under counterparty default risk

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Asset allocation considerations
Spread risk SCR comparison – July 2014

Spread risk ($B_i * duration_i$)

Credit quality	Commercial real estate loans			Securitizations (New Type 1 and Type 2)			Covered bonds		
	5y	10y	15y	2y	4y	6y	5y	10y	15y
AAA	4.5%	7.0%	9.5%	4.2% 25.0%	8.4% 50.0%	12.6% 75.0%	3.5%	6.0%	8.5%
AA	5.5%	8.4%	10.9%	6.0% 26.8%	12.0% 55.6%	18.0% 78.9%	4.5%	7.0%	9.5%
A	7.0%	10.5%	13.0%	8.0% 33.2%	16.0% 66.4%	24.0% 99.6%	Charges equal to commercial real estate loans		
BBB	12.5%	20.0%	25.0%	10.0% 39.4%	20.0% 78.8%	30.0% 100.0%			
Unrated	7.5%	11.8%	14.8%	100%	100%	100%			

► Commercial real estate loans treated in line with corporate bonds. Unrated could get some reduced capital charge, depending on collateral

► Retail real estate loans treated under counterparty default risk

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Asset allocation considerations
Spread risk SCR comparison – October 2014

Spread risk ($B_i * duration_i$)

Credit quality	Commercial real estate loans			Securitizations (New Type 1 and Type 2)			Covered bonds		
	5y	10y	15y	2y	4y	6y	5y	10y	15y
AAA	4.5%	7.0%	9.5%	4.2% **25.0%**	8.4% **50.0%**	12.6% **75.0%**	3.5%	6.0%	8.5%
AA	5.5%	8.4%	10.9%	6.0% **26.8%**	12.0% **55.6%**	18.0% **78.9%**	4.5%	7.0%	9.5%
A	7.0%	10.5%	13.0%	6.0% **33.2%**	12.0% **66.4%**	18.0% **99.6%**	Charges equal to commercial real estate loans		
BBB	12.5%	20.0%	25.0%	6.0% **39.4%**	12.0% **78.8%**	18.0% **100.0%**			
Unrated	7.5%	11.8%	14.8%	100%	100%	100%			

► Commercial real estate loans treated in line with corporate bonds. Unrated could get some reduced capital charge, depending on collateral

► Retail real estate loans treated under counterparty default risk

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Asset allocation considerations
Securitizations now viable?

Risk retention requirements

- ▶ No less than 5%
- ▶ Measured as nominal value
- ▶ Measured at origination

Qualitative

- ▶ Due diligence
- ▶ Features of originator
- ▶ Reporting/Monitoring

Exceptions

- ▶ ECB bonds and loans
- ▶ EU government loans
- ▶ EU central bank loans
- ▶ Multilateral development banks
- ▶ International organizations

What happens when rule is broken?

- ▶ Inform the supervisory authority immediately
- ▶ Proportionate increase to the SCR
- ▶ Risk factors progressively increased with each subsequent breach

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Asset allocation considerations
Takeaways

▶ Portfolio management is becoming more complex

▶ The rules are still being figured out

▶ New opportunities?

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Questions?

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