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How to Estimate Risk Margins Under Solvency II

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Today's Agenda

- Introduction (Risk Margin, Solvency II)
- Overview of Risk Margin Calculation
- SCR Overview
- Methods to Calculate Risk Margins
- Example
- Wrap-Up

Definition of Risk Margin

Industry descriptions of risk margin under Solvency II:

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- Along with "best estimate" makes up "technical provisions,"
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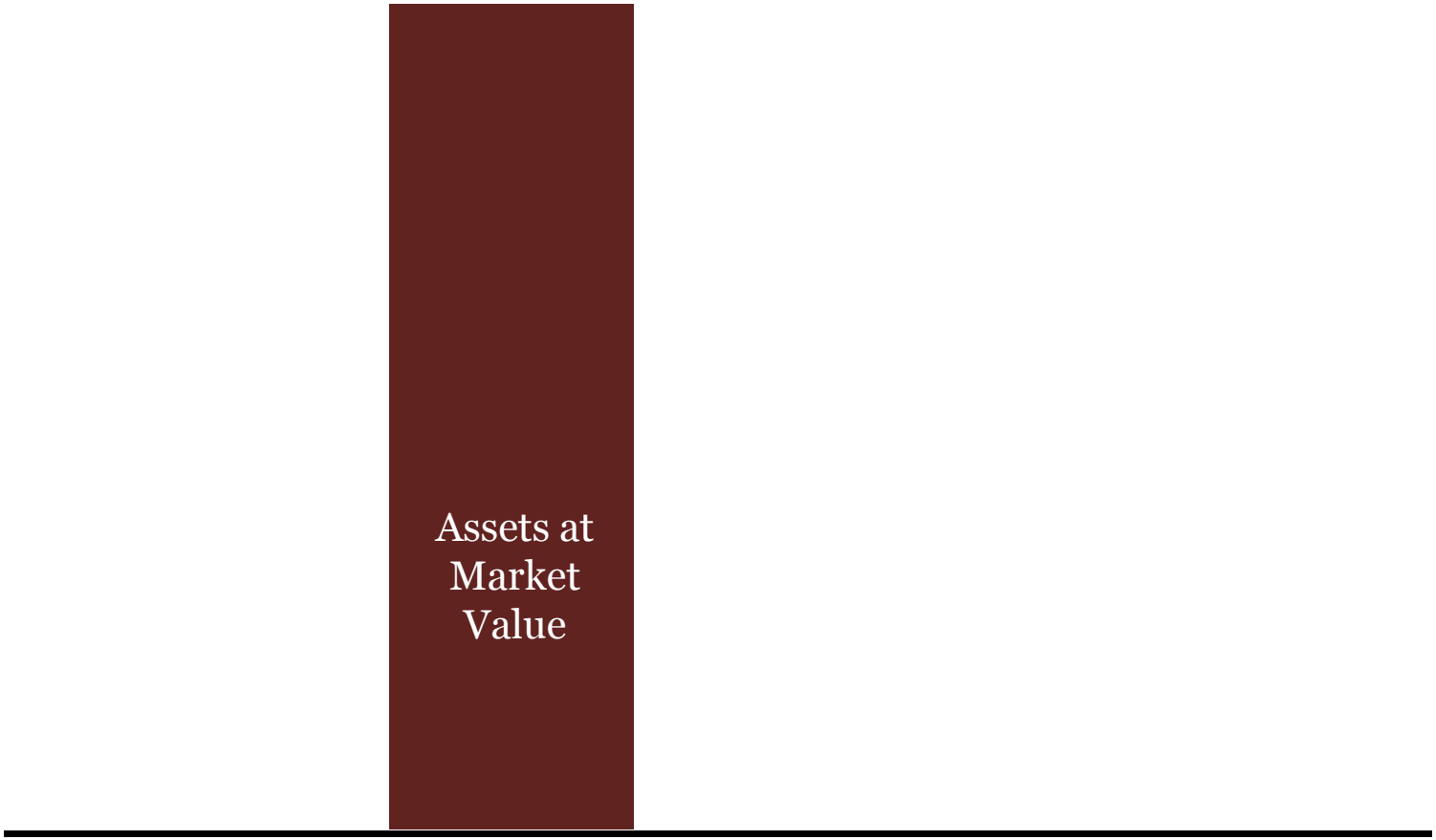
- Along with "best estimate" makes up "technical provisions,"
- Ensures that value of technical provisions is equivalent to the amount that an insurer would be expected to require in order to take over and meet the insurance obligations.

OR…

- Increases the technical provisions from the best estimate up to an amount equivalent to a theoretical level needed to transfer obligations to another insurer.

Solvency II Balance Sheet

Quantitative Capital Requirements



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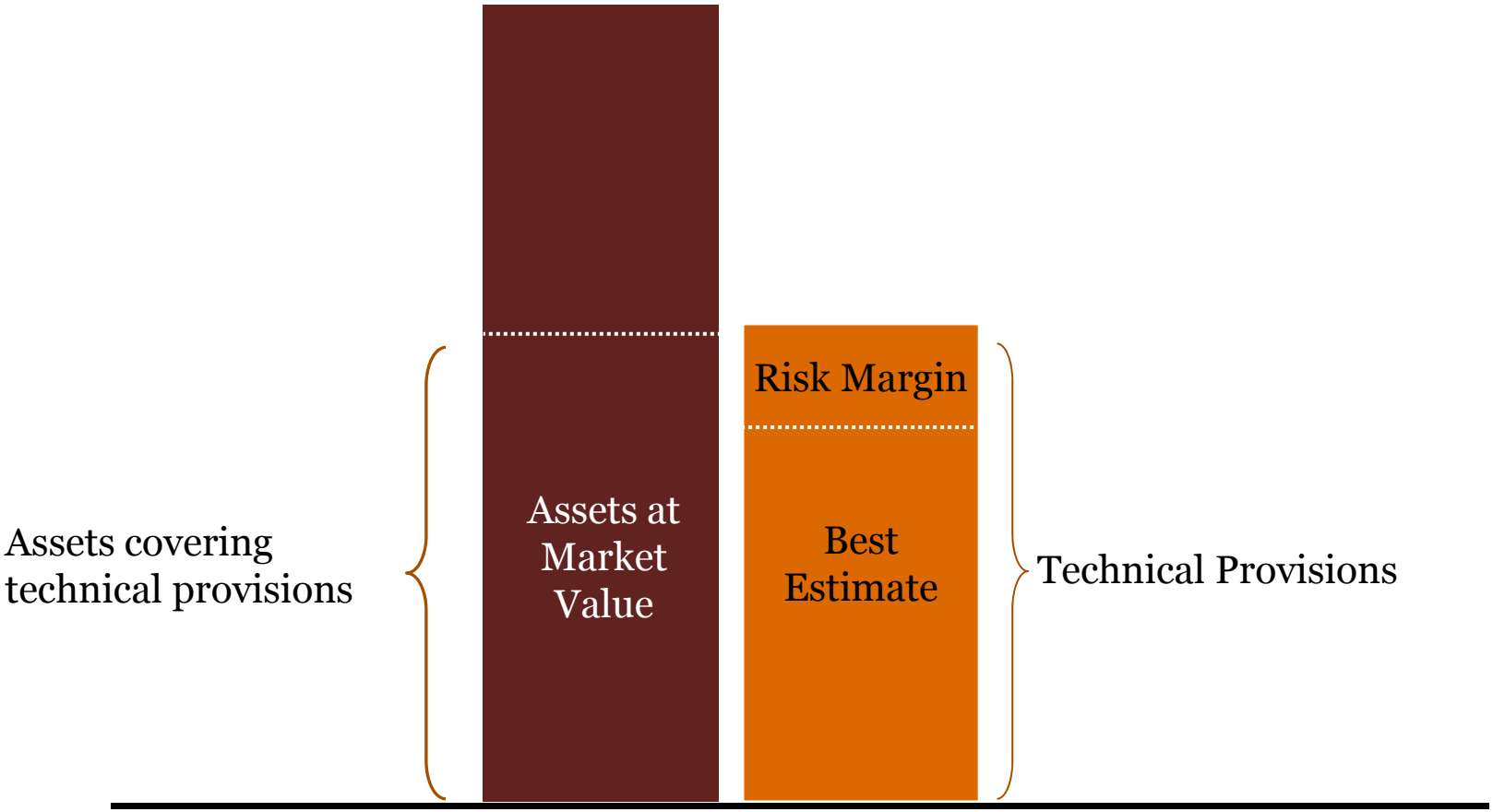

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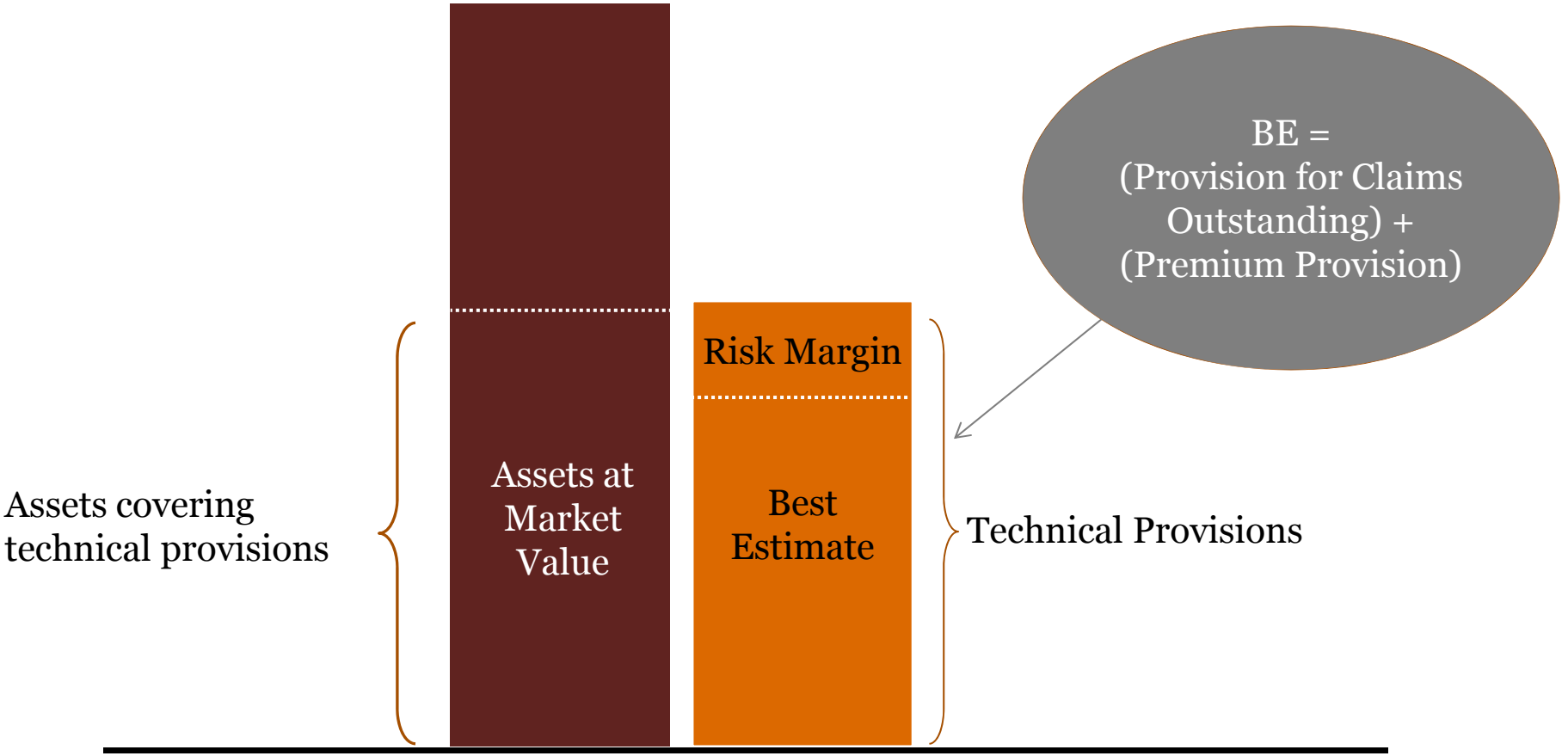

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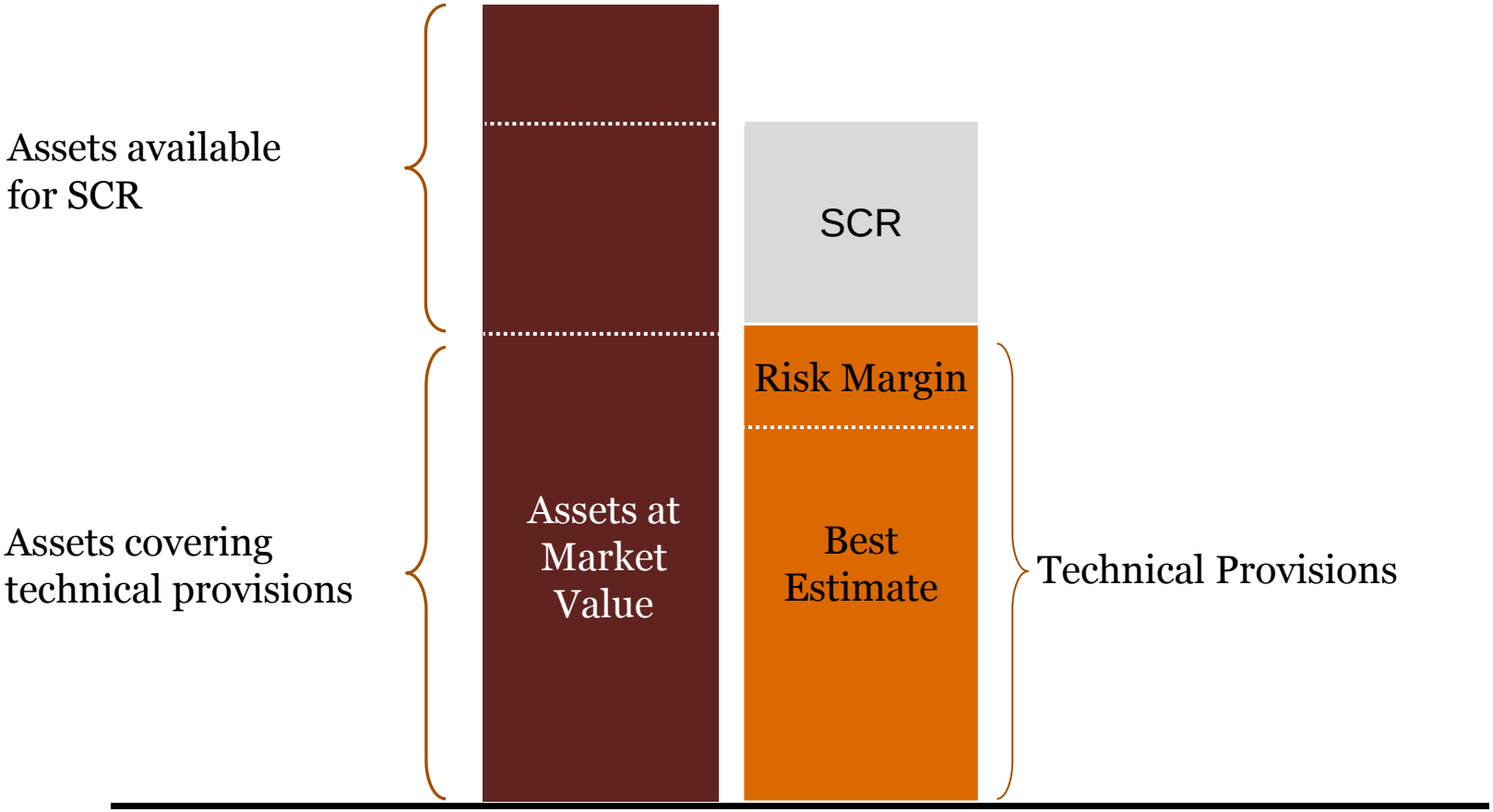

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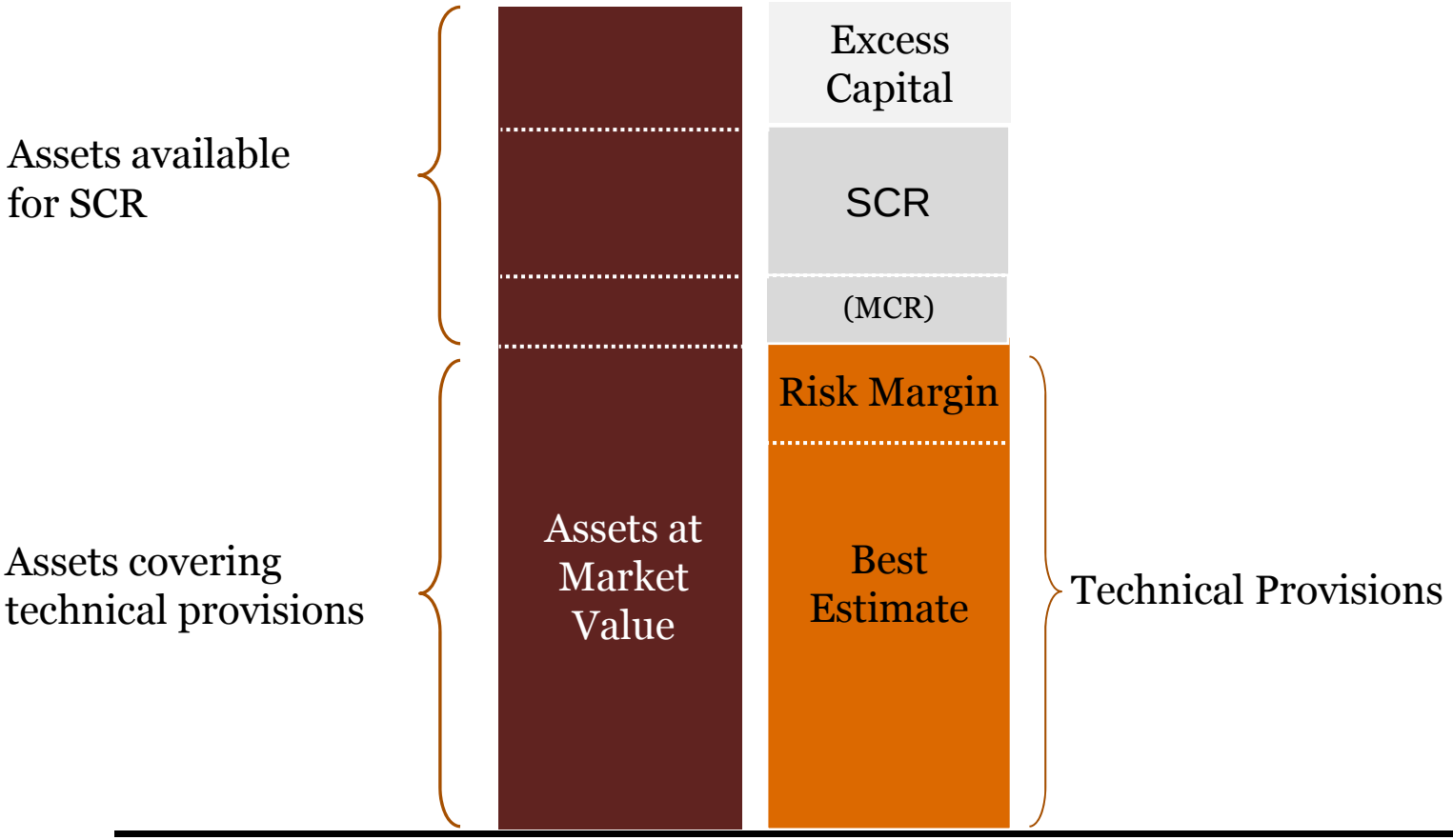

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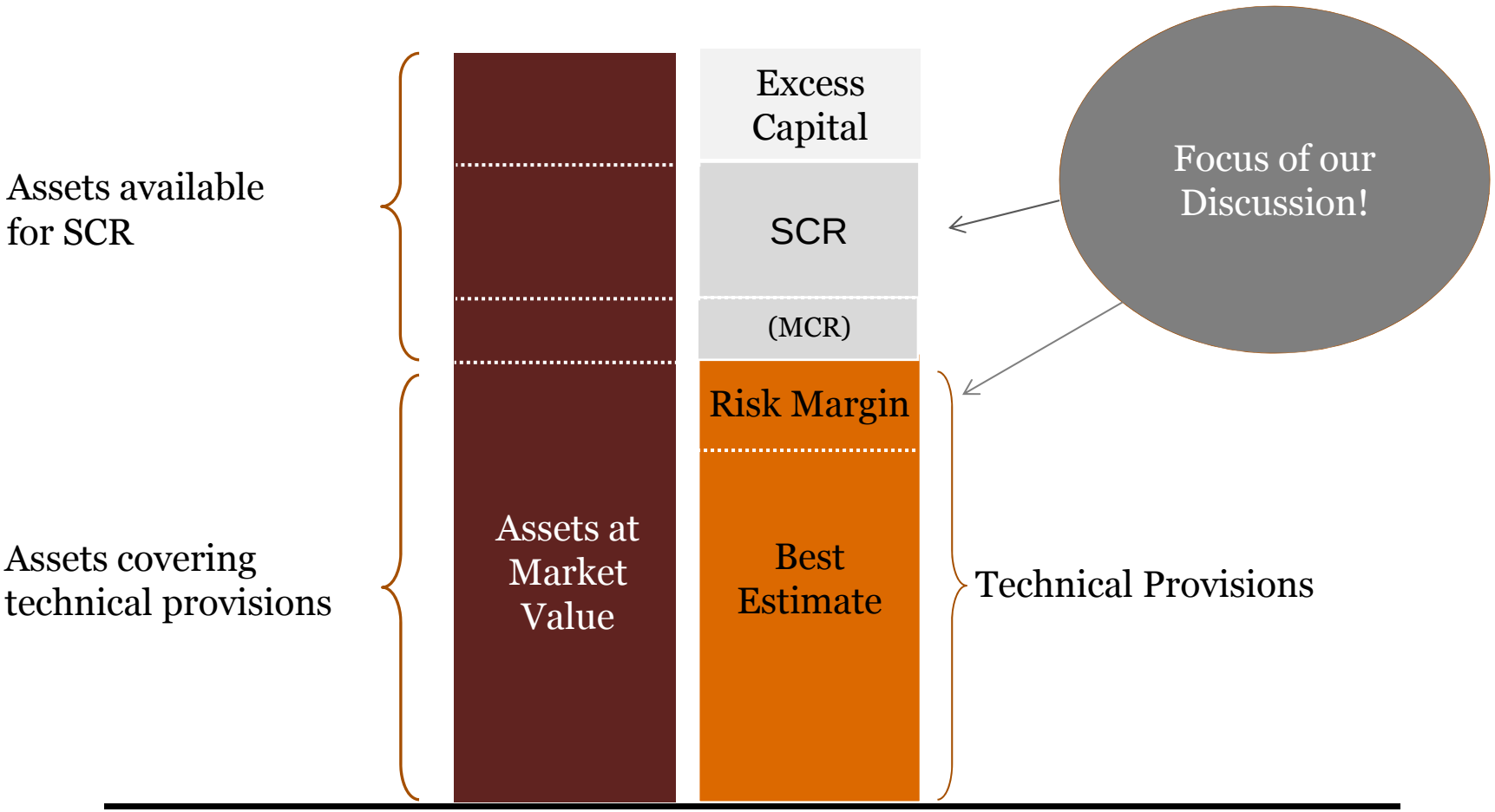

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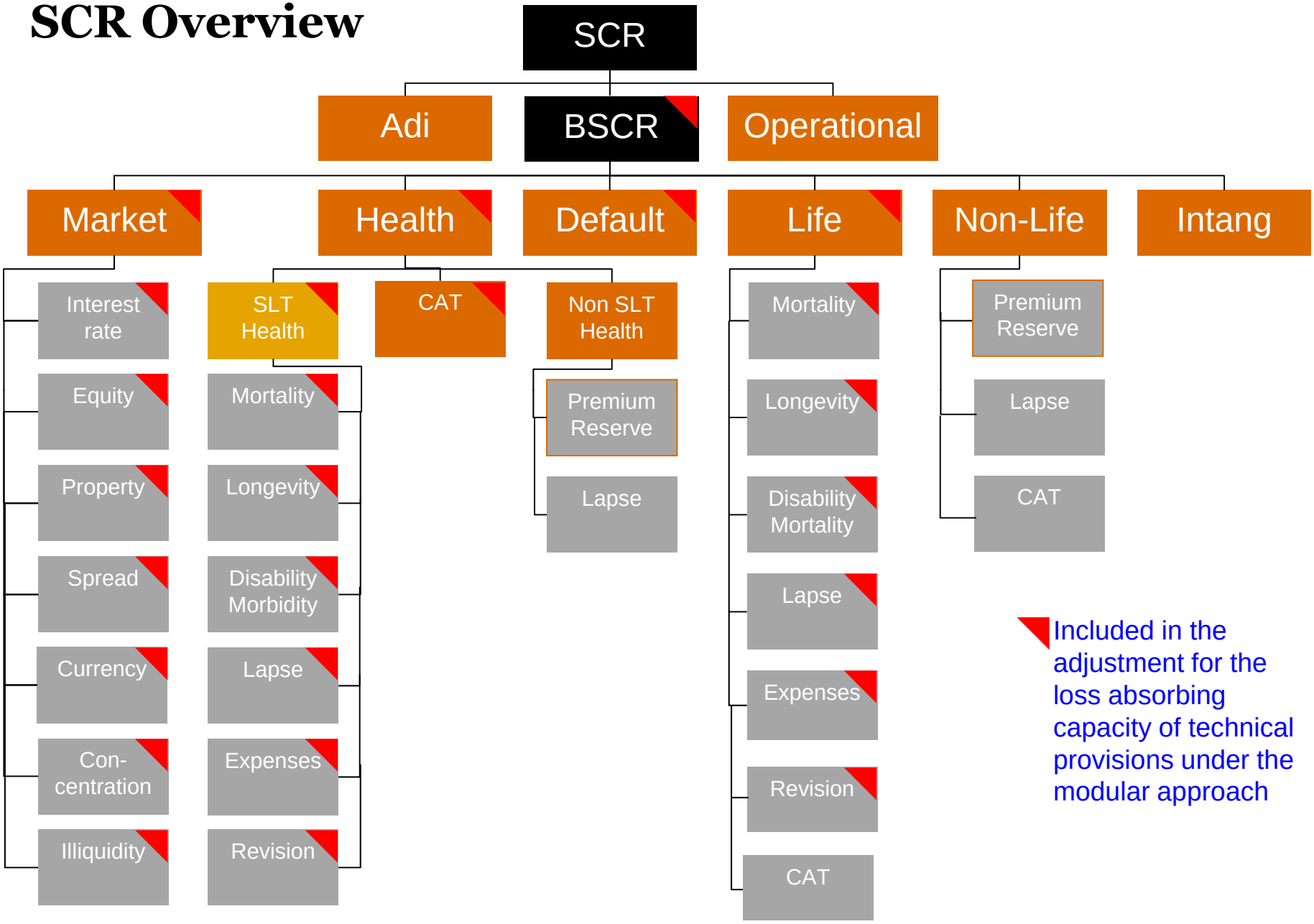

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  - Some confusion during QIS 5
  - Newer guidance adding clarity

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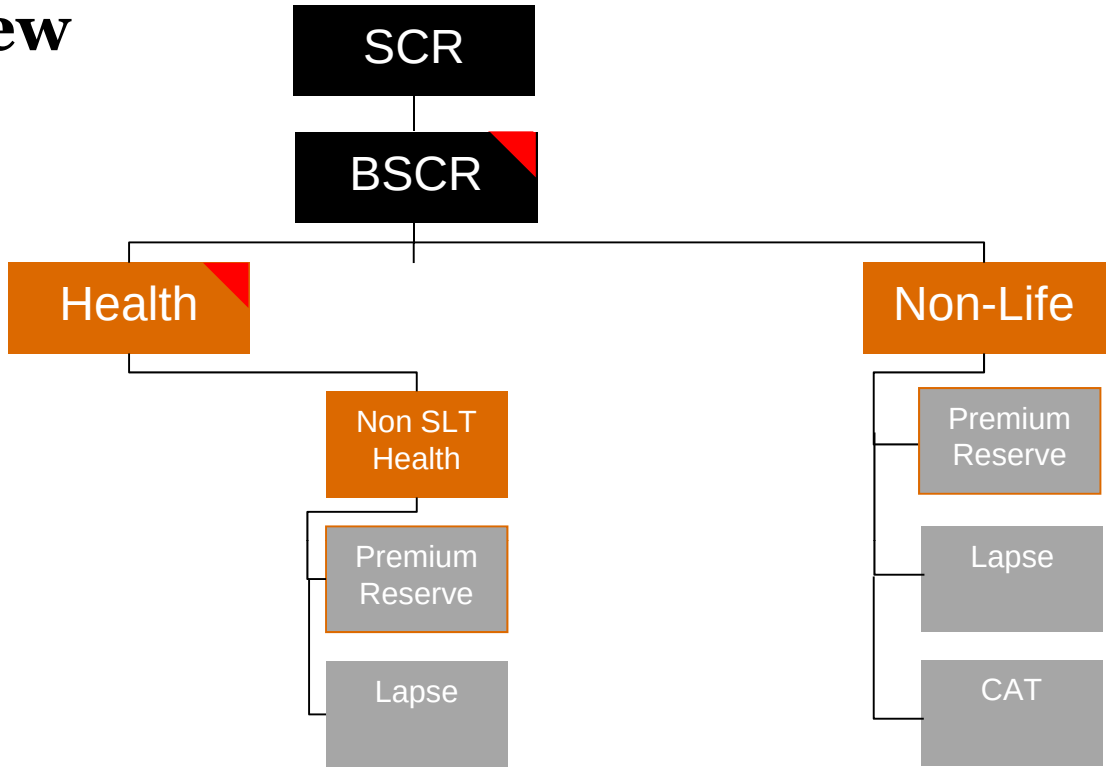

Underwriting Risks

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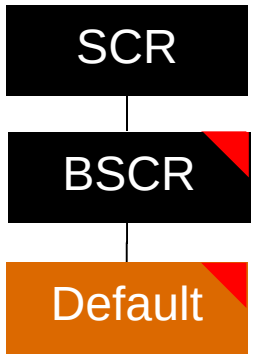
  - Make sure to exclude unrelated credit risks that are factored into SCR calculation (cash at bank, etc.)

SCR Overview



Credit Risk

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SCR needed to support runoff of your (re)insurance obligations captures the following:

- Underwriting Risk with respect to transferred business;
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- Operational Risk

SCR Overview

Operational Risk

SCR Overview

SCR needed to support runoff of your (re)insurance obligations captures the following:

- Underwriting Risk with respect to transferred business;
- Credit Risk (aka Counterparty Default risk) with respect to reinsurance contracts;
- Operational Risk;
- Unavoidable Market Risk – expected to be zero for P&C companies

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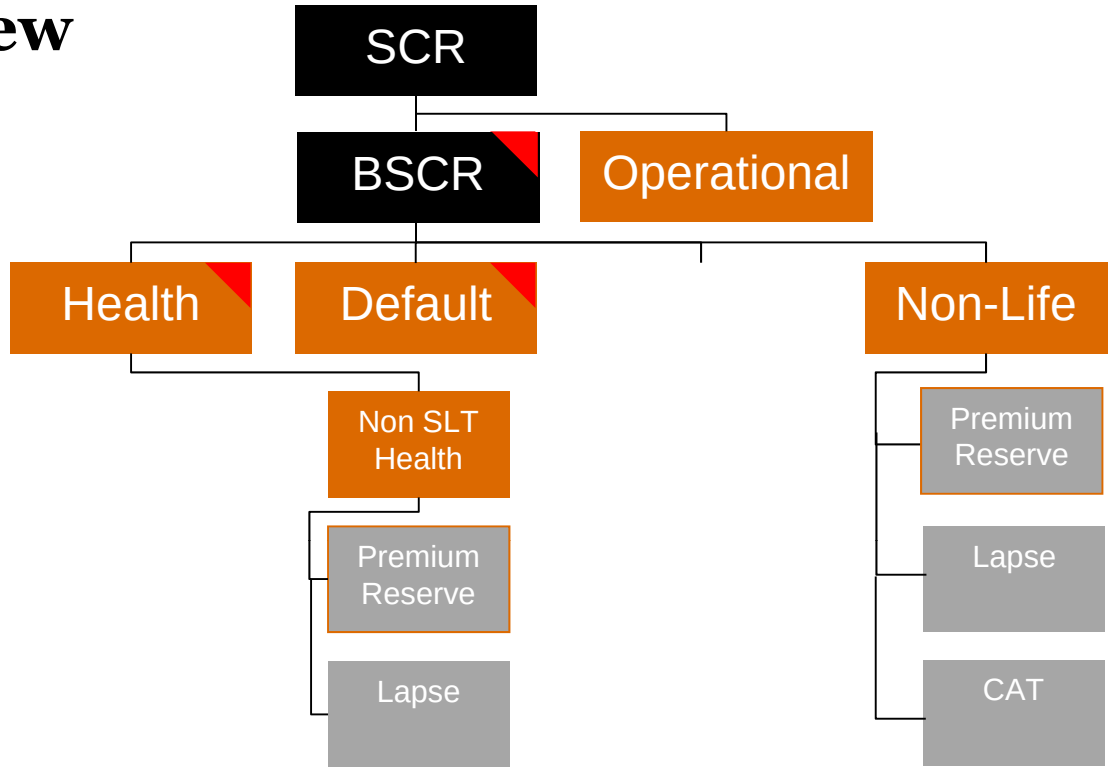

All Risks relevant to Risk Margin calculation

Risk Margin Calculation - Methods

Recall Formula:

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- CoC is given = 6%
- r_f is risk-free rate for t+1 years maturity
- SCR in future years is the unknown and where bulk of calculation lies

Risk Margin Calculation - Methods

Hierarchy of Simplifications used for projecting SCRs:

5) % of Best Estimate

Risk Margin Calculation - Methods

Hierarchy of Simplifications used for projecting SCRs:

4) Duration Approach
5) % of Best Estimate

Risk Margin Calculation - Methods

Hierarchy of Simplifications used for projecting SCRs:

3) Approximate whole SCR in future years (Proportional Approach)
4) Duration Approach
5) % of Best Estimate

Risk Margin Calculation - Methods

Hierarchy of Simplifications used for projecting SCRs:

2) Approximate individual (sub)risks used for SCR calculation
3) Approximate whole SCR in future years (Proportional Approach)
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5) % of Best Estimate

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Hierarchy of Simplifications used for projecting SCRs:

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Risk Margin Calculation - Methods

Method 3 - Proportional Approach

- Most commonly used;
- Formula is:

$$SCR_t = BE_t \times \left(\frac{SCR_0}{BE_0}\right) \quad t = 1,2,3, \ldots$$

- Method essentially "runs-off" SCR in proportion to Best Estimate (reserves);
- Recall SCR_0 only includes underwriting risk, credit risk, operational risk. Hence is NOT your company's full SCR

Risk Margin Calculation - Example

Example of Method 3 - Proportional Approach

- BE_0 = \$300M; SCR_0 = \$80M

t = time	Payment Pattern (Ratio-to-Ult)	BE_t	SCR_t
0	0%	\$300	\$80
1	40%	\$180	\$48
2	60%	\$120	\$32
3	80%	\$60	\$16
4	100%	\$0	\$0

- Where, $SCR_t = BE_t \times \left(\frac{SCR_0}{BE_0}\right) \quad t = 1,2,3,\ldots$

Risk Margin Calculation - Example

Example of Method 3 - Proportional Approach

- Next, calculate Risk Margin using: $$RM = CoC \times \sum_{t=0}^{n} \frac{SCR_t}{(1+r_f)^{t+1}}$$

t = time	SCR_t	r_f for t+1 years	$\frac{SCR_t}{(1+r_f)^{t+1}}$
0	$80	1.0%	$79
1	$48	1.0%	$47
2	$32	1.5%	$31
3	$16	1.5%	$15
4	$0	2.0%	$0
			$172 = Σ

- Risk Margin = (6%) x ($172M) = $10.3M
- Ratio of RM to BE = 3.4%

Risk Margin Calculation - Methods

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- Expected to gain popularity;
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  - Underwriting Risk – calculate SCRs in future years based on expected Best Estimates in future evaluations
  - Operational Risk – standard formula approach

Wrap-Up

Additional items to consider include:

- Solvency II requires Risk Margin allocated by LOB;
- Consideration of Standard Formula vs Internal model
- Calculating a unique Cost of Capital rate

Wrap-Up

Questions/Comments

Thank You

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