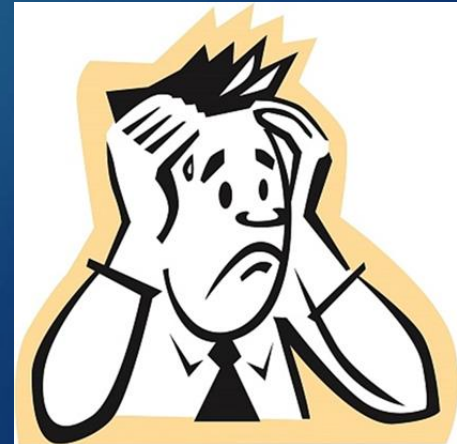
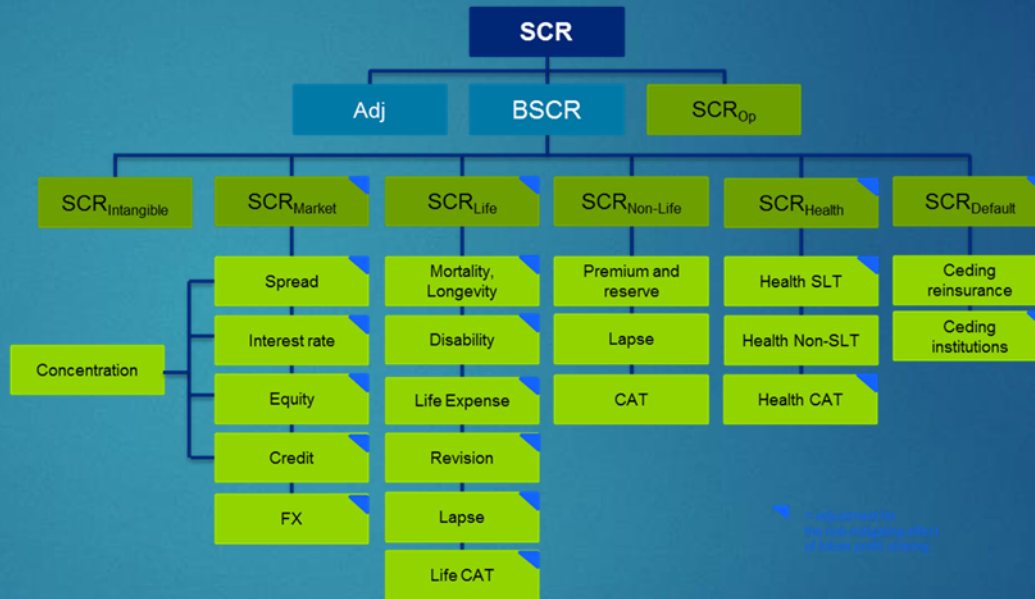


# Solventnost II – modul 3

ALES TOMAZIN, LJUBLJANA -> PODGORICA, 10.12.2020

# Agenda

- ▶ Radionice
  - ▶ CDR
  - ▶ **Nonlife UW risk**
  - ▶ Market risk
  - ▶ Risk margin
- ▶ 15/45 format

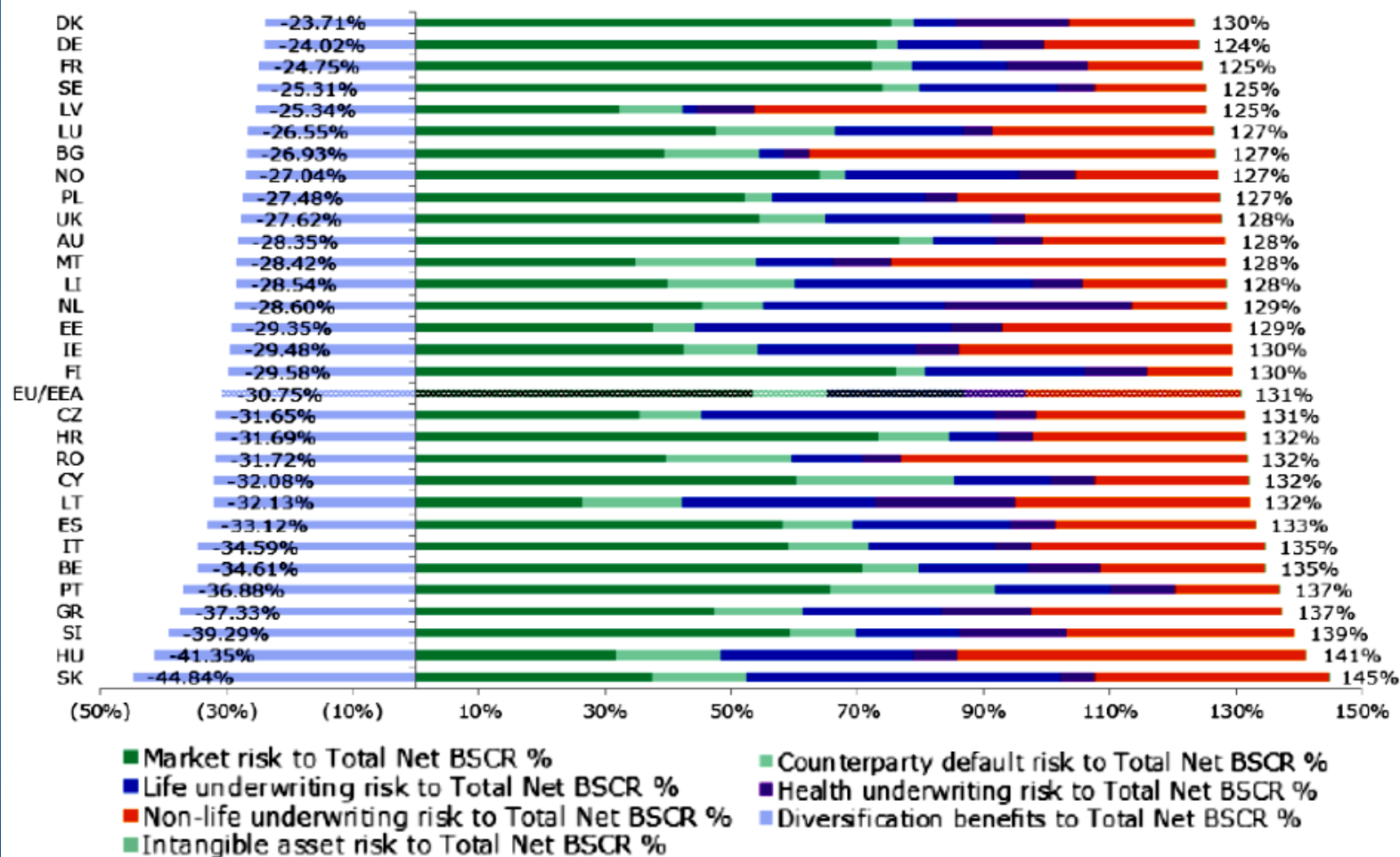


# Radionica – wrap-up

- ▶ Cilj je bio CDR modul (na kraju SCR i SII BS)
- ▶ Za SCR\_n1 trebaju nam podaci o premiji i rezervacijama te statistike oko naseg portfolia rizika i specifikacije ugovora reosiguranja
- ▶ Uradili smo
  - ▶ GWP + earned dio
  - ▶ Premija za reosiguranje + earned dio
  - ▶ Plan neto zarađene premije za sledeću godinu (posebno premija bez reosiguranja za RM efekat)
  - ▶ Izračun neto štetnih rezervacija

# EIOPA June 2017 Financial Stability Report

## Breakdown of net Basic SCR



Source: EIOPA June 2017 Financial Stability Report



# SCR\_nl

- ▶ SCR\_nl non-life underwriting module
- ▶ Modul rizika neživotnog osiguranja
  - ▶ Kapital kojeg moramo imati zbog non-life rizika, koji potiče iz obaveza naših non-life ugovora osiguranja
  - ▶ Neizvjesne opcije ugovora osiguranja (obnova, prekid...)
  - ▶ Trenutni portfolio i novi posao u narednoj godini (sjetite se, da je SCR kapital, koji nam treba za narednih 12 mjeseci 😊)
  - ▶ Tri podmula:
    - ▶ Rizik iz premija i rezervi za štete (NL\_pr)
    - ▶ Rizik iz prekida ugovora osiguranja (NL\_lapse)
    - ▶ Rizik iz CAT (katastrofalnih) događaja (NL\_CAT)

# SCR\_nl

SCR.9.7. The capital requirement for non-life underwriting risk is derived by combining the capital requirements for the non-life sub-risks using a correlation matrix as follows:

$$SCR_{nl} = \sqrt{\sum \text{CorrNL}_{r,c} \cdot NL_r \cdot NL_c}$$

where

$\text{CorrNL}_{r,c}$  = The entries of the correlation matrix  $\text{CorrNL}$

$NL_r, NL_c$  = Capital requirements for individual non-life underwriting sub-risks according to the rows and columns of correlation

matrix  $\text{CorrNL}$

and where the correlation matrix  $\text{CorrNL}$  is defined as:

$\text{CorrNL}$	$NL_{pr}$	$NL_{lapse}$	$NL_{CAT}$
$NL_{pr}$	1		
$NL_{lapse}$	0	1	
$NL_{CAT}$	0.25	0	1

# SCR\_nl

- NL\_pr: rizik iz premija i rezervi
- za svaki segment s trebaju nam:

$PCO_s$	=	Best estimate for claims outstanding for each segment. This amount should be less the amount recoverable from reinsurance contracts and special purpose vehicles.
$P_s$	=	Estimate of the premiums to be earned by the insurance or reinsurance undertaking for each segment during the following 12 months
$P_{(last,s)}$	=	The premiums earned by the insurance or reinsurance undertaking for each segment during the last 12 months
$FP_{(existing,s)}$	=	The expected present value of premiums to be earned by the insurance or reinsurance undertaking for each segment after the following 12 months for existing contracts
$FP_{(future,s)}$	=	The expected present value of premiums to be earned by the insurance and reinsurance undertaking for each segment for contracts where the initial recognition date falls in the following 12 months but excluding the premiums to be earned during the 12 months after the initial recognition date

# SCR\_nl

## ► NL\_pr: kalkulacija

SCR.9.12. The capital requirement for the combined premium risk and reserve risk is determined as follows:

$$NL_{pr} = 3 \cdot \sigma \cdot V$$

where

$V$	=	Volume measure
$\sigma$	=	Combined standard deviation for non-life premium and reserve risk

SCR.9.13. The volume measure  $V$  and the combined standard deviation  $\sigma$  for the overall non-life insurance portfolio are determined in two steps as follows:

- For each individual segment, the standard deviations and volume measures for both premium risk and reserve risk are determined;
- The standard deviations and volume measures for the premium risk and the reserve risk in the individual segments are aggregated to derive an overall volume measure  $V$  and a combined standard deviation  $\sigma$ .



# SCR\_nl

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	Segment
1	Motor vehicle liability insurance and proportional reinsurance
2	Other motor insurance and proportional reinsurance
3	Marine, aviation and transport insurance and proportional reinsurance
4	Fire and other damage to property insurance and proportional reinsurance
5	General liability insurance and proportional reinsurance
6	Credit and suretyship insurance and proportional reinsurance
7	Legal expenses insurance and proportional reinsurance
8	Assistance and its proportional reinsurance
9	Miscellaneous financial loss insurance and proportional reinsurance
10	Non-proportional casualty reinsurance
11	Non-proportional marine, aviation and transport reinsurance
12	Non-proportional property reinsurance

# SCR\_nl

## ► NL\_pr: kalkulacija

SCR.9.16. For each segment, the volume measures and standard deviations for premium and reserve risk are denoted as follows:

$V_{(prem,s)}$  = The volume measure for premium risk

$V_{(res,s)}$  = The volume measure for reserve risk

$\sigma_{(prem,s)}$  = standard deviation for premium risk

$\sigma_{(res,s)}$  = standard deviation for reserve risk

SCR.9.17. The volume measure for premium risk in the individual segment is determined as follows:

$$V_{(prem,s)} = \max(P_s; P_{(last,s)}) + FP_{(existing,s)} + FP_{(future,s)}$$

SCR.9.22. The volume measure for reserve risk for each individual segment is determined as follows:

$$V_{(res,s)} = PCO_s$$

Segment	Standard deviation for premium risk (gross of reinsurance)
1. Motor vehicle liability insurance and proportional reinsurance	10% · NP <sub>lob</sub>
2. Other motor insurance and proportional reinsurance	8% · NP <sub>lob</sub>
3. MAT insurance and proportional reinsurance	15% · NP <sub>lob</sub>
4. Fire insurance and proportional reinsurance	8% · NP <sub>lob</sub>
5. 3rd-party liability insurance and proportional reinsurance	14% · NP <sub>lob</sub>
6. Credit insurance and proportional reinsurance	12% · NP <sub>lob</sub>
7. Legal expenses insurance and proportional reinsurance	7% · NP <sub>lob</sub>
8. Assistance insurance and proportional reinsurance	9% · NP <sub>lob</sub>
9. Miscellaneous insurance and proportional reinsurance	13% · NP <sub>lob</sub>
10. Np reins (cas)	17%
11. Np reins (MAT)	17%
12. Np reins (prop)	17%

LoB <sub>i</sub>	standard deviation for reserve risk (net of reinsurance)
Motor vehicle liability insurance and proportional reinsurance	9%
Other motor insurance and proportional reinsurance	8%
MAT insurance and proportional reinsurance	11%
Fire insurance and proportional reinsurance	10%
3rd-party liability insurance and proportional reinsurance	11%
Credit insurance and proportional reinsurance	19%
Legal expenses insurance and proportional reinsurance	12%
Assistance insurance and proportional reinsurance	20%
Miscellaneous insurance and proportional reinsurance	20%
Np reins (cas)	20%
Np reins (MAT)	20%
Np reins (prop)	20%

# SCR\_nl

## ► NL\_pr: kalkulacija (index j za geografski segment)

SCR.9.26. 
$$\sigma_s = \frac{\sqrt{(\sigma_{(prem,s)} V_{(prem,s)})^2 + \sigma_{(prem,s)} \sigma_{(res,s)} V_{(prem,s)} V_{(res,s)} + (\sigma_{(res,s)} V_{(res,s)})^2}}{V_{(prem,s)} + V_{(res,s)}}$$

SCR.9.27. The overall standard deviation  $\sigma$  is determined as follows:

$$\sigma_{nl} = \frac{1}{V_{nl}} \cdot \sqrt{\sum_{s,t} CorrS_{(s,t)} \cdot \sigma_s \cdot V_s \cdot \sigma_t \cdot V_t}$$

where

- $s, t$  = All indices of the form (segment)
- $CorrS_{s,t}$  = The entries of the correlation matrix CorrS
- $V_s, V_t$  = Volume measures for premium and reserve risk of segments  $s$  and  $t$  respectively
- $\sigma_s, \sigma_t$  = standard deviations for non-life premium and reserve risk of segments  $s$  and  $t$  respectively

SCR.9.29.

$$V_s = (V_{(prem,s)} + V_{(res,s)}) \cdot (0.75 + 0.25 \cdot DIV_s)$$

where

$$DIV_s = \frac{\sum_j (V_{(prem,j,s)} + V_{(res,j,s)})^2}{\sum_j (V_{(prem,s)} + V_{(res,s)})^2}$$

CorrS	1	2	3	4	5	6	7	8	9	10	11	12
1: Motor vehicle liability	1											
2: Other motor	0,5	1										
3: MAT	0,5	0,25	1									
4: Fire	0,25	0,25	0,25	1								
5: 3rd party liability	0,5	0,25	0,25	0,25	1							
6: Credit	0,25	0,25	0,25	0,25	0,5	1						
7: Legal exp.	0,5	0,5	0,25	0,25	0,5	0,5	1					
8: Assistance	0,25	0,5	0,5	0,5	0,25	0,25	0,25	1				
9: Miscellaneous.	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	1			
10: Np reins. (casualty)	0,25	0,25	0,25	0,25	0,5	0,5	0,5	0,25	0,25	1		
11: Np reins. (MAT)	0,25	0,25	0,5	0,5	0,25	0,25	0,25	0,25	0,5	0,25	1	
12: Np reins. (property)	0,25	0,25	0,25	0,5	0,25	0,25	0,25	0,5	0,25	0,25	0,25	1

# SCR\_nl

## ► NL\_lapse: kalkulacija

SCR.9.33. The capital requirement for lapse risk should be equal to the loss in basic own funds of undertakings that would result from the combination of two shocks:

$$NL_{lapse} = \Delta BOF | (lapseshock_1, lapseshock_2),$$

where

$NL_{lapse}$	=	Capital requirement for lapse risk
$\Delta BOF$	=	Change in the value of basic own funds (not including changes in the risk margin of technical provisions)
$lapseshock_1$	=	Discontinuance of 40 % of the insurance policies for which discontinuance would result in an increase of technical provisions without the risk margin.
$lapseshock_2$	=	Decrease of 40 % of the number of future insurance or reinsurance contracts used in the calculation of technical provisions associated to reinsurance contracts cover insurance or reinsurance contracts to be written in the future.



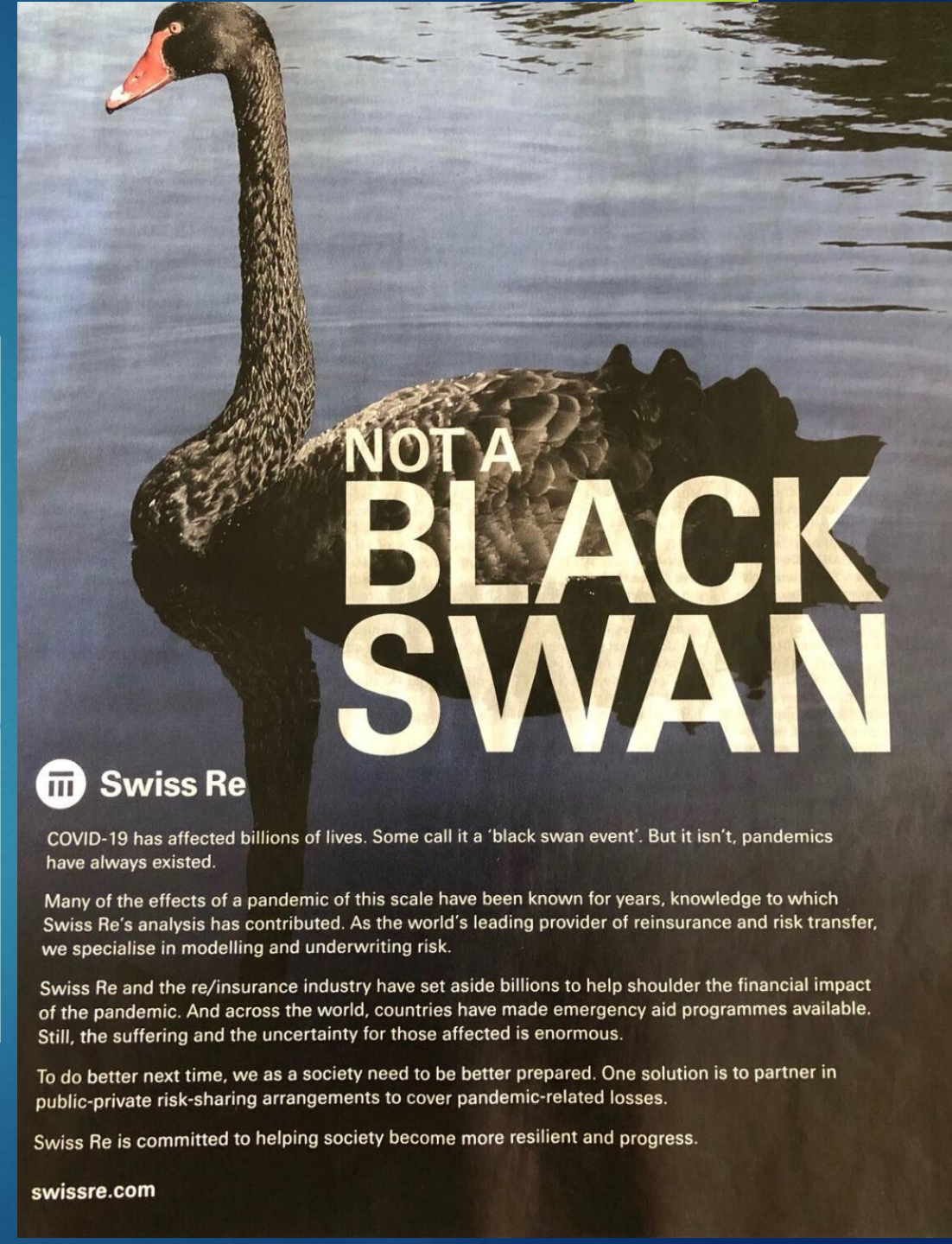
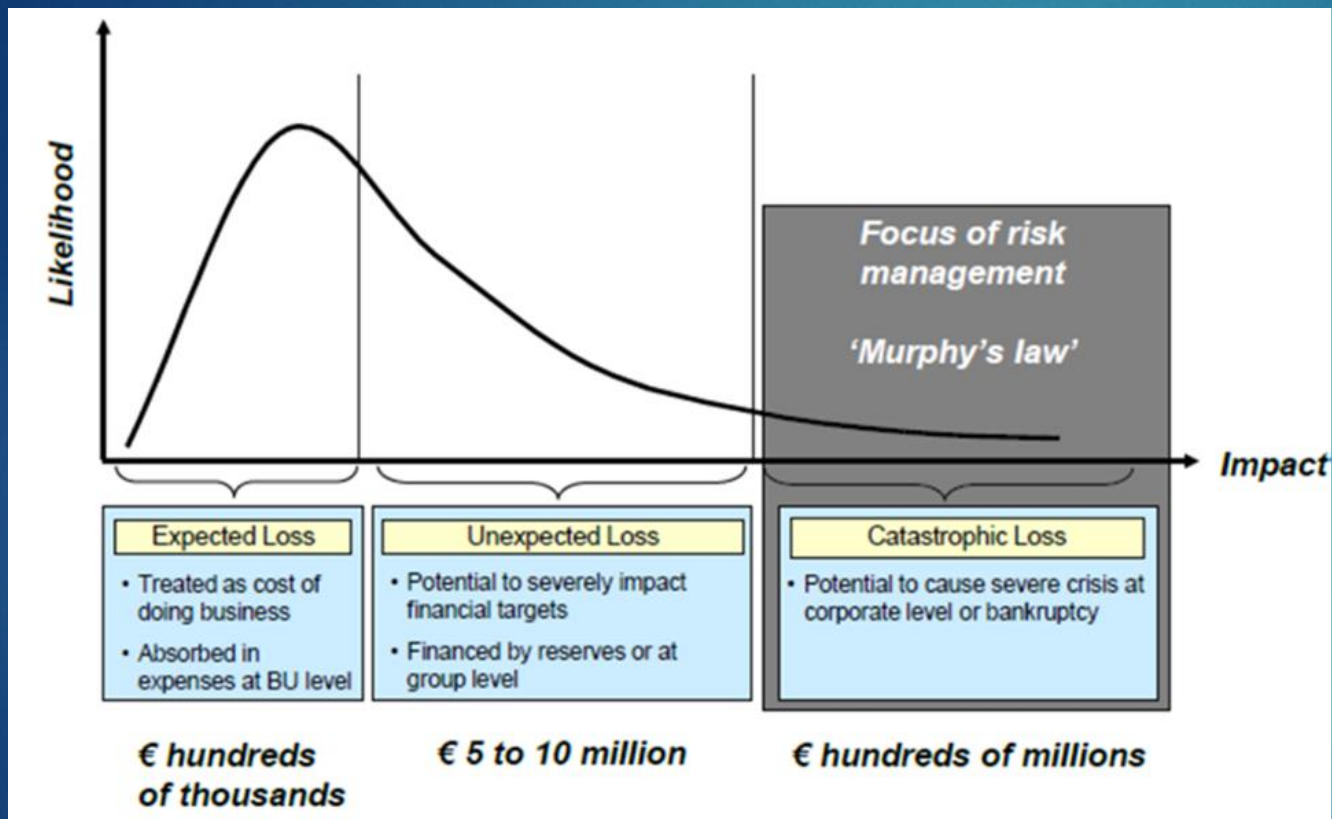
# SCR<sub>nl</sub>

## ► NL\_CAT

- Riziki iz prirodnih katastrofa (NAT\_CAT)
- Riziki iz ne-proporcionalnog reosiguranja (NP\_Property)
- Riziki iz man-made katastrofa (MM\_CAT)
- Ostali non-life riziki iz katastrofa (CAT\_Other)

$$SCR_{nlCAT} = \sqrt{(SCR_{natCAT} + SCR_{npproperty})^2 + SCR_{mmCAT}^2 + SCR_{CATother}^2}$$

# CAT – Intermezzo



COVID-19 has affected billions of lives. Some call it a 'black swan event'. But it isn't, pandemics have always existed.

Many of the effects of a pandemic of this scale have been known for years, knowledge to which Swiss Re's analysis has contributed. As the world's leading provider of reinsurance and risk transfer, we specialise in modelling and underwriting risk.

Swiss Re and the re/insurance industry have set aside billions to help shoulder the financial impact of the pandemic. And across the world, countries have made emergency aid programmes available. Still, the suffering and the uncertainty for those affected is enormous.

To do better next time, we as a society need to be better prepared. One solution is to partner in public-private risk-sharing arrangements to cover pandemic-related losses.

Swiss Re is committed to helping society become more resilient and progress.

[swissre.com](https://www.swissre.com)

# SCR\_nl

- ▶ NL\_CAT
- ▶ Technical\_Specification\_for\_the\_Preparatory\_Phase\_\_Part\_I\_ : str. 259 – 288
- ▶ Delegirana uredba: str. 75 - 87



# SCR\_nl

## ► NL\_CAT

## ► NAT\_CAT: samo ako ste na listi zemalja

SCR.9.41. The natural catastrophe risk sub-module shall consist of the following sub-modules:

- (a) the windstorm risk sub-module;
- (b) the earthquake risk sub-module;
- (c) the flood risk sub-module;
- (d) the hail risk sub-module;
- (e) the subsidence risk sub-module.

SCR.9.42. The capital requirement for natural catastrophe risk shall be equal to the following:

$$SCR_{natCAT} = \sqrt{\sum_i SCR_i^2}$$

Regije in faktorji tveganja viharja

Kratica regije r	Regija r	Faktor tveganja viharja Q (windstorm,r)
AT	Republika Avstrija	0,08 %
BE	Kraljevina Belgija	0,16 %
CZ	Češka republika	0,03 %
CH	Švicarska konfederacija; Kneževina Lihtenštajn	0,08 %
DK	Kraljevina Danska	0,25 %
FR	Francoska republika <sup>(1)</sup> ; Kneževina Monako; Kneževina Andora	0,12 %
DE	Zvezna republika Nemčija	0,09 %
IS	Republika Islandija	0,03 %
IE	Irska	0,20 %
LU	Veliko vojvodstvo Luksemburg	0,10 %
NL	Kraljevina Nizozemska	0,18 %
NO	Kraljevina Norveška	0,08 %
PL	Republika Poljska	0,04 %
ES	Kraljevina Španija	0,03 %
SE	Kraljevina Švedska	0,09 %
UK	Združeno kraljestvo Velika Britanija in Severna Irska	0,17 %
GU	Guadeloupe	2,74 %
MA	Martinik	3,19 %
SM	Čezmorska skupnost Saint-Martin	5,16 %
RE	Reunion	2,50 %

<sup>(1)</sup> Razen otokov Guadeloupe, Martinik, Čezmorska skupnost Saint-Martin in Reunion



# SCR\_nl

## ► NL\_CAT

SCR.9.106. Man-Made Catastrophes: extreme or exceptional events arising from:

- Motor
- Fire
- Marine
- Aviation
- Liability
- Credit & Suretyship

SCR.9.108. The capital requirement for the man-made catastrophe risk shall be equal to the following:

$$SCR_{mmCAT} = \sqrt{\sum_i SCR_i^2}$$

# SCR\_nl

## ► NL\_CAT -> MM\_CAT -> AO rizik

SCR.9.110. The capital requirement for the man-made catastrophe risk shall be equal to the following the loss in basic own funds of insurance and reinsurance undertakings that would result from an instantaneous loss of an amount that, without deduction of the amounts recoverable from reinsurance contracts and special purpose vehicles is equal to:

$$SCR_{motorCAT} = \Delta BOF | L_{motor}$$

$$L_{motor} = 50000 \cdot \max\left(120, (N_a + 0.95 \cdot \min(20000, N_b) + 0.05 \cdot N_b)^{\frac{1}{2}}\right)$$

$N_a$  = Number of vehicles insured by the insurance or reinsurance undertaking in lines of business 4 and 16 as set out in Annex K with a deemed policy limit above 24 000 000 euro

$N_b$  = Number of vehicles insured by the insurance or reinsurance undertaking in lines of business 4 and 16 as set out in Annex K with a deemed policy limit below or equal to 24 000 000 euro

Hvala 😊

