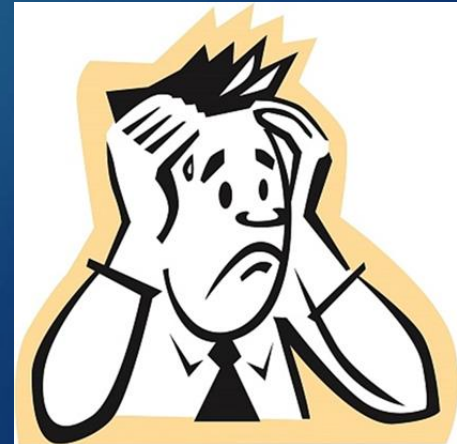
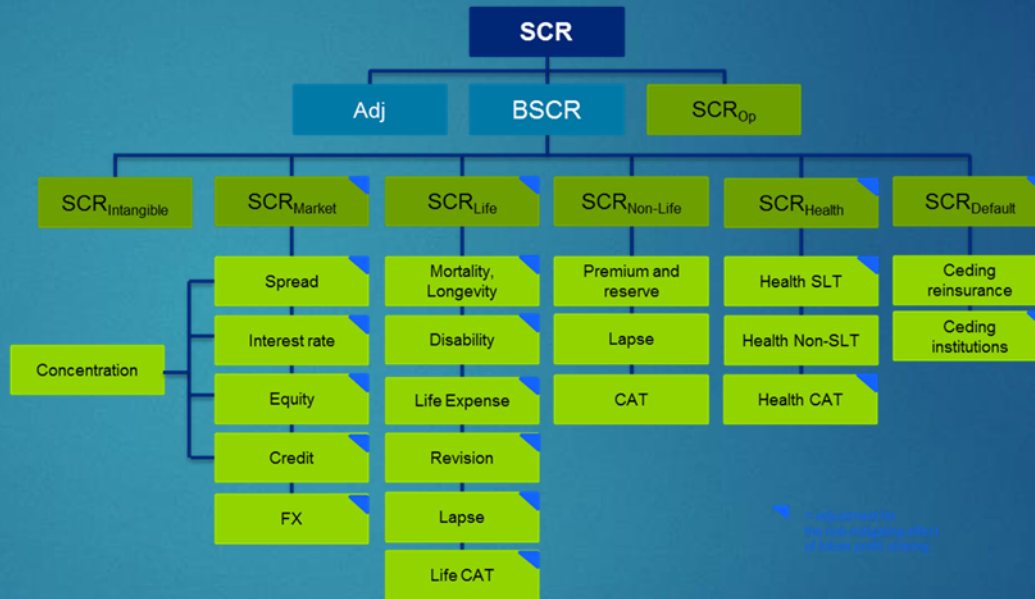


Solventnost II – modul 3

ALES TOMAZIN, LJUBLJANA -> PODGORICA, 10.12.2020

Agenda

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



Radionica – wrap-up

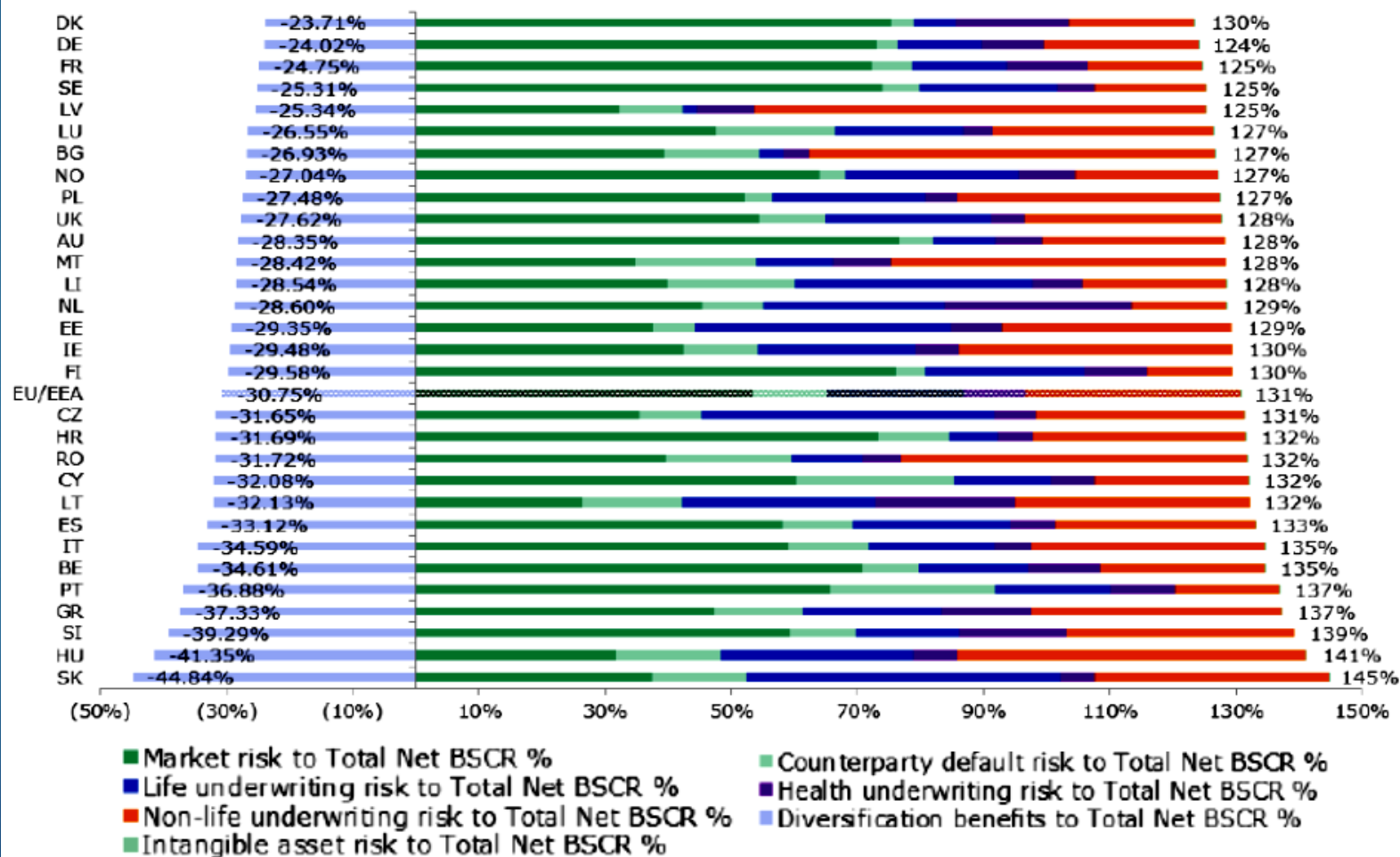
- ▶ Cilj je bio CDR modul (na kraju SCR i SII BS)
- ▶ Za SCR_market trebaju nam informacije o investicijama i rezervacijama
 - ▶ SII valuacija (MCBS)
 - ▶ Za SCR treba uraditi šokove na strani sredstava i obaveza!
- ▶ Uradili smo
 - ▶ BE CP kamatni šok (bruto, neto)
 - ▶ BE PP kamatni šok (bruto, neto)

Radionica – wrap-up

- ▶ Za naš primjer:
 - ▶ Tri državne obaveznice -> CF modeli
 - ▶ Dva depozita -> duration (trajanje) / CF model
 - ▶ Novac na računu -> kredit rejting
- ▶ SII valuacija -> SII BS (rezervacije već imamo)
- ▶ Kamatni šok za podmodul rizika kamatnih stopa
- ▶ Ostali šokovi...

EIOPA June 2017 Financial Stability Report

Breakdown of net Basic SCR



Source: EIOPA June 2017 Financial Stability Report

EIOPA October 2020

RISK DASHBOARD

October 2020¹

Risks	Level	Trend (Past 3 months)	Outlook ² (Next 12 months)
1. Macro risks	Very high	→	→
2. Credit risks	Medium	↓	→
3. Market risks	Medium	↓	→
4. Liquidity and funding risks	Medium	→	→
5. Profitability and solvency	Medium	↓	→
6. Interlinkages and imbalances	Medium	→	→
7. Insurance (underwriting) risks	Medium	→	→
8. Market perceptions	Medium	↓	→

https://www.eiopa.europa.eu/tools-and-data/risk-dashboard_en

<https://www.eiopa.europa.eu/risk-dashboards-previous-publications>

SCR_market

- ▶ Tržišni rizik dolazi iz volatilnosti tržišnih cijena finansijskih instrumenta.
- ▶ Mjeri se kao učinak promjena finansijskih varijabli kao što su cijena dionica, kamatne stope, cijene nekretnina i valutni kurs
- ▶ Kalkulacija se radi posebno

$$SCR_{mkt} = \sqrt{\sum_{r,c} CorrMkt_{r,c} \cdot Mkt_r \cdot Mkt_c}$$

where

$CorrMkt$ = the entries of the correlation matrix $CorrMkt$

Mkt_r, Mkt_c = Capital requirements for the individual market risks under the interest rate stress according to the rows and columns of the correlation matrix $CorrMkt$

SCR_market

SCR.5.3. The following input information is required²⁰:

Mkt_{int}^{Up}	=	Capital requirement for interest rate risk for the “up” shock
Mkt_{int}^{Down}	=	Capital requirement for interest rate risk for the “down” shock
Mkt_{int}	=	Capital requirement for interest rate risk
Mkt_{eq}	=	Capital requirement for equity risk
Mkt_{prop}	=	Capital requirement for property risk
Mkt_{sp}	=	Capital requirement for spread risk
Mkt_{conc}	=	Capital requirement for risk concentrations
Mkt_{fx}	=	Capital requirement for currency risk
$nMkt_{int}^{Up}$	=	Capital requirement for interest rate risk for the “up” shock including the loss absorbing capacity of technical provisions
$nMkt_{int}^{Down}$	=	Capital requirement for interest rate risk for the “down” shock including the loss absorbing capacity of technical provisions
$nMkt_{int}$	=	Capital requirement for interest rate risk including the loss absorbing capacity of technical provisions
$nMkt_{prop}$	=	Capital requirement for property risk including the loss absorbing capacity of technical provisions
$nMkt_{sp}$	=	Capital requirement for spread risk including the loss-absorbing capacity of technical provisions
$nMkt_{conc}$	=	Capital requirement for concentration risk including the loss-absorbing capacity of technical provisions
$nMkt_{fx}$	=	Capital requirement for currency risk including the loss-absorbing capacity of technical provisions
$nMkt_{eq}$	=	Capital requirement for equity risk including the loss-absorbing capacity of technical provisions

SCR_market

- ▶ Kalkulacija se radi prema određenim scenariju
- ▶ Treba upotrijebiti Look-through pristup



SCR_market

- ▶ Mkt_int – interest rate risk
 - ▶ sredstva i obaveze koja su senzitivna na promjenu kamatne stope

SCR.5.21. The following input information is required:

BOF = Net value of assets minus liabilities

SCR.5.23. The capital requirement for interest rate risk is determined as the result of two pre-defined scenarios:

$$Mkt_{int}^{Up} = \Delta BOF|_{up}$$
$$Mkt_{int}^{Down} = \Delta BOF|_{down}$$

SCR_market

- ▶ Mkt_eq – equity risk
 - ▶ Volatilnost tržišnih cijena investicija (sredstva i obaveze)
 - ▶ Tip 1, Tip 2 - definicija

$Mkt_{eq,i} = \max(\Delta BOF equity\ shock_i; 0)$			Type 1	Type 2
		equity shock _i	46.5%	56.5%
where				
equity shock _i	=	Prescribed fall in the value of equities in the category <i>i</i>		
$Mkt_{eq,i}$	=	Capital requirement for equity risk with respect to category <i>i</i> ,		

SCR_market

► Mkt_eq – equity risk

$$MKT_{eq} = \sqrt{\sum_{rxc} CorrIndex^{rxc} \cdot Mkt_r \cdot Mkt_c}$$

where

$CorrIndex^{rxc}$ = The entries of the correlation matrix $CorrIndex$
 Mkt_r, Mkt_c = Capital requirements for equity risk per individual category according to the rows and columns of correlation matrix $CorrIndex$

and where the correlation matrix $CorrIndex$ is defined as:

$CorrIndex$	Type 1	Type 2
Type 1	1	
Type 2	0.75	1

SCR_market

- ▶ Mkt_prop – property risk
 - ▶ Volatilnost tržišnih cijena nekretna na sredstva i obaveze)

SCR.5.61. The capital requirement for property risk is determined as the result of a pre-defined scenario:

$$Mkt_{prop} = \max(\Delta BOF | \text{property Shock}; 0)$$

SCR.5.62. The property shock is the 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 immovable property, taking account of all the participant's individual direct and indirect exposures to property prices. The property shock takes account of the specific investment policy including e.g. hedging arrangements, gearing etc.

SCR_market

- ▶ Mkt_fx – currency risk
 - ▶ Volatilnost kursa

SCR.5.72. The capital requirement for currency risk is determined as the result of two pre-defined scenarios:

$$Mkt_{fx,C}^{Up} = \max(\Delta BOF | fxupward\ shock_i; 0)$$

$$Mkt_{fx,C}^{Down} = \max(\Delta BOF | fxdownward\ shock_i; 0)$$

SCR.5.73. The scenario *fxupward shock* is an instantaneous rise in the value of 25% of the currency C against the local currency. The scenario *fxdownward shock* is an instantaneous fall of 25% in the value of the currency C against the local currency.

SCR_market

- ▶ Mkt_sp – spread risk
- ▶ Volatilnost kreditnog opsega

SCR.5.89. The following input information is required:

MV_i = the value of the credit risk exposure i

$rating_i$ = the external credit quality step of credit risk exposure i

$duration_i$ = the duration of credit risk exposure i

SCR_market

► Mkt_sp – spread risk

SCR.5.92. The capital requirement for spread risk is determined as follows:

$$Mkt_{sp} = Mkt_{sp}^{bonds} + Mkt_{sp}^{securitisation} + Mkt_{sp}^{cd}$$

where:

Mkt_{sp}^{bonds} = the capital requirement for spread risk of bonds and loans other than residential mortgage loans fulfilling the criteria as set out in SCR.6.42

$Mkt_{sp}^{securitisation}$ = the capital requirement for spread risk of tradable securities or other financial instruments based on repackaged loans which are offered by way of securitisation within the meaning of point (61) of Article 4(1) of Regulation (EU) No 575/2013

Mkt_{sp}^{cd} = the capital requirement for spread risk on credit derivatives

SCR_market

► Mkt_sp – spread risk

SCR.5.93. The capital requirement for spread risk of bonds and loans other than residential mortgage loans is determined as the result of a pre-defined scenario :

$$Mkt_{sp}^{bonds} = \max(\Delta BOF | \text{spread shock on bonds}; 0)$$

SCR.5.94. The spread risk shock on bonds and loans other than residential mortgage loans is the immediate effect on the net value of asset and liabilities expected in the event of an instantaneous decrease of values in bonds and loans other than non-residential mortgage loans due to the widening of their credit spreads:

$$\sum_i MV_i \cdot F^{up}(rating_i; duration_i)$$

SCR_market

► Mkt_sp – spread risk

$duration_i$ (years)	F^{up}
up to 5	3.0 % $\cdot duration_i$
More than 5 and up to 10	15.0%+1.7% $\cdot (duration_i - 5)$
More than 10 and up to 20	23.5%+1.2% $\cdot (duration_i - 10)$
More than 20	Min(35.5% + 0.5 % $\cdot (duration_i - 20)$;1)

credit quality step \ $duration_i$ (years)	0	1	2	3	4	5	6
up to 5	0.9 % $\cdot duration_i$	1.1 % $\cdot duration_i$	1.4 % $\cdot duration_i$	2.5 % $\cdot duration_i$	4.5 % $\cdot duration_i$	7.5 % $\cdot duration_i$	7.5 % $\cdot duration_i$
More than 5 and up to 10	4.5% + 0.5 % $\cdot (duration_i - 5)$	5.5% + 0.6% $\cdot (duration_i - 5)$	7.0% + 0.7% $\cdot (duration_i - 5)$	12.5% + 1.5% $\cdot (duration_i - 5)$	22.5% + 2.5% $\cdot (duration_i - 5)$	37.5% + 4.2% $\cdot (duration_i - 5)$	37.5% + 4.2% $\cdot (duration_i - 5)$
More than 10 and up to 15	7.2% + 0.5 % $\cdot (duration_i - 10)$	8.4% + 0.5 % $\cdot (duration_i - 10)$	10.5% + 0.5 % $\cdot (duration_i - 10)$	20.0% + 1.0 % $\cdot (duration_i - 10)$	35.0% + 1.8 % $\cdot (duration_i - 10)$	58.5% + 0.5 % $\cdot (duration_i - 10)$	58.5% + 0.5 % $\cdot (duration_i - 10)$
More than 15 and up to 20	9.7% + 0.5 % $\cdot (duration_i - 15)$	10.9% + 0.5 % $\cdot (duration_i - 15)$	13.0% + 0.5 % $\cdot (duration_i - 15)$	25.0% + 1.0 % $\cdot (duration_i - 15)$	44.0% + 0.5 % $\cdot (duration_i - 15)$	61.0% + 0.5 % $\cdot (duration_i - 15)$	61.0% + 0.5 % $\cdot (duration_i - 15)$
More than 20	12.2% + 0.5 % $\cdot (duration_i - 20)$	13.4% + 0.5 % $\cdot (duration_i - 20)$	15.5% + 0.5 % $\cdot (duration_i - 20)$	30.0% + 0.5 % $\cdot (duration_i - 20)$	46.6% + 0.5 % $\cdot (duration_i - 20)$	63.5% + 0.5 % $\cdot (duration_i - 20)$	63.5% + 0.5 % $\cdot (duration_i - 20)$

SCR_market

- ▶ Mkt_conc – concentration risk
 - ▶ Rizici koji su u equity, spread i property modulima i nisu u CDR
 - ▶ Primjer: novac u banci ide u CDR a drugi instrumenti od banke idu u rizik koncentracije

SCR.5.125. Risk exposures in assets need to be grouped according to the counterparties involved.

E_i = Net Exposure at default to counterparty i that is included in the calculation base of the market risk concentration sub-module

$Assets_{xl}$ = Total amount of assets considered as calculation base of this sub-module.

$rating_i$ = External credit quality step of the counterparty i

SCR_market

► Mkt_conc – concentration risk

SCR.5.131. The relative excess exposure per single name exposure is calculated as:

$$XS_i = \max\left(0, \frac{E_i}{Assets_{xl}} - CT\right)$$

where the relative excess exposure threshold CT, depending on the credit quality step of single name i, is set as follows:

credit quality step	Relative excess exposure threshold (CT)
0	3%
1	3%
2	3%
3	1.5%
4	1.5%
5	1.5%
6 or unrated	1.5%

SCR_market

► Mkt_conc – concentration risk

SCR.5.132. The capital requirement for market risk concentration on a single name exposure i $Conc_i$ shall be equal to the loss in the basic own funds that would result from an instantaneous relative decrease in the value of the assets corresponding to the single name exposure i equal to:

$$XS_i \cdot g_i$$

where the parameter g_i , depending on the credit quality step of the counterparty, is determined as follows:

Credit quality step	0	1	2	3
Risk factor g_i	12 %	12 %	21 %	27 %

Solvency ratio	196% or higher	175%	122%	100%	95% or lower
Risk factor g_i	12 %	21 %	27 %	64,5 %	73 %

SCR_market

► Mkt_conc – concentration risk

Solvency ratio	196% or higher	175%	122%	100%	95% or lower
Risk factor g_i	12 %	21 %	27 %	64,5 %	73 %

SCR.5.136. The capital requirement for concentration risk is determined assuming no correlation among the requirements for each counterparty I , and it should be equal to the following:

$$Mkt_{conc} = \sqrt{\sum_i (Conc_i^2)}$$

SCR.5.147. Bank deposits considered in the concentration risk sub-module²⁵ shall be assigned a risk factor g_i for market risk concentration of 0 % to the extent their full value is covered by a government Deposit Guarantee Scheme in the Community, the guarantee is applicable without any restrictions to the undertaking and provided there is no double-counting of such guarantee in the SCR calculation.

Hvala 😊

