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Risk Based Catastrophe Insurance Supervision Made Simple

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Objectives of RBS:

- Ensure adequate solvency of insurance companies writing property catastrophe business.
- Create regulatory level playing field for all operators in the market.
- Lay the groundwork for introduction of Solvency II.



solvency basic principle

- level of own surplus capital (reserve, equity and reinsurance) allocated to catastrophe insurance (1)
- catastrophe reinsurance adjusted coverage (2)

SHOULD NOT BE LOWER than

aggregate gross PML for a N year return period – 200 years for SII or 250 years for SST (3)





EQ Risk Adjusted Solvency - assessment flowchart





Parametric

methodology to assess insurer's maximum net retention level



Calculate company's net EQ PML for a 1/n years event in highly correlated locations

	step	<u>formula</u>	how?
1	measure aggregate EQ exposure in force in cities	$\sum Si_{city}$	Total of EQ sums insured in each city
2	calculate gross PML in each city	PML coeff $*\sum Si$	Use city PML coefficient for a given return period suggested by AFN
3	apply available catastrophe reinsurance protection per event	amount of reinsured PML	Recognize only reinsurance capacity received from reinsurers rated BBB or above
4	calculate 'net PML' per event for each city	<u>2 minus 3</u>	
5	aggregate net PMLs for cities with correlated EQ events (A, B, D)	<u>Formula 1</u>	Monday, November 07, 2011

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simple illustration (continue)

available solvency margin of X as at 31 Dec 2011 is 7,000,000 Euro. Gross PML coefficients for cities are given below:

	А	В	С	D	Е	Total
PML coefficients	7%	10%	8%	15%	20%	7%

check compliance

answer:

1. Assess overall gross PML, based on methodology

	Α	В	С	D	E
aggregate exposure (SI)	50,000,000	25,000,000	4,000,000	100,000,000	3,000,000
gross PML coefficients	18%	2%	8%	16%	20%
calculate Gross PML/ city (A,B, D)	9,000,000	500,000	320,000	16,000,000	600,000
		gross PML = 25,500,000	>		
	aggregate exposure (SI) gross PML coefficients calculate Gross PML/ city (A,B, D)	A aggregate exposure (SI) 50,000,000 gross PML coefficients 18% calculate Gross PML/ city (A,B, D) 9,000,000	ABaggregate exposure (SI)50,000,00025,000,000gross PML coefficients18%2%calculate Gross PML/ city (A,B, D)9,000,000500,000Gross PML/sity (A,B, D)gross PML site Gross PML/site (A,B, D)	ABCaggregate exposure (SI)50,000,00025,000,0004,000,000gross PML coefficients18%2%8%calculate Gross PML/ city (A,B, D)9,000,000500,000320,000gross PML = 25,500,000	ABCDaggregate exposure (SI)50,000,00025,000,0004,000,000100,000,000gross PML coefficients18%2%8%16%calculate Gross PML/city (A,B, D)9,000,000500,000320,00016,000,000gross PML = 25,500,000

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simple illustration (continue)

2. assess acceptable reinsurance recoverable

2.1. assess all reinsurance recoverable

limit in excess of retention = 9,5000,000

2.2. split reinsurance recoverable into reinsurers and sum up only recoverables allocated to reinsurers rated BBB+ or more:



3. calculate net PML

net PML = gross PML – accepted RI recoverable

net PML = 25,500,000 - 7,125,000 = 18,375,000



partial **RBS**

methodology to assess insurer's maximum net retention level (continued)



compare & react

company's Available surplus capital



Net unprotected PML Plus Credit Risk Reserve



company X needs to stop writing the business, immediately increase capital or buy more reinsurance!

Tool Output: Assessment of Gross and Net Retained Cat Risk Exposure

- Deriving of loss frequency and loss severity distributions for company's gross and net retained loss based on the stochastic event set supplied by the country risk model.
- Monte Carlos Simulation (up to 65,536 simulation runs) for obtaining Annual Expected Losses and PML curves: gross and net retained event loss (OEP) and total annual loss (AEP)

		Mean NoGrossClaims	Mean NoNetClaims	
AEL Gross	AEL Net	p.a.	p.a.	
10,815	10,437	0.0755	0.0755	

Return period	Gross AEP Curve	Gross OEP Curve	Net AEP Curve	Net OEP Curve
10	0	0	0	0
20	4,345	4,289	3,810	3,793
30	202,444	202,331	194,532	194,423
40	225,139	224,673	216,561	216,112
50	238,817	238,652	229,838	229,676
60	247,937	247,056	238,690	237,834
70	252,798	252,155	243,409	242,785
400	303,758	296,184	292,891	285,537
500	305,249	300,351	294,215	289,583
600	307,409	302,077	295,674	291,259
700	308,386	303,758	297,386	292,891
800	309,963	304,233	298,917	293,366
900	312,963	305,249	301,836	293,456
1000	350,059	305,249	335,823	294,215