



18TH EAST ASIAN ACTUARIAL CONFERENCE

12-15 October 2014

Taipei International Convention Center in Taipei Taiwan

Some simple considerations in terms of capital allocation within the standard capital model of Solvency II

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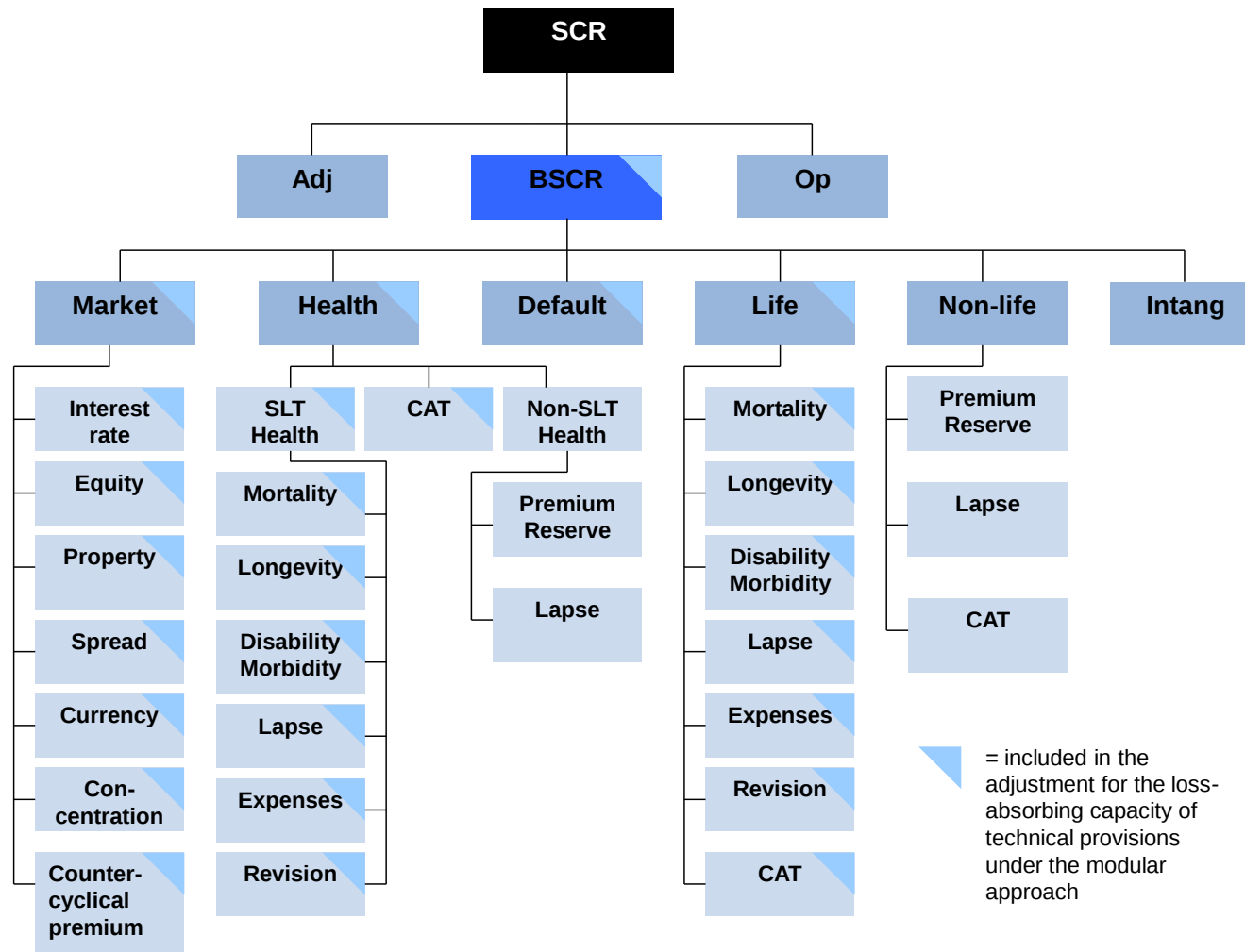
What is this talk about ?

- The goal is to show you how some simple capital allocations calculations can be done within the standard capital model
- How can the results be understood and used in terms of running an insurance business ?
- The idea is to get a better understanding of reward/risk – also be taken into account when performing the ORSA process

Short introduction to the standard capital model

- The LTGA model (Long Term Guarantees Assessment) is expected to be the model to be applied by the insurance companies in Europe with a few changes
- The model was introduced to the market in early 2013. Some amendments have been published by EIOPA in the spring 2014

The set up of the model



EIOPA – LTGA specifications (spring 2013)

Capital allocation

- Many different methods is out there ...for instance
 - CoVAR (Covariance principle)
 - TVAR (Tail Var)
 - COTVAR (Conditional tailVAR)
- There are many papers about measures, properties (coherent measures) and methodology
- Practical considerations – what is the purpose of the allocation ?

Capital allocations

- They are many reasons to do capital allocations
 - Which lines of business is attracting capital ?
 - Is profit good enough compared to "risks" ?
- Another consideration
 - Which capital to allocate
 - The required capital (SCR)
 - "Equity"

Practical example: Non-life insurance company

- Covariance principle (excluding "CATS")
- The Covariance measure is almost a coherent risk measure – only "translation invariance" is missing
- Allocation method:
- A line of business ("X(i)") or a business unit ("X(i)") is allocated by

$$\text{COV}(X(i);X.)/\text{Var}(X.)$$

Information about business lines

Volume measure for non-life premium risk per segment	Mean	Distribution	Coefficient of variance	Standard deviation (amount)
Motor vehicle liability	854,73	24,78%	8,44%	72,1
Motor, other classes	753,67	21,85%	6,84%	51,5
Marine, aviation, transport (MAT)	16,38	0,47%	13,45%	2,2
Fire and other property damage	1521,58	44,11%	9,08%	138,1
Third-party liability	25,05	0,73%	11,61%	2,9
Credit and suretyship	0,00	0,00%	0,00%	0,0
Legal expenses	0,00	0,00%	0,00%	0,0
Assistance	0,00	0,00%	0,00%	0,0
Miscellaneous	269,82	7,82%	12,02%	32,4
Non-prop. reinsurance - casualty	0,00	0,00%	0,00%	0,0
Non-prop. reinsurance - MAT	7,07	0,20%	20,00%	1,4
Non-prop. reinsurance - property	0,91	0,03%	20,00%	0,2
	3449,19			

- Mean represents "volume" (sum of reserve and premium)
- Coefficient of variance represents a combined measure for both reserve and premium

Allocations - results

Line of business	Standard deviations	Motor vehicle liability	Motor, other classes	Marine	Fire and other property damage	Third-party liability	Credit and suretyship	Legal expenses	Assistance	Miscellaneous	Non-prop. reinsurance - casualty	Non-prop. reinsurance - MAT	Non-prop. reinsurance - property	
Motor vehicle liability	72,10	5.198	1.858	79	2.489	105	0	0	0	1.169	0	25	3	
Motor, other classes	51,54	1.858	2.656	28	1.780	37	0	0	0	836	0	18	2	
Marine, aviation, transport (MAT)	2,20	79	28	5	76	2	0	0	0	36	0	1	0	
Fire and other property damage	138,11	2.489	1.780	76	19.074	100	0	0	0	2.240	0	49	13	
Third-party liability	2,91	105	37	2	100	8	0	0	0	47	0	2	0	
Credit and suretyship	0,00	0	0	0	0	0	0	0	0	0	0	0	0	
Legal expenses	0,00	0	0	0	0	0	0	0	0	0	0	0	0	
Assistance	0,00	0	0	0	0	0	0	0	0	0	0	0	0	
Miscellaneous	32,44	1.169	836	36	2.240	47	0	0	0	1.052	0	11	3	
Non-prop. reinsurance - casualty	0,00	0	0	0	0	0	0	0	0	0	0	0	0	
Non-prop. reinsurance - MAT	1,41	25	18	1	49	2	0	0	0	11	0	2	0	
Non-prop. reinsurance - property	0,18	3	2	0	13	0	0	0	0	3	0	0	0	
		10.928	7.216	227	25.821	302	0	0	0	5.394	0	109	21	50.019

Allokering

21,85%	14,43%	0,45%	51,62%	0,60%	0,00%	0,00%	0,00%	10,78%	0,00%	0,22%	0,04%	100,0%
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Varians total 50.018,9
Standardafvigelse 223,6

CorrLob	1	2	3	4	5	6	7	8	9	10	11	12
1: Motor vehicle liability	100%	50%	50%	25%	50%	25%	50%	25%	50%	25%	25%	25%
2: Other motor	50%	100%	25%	25%	25%	25%	50%	50%	50%	25%	25%	25%
3: MAT	50%	25%	100%	25%	25%	25%	25%	50%	50%	25%	25%	50%
4: Fire	25%	25%	25%	100%	25%	25%	25%	50%	50%	50%	25%	50%
5: 3rd party liability	50%	25%	25%	25%	100%	50%	50%	25%	50%	25%	50%	25%
6: Credit	25%	25%	25%	25%	50%	100%	50%	25%	50%	25%	50%	25%
7: Legal exp.	50%	50%	25%	25%	50%	50%	100%	25%	50%	25%	50%	25%
8: Assistance	25%	50%	50%	50%	25%	25%	25%	100%	50%	50%	25%	25%
9: Miscellaneous.	50%	50%	50%	50%	50%	50%	50%	50%	100%	25%	25%	50%
10:Np reins. (property)	25%	25%	25%	50%	25%	25%	25%	50%	25%	100%	25%	25%
11:Np reins. (casualty)	25%	25%	25%	25%	50%	50%	50%	25%	25%	100%	25%	25%
12:Np reins. (MAT)	25%	25%	50%	50%	25%	25%	25%	25%	50%	25%	25%	100%

Same data – Cotvar

- Conditional TailVar

For the familiar normal distribution $N(\mu, \sigma^2)$, with mean μ and variance σ^2 , it was noticed by Panjer (2002) that

$$TCE_X(x_q) = \mu + \left[\frac{\frac{1}{\sigma} \varphi\left(\frac{x_q - \mu}{\sigma}\right)}{1 - \Phi\left(\frac{x_q - \mu}{\sigma}\right)} \right] \sigma^2, \quad (2)$$

where $\varphi(\cdot)$ and $\Phi(\cdot)$ are, respectively, the density and cumulative distribution functions of a standard normal $N(0, 1)$ random variable. We extend

Results COTVAR

Volume measure for non-life premium risk per segment	Mean	Distribution	Coefficient of variance	Standard deviation (amount)	COTVAR	Allocation percentages
Motor vehicle liability	854,73	24,78%	8,44%	72,1	912,3	24,73%
Motor, other classes	753,67	21,85%	6,84%	51,5	794,8	21,54%
Marine, aviation, transport (MAT)	16,38	0,47%	13,45%	2,2	18,1	0,49%
Fire and other property damage	1521,58	44,11%	9,08%	138,1	1631,8	44,23%
Third-party liability	25,05	0,73%	11,61%	2,9	27,4	0,74%
Credit and suretyship	0,00	0,00%	0,00%	0,0	0,0	0,00%
Legal expenses	0,00	0,00%	0,00%	0,0	0,0	0,00%
Assistance	0,00	0,00%	0,00%	0,0	0,0	0,00%
Miscellaneous	269,82	7,82%	12,02%	32,4	295,7	8,02%
Non-prop. reinsurance - casualty	0,00	0,00%	0,00%	0,0	0,0	0,00%
Non-prop. reinsurance - MAT	7,07	0,20%	20,00%	1,4	8,2	0,22%
Non-prop. reinsurance - property	0,91	0,03%	20,00%	0,2	1,0	0,03%
	3449,19				3689,3	

- Based on the 50'th percentile

Comments

- The allocations have ignored CAT events
- CAT can change allocations significantly if not well reinsured
- COTVAR and CoVar allocations are alike (no big difference in standard deviation assumptions)
- The allocations models are based on “normal” distribution” assumptions.

Link to the ORSA proces and practical application

- Which areas are attracting capital ?
- Is the profit by line of business – good enough compared to its risk ?
- Allocations can initiate a debate where to grow or shrink the business
- Product allocation – not customer level
 - Another approach has to be applied
 - Micro tariffs sometimes not consistent with capital model

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