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# On contractual limits and natural catastrophe risk

The European Commission call for advice contains a specific request on the catastrophe risk and contractual limits.

In addition to the advice on a possible simpler structure, "*EIOPA is asked to assess the continued appropriateness of the methods and assumptions, and where required, the parameters, used when calculating the non-life catastrophe risk submodule, in particular in view of the approach on contractual limits as set out in recital 54 of Delegated Regulation (EU) 2015/35*."

As explained in the EIOPA document about "The underlying assumptions in the standard formula of the Solvency Capital Requirement calculation": "*the calibration of the natural catastrophe risk submodule is based on average conditions for any given country-peril combination."*

The risk weights and risk factors defined in Articles 120-125 of the Delegated Regulation have been calibrated by the previous CAT TF taking account of average contractual limits and average deductibles. The intention was to apply the risk factors directly to the undertaking's sum insured without contractual limits and without deductibles, so that the SCR per peril is calibrated at the appropriate level for each country.

Recital 54 of the Delegated Regulation provides further guidance at undertaking level: "*In order to capture the actual risk exposure of the undertaking in the calculation of the capital requirement for natural catastrophe risk in the standard formula, the sum insured should be determined in a manner that takes account of contractual limits for the compensation for catastrophe events*."

The purpose of the recital seems to better take into account individual risk profiles. However it is difficult to put in place in practice at individual level, since the input of the formula of Articles 120-125 should be the sum insured gross of deductibles and contractual limits. This would require a radical change in the calibration process, making it difficult since historical losses would not be usable anymore, but even more importantly would severely increase the complexity of the design of the standard formula, since the relationship between catastrophe losses and contractual limits on policies is non-linear.

That is why the Insurance Policy Committee of EIOPA decided that only an adjustment to the end results would make sense. The proposal is referred as an "ex-post adjustment" and would work as follows, for each peril:

- Calculate, for each zone, the corresponding gross loss by applying the following formula: *country factor* times *zonal relativity* times *sum insured gross of deductibles and contractual limits*. Using the notation of the Delegated Regulation, with a region $r$ and a zone $i$:

$$GrossLoss_{(peril,r,i)} = Q_{(peril,r)} \times W_{(peril,r,i)} \times SI_{(peril,r,i)}$$

- Define the maximum gross exposure in the zone $i$, using the undertaking-specific policy conditions: $MaxGrossExposure_{(peril,r,i)}$
- Take the minimum between (1) and (2) as the maximum loss for the zone $i$:

$$MaxLoss_{(peril,r,i)} = \min\left(GrossLoss_{(peril,r,i)}, MaxGrossExposure_{(peril,r,i)}\right)$$

- Calculate the loss for the region $r$ by using the aggregation matrix:

$$L_{(peril,r)} = \sqrt{\sum_{(i,j)} Corr_{(peril,r,i,j)} \times MaxLoss_{(peril,r,i)} \times MaxLoss_{(peril,r,j)}}$$

This adjustment allows taking into account the specific exposure of undertakings that sell contract with policy conditions different than the average undertaking. In the case where the written policy of the undertaking limits more greatly the sum it would have to pay in case of catastrophic events than the average undertaking, the "ex-post adjustment" avoids that the SCR of this specific undertaking becomes unrealistically large.

**Does the CAT WS have any comment or suggestion on this approach?**