To: Solvency II WG
From: Prudential Team
cc:
Date: 29-03-2023
Reference: ECO-SLV-23-067

Subject: Final response for EIOPA's Call for evidence for the reassessment of the Nat Cat SF SCR parameters

Questions

Question 1:
Is there any peril/region, which would need to be recalibrated? If yes, which parameters[1]?
If yes please provide evidence/ data[2] to support your point (due to changes in exposure, model changes, new recent events, climate change, evidence-based requests from stakeholders for the recalibration of a certain peril/region, changes in national insurance schemes (new pools for example))

Even though some of the below listed perils will be visibly influenced by climate change, it is important to emphasize that Solvency II capital requirements are determined on the basis of a 99.5% value-at-risk measure over one year. A recalibration has to take this fact into account and therefore focus on the current and not future Nat Cat risk (multi-year forward looking assessments are part of the ORSA and that should remain so). The regularly planned reassessment of the parameters can adequately reflect possibly changes due to climate change.

Windstorm

Europe wide:

- The observed frequency and severity of windstorm events since 2010 does not show a need for parameters recalibration related to climate change. Prospective studies on climate change performed in some Member States and the JRC Technical Report on Global warming and windstorm impacts in the EU show no evidence, for the moment, that a material increase should be expected in the next decades. This assumes that windstorm is interpreted as extra-tropical windstorm, excluding severe convective storms which would be covered under Hail.
- Consideration of the effect of rising sea levels on coastal flooding due to storm surge could be made for countries where it is material. However, any impact is expected to be minor as the last updates were in 2018, so there is no expectation for a need of recalibration.

Country specific:

- More specifically, the current risk factor Q (0,07%) is adequately reflecting the windstorm risk in **Germany**.
- For **France,** data and studies indicate that there is no need for a recalibration of windstorm risk and the factors calibrated in 2018 remain appropriate.

[1] Note that if a parameter should be recalibrated, the submitted data should have the same definition as the perils and parameters in the standard formula, otherwise it will not be considered

[2] To support the need of a recalibration we would appreciate to, for example, receive modelling results.

Prudential Team •
Insurance Europe aisbl • Rue du Champ de Mars 23, B-1050 Brussels
Tel: • E-mail: prudential@insuranceeurope.eu

Drought & Subsidence

Country specific:

- The subsidence parameters for **France** need to be updated following the major event in 2022 (subsidence risks). Furthermore, the current parameters are starting to become outdated as the last recalibration took place in 2010.

Earthquake:

Europe wide:

- Earthquake by nature is not impacted by climate change. However, given that a recalibration effort is being discussed, it could be useful to consider advances in scientific literature to review earthquake risk in Europe following the release of ESHM20, which was not available at the time of the 2018 recalibration of the SF. A further element to consider is the usage of sums insureds vs loss limits when assessing the correct parameterization of the formula. The reason for this is to ensure the correct representation of policy limits, which for some countries does not appear to be sufficiently considered in the current approach, or is too variable depending on the business segment covered.

Country specific:

- The earthquake risk factor Q of 0,10 % for the region **Germany** seems to be rather high compared to the results of Nat Cat models. Though it is conceivable that earthquakes with high claims occur in Germany, however, these have only a very low probability of occurrence.
- For **Italy**, a recalibration could be considered given the release of the new MPS19 and models for Italian earthquake, in addition to ESHM20, and also to better reflect the effect of current average policy limits.
- In **Greece**, based on current data, there is no need for a recalibration for earthquake risk.
- For **France**, the current parameters are appropriate and therefore there is no need for a recalibration.

Hail:

Europe wide:

- Recent severe hail producing storm events observed in some countries (June 2021 & 2022) in combination with advances in the scientific understanding of the effects of climate change on severe storms are providing evidence that the frequency of severe storms producing large hail is increasing for some countries that have exposure to hail risk according to the standard formula (SF) (e.g. Raedler et al. 2019, Raupach et al. 2021).
- In that context and given the scientific advances in NatCat models, it could be relevant to ensure that the calibration and the parameters of this peril remain pertinent for some of the countries with SF hail risk exposure.
- Moreover, it should also be clarified if this peril should cover severe convective storm in general, rather than hail only.

Country specific:

- In **Germany** data indicate that household contents play a subordinate role in windstorm and hail. This is not adequately reflected in the standard formula and should be considered in case a recalibration is decided.
- In **Spain**, there is no evidence of an increase in frequency and severity of hail events that would require a recalibration.
- For **Italy**, a recalibration of this peril could be considered, in order to reflect the recent claim experience and to ensure that the calibration of the Q parameter properly takes into account country specific loss limits.
    - In the property component, for example, the use of the insured sums to calculate the Hail SCR generates unexpected losses that are too high compared to the portfolio under analysis, as it is extremely unlikely to experience losses due to hail close to the whole insured sum of a building.

- Moreover, it should be clarified why motor insured sums are multiplied by 5.
- The hail damages that occurred during the severe storm events of 2021 and 2022 in **France**, as well as the advances in hail Nat Cat modelling, indicate that a recalibration might be useful to ensure that hail risk is adequately reflected.

Flood:

Europe wide:

- The record intensity of precipitation and the subsequent flooding from storm Bernd (July 2021) is estimated to become more likely (with varying estimates depending on model and observations used) due to climate change (Kreienkamp et al. 2021). This event and the associated scientific literature (including the IPCC) indicate that the monitoring of the SCR parameters associated to that peril is relevant.
- Nevertheless, it is too soon to conclude from one year of increased frequency/severity in one country that the parameters need to change. The emergence of the consequences of climate change on this peril could indeed lead to increased claims over the next thirty years, but at the same time adaptation measures should also lower the impact. In that context, it is important to note that since the last calibration of the flood risk in the Standard Formula, adaptation measures have already been widely extended in several European countries that are vulnerable to flood risk. Therefore, no rash action of increasing abnormally the capital cost of covering these perils should be taken on the Standard Formula parameters, at least for the upcoming years.

Country specific:

- It is noted that the current calibration for the parameters for flood risk is conservative considering the current levels of flood risk in **Germany**. In particular, based on expert judgement, the enormous damage caused by the flooding of the Bernd rainstorm in 2021 is covered by the current calibration.
- Recalibration of the Standard Formula parameters for flood risk in **Poland** is necessary to accurately reflect the current and future risk of floods in the region. One of the reasons for recalibration is the adoption of measures that lower physical risks, including building safeguards against floods. Due to lack of major flood events in the last 12 years, data of flood loses cannot be provided.
- For **France**, no immediate recalibration of flood parameters is identified at this stage. Nevertheless, this peril and the relevant SCR parameters needs to be closely monitored, and a reassessment could be supported in the basis of monitoring that flood risk is adequately reflected in the standard formula.

Question 2:

The CRESTA version used in Solvency II are from 2010. Do you think that we should update the CRESTA version to the latest one? If yes, please explain. An update could imply to recalibrate also correlation matrices. (Some elements to consider, for FR or ES the CRESTA zones have been updated since 2010, for DK, FI, SI the zoning used is made as a "self-made" zoning, for RO, SE, HR, HU, BG the zones are based on admin NUTS instead of CRESTA).

To avoid unnecessary work for supervisors and companies alike, any updates to CRESTA zoning should only be incidental to a recalibration of the peril ie. updates to CRESTA zoning should not be the reason for the recalibration of a peril (either the country factor, zonal factors or correlation matrix).

- If/when a recalibration is to be undertaken, the following aspects should be considered for the countries where these are relevant:
  - if an updated CRESTA zone allows for a modelling improvement (e.g. inclusion of Monaco as FRA_99, or Ceuta and Melilla for Spain)
  - to have a more detailed CRESTA zoning in some countries apt at capturing risks more accurately
  - to shift from other groupings (e.g. NUTS, etc.) to CRESTA, for the sake of standardization, unless there is some clear advantage in remaining with the non-CRESTA grouping (e.g. availability of free

and reliable shapefiles) or unless such a change will not significantly improve the modelling of Nat Cat risk. CRESTA is widely used in the insurance industry and consistency in zoning criteria for different purposes (e.g Solvency II, Reinsurance, etc.) could be preferable.

- For the countries where the zones currently used in the standard formula are fit for purpose, such as Germany, no update is needed.

Nevertheless, it is reiterated that an update to the current version of CRESTA zone would not provide a better representation of Nat Cat risks per se and shall only be considered if a recalibration of a peril is decided.

Any final comments

Please provide any comments or suggestions you may have in the text box below.

Insurance Europe welcomes the evidence-based approach followed by the European Insurance and Occupational Pensions Authority (EIOPA) to reassess the calibration of the Nat Cat module based on evidence and data.

Overall, the industry does not consider that there have been material changes that would justify a complete recalibration of the Nat Cat module for weather related events, and where changes are observed a detailed analysis should be carried out to identify the extent and necessity of a Nat Cat recalibration per country. In any case, it is very important that the recalibration process should be carried out transparently and EIOPA should disclose the methods and data used.

Generally, it is noted that, overall, the reflection of the overall Nat Cat risk in the standard formula is conservative compared to the underlying risk. This is revealed by many users of the standard formula, who additionally use own NatCat models to assess their risks. Moreover, EIOPA is encouraged to evaluate taking into account the risk mitigating effect of adaptation measures as well as contract limits and deductibles. Currently only sum insureds are defined as exposure basis and contract limits and deductibles do not have an influence. Therefore, estimates are for many companies on the conservative side.

Annex: Complementary information

Proposal by the EU COM on the Solvency II review

The mandate in the proposal which is currently still under discussion is as follows:

> EIOPA shall review at least every three years, with respect to natural catastrophe risk, the scope and the calibration of the standard parameters of the non-life catastrophe sub-module of the Solvency Capital Requirement referred to in Article 105(2), third subparagraph, point (b). For the purpose of those reviews, EIOPA shall take into account the latest available relevant evidence on climate science and the relevance of risks in terms of the risks underwritten by insurance and reinsurance companies that use the standard formula for the calculation of the non-life catastrophe sub-module of the Solvency Capital Requirement.
>
> The first review pursuant to the first subparagraph of Article 304a(2) shall be completed by [OP please insert date = two years after entry into force of this Directive].
>
> Where EIOPA finds, during a review pursuant to the first subparagraph of Article 304a(2), that, due to the scope or the calibration of the standard parameters of the non-life catastrophe risk sub-module, there is a significant discrepancy between the part of the Solvency Capital Requirement relating to natural catastrophes and the actual natural catastrophe risk that insurance and reinsurance undertakings face, EIOPA shall submit an opinion on natural catastrophe risk to the Commission.
>
> An opinion on natural catastrophe risk submitted to the Commission pursuant to the third subparagraph of Article 304a(2) shall consider the scope or the calibration of the standard parameters of the non-life catastrophe sub-module of the Solvency Capital Requirement in order to remedy the discrepancy found and be accompanied by an assessment of the impact of the proposed amendments on insurance and reinsurance undertakings.

Definition of the peril used in the Standard Formula

Standard Formula peril name	Type of disaster	Standard Formula
Earthquake	Geophysical	Includes ground movement, but neither tsunami nor fire following.
Flood	Hydrological	Includes riverine (or fluvial) floods and floods that result from rainfall (pluvial, or surface water, floods). Storm surge is not included. Flash floods, which can be part fluvial and part pluvial, are included.
Windstorm	Meteorological	Includes cyclonic storms (both extra-tropical and tropical cyclones). Storm surge is not a separate peril-but where material-combined with windstorm due to the inherently coupled nature. Convective storms are not part of the windstorm peril.
Hail	Meteorological	The standard formula includes in particular hail as the dominant sub-peril, but also other sub-perils of severe convective storms, such as tornadoes and lightning.
Subsidence	Geophysical	Subsidence is part of the standard formula in France and refers to a swelling or shrinking of clay soils.

Last recalibration

Timing and item of the last recalibration of the parameters of the standard formula (country factors (Q), zonal weight (W), zonal correlation (C)). The following peril/countries were added in 2018: Finland, Hungary and Slovenia windstorm & Czech Republic Slovenia Hail.

	Windstorm	Earthquake	Flood	Hail	Subsidence
AT	2018 Q	2010	2018 Q	2010	
BE	2018 Q	2010	2018 Q	2010	
BG		2010	2018 Q		
CY		2010			
CZ	2018 Q	2010	2018 Q	2018 Q, W, C	
DE	2018 Q	2010	2018 Q	2010	
DK	2018 Q				
ES	2018 Q			2010	
FI	2018 Q, W, C				
FR	2018 Q	2010	2018 Q	2010	2010
GR		2018 Q, W			
HR		2010			
HU	2018 Q, W, C	2010	2018 Q		
IE	2018 Q				
IT		2018 Q	2018 Q	2010	
IS	2010				
LI	2010	2010	2010 Q	2010	
LU	2018 Q			2010	
MT		2010			
NL	2018 Q			2010	
NO	2018 Q				
PL	2018 Q		2018 Q		
PT		2010			
RO		2010	2018 Q		
SE	2018 Q, W				
SI	2018 Q, W, C	2018 Q, W	2018 Q	2018 Q, W, C	
SK		2010	2018 Q		
CH	2018 Q		2018 Q		
UK	2018 Q		2018 Q		

Definition of Nat Cat parameters used in the SF

The standard formula uses three sets of parameters per scenario to determine the NatCat SCR of an insurer, based on the particular exposure that must be allocated to risk zones[3]:

- *risk factor* for a region/country ("Q" in SF notation): representing the loss of an average industry portfolio (i.e. with diversification in the given country and with average policy conditions) being hit by a 1-in-200-years event of the respective peril (severity of hazard, vulnerability, policy conditions and spatial concentration of insured property); like in the initial calibration, it should be aimed at cross-border consistency of the "Q" values ("neighbouring Qs" should to the extent possible reflect the differences and similarities in risks for portfolios in neighbouring countries) for those perils that affect several countries at the same time (typically windstorm and flood);
- *risk zone* weights ("W" in SF notation): addressing spatial allocation of insurance losses due to a 1-in-200 years event to a segmentation of the country (administrative zones, like the CRESTA zones) where it deviates from a 'countrywide average portfolio'. For some zone r, Wr<1 means that, on average, there is less risk in zone r, than the average risk at country level; Wr > 1 means there is more risk; Wr = 1 means that exposure in zone r bears exactly the countrywide average risk; Wr needs to be consistent with the risk in neighbouring zones (but only those within the same country) in terms of hazard, vulnerability, policy conditions and concentration of exposure.

[3] EIOPA 2nd set of advice on SCR review

- *zone correlations* (Corr peril, region): the values Corr(peril, region) are organised in a symmetric n x n matrix, with n being the number of zones within a given region/country; they reflect the correlation of 1-in-200y insurance losses for each pair i, j of zones, including the zone i itself (Corr(peril, region)=1).[1] Due to the way Corr(peril, region) matrices are constructed, they are so-called 'aggregation matrices', as they are calibrated in an iterative approximation process.

Zones used for Nat Cat EEA countries

The standard formula mainly uses either CRESTA zones or admin zones (Eurostat NUTS).

Country	Zone in SF	CRESTA or admin unit?	Change since 2010?	Comment	Update?
AT	2 digit postal code	CRESTA low res	No		
BE	1-Digit Postcode	CRESTA low res	No		
BG	admin units	NUTS3		89 cresta zones vs 28 NUTS3	
CY	1-Digit Postcode	CRESTA low res	No		
CZ	2 digit postal code	CRESTA low res	No		
DE	2 digit postal code	CRESTA low res	No		
DK	?	Own mapping		Does not correspond to CRESTA or admin level	Should we keep own mapping?
EE	Not in the SF				
EL	2 digit postal code	CRESTA low res	No		
ES	2 digit postal code	CRESTA low res	ESP_51,ESP_52,ESP_AD,ESP_GX have been added		Add missing regions (Ceuta, Melilla)?
FI	?	Own mapping		Does not correspond to CRESTA or admin level	Should we keep own mapping?
FR	2 digit postal code	CRESTA low res	FRA_99 Monaco		Add Monaco?
HR	admin units	NUTS3		67 cresta zones vs 21 NUTS3	
HU	admin units	NUTS3		83 cresta zones vs 24 NUTS3	
IE	2 letters postcode	CRESTA low res	No		
IT	2 digit postal code	CRESTA low res	No		
LT	Not in the SF				
LU	Country	Country	No		No
LV	Not in the SF		-		
MT	Country	Country	No		No
NL	2 digit postal code	CRESTA low res	No		
PL	2 digit postal code	CRESTA low res	No		

PT	2 digit postal code	CRESTA low res	No		
RO	admin units	NUTS3		47 cresta zones vs 41 NUTS3	Why using NUTS instead of CRESTA?
SE	2 digit postal code	NUTS3		290 cresta zones vs 21 NUTS3	
SI	?	Own mapping		Does not correspond to CRESTA or admin level	Should we keep own mapping?
SK	2 digit postal code	CRESTA low res	No		
IS	Not in the SF				
LI	country	Country			No
NO	County	CRESTA low res	No		
CH	canton	CRESTA low res	No		
UK	Postcode Area	CRESTA low res	No		

Zone for Slovenia

Slovenia has 12 zones for NUTS3 but these zones are not exactly the same as the ones defined in the SF see tables below. The mapping used in the SF does not correspond to any admin level.

Nuts3	First 2 digit postal code
SI042	4000,4201,4202,4203,4204,4205,4206,4207,4208,4209,4210,4211,4212,4220,4223,4224,4225,4226,4227,4228,4229,4240,4243,4244,4245,4246,4247,4248,4260,4263,4264,4265,4267,4270,4273,4274,4275,4276,4280,4281,4282,4283,4290,4294
SI043	6000,6210,6215,6216,66217,6219,6221,6222,6223,6224,6240,6242,6243,6271,6272,6273,6274,6275,6276,6280,6281,6310,6320,6330,6333

Table: Mapping between NUTS and first 2 digit postal code

Mapping of risk zones for the Republic of Slovenia

The mappings for the region SI shall be based on the 4 digits of the postal code.

Risk Zone	Region										
1	5000	5210	5211	5212	5213	5214	5215	5216	5220	5222	5223
	5224	5230	5231	5232	5242	5243	5250	5251	5252	5253	5261
	5262	5263	5270	5271	5272	5273	5274	5275	5280	5281	5282
	5283	5290	5291	5292	5293	5294	5295	5296	5297		
2	4000	4201	4202	4203	4204	4205	4206	4207	4208	4209	4211
	4212	4220	4223	4224	4225	4226	4227	4228	4229	4240	4243
	4244	4245	4246	4247	4248	4260	4263	4264	4265	4267	4270
	4273	4274	4275	4276	4280	4281	4282	4283	4290	4294	
3	1215	1216	1217	1218	1219	1221	1222	1223	1225	1230	1233
	1234	1235	1236	1241	1242	1251	1252	1262	1270	1272	1273
	1274	1275	1276	1281	1282	1290	1291	1292	1293	1294	1295
	1296	1301	1303	1310	1311	1312	1313	1314	1315	1316	1317
	1318	1319	1330	1331	1332	1336	1337	1338	1351	1352	1353
	1354	1355	1356	1357	1358	1360	1370	1372	1373	1380	1381
	1382	1384	1385	1386	1410	1411	1412	1413	1414	1420	1423
	1430	1431	1433	4207	4208	4212	8342				

Risk Zone	Region										
9	6000	6216	6240	6242	6243	6271	6272	6273	6274	6275	6276
	6280	6281	6310	6311	6320	6323	6330	6333			
10	5271	5272	6210	6215	6217	6219	6221	6222	6223	6224	6225
	6230	6232	6244	6250	6253	6254	6255	6256	6257	6258	
11	1434	8000	8210	8211	8212	8213	8216	8220	8222	8230	8231
	8232	8233	8250	8251	8253	8254	8255	8256	8257	8258	8259
	8261	8262	8263	8270	8272	8273	8274	8275	8276	8280	8281
	8282	8283	8290	8292	8293	8294	8295	8296	8297	8310	8311
	8312	8321	8322	8323	8330	8331	8332	8333	8340	8341	8343
	8344	8350	8351	8360	8361	8362					

Zone for Denmark

Denmark has 11 zones for NUTS3 but these zones are not the same as the ones defined in the SF see tables below. The mapping used in the SF does not correspond to any admin level.

Nuts3	First 2 digit postal code
DK011	09,10,11,12, 13,14,15,16,17,18,19,20,21,22,23,24,25,27
DK012	08,29,28,27,26
DK013	27,28,29,30,31,32,33,34,35,36,40

Table: Mapping between NUTS and first 2 digit postal code

Mapping of risk zones for the Kingdom of Denmark

The mapping of risk zones for the region DK shall be based on the first 2 digits of the postal code.

Risk Zone	Region									
1	90	92	93	94	95	96	97	98	99	
2	69	74	75	76	77	78	79			
3	80	82	83	84	85	86	87	88	89	
4	62	65	66	67	68	72				
5	60	61	63	64	70	71	73			
6	50	52	53	54	55	56	57	58	59	
7	40	41	42	43	44	45				
8	46	47	48	49						
9	30	31	32	33	34	35	36			
10	10	11	12	13	14	15	16	17	18	19
	20	21	22	23	24	25	26	27	28	29
11	37									

Zone for Finland

Finland has 19 zones for NUTS3 but these zones are not the same as the ones defined in the SF see tables below. The mapping used in the SF does not correspond to any admin level.

Nuts3	First 2 digit postal code
FI193	17,19,35,40,41,42,43
FI194	60,61,62,63,64,66

Table: Mapping between NUTS and first 2 digit postal code

'Mapping of risk zones for the Republic of Finland

The mapping of risk zones for the region FI shall be based on the first 2 digits of the postal code.

Risk Zone	Postal Code Zone										
1	00	01	02	03	04	05	06	07	08	09	10
2	20	21	23	24	25						
3	26	27	28	29	32	38					
4	11	12	13	14	30	31					
5	33	34	35	36	37	39					
6	15	16	17	18	19						
7	45	46	47	48	49						
8	53	54	55	56	59						
9	50	51	52	57	58	76					
10	70	71	72	73	74	77	78	79			
11	75	80	81	82	83						
12	40	41	42	43	44						
13	60	61	62	63							
14	64	65	66	68							
15	67	69									
16	84	85	86	90	91	92	93				
17	87	88	89								
18	94	95	96	97	98	99					
19	22'.										