



EIOPA-BoS-18/075
28 February 2018

EIOPA's second set of advice to the European Commission on specific items in the Solvency II Delegated Regulation

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Introduction

Final report on the Public Consultation No. 17/006

1. EIOPA has consulted on a second set of advice to the European Commission on the review of specific items in the Solvency II Delegated Regulation (Public Consultation No. 17/006).
2. After having analysed the comments from stakeholders, EIOPA has modified its advice where appropriate. EIOPA has also provided a summary of the main comments received during this public consultation. EIOPA answered each comment received.

Review of the Commission Delegated Regulation (EU) 2015/35¹ (Solvency II Delegated Regulation)

3. The European Commission expressed its intention to review methods, assumptions and standard parameters used when calculating the Solvency Capital Requirement with the standard formula. This review is to be performed before December 2018².
4. The European Commission has asked EIOPA to provide technical advice as part of its review of the Solvency Capital Requirement³.

What is the scope of this consultation paper?

5. This consultation paper covers the following areas:
 - I. Recalibration of standard parameters of premium and reserve risks
 - II. Volume measure for premium risk
 - III. Recalibration of mortality and longevity risks
 - IV. Health catastrophe risk
 - V. Man-made catastrophe risk
 - VI. Natural catastrophe risk
 - VII. Interest rate risk
 - VIII. Market risk concentration

¹ Commission Delegated Regulation (EU) 2015/35 of 10 October 2014 supplementing Directive 2009/138/EC of the European Parliament and of the Council on the taking-up and pursuit of the business of Insurance and Reinsurance (Solvency II), OJ L 12, 17.1.2015

² Recital 150 of Commission Delegated Regulation (EU) 2015/35

³ See:

https://eiopa.europa.eu/Publications/Requests%20for%20advice/CfA_annex.pdf
and

<https://eiopa.europa.eu/Publications/Requests%20for%20advice/2017.02.21%20-%20Annex%20CfA%20II.pdf>

- IX. Currency risk at group level
- X. Unrated debt
- XI. Unlisted equity
- XII. Strategic equity investments
- XIII. Simplification of the counterparty default risk
- XIV. Treatment of exposures to CCPs and changes resulting from EMIR
- XV. Simplification of the look-through approach
- XVI. Look-through approach at group level
- XVII. Loss-absorbing capacity of deferred taxes
- XVIII. Risk margin
- XIX. Comparison of own funds in insurance and banking sectors
- XX. Capital instruments only eligible as tier 1 up to 20% of total tier 1
- XXI. Article 209(3): allowed adjustment
- XXII. USP for lapse risk
- XXIII. Recognition of adverse development covers
- XXIV. Impact assessment

Structure of this advice

6. The consultation paper is divided into 24 chapters, each covering the areas described in the paragraph above on scope of the consultation paper. Each chapter follows the same structure:

- Extract from the call for advice
- Legal basis
- EIOPA's advice
 - Analysis
 - Advice (and if relevant proposals for legal articles)

7. The exceptions are:

- Chapter 12 on strategic equity investments, which provides information only, as requested by the Commission.

- Chapters 21, 22 and 23 on allowed adjustments, USP for lapse risk and recognition of adverse development covers, which complement the first set of advice EIOPA already sent to the European Commission⁴.
- Chapter 24 on impact assessment.

Length of the advice

8. The advice is a long document. This reflects the large number of topics being reviewed and EIOPA's desire to be fully transparent on the basis for its proposed advice.
9. Where appropriate, material is placed in annexes to the chapters.
10. As well as the common structure set out above, EIOPA's advice is highlighted in a blue box towards the end of each chapter, and these blue boxes are a good place to start for those readers who do not need to consider some or all of the issues in detail.

Engagement with stakeholders

11. In addition to the consultation paper EIOPA has engaged with stakeholders throughout the development of its advice.
12. EIOPA issued a first discussion paper in December 2016. It has held meetings with stakeholders during 2017 on 23 May, 8 June and 27 September and teleconferences on 23 January and 30 January. In addition EIOPA has been in dialogue with its Insurance and Reinsurance Stakeholder Group.
13. EIOPA has also sought information on specific topics from insurance undertakings and from national supervisory Authorities ("NSAs").

Appreciation

14. EIOPA would like to record its appreciation of all those who have responded to its engagement with stakeholders.
15. EIOPA would like to thank in particular the participants of the Catastrophe Risk Workstream for their significant commitment of time and effort.

⁴ https://eiopa.europa.eu/Publications/Consultations/EIOPA-BoS-17-280_First_set_of_Advice_on_SII_DR_Review.pdf

1. Recalibration of standard parameters of premium and reserve risks

1.1. Feedback statement on the main comments received to the consultation paper (EIOPA-CP-17-006)

1.1.1. General comments

a. Summary of the comments received

17. Some stakeholders highlighted the simplification made by EIOPA for the purpose of deriving the parameter that reflects the 99.5% quantile in the premium and reserve risks' formula and questioned the appropriateness of such a simplification.
18. Some comments advocated for the application of country specific volatility because the application of the same factors across Europe for a given line of business would disregard differences in national markets.
19. Following some answers, adverse development covers contracts and the ability of some reserves to play the role of risk mitigation techniques were allegedly not properly addressed.
20. If a recalibration occurred, some wondered whether a transitional period would take place and whether those changes should be anticipated in the ORSA. Furthermore, the question of the impact of a change in the standard formula's parameters on USP was raised.

b. Assessment

21. The scope of the call for advice launched by the European Commission in July 2016 only focuses on the standard parameters of the non-life premium and reserve risk. Therefore, neither the derivation of national specific parameters, nor the assessment of the parameter that reflects the 99.5% quantile are in the scope of this exercise. Regarding the latter, the level of this parameter is derived as a rounding of the log normal distribution law from 2.95 to 3, which was performed in 2011 for the sake of simplicity.
22. Similarly, adverse development covers contracts and risk mitigation techniques are not part of this specific exercise of non-life recalibration. Please refer to the appropriate sections.
23. USP are meant to derive volatility parameters in accordance with the risk profile of undertakings. As a change in the standard parameter has no impact on the risk profile of a given undertaking, it cannot lead to a withdrawal of the USP submission and to a return to the standard parameter. However, in the case where the historical depth of undertaking's data is less than 10 years and where the use of a credibility factor is necessary, changes in the level of the standard parameters would impact USP figure.
24. Given the non-material outcomes of the impact assessment performed by EIOPA, the need for a transitional period is not deemed as necessary.

1.1.2. Data

a. Summary of the comments received

25. Some stakeholders questioned the opportunity to perform the recalibration of some lines of business (HME or HWC). Moreover, the representativeness of the sample used for the recalibration was disputed.
26. More details were required regarding the data cleaning process developed and the three steps automated elimination. More specifically, stakeholders asked whether the exclusion of one-off CAT outliers has been performed.

b. Assessment

27. The assessment of the HME calibration is an explicit request from the call for advice launched by the European Commission in July 2016. The assessment of the HWC calibration is due to the fact that less than 100 undertakings from less than twenty countries participated in the 2011 data collection as disclosed in the table below.
28. The advice has been amended in order to include further details regarding the data cleaning process.

1.1.3. Methodology

a. Summary of the comments received

29. Both the appropriateness and the accuracy of the methods used were put into question. The use of an alternate method was suggested (GIRO; scenario based approach). Moreover, the use of the 2011 level of the gross to net factor was challenged. According to some comments, further elements could be taken into account in the methodology such as commissions or non-proportional reinsurance.
30. In the USP methodology, stakeholders wondered whether outliers due one-off CAT events have been retreated.
31. For some lines of business, some of the choices were questioned. For instance, whether the lognormal approach is more appropriate than the normal one for HME or whether the double counting with the CAT recession module has been considered for CS. Further comments about the outcomes of the recalibration were also made, particularly for LE and CS lines of business. Some answers pointed out that the weights of NL in the HME line of business seemed too high.

b. Assessment

32. As a general statement, it is worth noting that the calibration exercise performed relied on the methodology developed in 2011 in order to derive a sound comparison. Therefore, it aimed at assessing the level of the calibration rather than the methodology used. Furthermore, as this exercise does not target all lines of business, a change in the methodology for only some of those lines of business will result in a major inconsistency. The

development and assessment of alternative methods is not within the realm of this exercise.

33. The comparison between the standard parameters and the individual USP levels could have been impacted by the non-exclusion of some CAT events. Nonetheless, in most cases and where possible data have been processed in order to exclude those effects. Also note that the USP calibration is only used as an indication for the purpose of the calibration.
34. The final advice includes further consideration and explanation regarding specific lines of business.
35. Regarding the weights of NL in the HME line of business, EIOPA internally investigated the matter and acknowledged that the specificities of the Dutch market, in particular the HRES, were not duly taken into account. Therefore, HME weights were amended and the calculation done once again. This resulted in a change in the final advice with respect to the HME line of business.

1.1.4. Disclosure

- a. Summary of the comments received

36. Further details about the kappa factors used to derive the final calibration and of goodness of fit were requested.
37. Rough impact assessments of the changes were provided by stakeholders.

- b. Assessment

38. Final advice includes further details about kappa factors, goodness of fit and an extensive impact assessment.

1.1.5. Recalibration

- a. Summary of the comments received

39. The calibration of the selected lines of business was not supported by some respondents while others welcomed it.

1.2. Call for advice

EIOPA is invited to provide technical advice on standard parameters to be used when calculating specific underwriting risk modules (under the empowerment in Article 111(1)(c) of Directive 2009/138/EC).

EIOPA is asked to assess which standard parameters need to be changed amongst the following underwriting submodules and to suggest possible new calibrations where appropriate, making use of the experience gained and data gathered during the transitional period and the first year of application of Solvency II, also making use of relevant data provided by other parties.

The standard parameters for non-life premium and reserve risk, and the standard parameters for medical expense risk, that should be calibrated on the basis of extended data.

1.3. Legal basis

1.3.1. Directive 2009/138/EC ("Solvency II Directive")

40.Article 105: Calculation of the Basic Solvency Capital Requirement

The non-life underwriting risk module shall reflect the risk arising from non-life insurance obligations, in relation to the perils covered and the processes used in the conduct of business.

It shall take account of the uncertainty in the results of insurance and reinsurance undertakings related to the existing insurance and reinsurance obligations as well as to the new business expected to be written over the following 12 months.

It shall be calculated, in accordance with point (2) of Annex IV, as a combination of the capital requirements for at least the following sub-modules:

(a) the risk of loss, or of adverse change in the value of insurance liabilities, resulting from fluctuations in the timing, frequency and severity of insured events, and in the timing and amount of claim settlements (non-life premium and reserve risk);

(b) the risk of loss, or of adverse change in the value of insurance liabilities, resulting from significant uncertainty of pricing and provisioning assumptions related to extreme or exceptional events (non-life catastrophe risk).

1.3.2. Delegated Regulation

41.Article 115: Non-life premium and reserve risk sub-module

The capital requirement for non-life premium and reserve risk shall be equal to the following for a given line of business (LoB) l :

$SCR_l = 3 \cdot \sigma_l \cdot V_l$, where:

(a) σ_l denotes the standard deviation for non-life premium and reserve risk determined in accordance with Article 117 for a given LoB l ;

(b) V_l denotes the volume measure for non-life premium and reserve risk determined in accordance with Article 116 for a given LoB l .

42.Article 146: NSLT health premium and reserve risk sub-module

The capital requirement for NSLT health premium and reserve risk shall be equal to the following:

$SCR_{(NSTL,pr)} = 3 \cdot \sigma_{NSLT_h} \cdot V_{NSLT_h}$, where:

(a) σ_{NSLT_h} denotes the standard deviation for NSLT health premium and reserve risk determined in accordance with Article 148;

(b) V_{NSLTh} denotes the volume measure for NSLT health premium and reserve risk determined in accordance with Article 147.

1.4. Advice

1.4.1. Selection of line of business

43.EIOPA has identified that for the following Lines of business a recalibration exercise could be needed for the non-life premium and reserve risk standard deviation:

- medical expense (LoB n°1 of Annex I of the Delegated Regulation)
- credit and suretyship (LoB n°9)
- assistance (LoB n°11)
- legal expenses (LoB n°10)
- worker compensation (LoB n°3).

44.EIOPA has selected these Lines of business to be recalibrated by analyzing the calibration done in 2010-2011. In the report of the Joint Working Group (JWG), data availability⁵ and data limitations are discussed and for every single LoB the number of undertakings that provided data is reported.

45.EIOPA has selected for the purpose of this exercise the Lines of business where data has been assessed as not representative enough for both premium and reserve risks, in view of the number of undertakings that currently are doing business in the same Lines of business.

46.In particular, where the number of undertakings that submitted valid data is less than 100 before adjustments due to the exclusion of catastrophe losses and where the data provided came from less than 20 different European countries, EIOPA has considered that a recalibration would be necessary. It should be noted that these criteria do not apply to non-proportionate reinsurance Lines of business due to the specific nature of the business and due to the limited number of undertakings that carry out this business. Furthermore, the medical expense LoB is included as an explicit request from the call for advice of the European Commission as outlined previously.

47.It should be noted that the JWG explicitly excluded credit and suretyship and assistance reserve risks from the recommendations because of a lack of observations⁶.

48.Below is disclosed the amount of submission received by the JWG in 2011:

⁵ *ibid* pp 9-11.

⁶ *ibid* p.4

	JWG				
	AS	CS	HME	HWC	LE
Undertakings	86	97	269	51	149
Countries	21	21	25	16	19
AT	2		1		8
BE	1	1	6	5	12
BU	1	1			
CY					
CZ		2	1		
DE			56		31
DK	3	2	7	7	2
EE					
EL					
ES	6	5	14		3
FI		3	2	4	10
FR	5	3	51	2	8
HU	2	3	3		2
IE	5	8	11		4
IT	20	26	34	1	32
LI					
LT	4	6	6	1	
LU	1	3	1	1	4
LV	3	4	8		1
MT	4	2	8	4	3
NL	4	4	21	1	8
NO	1		1	7	
PL		2	2	1	
PT	2	2	5	6	3
RO	7	9	8	2	2
SE	3		5	1	
SI	4	5	5		5
SK	2	1	1		1
UK	6	5	11	5	10
IS			1	3	

1.5. Data

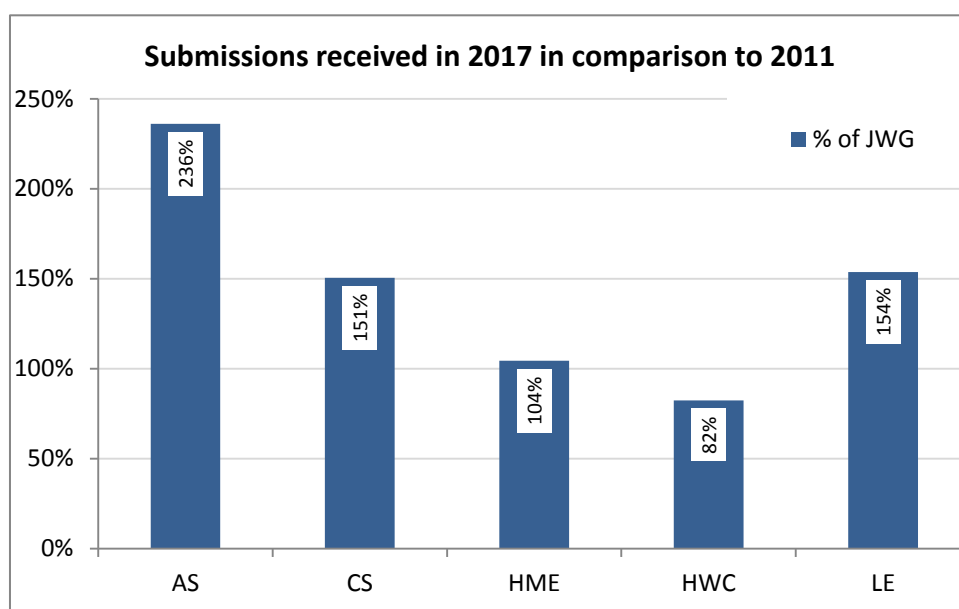
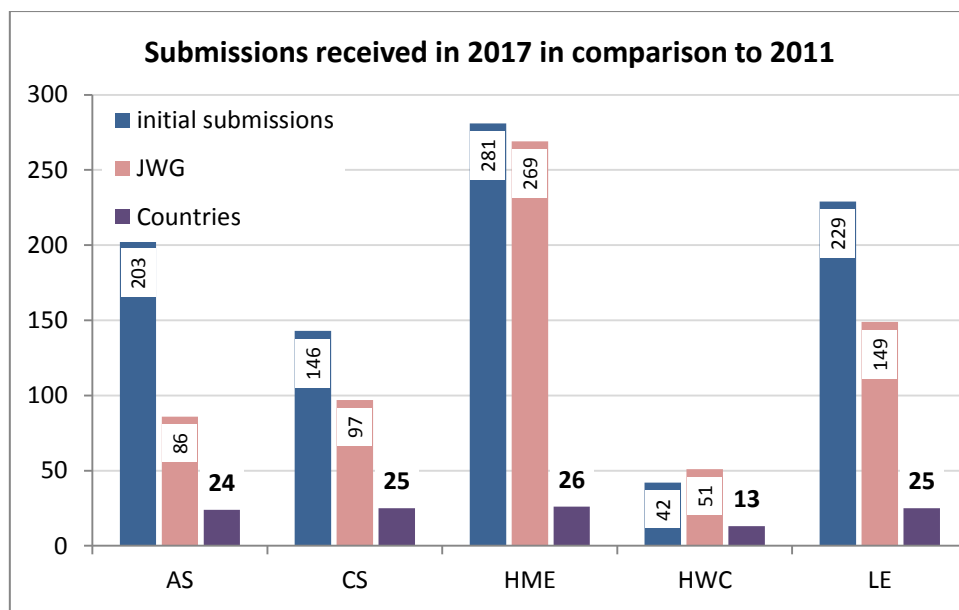
1.5.1. Data collection exercise

49. For the purpose of this recalibration, EIOPA requested data at EU level covering as wide a range of undertakings (of all types and sizes) and Member States as possible. The data had to be provided by undertakings that do direct business in one of the five lines of business aforementioned. The data was collected by EIOPA from December 2016 to March 2017.
50. For more details on the data collection exercise, please refer to the *Discussion Paper on the review of specific items in the Solvency II Delegated Regulation* published by EIOPA in December 2016⁷.
51. As a result of this exercise, EIOPA received data from 486 undertakings from 27 countries. It should be highlighted that further credit and suretyship submissions were received after the latest consultation paper (EIOPA-CP-17-006), which resulted in an increase of the representativeness of the sample. The distribution among LoB is shown in the table below.

⁷ EIOPA-CP-16/008 of 5th December 2016 : https://eiopa.europa.eu/Publications/Consultations/EIOPA-CP-16-008_Discussion_Paper_on_SII_DR_SCR_Review.pdf

		2017 submissions				
		AS	CS	HME	HWC	LE
Undertakings		203	146	281	42	229
Countries		24	25	26	13	25
	AT	3	3			16
	BE	2	1	2	4	3
	BU					
	CY					
	CZ	8	5	10		3
	DE	12	2	10		18
	DK			1	1	
	EE	1	2	6		1
	EL	14	7	18	1	20
	ES	19	7	17	1	12
	FI		4	26	8	26
	FR	9	6	37		24
	HR	12	8	8	1	6
	HU	7	6	7	2	5
	IE	5	7	2		1
	IT	50	31	52		51
	LI	1	3	4		
	LT			1		1
	LU	2	1	4		4
	LV	5	4	4		1
	MT	4	3	3	1	1
	NL	4	5	20		13
	NO					
	PL	6	3	3	1	2
	PT	13	9	18	16	11
	RO	10	9	11	3	2
	SE	2	2	4	1	1
	SI	5	4	6		3
	SK	6	4	2		1
	UK	3	10	5	2	3

52. The charts below disclose the comparison per LoB between the submissions received in 2017 and the 2011 JWG data collection.



1.5.2. Data cleaning

53. In order to get exploitable data, the first step was a dialogue between undertakings and NSAs to clarify some areas of uncertainty.

54. The second step consisted in cleaning data where possible. The most common inconsistencies with data were the following:

- unit of values, where the unit described by the undertaking does not correspond to the underlying unit in the submitted values,
- negative values, e.g. in earned premiums,
- zeros e.g. in earned premiums,
- inconsistency between earned premium and loss estimates which leads to not entirely natural loss ratios,

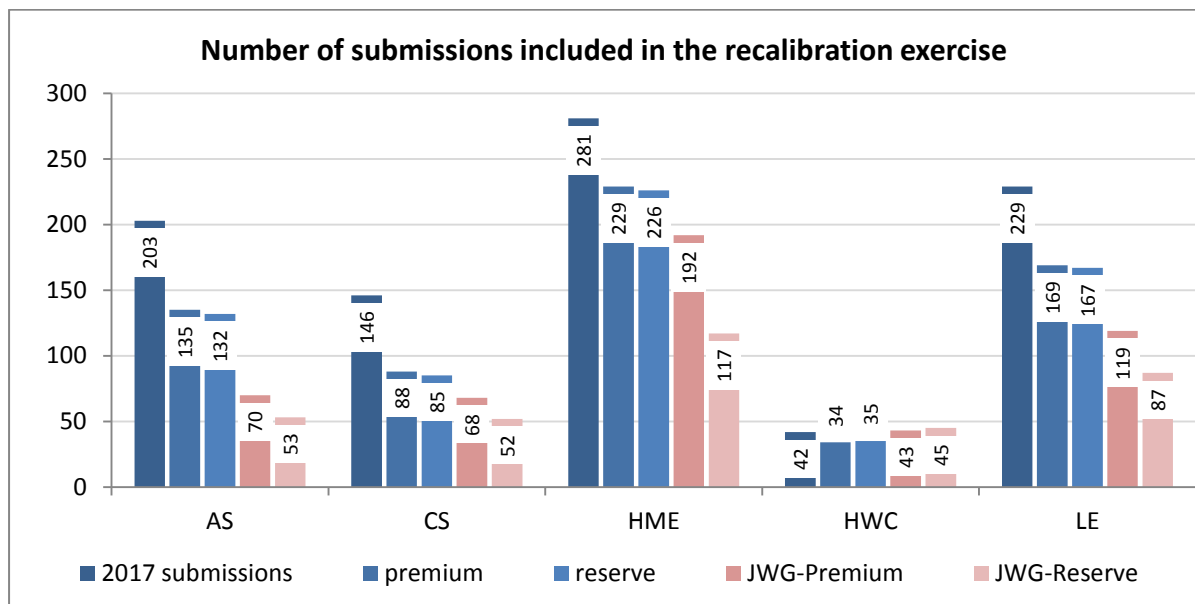
- inconsistency between loss estimates and triangle data,
- inclusion of catastrophe events and other outliers in premium risk data.

55. Finally, where data could not be considered sufficiently reliable, submissions were not taken into account.

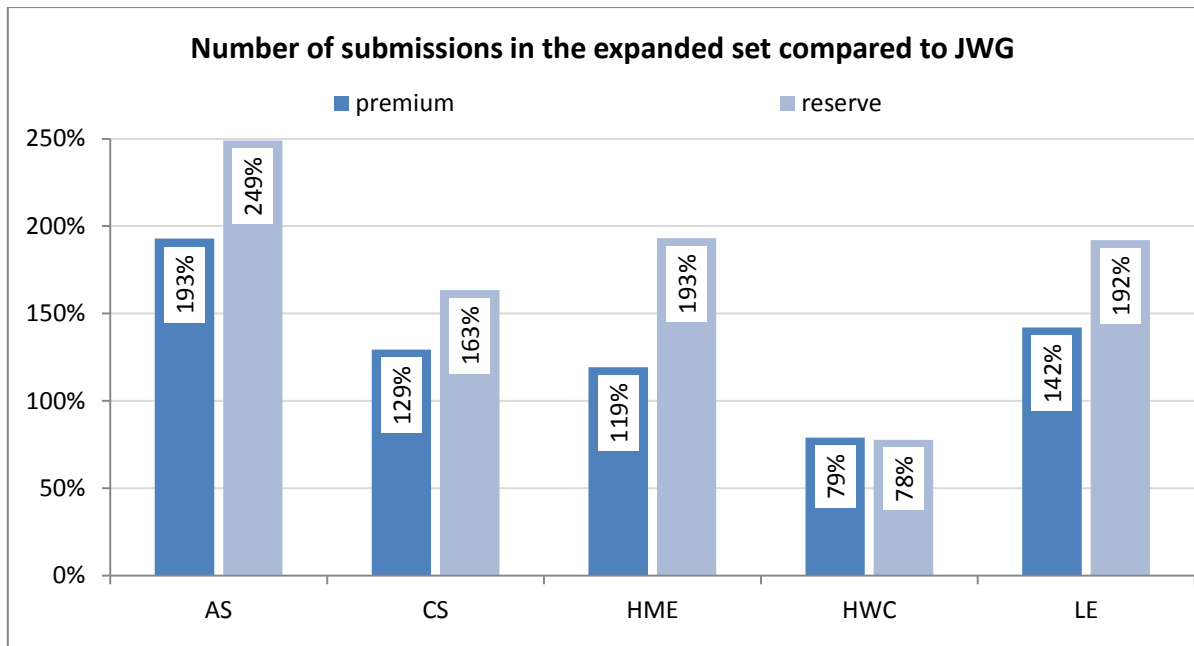
1.5.3. Representativeness of data

56. Representativeness of data collected in 2017 can be drawn both by comparing to the total number of submissions finally used in 2011 and, to the total volumes of premium and reserve of 2011.

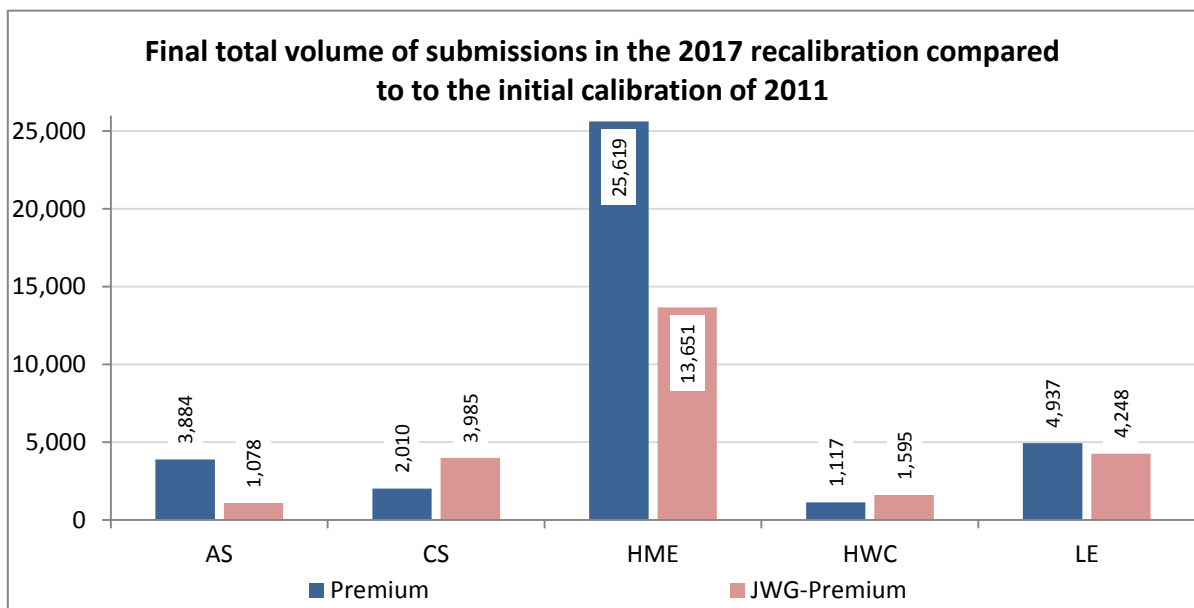
57. The chart below sums up distribution of submission after the cleaning process and compares with the outcome of the same process performed by the JWG.

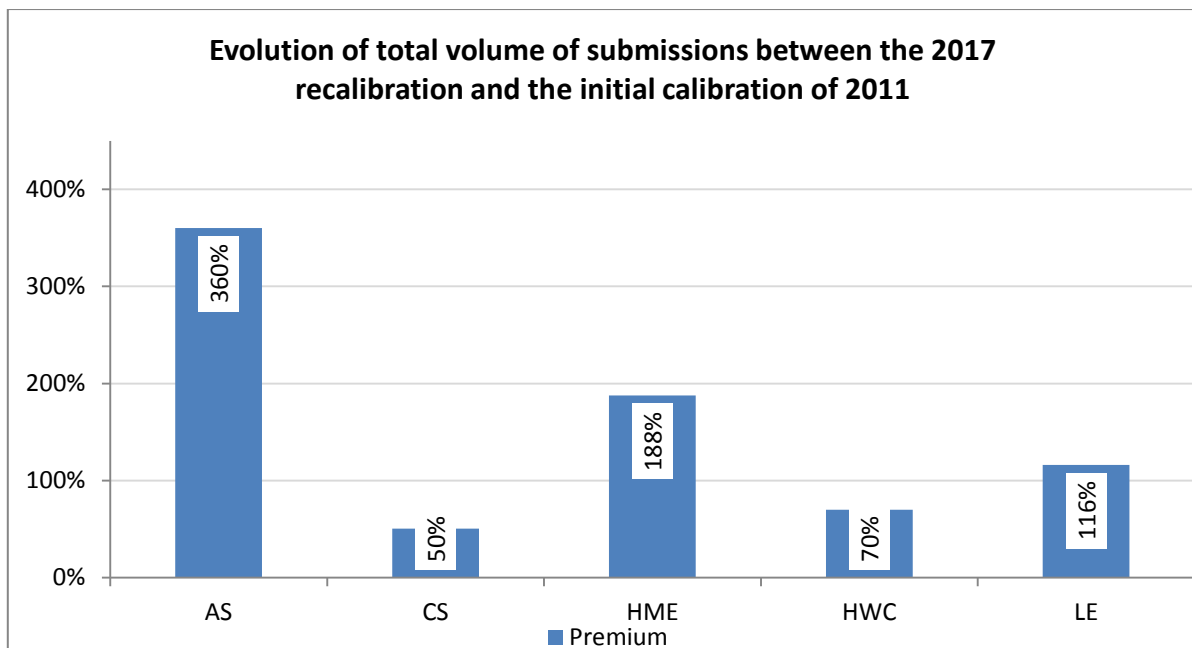


58. In proportion of the respective initial submission set, the 2017's cleaning process resulted in the inclusion of a higher amount of data than the 2011's one. Therefore, for every LoB except worker's compensation LoB, the 2017 recalibration relied on a higher number of submissions than the initial calibration of 2011.

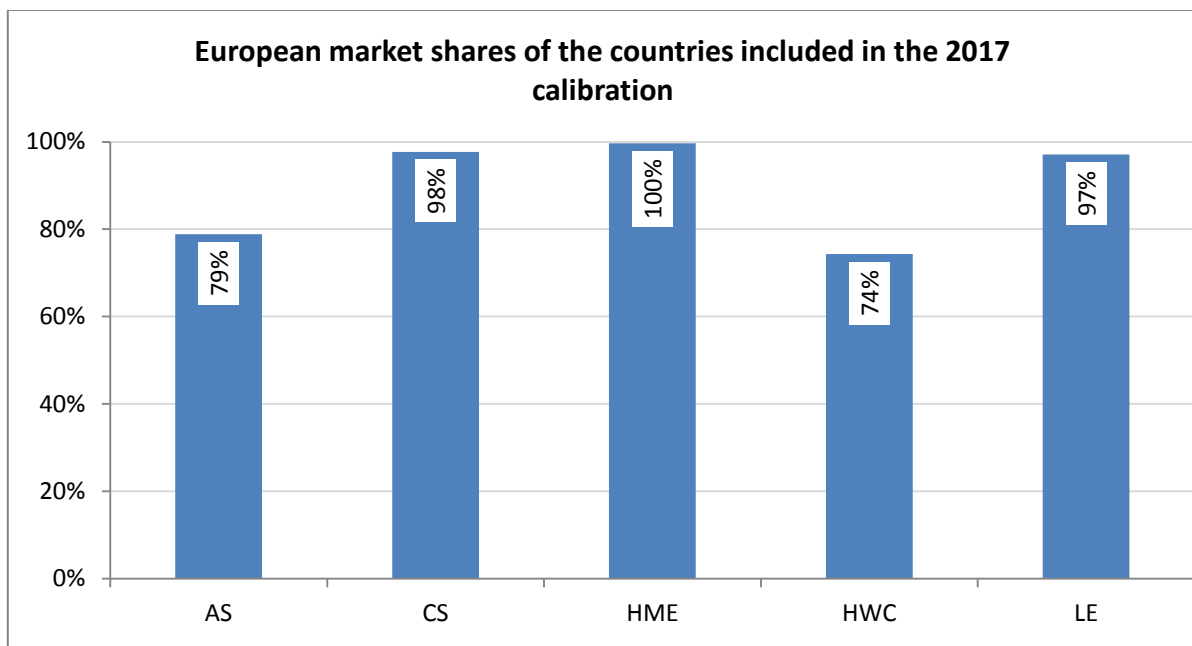


59. Except for the credit & suretyship LoB, volumes collected in 2017 were higher than those collected in 2011. The volume of the worker's compensation LoB is of the same range between the two data collections (EUR 1.1bn in 2017 versus EUR 1.6bn in 2011).

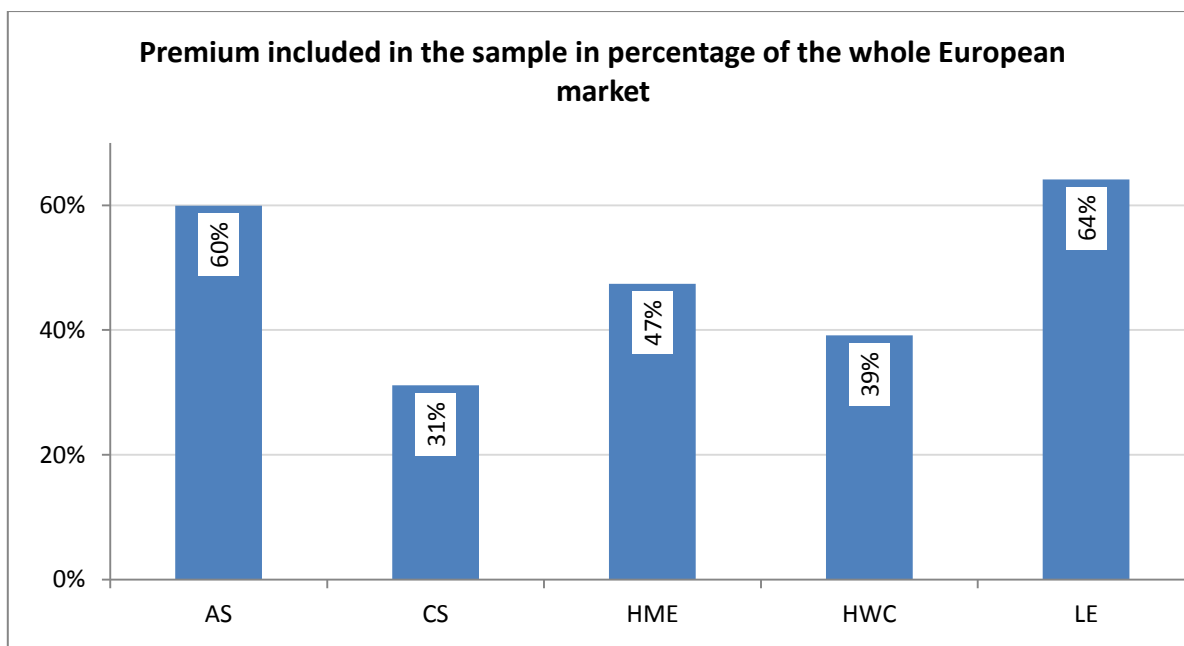




60. Representativeness can also be assessed by comparing the market share of the countries included in the sample. For instance, the twenty four countries included in the Assistance sample represent 79% of the whole European Assistance market in terms of premium.



61. Finally the size of the sample in terms of volume collected can be compared to the European market in order to conclude on the representativeness of the sample. For example, in the Assistance sample we capture 50% of the European market.



62. The table below sums up the evidence that advocates for the good representativeness of the sample.

	Representativeness			
	number of submission vs. 2011	volume vs. 2011	countries	market share
AS	+	+	+	+
CS	+	—	+	+
HME	+	+	+	+
HWC	—	—	+	+
LE	+	+	+	+

63. The credit & suretyship LoB that has a total volume lower than these collected in 2011 is nonetheless considered representative enough, because of:

- the high share that the sample represents (31% of the European market);
- the countries included in the sample that correspond to more than 95% of the total European volume;

- the higher number of contribution collected (29% more contribution in 2017 than in 2011).
2. The further credit & suretyship submissions received from the UK and Ireland after the latest consultation paper (EIOPA-CP-17-006) resulted in a material increase of the representativeness of the sample as the volume size of the sample increased by 20%.
64. The worker's compensation LoB where both number of submissions and the total volume are lower than those collected in 2011 is considered representative enough because of:
- the high share that the sample represents (31% of the European market);
 - the countries included in the sample that correspond to more than 70% of the total European volume.
65. As a conclusion, data collected is considered as sufficiently representative to derive conclusion on the five identified lines of business.

1.5.4. Type of data used

66. Data collection requested:
- raw data gross of reinsurance;
 - adjusted data gross of reinsurance, excluding catastrophe loss;
 - data net of reinsurance;
 - adjusted data net of reinsurance, excluding catastrophe loss;
 - impacts of salvage and subrogation.
67. Sufficient data was only received for raw data gross of reinsurance.
68. Calibration was therefore performed with data gross of reinsurance and without exclusion of catastrophe events a priori. In the different steps of the recalibration, outliers were excluded (please see below sub-section 1.6.2), which means that undertakings with extraordinary volatility were excluded. These extraordinary volatilities may have been due to catastrophe events. For the Lines of business considered in this exercise, catastrophe events are not expected to have a major impact on the results.
69. Premium calibration was moreover calibrated based on loss at the end of the first year, as in 2011.
70. In case of the reserve calibration, the 2011's calibration was performed on both net and gross of reinsurance data and the final advice was given net of

reinsurance. In order to draw a sound comparison, this reserve calibration exercise will be compared to the 2011's outcome gross of reinsurance⁸. Furthermore, gross to net factors from the 2011's exercise are used to derive a final figure for this exercise.

		JWG (2011)		
		Method 2		Gross to net factor
		<i>gross</i>	<i>net</i>	
Reserve	AS	19,1%	19,1%	100%
	CS	52,6%	52,6%	100%
	HME	9,2%	5,3%	58%
	HWC	12,7%	11,4%	90%
	LE	12,3%	12,3%	100%

1.6. General approach for assessing the non-life premium and reserve risk standard deviations

71.The initial calibration of the non-life premium and reserve risk standard deviations was carried out by the JWG in 2011.

72.In order to assess whether the calibration performed in 2011 needed to be updated in the most reliable manner, it has been decided to apply the exact same methodology. This methodology is briefly described below and can be found in details in the report produced by the JWG⁹. We also reproduced several of the various options considered back then (see the description of methodology 1 below).

73.The methodology of the JWG provides for standard deviations appropriate at European level. The data request was made such to ensure that sufficient and appropriate data are available to calibrate these European parameters. Both the data and the methodology are not appropriate for providing country specific parameters. Indeed, the methodology would need to be re-designed

⁸Figures can be found in annex B of the Calibration of the Premium and Reserve Risk Factors in the Standard Formula of Solvency II, Report of the Joint Working Group on Non-Life and Health NSLT Calibration, EIOPA,12 December 2011:

https://eiopa.europa.eu/Publications/Reports/EIOPA-11-163-C-Annex_6_2_Report_JWG_on_NL_and_Health_non-SLT_Calibration.pdf

⁹https://eiopa.europa.eu/Publications/Reports/EIOPA-11-163-A-Report_JWG_on_NL_and_Health_non-SLT_Calibration.pdf

so that it can be applied to small set of data and appropriate information would need to be collected. This may also disadvantage some countries over others due to the implicit higher volatility of smaller data sets.

1.6.1. Methods applied

74. The methods applied were based on both normal and lognormal parametrisation.
75. Premium risk used the following parametrization: x as earned premium and y as aggregate loss at the end of the first year. We used one definition of normal variance and two lognormal ones¹⁰.
76. Reserve risk was based on the same methods as per premium risk with the following parametrization: x as total claims provision at the start of a given financial year and y as aggregate loss incurred in a given financial year for all earlier accidents years. We used one definition of normal variance and one lognormal.
77. The CEIOPS final advice was based on normal parametrizations.

1.6.2. Procedure to eliminate outliers

78. Elimination of outliers was performed in three automated steps.
79. For each type of calibration and for both premium and reserve risks we performed a first estimation of the parameters. We eliminated observations that generated outlying standardised residuals: being outside the interval that may be expected for standard normal random variables with the given sample size. This procedure was performed three times before performing the final calibration. This step is of paramount importance in order to obtain the most accurate modelling.
80. This process resulted in the exclusion of very few observations. It had therefore no impact on the representativeness of the samples. Besides, for countries where less than five submissions were received, the procedure was performed only twice.
81. It should be highlighted that proceeding in this manner results in producing parameters in the low range of the possible outcomes.

¹⁰ With x earned premium and $\bar{x}$ the sample mean, σ standard deviation, β loss ratio parameter, ∂ probability distribution of y , we have the following μ mean and the following ω variances:

$$\mu = \log(\beta x) - \frac{\omega}{2}$$

$$\omega_1 = \log\left(1 + \frac{\sigma^2((1-\delta)\bar{x}x + \delta x^2)}{\beta^2 x^2}\right) \text{ and } \omega_2 = \log(1 + \sigma^2((1-\delta)\bar{x}x^{-1} + \delta))$$

1.6.3. Portfolio-size heterogeneity

82. In order to address the issue stemming from the fact that the calibration is performed assuming an average sized portfolio sample, the methodology of the CEIOPS introduces a kappa factor that generated a *standard deviation*, independent on the size of the sample. This kappa factor is meant to standardize the outcomes and to avoid that a too large SCR is calculated for the larger portfolios and a too small one for the smaller portfolios. In order to obtain a calibration at the appropriate level, the *unbiased sigma* is multiplied by the chosen kappa.
83. The value of the kappa factor would depend on whether the size is measured in terms of share of portfolios in the sample (*company approach*) or in terms of share of volume, i.e. policyholders that are insured by undertakings of the portfolio (*policyholder approach*).
84. The calibration performed by the JWG set the following limits:
- *company approach* - at least 65% of portfolios should be covered with a security level of at least 99.5%,
 - *policyholder approach* - at least 95% of policyholders in term of volume should be covered with a security level of at least 99.5%.
85. Choice between the two approaches can have significant influence on the outcome. The final figures of the kappa factors are displayed in annex (see "29. Annex to chapter 1- Kappa factors used in method 2 and goodness of fit graphs").
86. The CEIOPS final advice relied on the policyholder approach.

1.6.4. Deriving a European parameter

87. Deriving a European calibration can be done in different manners, either by considering Europe as a whole market and performing a calibration on the whole European dataset (method 1¹¹), or by considering that the European market is composed by the different national markets (method 2¹²). In order to reflect this, the two kinds of calibration were realized.
88. In method 1, the calibration can either be performed using the company approach or the policyholder approach.
89. In method 2, calibration is performed at the country level using the policyholder approach. The 95% of policyholders is defined with the European sample. The aggregation is made thanks to a weighted average using volume measures for each LoB (premiums or reserve) from 2016 quantitative reporting as weights (see "28. Annex to chapter 1 – Weights used in the method 2").

¹¹ Referred as the pan-European approach in 2011.

¹² Referred as the combined approach in 2011.

90. A threshold was applied to only include in the analysis countries with at least three portfolios. Limit was set to two portfolios for worker's compensation and credit and suretyship lines of business given the smaller number of undertakings doing this business. This threshold was set to five in 2011. We decreased it, in order to have more country included and a more representative sample.

91. The CEIOPS final advice was based on the method 2.

1.6.5. USP calibration to back test results

92. In parallel of the aforementioned methodologies, a calculation of the USP for each undertaking and each LoB was performed.

93. We used the prescribed legal methodologies described in Annex XVII of the Delegated Regulation.

94. In order to characterize our sample and to compare it to the standard formula calibration, we analysed the number of undertakings of the sample that were below or above the standard formula's calibration. We considered that the USP methodology provided evidences for a recalibration when more than 60% of the total sample was below/above the current calibration.

95. The following table discloses the amount of USP for a given LoB that is below standard formula's calibration. Only USP figures below 100% are taken into account. USP figures that are above 100% were considered as outliers and excluded from the ratio calculation. Graphs disclosing the results can be found in "25. Annex to chapter 1 – USP calibration".

	Amount of USP below the standard formula calibration		
	<i>Premium</i>	<i>Reserve LogN</i>	<i>Reserve Triangle</i>
AS	51%	36%	28%
CS	19%	35%	31%
HME	41%	11%	9%
HWC	46%	22%	45%
LE	59%	46%	52%

96. *LogN method* refers to the *reserve risk method 1* of the paragraph C of Annex XVII. *Triangle method* refers to the *reserve risk method 2* of the paragraph D of Annex XVII of the Delegated Regulation. These are calculated using paid triangles.

1.7. Final recommendation

97. In the following table are summed up all the evidences gathered in this recalibration exercise and the representativeness is assessed. Details of the results can be found in "26. Annex to chapter 1 – Results of the calibration for premium risks" and "27. Annex to chapter 1 – Results of the calibration for premium risks".

98. In the column *Evidences provided for a recalibration*, an up arrow ($\nearrow$) means that the given methodology pleads in favour of a higher calibration, i.e. the outcome of the methodology in 2017 is higher than in 2011. A down arrow ($\searrow$) means that the methodology advocates for a lower calibration, i.e. the outcome of the methodology in 2017 is lower than in 2011. A double horizontal arrow ($\leftrightarrow$) means that the methodology suggests no change, i.e. outcomes from 2017 and 2011 are of the same range. Decisions are mainly driven by method 2 (in black), while method 1 (in dark grey) and USP¹³ (in light grey) are more indicative.

99. Figures for the *final calibration* column are derived from method 2 which is identical to the method used to derive standard formula's calibrations, i.e. based on an aggregation of country normal sigma using the policyholder approach.

100. As stated in the section 0, data is considered as sufficiently representative to support a recalibration.

¹³ Outcomes and assessments of the USP calibration are explained in sub-section 1.6.5.

1.7.1. Premium

		Evidences provided for a recalibration			Standard formula	JWG calibration	Final calibration
		method 2	method 1	USP calculations			
Premium	AS	↘	↔	↔	9%	9.3%	6.4%
	CS	↗	↗	↗	12%	11.7%	19.0%
	HME	↔	↗	↔	5%	5.0%	5.3%
	HWC	↗	↘	↔	8%	8.0%	9.6%
	LE	↗	↘	↘	7%	6.5%	8.3%

101. The reduction in the calibration in the *assistance* premium risk volatility is driven by the higher number of submission from French undertakings received compared to the previous calibration. Indeed, volatility of most of the French big players that took part to this exercise is lower than the current standard parameter, if we refer to the USP submissions. From a larger perspective, the representativeness of the sample used for this exercise is much greater than the 2011's one.
102. For *credit and suretyship*, the congruent outcomes for all three kinds of calculation argue without ambiguity for an increase of the calibration. Although the volume of premium collected in 2017 is smaller than in 2011, the participation was higher in 2017 and data quality were better, as can also be seen with the calibration of reserve risk.
103. Given the large participation to the exercise and the resulting volatility of the *medical expense* LoB (5.3%, see "26. Annex to chapter 1 - Results of the calibration for premium risks"), EIOPA does not recommend a change in the volatility of the premium risk.
104. The *worker's compensation* LoB is not widely used among the European undertakings, but the amount of data collected is sufficiently representative of the whole European market and pleads in favour of an increase of the premium parameter.
105. The change in the in the *legal expenses* premium volatility can mainly be attributed to the increased participation to the data collection. The volume included in the calibration represents almost 40% of the European market shares. In particular, German undertakings took largely part to this exercise contrarily to 2011.

1.7.2. Reserve

		Evidences provided for a recalibration			Standard formula	JWG calibration	Gross to net factor	Final calibration
		method 2	method 1	USP calculations				
Reserve	AS	↗	↔	↗	20%	19.1%	100%	22.0%
	CS	↘	↔	↗	19%	52.6%	100%	17.2%
	HME	↗	↗	↗	5%	5.3%	58%	5.7%
	HWC	↔	↘	↗	11%	12.7%	90%	11.0%
	LE	↘	↘	↔	12%	12.3%	100%	5.5%

106. The JWG explicitly excluded *assistance* reserve risks from its recommendations because of the lack of observations. The figure used as standard parameter is nonetheless probably derived from this particular work. Both participation and representativeness of the actual exercise is greater than in 2011, it leads to an increase in the final reserve volatility. The rather high figure obtained is due to the very nature of the assistance business.

107. The JWG explicitly excluded *credit and suretyship* reserve risks from the recommendations because of the lack of observations. Figure provided then was greater than 50%. The data reliability is much greater this time and the current study suggests a decrease in the reserve volatility of this LoB. As detailed in section *Type of data used*, for the *medical expense* LoB a 58% gross to net factor was applied to the gross calibration in 2011. As this factor could not be assessed due to the lack of data net of reinsurance available in 2017, we applied the very same factor to the 2017 gross calibration ($9.9\% \times 58\% = 5.7\%$). The congruent outcomes for all three kinds of calculation argue for a slight increase of the calibration.

108. No change is suggested for the *worker's compensation* LoB, as advocated by the methodology 2 and after application of a gross to net factor of 90%.

109. As per the premium risk, the change in the in the legal expenses reserve volatility can mainly be attributed to the increased participation to the data collection. The volume included in the calibration represents almost 40% of the European market shares. In particular, German undertakings took largely part to this exercise on the contrary to 2011.

1.7.3. EIOPA's advice

110. EIOPA has identified that for the following lines of business a recalibration exercise is needed for the non-life premium and reserve risk standard deviations:

- medical expense (line of business n°1 of Annex I of the Delegated Regulation) as also requested by the Commission;
- credit and suretyship (line of business n°9);
- assistance (line of business n°11);
- legal expenses (line of business n°10);
- worker's compensation (line of business n°3).

111. EIOPA has selected these lines of business to be recalibrated by analyzing the calibration done in 2010-2011. In the report of the Joint Working Group, data availability and data limitations are discussed and for every single line of business the number of undertakings that provided data is reported.

112. EIOPA has selected for the purpose of this exercise the Lines of business where data has been assessed as not representative enough for both premium and reserve risks, in view of the number of undertakings that currently are doing business in the same Lines of business.

113. It should be noted that the Joint Working Group explicitly excluded credit and suretyship and assistance reserve risks from the recommendations because of the lack of observations.

114. In order to assess whether the calibration performed in 2011 needed to be updated in the most reliable manner, it has been decided to apply the exact same methodology than the Joint Working Group. This has the advantages of providing consistent results and of relying on a methodology that proved itself to be robust and that was developed in cooperation with stakeholders.

Premium

115. EIOPA's advice is to modify Annex II of the Delegated Regulation¹⁴ as follows:

- the standard deviation for gross premium risk of the *credit and suretyship* segment is set to 19.0%;

¹⁴ Annex II-Segmentation Of Non-Life Insurance And Reinsurance Obligations And Standard Deviations For The Non-Life Premium And Reserve Risk Sub-Module

- the standard deviation for gross premium risk of the *assistance* segment is set to 6.4%;
- the standard deviation for gross premium risk of the *legal expenses* segment is set to 8.3%.

116. EIOPA's advice is to modify Annex XIV of the Delegated Regulation¹⁵ as follows:

- the standard deviation for gross premium risk of the *worker's compensation* segment is set to 9.6%.

117. EIOPA's advice is not to modify the standard deviation for gross premium risk of the *medical expenses* segment in Annex XIV of the Delegated Regulation.

Reserve

118. EIOPA's advice is to modify Annex II of the Delegated Regulation as follows:

- the standard deviation for reserve risk of the *credit and suretyship* segment is set to 17.2%;
- the standard deviation for reserve risk of the *assistance* segment is set to 22.0%;
- the standard deviation for reserve risk of the *legal expenses* segment is set to 5.5%.

119. EIOPA's advice is to modify Annex XIV of the Delegated Regulation as follows:

- the standard deviation for reserve risk of the *medical expenses* segment is set to 5.7%.

120. EIOPA's advice is not to modify the standard deviation for gross reserve risk of the *worker's compensation* segment in Annex XIV of the Delegated Regulation.

Transitional period

121. Given the outcome of the performed impact assessment, EIOPA does not consider a transitional period necessary for implementing changes in the non-life and health standard deviations.

¹⁵ Annex XIV- Segmentation Of NSLT Health Insurance And Reinsurance Obligations And Standard Deviations For The Nslt Health Premium And Reserve Risk Sub-Module

2. Volume measure for premium risk

2.1. Call for advice

EIOPA is asked to assess which standard parameters need to be changed amongst the following underwriting submodules and to suggest possible new calibrations where appropriate, making use of the experience gained and data gathered during the transitional period and the first year of application of Solvency II, also making use of relevant data provided by other parties:

- The standard parameters for non-life premium and reserve risk, and the standard parameters for medical expense risk, that should be calibrated on the basis of extended data; in this context, the definition of the volume measure for premium risk should be reassessed for continued appropriateness.

2.2. Legal basis

Directive 2009/138/EC¹⁶ ("Solvency II Directive")

122. Article 105(2): Calculation of the Basic Solvency Capital Requirement

The non-life underwriting risk module shall reflect the risk arising from non-life insurance obligations, in relation to the perils covered and the processes used in the conduct of business.

It shall take into account of the uncertainty in the results of insurance and reinsurance undertakings related to the existing business as well as to the new business expected to be written over the following 12 months.

It shall be calculated, in accordance with point (2) of Annex IV, as a combination of the capital requirements for at least the following sub-modules:

- (a) *the risk of loss, or of adverse change in the value of insurance liabilities, resulting from fluctuations in the timing, frequency and severity of insured events, and in the timing and amount of claim settlement (non-life premium and reserve risk);*

Delegated Regulation

123. Recital (43):

In order to avoid giving the wrong incentives to restructure long-term contracts as short-term renewable contracts, the volume measure for non-life and NSLT¹⁷ health premium risk used in the standard formula should be based on the economic substance of insurance and reinsurance contracts rather than on their legal form. The volume measure should, therefore, capture earned premiums that are within the contract boundary of existing contracts and on contracts that will be written in the next 12 months.

¹⁶ Directive 2009/138/EC of 25 November 2009 of the European Parliament and of the Council on the taking-up and pursuit of the business of Insurance and Reinsurance (Solvency II) (OJ L 335, 17.12.2009, p. 1)

¹⁷ Must be NSLT. It's an obvious typing error. The delegated regulation prescribes the premium risk for NSLT health insurance and not for SLT health insurance.

124. Recital (45):

In relation to premium risk, the calculation of the capital requirement for non-life and health premium and reserve risk should be based on the larger of the past and the expected future earned premiums to take account of the uncertainty around the future earned premiums. However, where an insurance or reinsurance undertaking can reliably ensure that the future earned premiums will not exceed the expected premiums, the calculation should be based on the expected earned premiums only.

125. Article 115: Non-life premium and reserve risk sub-module

The capital requirement for non-life premium and reserve risk shall be equal to the following:

$$SCR_{nl\,prem\,res} = 3 \cdot \sigma_{nl} \cdot V_{nl}$$

where:

(a) σ_{nl} denotes the standard deviation for non-life premium and reserve risk determined in accordance with Article 117;

(b) V_{nl} denotes the volume measure for non-life premium and reserve risk determined in accordance with Article 116.

126. Article 146 NSLT health premium and reserve risk sub-module

The capital requirement for NSLT health premium and reserve risk shall be equal to the following:

$$SCR_{(NSLT,pr)} = 3 \cdot \sigma_{NSLT\,h} \cdot V_{NSLT\,h}$$

where:

(a) $\sigma_{NSLT\,h}$ denotes the standard deviation for NSLT health premium and reserve risk determined in accordance with Article 148;

(b) $V_{NSLT\,h}$ denotes the volume measure for NSLT health premium and reserve risk determined in accordance with Article 147.

127. Article 116: Volume measure for non-life premium and reserve risk

1. The volume measure for non-life premium and reserve risk shall be equal to the sum of the volume measures for premium and reserve risk of the segments set out in Annex II.

2. For all segments set out in Annex II, the volume measure of a particular segment s shall be equal to the following:

$$V_s = (V_{(prem,s)} + V_{(res,s)}) \cdot (0,75 + 0,25 \cdot DIV_s)$$

where:

(a) $V_{(prem,s)}$ denotes the volume measure for premium risk of segment s ;

(b) $V_{(res,s)}$ denotes the volume measure for reserve risk of segment s ;

(c) DIV_s denotes the factor for geographical diversification of segment s .

3. For all segments set out in Annex II, the volume measure for premium risk of a particular segment s shall be equal to the following:

$$V_{(prem,s)} = \max[P_s; P_{(last,s)}] + FP_{(existing,s)} + FP_{(future,s)}$$

where:

(a) P_s denotes an estimate of the premiums to be earned by the insurance or reinsurance undertaking in the segment s during the following 12 months;

(b) $P_{(last,s)}$ denotes the premiums earned by the insurance or reinsurance undertaking in the segment s during the last 12 months;

(c) $FP_{(existing,s)}$ denotes the expected present value of premiums to be earned by the insurance or reinsurance undertaking in the segment s after the following 12 months for existing contracts;

(d) $FP_{(future,s)}$ denotes the expected present value of premiums to be earned by the insurance and reinsurance undertaking in the segment s for contracts where the initial recognition date falls in the following 12 months but excluding the premiums to be earned during the 12 months after the initial recognition date.

4. For all segments set out in Annex II, insurance and reinsurance undertakings may, as an alternative to the calculation set out in paragraph 3 of this Article, choose to calculate the volume measure for premium risk of a particular segment s in accordance with the following formula:

$$V_{(prem,s)} = P_s + FP_{(existing,s)} + FP_{(future,s)}$$

provided that the all of following conditions are met:

(a) the administrative, management or supervisory body of the insurance or reinsurance undertaking has decided that its earned premiums in the segment s during the following 12 months will not exceed P_s ;

(b) the insurance or reinsurance undertaking has established effective control mechanisms to ensure that the limits on earned premiums referred to in point (a) will be met;

(c) the insurance or reinsurance undertaking has informed its supervisory authority about the decision referred to in point (a) and the reasons for it.

For the purposes of this calculation, the terms P_s , $FP_{(existing,s)}$ and $FP_{(future,s)}$ shall be denoted in accordance with points (a), (c) and (d) of paragraph 3.

5. For the purposes of the calculations set out in paragraphs 3 and 4, premiums shall be net, after deduction of premiums for reinsurance contracts. The following premiums for reinsurance contracts shall not be deducted:

(a) premiums in relation to non-insurance events or settled insurance claims that are not accounted for in the cash- flows referred to in Article 41(3);

(b) premiums for reinsurance contracts that do not comply with Articles 209, 210, 211 and 213.

6. For all segments set out in Annex II, the volume measure for reserve risk of a particular segment shall be equal to the best estimate of the provisions for claims outstanding for the segment, after deduction of the amounts recoverable from reinsurance contracts and special purpose vehicles, provided that the reinsurance contracts or special purpose vehicles comply with Articles 209, 210, 211 and 213. The volume measure shall not be a negative amount.

7. For all segments set out in Annex II, the default factor for geographical diversification of a particular segment shall be either 1 or calculated in accordance with Annex III.

128. Article 147: Volume measure for NSLT health premium and reserve risk

1. The volume measure for NSLT health premium and reserve risk shall be equal to the sum of the volume measures for premium and reserve risk of the segments set out in Annex XIV.

2. For all segments set out in Annex XIV, the volume measure of a particular segment s shall be equal to the following:

$$V_s = (V_{(prem,s)} + V_{(res,s)}) \cdot (0,75 + 0,25 \cdot DIV_s)$$

where:

(a) $V_{(prem,s)}$ denotes the volume measure for premium risk of segment s ;

(b) $V_{(res,s)}$ denotes the volume measure for reserve risk of segment s ;

(c) DIV_s denotes the factor for geographical diversification of segment s .

3. For all segments set out in Annex XIV, the volume measure for premium risk of a particular segment s shall be equal to the following:

$$V_{(prem,s)} = \max[P_s; P_{(last,s)}] + FP_{(existing,s)} + FP_{(future,s)}$$

where:

(a) P_s denotes an estimate of the premiums to be earned by the insurance or reinsurance undertaking in the segment s during the following 12 months;

(b) $P_{(last,s)}$ denotes the premiums earned by the insurance and reinsurance undertaking in the segment s during the last 12 months;

(c) $FP_{(existing,s)}$ denotes the expected present value of premiums to be earned by the insurance and reinsurance undertaking in the segment s after the following 12 months for existing contracts;

(d) $FP_{(future,s)}$ denotes the expected present value of premiums to be earned by the insurance and reinsurance undertaking in the segment s for contracts where the initial recognition date falls in the following 12 months but excluding the premiums to be earned during the 12 months after the initial recognition date.

4. For all segments set out in Annex XIV, insurance and reinsurance undertakings may, as an alternative to the calculation set out in paragraph 3, choose to calculate the volume measure for premium risk of a particular segment s in accordance with the following formula:

$$V_{(prem,s)} = P_s + FP_{(existing,s)} + FP_{(future,s)}$$

provided that all of the following conditions are met:

(a) the administrative, management or supervisory body of the insurance or reinsurance undertaking has decided that its earned premiums in the segment s during the following 12 months will not exceed P_s ;

(b) the insurance or reinsurance undertaking has established effective control mechanisms to ensure that the limits on earned premiums referred to in point (a) will be met;

(c) the insurance or reinsurance undertaking has informed its supervisory authority about the decision referred to in point (a) and the reasons for it.

For the purposes of this paragraph, the terms P_s , $FP_{(existing,s)}$ and $FP_{(future,s)}$ shall be denoted in accordance with points (a), (c) and (d) of paragraph 3.

5. For the purposes of the calculations set out in paragraphs 3 and 4, premiums shall be net, after deduction of premiums for reinsurance contracts. The following premiums for reinsurance contracts shall not be deducted:

(a) premiums in relation to non-insurance events or settled insurance claims that are not accounted for in the cash- flows referred to in Article 41(3);

(b) premiums for reinsurance contracts that do not comply with Articles 209, 210, 211 and 213.

6. For all segments set out in Annex XIV, the volume measure for reserve risk of a particular segment shall be equal to the best estimate for the provision for claims outstanding for the segment, after deduction of the amounts recoverable from reinsurance contracts and special purpose vehicles, provided that the reinsurance contracts or special purpose vehicles comply with Articles 209, 210, 211 and 213. The volume measure shall not be a negative amount.

7. For all segments set out in Annex XIV, the default factor for geographical diversification shall be either equal to 1 or calculated in accordance with Annex III.

2.3. Feedback statement on the main comments received to the consultation paper (EIOPA-CP-17-006)

Definition of $FP_{(future,s)}$

a. Summary of the comments received

129. Stakeholder views on the two options presented to define the volume measure were split: some considered that the gap should be removed but that the policy option of EIOPA was not appropriate; others considered that the gap should be maintained and that the current definition was preferable.

130. The main disadvantages that were pointed out to option 2 were that it increases the complexity of the standard formula and also the volatility of the volume measure. Another consequence is the general increase of the capital requirements especially on the majority of the business (1 year time horizon) and finally the lack of technical justification for the introduction and calibration of the alpha factor.

131. Especially for annual contracts, several stakeholders think that the volume measure should not go beyond 1 year timeframe. Some also refer that the calibration was performed on a purely one year perspective basis and therefore it is not appropriate to extend the volume measure beyond that.

132. On the calibration of alpha factor, some stakeholders consider that the methodology is neither sufficiently justified nor appropriate since it was envisaged to minimise the difference between the SCR results based on the new methodology and the current one. Also, there are proposals that the factor should be undertaking specific or country specific, among others.

133. Some alternative definitions of the volume measure were also proposed. All of them are based on option 2 definition but with the following differences: extending the application of the alpha factor to $FP_{(existing,s)}$ since this component is subject exactly to the same type of risks; change the calibration of alpha by half and apply the proposed alpha to $FP_{(future,s)}$ on the argument that for future business undertakings can manage the risk by adjusting the pricing comparing to existing business; and also add other factors on top of the previous ones to smooth the “elasticity” of the volume measure by changing the initial recognition date along the year.

b. Assessment

134. Given the comments received and the fact that both options present advantages and disadvantages, EIOPA concluded that the volume measure should be kept as it is for annual contracts and option 2, should be only applied to multi-year contracts.

135. The reason for this is that the gap was designed in order to approximate the premium capital charge to the 1 year view perspective and at the same time ensure that the volume measure does not depend on where the initial recognition date is within each year. However, the gap is not appropriate for multi-year contracts when excluding the first year of premiums of future business and including the remaining ones and subjecting those to the same risk level as premiums received during the next 12 months.

136. On $FP_{(existing,s)}$, although theoretically it is exposed to a smaller risk than P_s , no evidence is provided that this is the case in practice and by how much. The fact that a stress occurs for existing contracts and is also reflected in $FP_{(existing,s)}$ still appears the best way to capture the 1-in-200 years event.

137. On having a volume measure of 1 year for 1-year contract, EIOPA disagrees: as explained in the advice, some 1-year contracts are exposed to risks reflected in $FP_{(existing,s)}$ and $FP_{(future,s)}$. This depends on the initial recognition and when the cover of the contract begins.

Definition of initial recognition date

a. Summary of the comments received

138. One of the comments received refers that the volume factor should start at the beginning of the coverage period to avoid double counting of risks due to the assumptions underlying the calibration of the standard deviation. Others refer the same but in order to not create additional volatility and incentives to change the date of the recognition to minimize the capital charge. Also it widens the scope of the volume measure when it comes to new business implying a material increase of the volume measure in some cases.

139. On the alignment of this concept with the provisions under Article 17 of the Delegated Regulation, there is a comment that refers that the concept of “becoming party of a contract” is not the advance notification date but the moment the renewal is accepted by the policyholder.

140. Another stakeholder refers that if the initial recognition date is the advance notification date, the calibration applicable to the period from this date and the start of the coverage should be lower.

b. Assessment

141. Given the specificities that may exist among different member states and types of contracts, EIOPA concluded that it is not appropriate to define unequivocally the meaning of initial recognition date. This way EIOPA's proposal is to not introduce a specific definition for this concept in the calculation of the capital requirements for premium and reserve risk. That also means that the alignment with Article 17 of the Delegated Regulation and the valuation of the Solvency II balance sheet are ensured.

Reinsurance

a. Summary of the comments received

142. Some stakeholders disagree with the EIOPA position how changed risk mitigation effect should be treated. In accordance with stakeholders' opinion applications of Article 116(4) or Article 147(4) of the Delegated Regulation is disproportionate and might not be the intention of these articles. By stakeholders' opinion these Articles refer to situations where undertakings make a significant change in their business plan. In this case, demonstrating control around the implementation of the business plan and informing the supervisor might make sense, e.g. to avoid wrong incentives about overly frequent changes to the plan.

143. Stakeholders believe that there is no need to demonstrate any additional controls as defined in Articles 116(4) and 147(4) of the Delegated Regulation for a reinsurance which is effective for the following 12 months. Stakeholders' opinion is that additional requirements would be disproportionate because Solvency II in general does not require undertakings to notify supervisors before concluding reinsurance.

144. Stakeholders arguing that their proposal to allow undertakings to replace (under certain conditions) last year's net earned premiums in formulas defined in Articles 116(3) and 147(3) of the Delegated Regulation with a recalculated figure, i.e. last year's gross earned premium adjusted for the impact of the new reinsurance structure is prudent, simple and transparent.

145. By the opinion of the stakeholders the approach is prudent because it prevents incentives for an overly conservative estimation of earned premiums for the forthcoming years and it is simple and transparent because it could be verified based on gross premium figures and detailed information on each reinsurance contract as included in SII reporting.

b. Assessment

146. The decrease of the net earned premiums over following years impacts the volume measure for premium risk with a one-year delay. Therefore, if the business plan does not change significantly the volume measure for the premium risk should not be lower than the volume measure for the previous

year. If there are significant changes to the business plan the undertakings might use the Article 116(4) or 147(4) of the Delegated Regulation to decrease the volume measure for next year.

147. Recalculating earned gross premiums of previous year to net premiums using reinsurance structure for next year does not have any meaning if the reinsurance structure has changed due to the change of the risks to which undertakings are exposed to. It is also almost impossible for the supervisory Authorities to verify the recalculated numbers based solely on gross premiums figures and information on each reinsurance contract included in the SII reporting. Therefore, the recalculation of gross earned premiums to net premiums is neither simple nor transparent.

Calibration

a. Summary of the comments received

148. Stakeholders report inconsistency between data presented. They are wondering how is a global average impact of -2% possible for an Alpha of 30% (cf §149 results) when all LoB have an impact assessment higher (or equal, only for 1 LoB) than this -2% impact for this level of Alpha (cf §151 results)?
149. Stakeholders pointed that the explanation of the calibration of adjustment factor alpha (30%) is not very clear. They ask for more insights / clarity about the calibration of the alpha and if more information can be given about the number of one-year contracts versus the number of long-term contracts in the calculations?
150. One stakeholder asks for explanation how it is possible that on average the volume factor HME has only 3% increase in table 151 if all contracts have a renewal date of 1-1 and contracts are bounded just before year end. According to their explanation the proposed introduction of the saw pattern results in a volume factor increase from 12 months to 15.6 months, a 30% increase.

b. Assessment

151. The inconsistency noticed by stakeholders is the consequence of not presenting the results for Non-proportional health reinsurance in Table in paragraph 151. Not reported value for "Non-proportional health reinsurance" (-269%) explains the noticed inconsistency.
152. The value for "Non-proportional health reinsurance" is not presented due to their value. In paragraph 152 of Consultation paper it was explained that for this LoB the result is not presented and it is also stated that there is still work in progress concerning the data cleaning and understanding of some unexpected behaviors shown in the data.
153. The calibration of adjustment factor alpha based on the requirement that the capital requirement for non-life and NSLT health premium and reserve risk defined in Articles 115 and 145 of the Delegated Regulation remains unchanged due to eliminating the "gap". This could in average be achieved if

the volume measure for premium risk determined in accordance with the Delegated Regulation would be equal to the proportion of the volume measure for premium risk without the "gap".

154. The relative change of the volume measure with different alpha has been calculated with a formula:

$$\frac{\alpha \cdot FP_{future2} - FP_{future1}}{\max(P_s, P_{last}) + FP_{existing} + FP_{future1}}$$

where:

- denominator is calculated in accordance with Delegated Regulation 2015/35 and
- $FP_{future2}$ is calculated according to EIOPA's instructions.

155. In paragraph 151 of Consultation paper the average results of relative changes with alpha 30% for each segment (LoB) over participating undertakings are presented. Due to data limitation the information about the number of one-year contracts versus the long-term contracts could not be provided.

156. On average the volume factor for "Medical expense insurance and proportional reinsurance" in Table in paragraph 151 is 3% according to following calculations. Table in paragraph 151 presents the average impact of the relative change of the volume measure using alpha 30%. Using this in transformed previous formula

$$\frac{\max(P_s, P_{last}) + FP_{existing} + FP_{future1} - FP_{future1} + \alpha \cdot FP_{future2} - (\max(P_s, P_{last}) + FP_{existing} + FP_{future1})}{\max(P_s, P_{last}) + FP_{existing} + FP_{future1}}$$

and taking into account assumptions that $FP_{future1}$ is 0 and that volume measure increased for 30% gives:

$$\frac{\alpha \cdot FP_{future2}}{\max(P_s, P_{last}) + FP_{existing}} = 30\% \cdot 30\% = 9\%$$

157. Assuming that $FP_{future1}$ in average presents 6% of volume measure than the result is:

$$\frac{-FP_{future1}}{\max(P_s, P_{last}) + FP_{existing} + FP_{future1}} + \frac{\alpha \cdot FP_{future2}}{\max(P_s, P_{last}) + FP_{existing} + FP_{future1}} = -6\% + 30\% \cdot 30\% = 3\%$$

Risk-sensitivity of the volume measure

- a. Summary of the comments received

158. Some stakeholders consider that in many cases the EIOPA answer to the proposals regarding the risk sensitivity of the volume measure are not substantiated enough especially where they are disregarded with the only justification of adding complexity. In stakeholders' opinion in most of the proposals the complexity added is very limited compared to the risk sensitivity gained and loss ratio figures are commonly available in systems of most undertakings. With regard to the need to recalibrate the parameters,

the loss ratio was already the basis for the calibration of the factors so a new calibration process is not needed.

159. There are also stakeholders who agree with the EIOPA that there is no feasible and less complex methodology which would reduce the dependency on the pricing strategy, which would not in turn change the SCR calculation approach significantly. They point out that other means of Solvency II (like ORSA and the assessment of the actuarial function in respect to the undertaking's pricing strategy) are more appropriate safeguards to address underpricing.
160. Some stakeholders highlighted that the actual definition of volume measure for premium risk depends on commissions included in the written premiums and is not associated to "expected" and "unexpected" losses described in Discussion Paper on the review of specific items in the Solvency II Delegated Regulation published by EIOPA in December 2016. For this reason, they believe that commissions should not be included in the volume measure for premium risk.
161. Some of stakeholders propose that this could be considered though to align the treatment of commissions, especially for companies writing business net of commissions (where distributors add the commissions). In this case, an average commission rate (given by the market NSA, for simplicity) or individual commission levels could be added in order to used guarantee a level playing field on applied premiums.

b. Assessment

162. It is true that the loss ratio was the basis for the calibration of the standard deviations but it was not used as an additional parameter which could be used for risk sensitivity of the volume measure. Using loss ratios as a parameter which would change (increase or decrease) the volume measure could also be interpreted as a parameter which change (decrease or increase) the standard deviations for premium risk. During the process of calibration of standard deviation, the Joint Working Group has not envisaged the calibration of standard deviation as a function of loss ratio. To use loss ratios as a factor for risk sensitivity a new calibration would be required which would answer questions such as "at which loss ratio the calibrated standard deviations are valid?" and "how standard deviations would change if loss ratio diverge from it?"
163. The volume measure used for determining underwriting risk should be consistent with the calibration. Earned premiums¹⁸ were requested for the purposes of calibration which by definition include commissions. The calibration of the standard formula has not distinguished between "expected"

¹⁸ Calibration of the Premium and Reserve Risk Factors in the Standard Formula of Solvency II, Report of the Joint Working Group on Non-Life and Health NSLT Calibration, 12 December 2011 (page 8; Volume of earned premium for the accident year gross of acquisition costs), https://eiopa.europa.eu/Publications/Reports/EIOPA-11-163-A-Report_JWG_on_NL_and_Health_non-SLT_Calibration.pdf

and “unexpected” risk. Therefore, commissions should be included in the volume measure for premium and reserve risk.

164. Those undertakings which write business net of commissions (where distributors add the commissions) should disclose these in ORSA and investigate if standard formula is appropriate for them.

2.4. Feedback statement on the main comments received to the discussion paper

Definition of $FP_{(future,s)}$

- a. Summary of the comments received

165. On the definition of the volume measure, the main issue under discussion was the gap that exists in the definition of one of the components of the volume measure, $FP_{(future,s)}$. The gap is defined by the exclusion of premiums to be earned during the 12 months after the initial recognition date of the contracts from this component.

166. The majority of the stakeholders acknowledged that the gap exists and should be corrected, however further adjustments should be made to the calculation of the volume measure in order to ensure consistency with the one year view assumption in the SCR calculation. By simply amending the gap from the volume measure it would imply a material increase of the non-life underwriting risk SCR and the referred consistency would no longer exist, according to several stakeholders. There are even a few stakeholders that support the current definition of the volume measure due to the risk of compromising this same consistency.

167. Some stakeholders even suggested that the component could be removed from the definition of the volume measure. The rationale for such removal is the overestimation of the capital charge due to the application of the shock for several years (inappropriate for multi-year contracts and renewable annual contracts).

168. In order to fix the gap but at the same time keeping the one year view assumption in this calculation, some stakeholders proposed to change the calibration of the standard deviation to make it consistent with the envisaged result. The alternative is keeping the calibration and change the volume measure (assuming that the gap will be amended) to comply with that assumption.

169. There were other comments concerning the inconsistency between the scope of premium provision and that of SCR, the former only including existing business and therefore not recognizing the expected future profits from future business and the latter establishing additional capital to face risks arising from this future business.

170. A few stakeholders also asked for more clarity on the definition of “initial recognition date” since it could be interpreted either as the beginning of the coverage period or at the date the undertaking becomes a party to the contract that gives rise to the obligation. For instance if the renewal date is in

the first day of each policy year and this is the interpretation of “initial recognition date”, future premiums will be much lower than in a situation where this date is considered to be before the end of each policy year.

171. Some stakeholders raised concerns regarding amending the gap as it would introduce undesired variation in the volume measure and SCR throughout the year for contracts that are being renewed at a certain day or period in the year.

b. Assessment

172. On the removal of $FP_{(future,s)}$, the Solvency II Directive clearly sets out that future business should be reflected in the SCR calculation, therefore the removal would be difficult to reconcile with the requirements of the Solvency II Directive.
173. On the possibility of introducing an adjustment factor to the volume measure (once the gap is removed) and this way keeping some consistency with the one year view in the calculation of the premium risk capital charge, EIOPA considers that this is one appropriate way to proceed especially since it would not require changing the calibration for this specific purpose.
174. The calibration is based on earned premiums exposure and therefore not sensitive to the different types of risk that each component of the volume measure should represent i.e. it covers all sources of sub-risks arising from premium risk. An adjustment factor that would be applied to $FP_{(future,s)}$ reduce the weight of this component in the volume measure. The sources of risks that this component is exposed to in the scope of the calculation of the SCR and the proposed factor are discussed in the “analysis” part.
175. On the concept of “initial recognition date”: EIOPA discusses this concept in the “analysis” part.
176. On the variation of the volume measure throughout the year: EIOPA also discusses this point below in the “analysis” part.

Risk-sensitivity of the volume measure

a. Summary of the comments received

177. The main issue under the discussion of the risk-sensitivity of the volume measure was the situation where an undertaking with lower and inadequate premiums will have a lower capital charge than an undertaking with higher and adequate premiums. A higher level of prudence in relation to premiums will usually lead to higher capital requirements.
178. In the discussion paper most of the stakeholders supported the idea of reviewing the definition of volume measure for decreasing their dependency on pricing strategy. Some stakeholders warned that method with lower dependency on pricing strategy could lead to additional complexity.
179. There were comments concerning the discrepancy between life and non-life standard formula calculation stemming from the fact that the SCR for life

underwriting risk is calculated on base of risk premium while for non-life business it is calculated on base of gross premiums and thus depends heavily on pricing strategy as well as on level of commission included in gross premium which creates arbitrage opportunity.

180. Stakeholders proposed different methods for decreasing dependency on pricing strategy such as adjust or replace volume measure or adjust final SCR or own funds.
181. To adjust volume measure, different ratios (e.g. claims ratio, loss ratio, combined ratio, operational ratio, combined operation ratio) using historical data or future estimates were proposed to remove prudency margin from the volume measure or to decrease volume measure for commission.
182. Some stakeholders proposed to replace premiums as a volume measure with exposure units or with claims incurred or with risk premium or with cash out-flow.
183. A supplementary issue under the discussion of the risk-sensitivity of the volume measure was a question if there are any other issues regarding the definition of volume measure for premium risk.
184. Some stakeholders highlighted that the formula for calculating volume measure in Article 116(3) of the Delegated Regulation does not take into account potential significant economic impact of increasing cession and that the use of past 12 months' premiums as a minimum cannot be justified because it decreases risk sensitivity.
185. The issues regarding long duration policies or multi-year policies were mentioned from some stakeholders. Volume measure for multi-year policies can reach a multiple of annual earned premium. They highlighted that diversification effects over time and cancelation options in case of claims of long duration are not properly considered.
186. Some stakeholders proposed that the volume measure should take into account loss absorbing effects of variable commission which may absorb the volatility of losses.
187. Some stakeholders highlighted that the volume measure has an element of double counting with natural catastrophe model as premium entered will have loadings for loss arising from natural catastrophe perils.
188. One stakeholder highlighted that Articles 116(3)(c), 116(3)(d), 147(3) and 147(3)(d) of the Delegated regulation are ambiguous and not precisely defined because they do not incorporate the idea of the Recital 43 that standard formula should capture earned premiums that are within the contract boundary of existing contracts and on contracts that will be written in the next 12 months.
189. One stakeholder required consistency between balance sheet and capital charge definition due to the gap between the perimeter of premiums underlying the assessment of the SCR and the perimeter of premiums underlying the assessment of the best estimate.

190. Some stakeholders highlighted that projection factor has increased from 2.58 to 3, which increase the capital requirements by approximately 16.3%.

b. Assessment

191. EIOPA considers methods which proposed adjustment of volume measure with different ratios as not appropriate because expected losses and profits are not to be recognised under the standard formula and they will make the calculations more complex.

192. Adjusting the volume measure with future estimates or replacing premiums as volume measure changes the volume measure which was used for calibration. EIOPA considers proposed methods as methods which require the recalibration of the standard parameters used in standard formula. Additionally, future estimates are not objective and increase complexity of standard formula from undertaking and supervision prospective.

193. Increasing complexity of the standard formula is not in line with EIOPA's goal which is not to add undue complexity to the standard formula calculation.

194. Discrepancy between life and non-life standard formula is because life risks are assessed using scenario based approach and non-life risks are assessed using factor based approach. At this stage EIOPA intention is not to fundamentally change the method of calculating capital requirements of premium risk and implement risk premium or other exposures which requires scenario based approach to calculate capital requirements.

195. EIOPA considers that the Delegated Regulation enables to take into account potential significant economic impact of increasing cession. EIOPA believes that in such events undertakings may, in accordance with Articles 116(4) and 147(4) of the Delegated Regulation, use only the estimate of the premiums to be earned by the undertaking during the following 12 months (P_s) instead of the minimum of the estimate of the premiums to be earned by the undertaking during the following 12 months (P_s) and the earned premiums during the last 12 months ($P_{last,s}$). In case where net earned premiums during the following 12 months (P_s) are lower compared to net earned premiums during the last 12 months ($P_{last,s}$) as result of increased cession, undertakings should in fact establish effective control mechanisms to ensure that net earned premiums during the following 12 months will not exceed P_s . Besides establishing effective control and taking the decision that net earned premiums during the following 12 months will not exceed P_s the undertaking has to inform its supervisory authority about the decision and the reasons for it to apply Articles 116(4) or 147(4) of the Delegated Regulation. Stakeholder's suggestion requires recalculation of net earned premiums during the last 12 months ($P_{last,s}$) to new cession. EIOPA does not support the recalculation of the net earned premiums during the last 12 months ($P_{last,s}$) because these are the only values in the formulas in the Articles 116(3) and 147(3) of the Delegated Regulation which could be verified and supervised off-site.

196. EIOPA disagrees with the statement of stakeholders that diversification effects over time and cancellation options in case of claims of long duration are not properly considered. Diversification effects over time and cancellation options are taken into account in the value of expected present value of premiums to be earned by the undertakings (Article 116(3)(c) and (d) of the Delegated Regulation).
197. Loss absorbing effects of variable commission are contract specific and could not be part of general standard formula. Undertakings could take into account variable commission through using partial internal models.
198. Double counting was taken into account and excluded in the process of calibrating standard deviations for non-life premium and reserve risk.
199. Removing the difference between the perimeter of premiums underlying the assessment of the SCR and the perimeter of premiums underlying the assessment of the best estimate is not in line with the Solvency II Directive which prescribes that uncertainty in the results of undertakings shall relate to the existing and new business expected to be written over the following 12 months.

2.5. Advice

2.5.1. Previous advice

200. CEIOPS-DOC-67/10 "Calibration of non-life underwriting risk"¹⁹.

2.5.2. Analysis

Definition of non-life underwriting risk

201. The Solvency II regulation for the non-life and health underwriting risks consists of two elements:
- Premium risk;
 - Reserve risk.
202. For reserve risk an undertaking assesses the extent to which best-estimate of the provision for claims outstanding at the beginning of a period plus the payments made to policyholders during that period deviate from the best-estimate of these contracts at the end of that period.
203. The definition of the risk measure for reserve risk is out of scope for this advice.

¹⁹ https://eiopa.europa.eu/CEIOPS-Archive/Documents/Advices/CEIOPS-DOC-67-10_L2_Advice_Non_Life_Underwriting_Risk.pdf

Different types of loss in premium and reserve risk

204. Premium risk arises when insurance obligations from policies exceed premiums thereof. Article 105(2) (second paragraph) of the Solvency II Directive refers that the SCR "*shall take account of the uncertainty in the results of insurance and reinsurance undertakings related to the existing insurance and reinsurance obligations as well as to the new business expected to be written over the following 12 months*". It clarifies that both existing and new business should be covered in the SCR calculation.

205. Recital 43 of the Delegated Regulation further refers that "in order to avoid giving the wrong incentives to restructure long-term contracts as short-term renewable contracts, the volume measure for non-life and SLT health premium risk used in the standard formula should be based on the economic substance of insurance and reinsurance contracts rather than on their legal form. The volume measure should, therefore, capture earned premiums that are within the contract boundary of existing contracts and on contracts that will be written in the next 12 months".

206. It can be interpreted that premium risk can give rise to expected and unexpected losses, as explained below:

- **Expected loss**: an undertaking knows upfront that premiums are insufficient to cover the expected payments on the insurance contract, e.g. underpricing of insurance policies;
- **Unexpected loss**: an undertaking experiences higher payments than the premiums due to adverse development of underwriting risk. There are two types of unexpected loss:
 1. permanent rise in costs e.g. inflation, change in legal environment;
 2. temporary rise in costs e.g. large event.

207. We discuss below which risks are included in each component of the volume measure for premium risk. Unexpected risk 1 covers unexpected increase in claim and expense costs that takes place during the following 12 months and has an influence also after that. Unexpected risk 2 in turn would cover all other unexpected changes in cost of claims or expenses during the following 12 months. In non-life insurance the latter would typically be the main source of volatility in the underwriting result for short term-business. Unexpected risk 1 would have a different impact on the volatility depending on the duration of the contract.

208. The next step is to try to understand how both losses can be considered in the scope of SCR calculation.

209. According to Article 101(3) of the Solvency II Directive the SCR "shall cover existing business, as well as the new business expected to be written over the following 12 months. With respect to existing business, it shall cover only unexpected losses".

Composition of the volume measure

210. The volume measure for non-life premium risk is given by the sum of the following 3 items:

1. P_s denotes an estimate of the premiums to be earned by the insurance or reinsurance undertaking in the segment s during the following 12 months. The claims corresponding to these premium would affect the own funds in the Solvency II balance-sheet over the year to come. P_s consists of the following parts:
 - a. unearned premiums from year t minus unearned premiums thereof at the end of year $t+1$
 - b. premiums written during year $t+1$ minus unearned premiums thereof at the end of year $t+1$

Since "a" represents existing business, only unexpected risks are to be taken into account.

Since "b" represents new business all risks are taken into account.

2. $FP_{(existing,s)}$ denotes the expected present value of premiums to be earned by the insurance or reinsurance undertaking in the segment s after the following 12 months for existing contracts. It corresponds to the part of the best estimate of premium provisions for existing contracts that will be calculated at the end of the 1-year horizon: this best estimate will affect the own funds of the Solvency II balance-sheet. $FP_{(existing,s)}$ is usually material for multi-years contracts. For one-year contracts, $FP_{(existing,s)}$ is zero where the initial recognition date coincides with the date at which the cover begins or if the one-year contract is already in force at the date of calculation.

It represents existing business, so expected losses should not be taken into account. Once the exposure relates to the risks arising after the next 12 months, the only source of unexpected losses that should be taken into account is permanent rise in costs.

3. $FP_{(future,s)}$ denotes the expected present value of premiums to be earned by the insurance and reinsurance undertaking in the segment s for contracts where the initial recognition date falls in the following 12 months but excluding the premiums to be earned during the 12 months after the initial recognition date. It corresponds to the part of the best estimate of premium provisions for future contracts that will be calculated at the end of the 1-year horizon: this best estimate will affect the own funds of the Solvency II balance-sheet.

It incorporates new business and therefore expected losses are taken into account. Also unexpected losses are included, again those permanent rise in costs.

211. The pictures below sum up the different components of the volume measure given an existing policy at the beginning of year t (A) and a new policy issued during that year (B).

Figure 2.1: contracts with period longer than 1 year

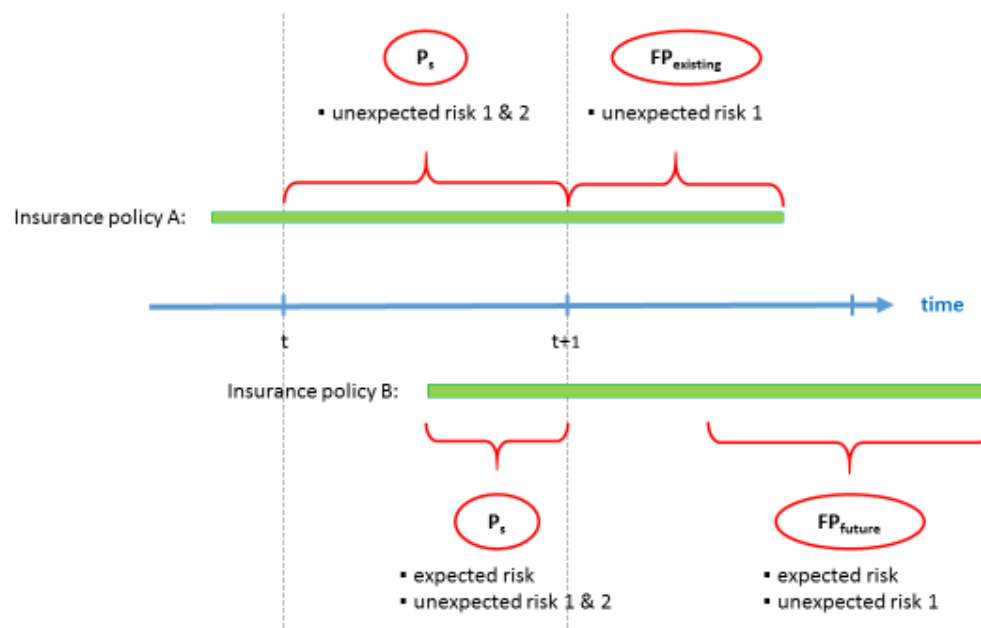


Figure 2.2: 1-year insurance contract with initial recognition during the year

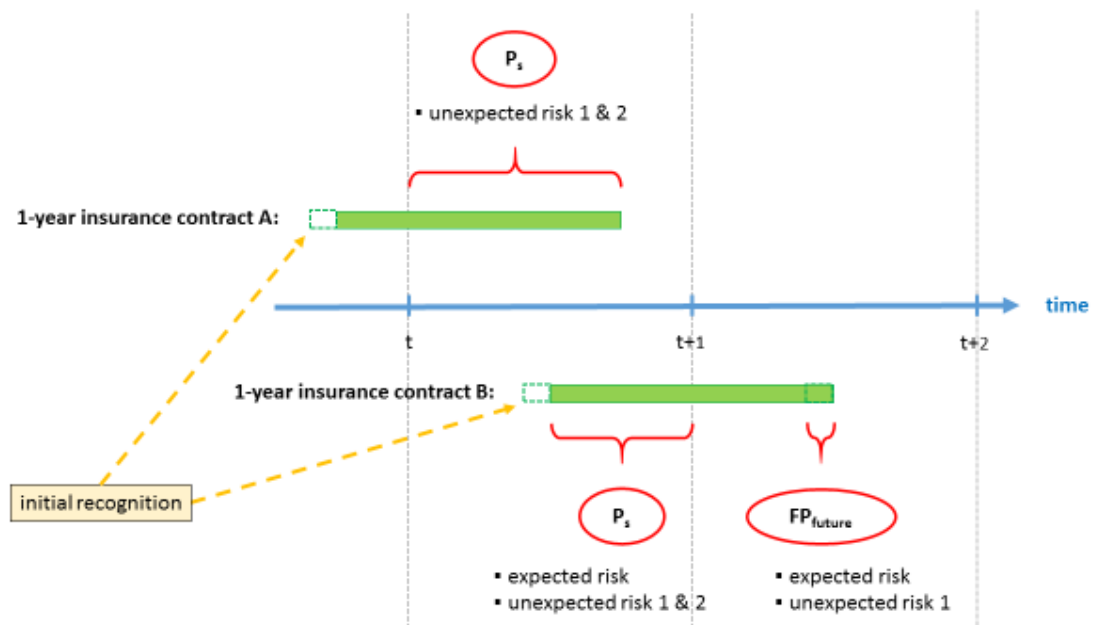
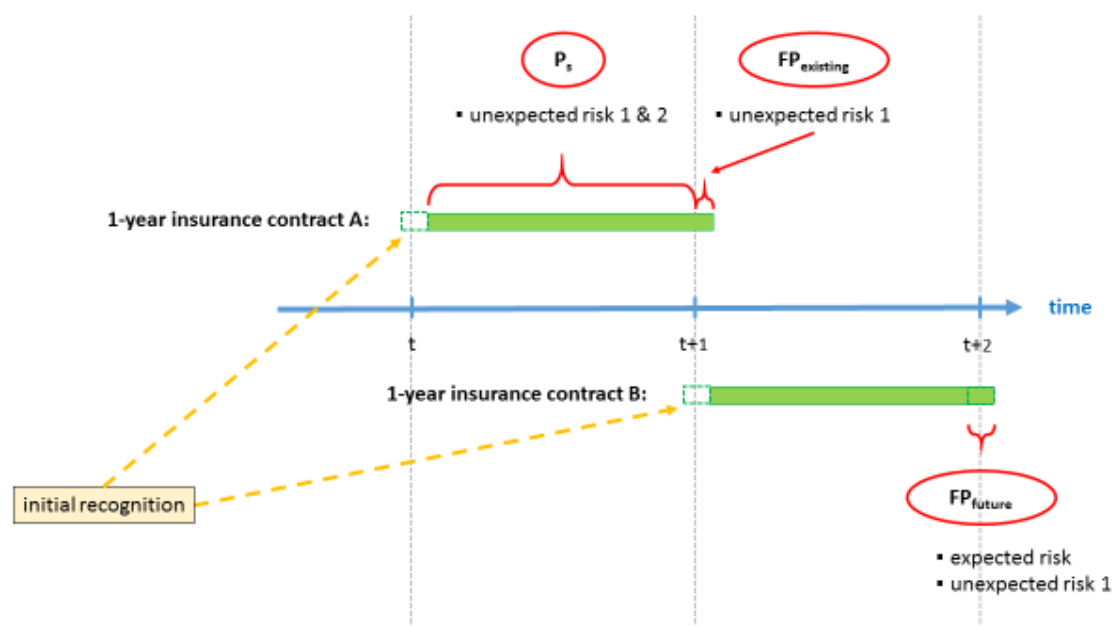


Figure 2.3: 1-year insurance contract with initial recognition towards the end of the year



Materialization of the risks in the Solvency II balance sheet

212. Next it is explained how premium risk materializes by each source of risks in relation to each component of the volume measure.

P_s (existing business (policy A))

Unexpected risk 1

- “permanent” increase in costs and expenses during the following 12 months (less premiums earned) exceeds the respective estimate in the premium provision at (t)

Unexpected risk 2

- “temporary” costs and expenses during the following 12 months (less premiums earned) exceed the respective estimate in the premium provision at (t)

$FP_{(existing,s)}$ (policy A)

Unexpected risk 1

- premium provision relating to this business at the end of the 12 months period (t+1) exceeds the respective estimate in the premium provision at (t)

P_s (future business (policy B))

Expected risk

- Realised value of costs and expenses during the following 12 months exceed the expected value of the respective premiums to be earned for that period

Unexpected risk 1

- Increase of “permanent” costs and expenses during the following 12 months in relation to the respective share of premiums to be earned for that period

Unexpected risk 2

- Increase of “temporary” costs and expenses during the following 12 months in relation to the respective share of premiums to be earned for that period

$FP_{(future,s)}$ (policy B)

Expected risk

- Expected value of costs and expenses after the following 12 months in relation to this future business exceed the expected value of the respective premiums to be earned after that period (this is not recognized in the balance sheet)

Unexpected risk 1

- Increase of “permanent” costs and expenses during the following 12 months and therefore affecting the period after the next 12 months, in relation to the respective share of future premiums to be earned after that period (having a higher premium provision in relation to this component than could be expected despite this expectation is not recognized in the balance sheet)

Contribution of premiums beyond next year to the volume measure

213. $FP_{(existing,s)}$ becomes positive and adds to the current Solvency II volume measure for two reasons:

- contracts provide coverage over a period longer than one year;
- an undertaking is already part of a one-year contract for which the coverage period has not yet started.

214. $FP_{(future,s)}$ becomes positive and adds to the current Solvency II volume measure for two reasons:

- contracts expected to be written provide coverage over a period longer than one year;
- an undertaking becomes part of a one-year contract in the coming 12 months, and the coverage starts later than the initial recognition date.

Calibration of the standard deviations for premium and reserve risks

215. For the initial calibration of premium risk in Solvency II CEIOPS²⁰ has compared the premiums earned of European (re-)insurance undertakings for several different lines of business with the corresponding payments and remaining provisions for these risks. These comparisons were done per book year of earned premiums, such that a distribution and the corresponding volatility of the difference between these earned premiums and actual payments are calibrated.
216. The data used for the calibration compares the premiums earned in a single year with the claim payments for events in that specific year. In the calibration data multi-year contracts are thus split over multiple years of earned premiums and corresponding claim payments for events in that year.
217. The calibration of the premium risk factors does not differentiate between expected and *unexpected risks 1 and 2*.
218. In order for the calibration to be aligned with the theoretical description above, the capital requirement for the period beyond the following 12 months should be lower than the one used for the following 12 months, due to the absence of *unexpected risk 2*. That means that the capital charges related to $FP_{(existing,s)}$ and $FP_{(future,s)}$ should be adjusted appropriately.
219. In practice, the adjustment to the capital requirements reflecting the absence of *unexpected risk 2* is expected to be material only for the $FP_{(future,s)}$ term. For $FP_{(existing,s)}$ the premium has already been written. Given the exact same contracts contribute to P_s and to $FP_{(existing,s)}$ it is very likely that any unexpected event materializing during the next 12 months would have a material effect for $FP_{(existing,s)}$. Furthermore, the main issue on volume measure identified after comments received on the 2016 discussion paper was on $FP_{(future,s)}$. Data were collected to help calibrate and assess impact of changes in $FP_{(future,s)}$ and not in $FP_{(existing,s)}$. Therefore the adjustment to the capital charges for $FP_{existing}$ appears less relevant in practice than for $FP_{(future,s)}$.
220. In the rest of this section, we discuss two ways to reflect the lower risk associated with $FP_{(future,s)}$:
- Keeping the “gap” in the premiums (i.e. no change compare to the current Delegated Regulation);
 - Having no gap but multiplying $FP_{(future,s)}$ by an adjustment factor *Alpha* that is lower than 1.

Option 1: no change to $FP_{(future,s)}$

221. Article 116(3)(d) provides that $FP_{(future,s)}$ “denotes the expected present value of premiums to be earned by the insurance and reinsurance undertaking in the segment *s* for contracts where the initial recognition date

²⁰ EIOPA does exactly the same exercise for the recalibration of premium and reserve risk for several selected lines of business in this advice.

falls in the following 12 months but excluding the premiums to be earned during the 12 months after the initial recognition date.”

222. The exclusion of the premiums to be earned during the 12 months after the initial recognition introduces a gap in the premiums that contribute to FP_{future} . This gap reduces the amount of premiums in this term, hence it decreases the risk associated with $FP_{(future,s)}$.

223. The effect of the gap is relatively different for 1-year or multi-year contracts:

- For a 1-year (new) contract with initial recognition date and the beginning of insurance cover are on 1st October, a calculation of the volume measure on 31st December results in:
 - $FP_{(future,s)}$ equals to 0 month of premium
 - P_s equals to 3 months of premium
 - and a volume measure of 3 months of premium

224. Therefore, the contribution of $FP_{(future,s)}$ to the volume measure is 0%.

- For a 2 years (new) contract with initial recognition date and the beginning of insurance cover are on 1st October, a calculation of the volume measure on 31st December results in
 - $FP_{(future,s)}$ equals to 12 month of premium
 - P_s equals to 3 months of premium
 - and a volume measure of 15 months of premium

225. Therefore, the contribution of $FP_{(future,s)}$ to the volume measure is 80%.

226. This difference may again be interpreted as a difference in the materiality of *unexpected risk 1*: permanent increases in costs have a more material impact on multi-year policies. However, comparing multi-year policies of 2, 3 and 4 years, the gap appears to reduce the risk in a different manner: the contribution of $FP_{(future,s)}$ to the volume measure is respectively 80%, 89% and 92%.

Option 2: removing the gap and introducing an adjustment factor in $FP_{(future,s)}$

227. Another option could be to change the definition of $FP_{(future,s)}$ as follows: “denotes the expected present value of premiums to be earned by the insurance and reinsurance undertaking in the segment s for contracts where the initial recognition date falls in the following 12 months but excluding the premiums to be earned during the following 12 months”. This would remove the gap in the current definition.

228. As explained above, an adjustment factor *Alpha* would then be introduced such that the definition of the volume measure for premium risk would be:

$$V_{(prem,s)} = \max[P_s; P_{(last,s)}] + FP_{(existing,s)} + \alpha \cdot FP_{(future,s)}$$

229. With *Alpha* smaller than 1 to reflect the smaller risk associated with $FP_{(future,s)}$.

230. EIOPA consulted on setting the value of *Alpha* at 30%. One stakeholder referred in its comments to the consultation paper that “studies have been performed on the appropriateness of the 30% factor. They suggest that this level is conservative and that a slightly lower factor could be considered”. One can argue that the calibration of the adjustment factor *Alpha* is sufficiently prudent but not over prudent. Another stakeholder referred that the 30% level appears to be a plausible ratio for the risk of change compared to the total premium risk.

231. For the purpose of calibrating and assessing the impact of *Alpha*, a specific data request to undertakings was launched in order to gather data on the amounts of each component of the premium risk volume measure (only the aggregate result is reported by the QRTs) and the assessment of FP_{future} under the assumption that there would be no gap in its definition.

232. The following table provides an assessment of the impact in introducing different *Alphas*. The tables distinguish the impact on one-year contracts and multi-year contracts.

<i>Alpha</i>	Average impact on the volume measure in percentages for all contracts
100%	+24%
90%	+21%
80%	+18%
70%	+15%
60%	+12%
50%	+9%
40%	+6%
30%	+3%
20%	0%
10%	-3%
0%	-6%

233. The following table presents an assessment of the impact introducing different Alphas on multiple year contracts.

Alpha	Average impact on the volume measure in percentages for multiple year contracts
100%	+11%
90%	+9%
80%	+6%
70%	+4%
60%	+2%
50%	-1%
40%	-3%
30%	-6%
20%	-8%
10%	-10%
0%	-12%

234. Undertakings with multiple year contracts in segment s are determined according to following criteria. Those segments s of undertaking are selected as multiple year contract where the ratio of $FP_{(exisiting,s)}$ and $P_{(last,s)}$ is higher than $2/12$.

235. The impact per line of business varies depending on the mix between 1-year contracts and multi-year contracts and according to the time distribution of new contracts over the year.

236. The table below shows the impacts per lines of business on the volume measure if we fix Alpha to 30%.

Line of business	Average impact on the volume measure in percentages for <i>an Alpha</i> of 30% for all contracts
Assistance	+6%
Credit and Suretyship	+3%
Fire and other property damage	+2%
Income protection insurance and proportional reinsurance	+2%
Legal expenses	-2%
Marine, aviation, transport (MAT)	+4%
Medical expenses insurance and proportional reinsurance	+3%
Miscellaneous	+2%
Motor vehicle liability	+6%
Motor, other classes	+5%
Non-proportional health reinsurance	+2%
Non-proportional reinsurance casualty	0%
Non-proportional reinsurance MAT	-1%
Non-proportional reinsurance property	+2%
Third-party liability	+3%
Workers' compensation insurance and proportional reinsurance	+5%

237. The table below shows the impacts per lines of business on the volume measure of multiple year contracts if Alpha is fixed to 30%²¹:

Line of business	Average impact on the volume measure in percentages for an Alpha of 30% for multi-year contracts
Assistance	-6%
Credit and Suretyship	-7%
Fire and other property damage	-5%
Income protection insurance and proportional reinsurance	-7%
Legal expenses	-5%
Marine, aviation, transport (MAT)	-7%
Medical expenses insurance and proportional reinsurance	-3%
Miscellaneous	-5%
Motor vehicle liability	0%
Motor, other classes	-6%
Non-proportional health reinsurance	NA
Non-proportional reinsurance casualty	-2%
Non-proportional reinsurance MAT	3%
Non-proportional reinsurance property	-1%
Third-party liability	-6%
Workers' compensation insurance and proportional reinsurance	5%

238. The effect of the adjustment factor would provide for the following difference between 1-year and multi-years contracts. With *Alpha* equals to 30%:

- For a 1-year (new) contract with initial recognition date and the beginning of insurance cover on 1st October, a calculation of the volume measure on 31st December results in:
 - $FP_{(future,s)}$ equals to 9 months of premium
 - $Alpha \times FP_{(future,s)}$ equals to 2.7 months of premium

²¹ The effect per Member State is provided in the impact assessment section.

- P_s equals to 3 months of premium
- and a volume measure of 5.7 months of premium

239. Therefore, the contribution of $FP_{(future,s)}$ to the volume measure is 47%.

- For a 2 years (new) contract with initial recognition date and the beginning of insurance cover on 1st October, a calculation of the volume measure on 31st December results in
 - $FP_{(future,s)}$ equals to 21 months of premium
 - $Alpha \times FP_{future}$ equals to 6.3 months of premium
 - P_s equals to 3 months of premium
 - and a volume measure of 9.3 months of premium

240. Therefore, the contribution of $FP_{(future,s)}$ to the volume measure is 68%.

241. The introduction of an adjustment factor *Alpha* treats the risk stemming from 1-year policies and multi-year policies in a uniform way. It also avoids cut-off effects due to the gap (differences are smoothed).

Definition of initial recognition date

242. Questions were raised as to when one should recognise contracts contributing to $FP_{(future,s)}$.

243. As explained earlier, this term is linked to the part of the best estimate of premium provisions for future contracts that will be calculated at the end of the 1-year horizon: the best estimate will affect the own funds of the Solvency II balance-sheet.

244. The initial recognition date is therefore to be interpreted in the same way as initial recognition date for best estimate calculation purposes: Article 17 of the Delegated Regulation applies. The initial recognition date is the date at which *"the undertaking becomes a party to the contract that gives rise to the obligation or the date the insurance or reinsurance cover begins, whichever date occurs earlier."*

245. When a contract is renewed, it should be treated as a new contract for the calculation of the volume measure and hence contribute to $FP_{(future,s)}$. This applies also to new contracts written during the following year. For instance, if a new contract is written in January of year $t+1$ and if the undertaking becomes party to the contract 3-months before the cover begins, then this renewal contract may be recognized on the Solvency II balance-sheet in October $t+1$ and it should contribute to $FP_{(future,s)}$.

246. Recognising contracts at the time the undertaking becomes party to the contract may have some implications. Depending when the undertaking becomes party to the contract compared to the beginning of the insurance cover the impact on the volume measure can be more or less material. The time period between the date the undertaking becomes party to the contract

(i.e. the initial recognition date) and the beginning of the contract can be different depending on the Member State since it depends on insurance contract law and specific terms and conditions, which in turn has a consequence on the risk exposure.

247. In the Delegated Regulation existing insurance or reinsurance contract is defined as an insurance or reinsurance contract for which insurance or reinsurance obligations have been recognised. This implies that, if an undertaking has become a party to a contract before year $t+1$, the contract may contribute to $FP_{(future, s)}$ even if insurance cover begins only during year $t+1$.

Impact of options on FP_{future}

248. We discuss below the case of 1-year contract where the initial recognition date is on 1st January and where there is no advance notification. We compare the two options where there is no change to the definition of FP_{future} (option 1) and where the gap is removed (option 2). In the latter an adjustment factor of 30% is assumed to be used.

249. Let's consider an annually renewable 1-year insurance contract with renewal date on 1st January and there is no advance notification.

Option 1: no change to $FP_{(future, s)}$

250. With the current definition, $FP_{(future, s)}$ equals 0 throughout the year. P_s is always equal to 12 months of premium, therefore the volume measure is stable throughout the year.

Option 2: removing the gap and introducing an adjustment factor of 30% in $FP_{(future, s)}$

251. The volume measure consists of two parts: P_s and $FP_{(future, s)}$.

252. P_s would equal 12 months' earned premiums regardless of the time of the calculation. Earned premiums for the following 12 months calculated at the end of month M in year t would be a combination of

- earned premiums for existing contracts from the beginning of month M+1 until the end of year t
- earned premiums for the renewed contracts from the beginning of year t+1 until the end of month M.

253. $FP_{(future, s)}$ would be different depending on the date of calculation. Earned premiums for the renewals in year t+1 are included in P_s for the following 12 months. Therefore $FP_{(future, s)}$ consists only of

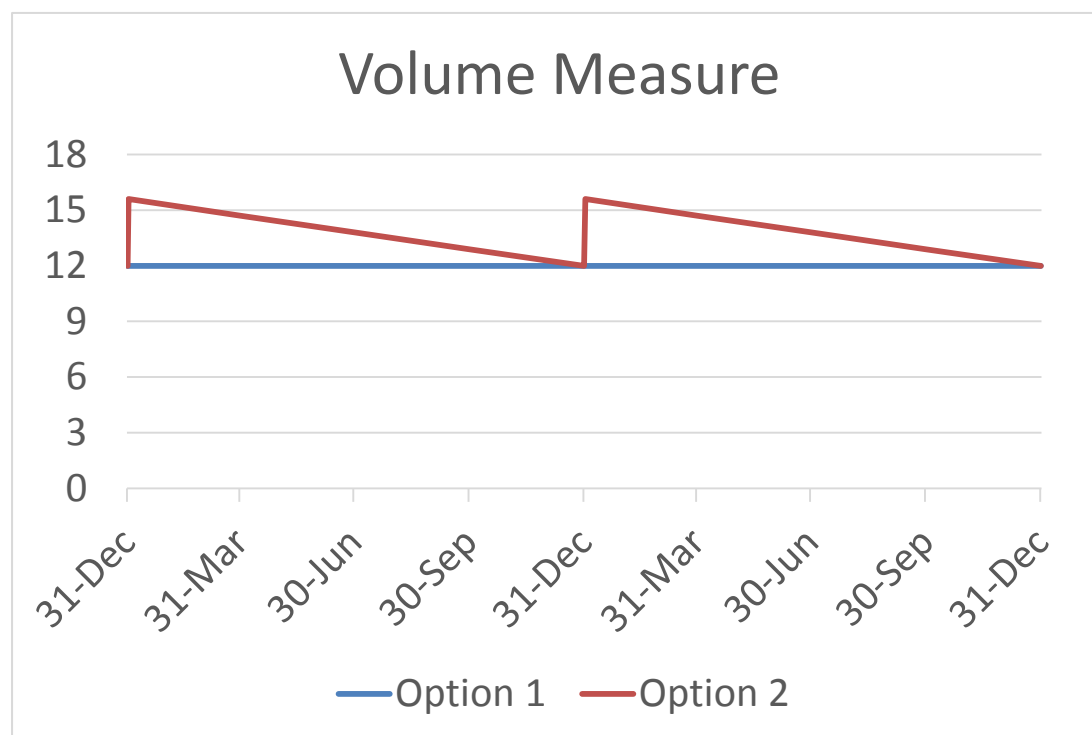
- earned premiums for the renewed contracts from the beginning of month M+1 in year t+1 until the end of year t+1 multiplied by the adjustment factor 30%.

254. This means that $FP_{(future, s)}$ reaches its peak at the beginning of the calendar year and gradually decreased to zero at the end of the year. This reflects the

change in the risk exposure of the undertaking during the following 12 months.

255. The following figure illustrates the development of $FP_{(future, s)}$ depending on time of calculation.

Figure 2.4: Development of $FP_{(future, s)}$ calculated at different date



256. The volatility option 2 could introduce for the volume measure of 1-year contracts is not welcome. Therefore for 1-year contract, option 1 is preferable.

257. For multi-year contracts, the current gap affects in a different way the weight of $FP_{(future, s)}$ in the volume measure, although there is no reason to make such a distinction between 2-year contracts, 3-year contracts ... Therefore, for multi-year contracts, option 2 is preferable.

Volume measure and contract boundaries

258. A question often raised is how $FP_{existing}$ and FP_{future} should be calculated and which time horizon should be considered for the projection of the respective premiums.

259. Recital 43 of the Delegated Regulation provides that the volume measure should “capture earned premiums that are within the contract boundary of existing contracts and on contracts that will be written in the next 12 months”. This clarifies that contract boundary Articles apply exactly in the same way either for existing business or for future contracts once they are recognized (i.e. after their recognition date, they contribute to the volume measure up to their contract boundary).

260. This is also consistent with the risk that these terms are capturing, since they correspond to the risk of the best estimate of premium provisions

affecting in an adverse manner the own funds of the Solvency II balance-sheet.

2.5.3. EIOPA's advice

Definition of $FP_{(future,s)}$

261. The components of the volume measure have been analysed to assess whether they reflect appropriately the risks to which (re)insurance undertakings are exposed to. The current definition of $FP_{(future,s)}$ excludes the premium to be earned during the 12 months after the initial recognition date, which creates an unbalance between 1-year and multi-year contracts.

262. EIOPA advises to distinguish 1-year contracts from multi-year contracts:

- For 1-year contracts: no change to $FP_{(future,s)}$
- For multi-year contracts: removing the gap and introducing an adjustment factor of 30% in $FP_{(future,s)}$

263. In the definition of $FP_{(future,s)}$, the initial recognition date should correspond to the date obtained by applying the provisions of Article 17 of the Delegated Regulation.

264. The length of projection for $FP_{(future,s)}$ and for $FP_{(existing,s)}$ should be the one obtained by applying the provisions of Article 18 of the Delegated Regulation, as recital 43 suggests.

2.5.4. Proposal for new Articles

In order to implement the advice, the following changes to Articles 116(3)(d) and 147(3)(d) of the Delegated Regulation could be made:

(d) $FP_{(future,s)}$ denotes:

- i. **For 1-year contracts**, the expected present value of premiums to be earned by the insurance and reinsurance undertaking in the segment s for contracts where the initial recognition date falls in the following 12 months but excluding the premiums to be earned during the 12 months after the initial recognition date.
- ii. **For multi-year contracts, 30% of** the expected present value of premiums to be earned by the insurance and reinsurance undertaking in the segment s , after the following 12 months, for contracts where the initial recognition date falls in the following 12 months.

3. Recalibration of mortality and longevity risks

3.1. Call for advice

265. EIOPA is asked to assess:

The standard parameters for mortality and longevity risk in the life and health underwriting modules, which should be assessed for their continued appropriateness. EIOPA is also asked to investigate more granular approaches for longevity risk, with a view to a calibration differentiated by age groups. EIOPA is asked to assess the costs and benefits of these more granular approaches, in particular in view of their risk sensitivity and complexity.

3.2. Legal basis

266. Article 105(3) of the Solvency II Directive:

The life underwriting risk module shall reflect the risk arising from life insurance obligations, in relation to the perils covered and the processes used in the conduct of business.

It shall be calculated, in accordance with point (3) of Annex IV, as a combination of the capital requirements for at least the following sub- modules:

(a) the risk of loss, or of adverse change in the value of insurance liabilities, resulting from changes in the level, trend, or volatility of mortality rates, where an increase in the mortality rate leads to an increase in the value of insurance liabilities (mortality risk);

(b) the risk of loss, or of adverse change in the value of insurance liabilities, resulting from changes in the level, trend, or volatility of mortality rates, where a decrease in the mortality rate leads to an increase in the value of insurance liabilities (longevity risk);

267. Articles 137-138 and 152-153 of the Delegated Regulation: (Health) mortality risk sub-module and (Health) longevity risk sub-module.

3.3. Feedback statement on the main comments received to the consultation paper (EIOPA-CP-17-006)

a. Summary of the comments received

268. On data used by EIOPA, stakeholders recognised that using the Human Mortality Database is a good basis and that is easily accessible. However, some stakeholders would have liked EIOPA to collect information from insurance undertakings given that mortality and longevity risks of insured population may differ from that of the general population.

269. On the methodology used, most stakeholders agreed with the two models used and the methodology. In particular for longevity risk, stakeholders appear to agree with EIOPA's assessment. On mortality, stakeholders criticised the methodology: because uncertainty increases over time, modelling expectation of life and translating the changes in expectation of life into instantaneous level shocks will overstate the level shocks at shorter

durations. This overstates the charge for contracts with significantly shorter terms than whole of life such as shorter duration life protection contracts.

270. Some stakeholders questioned the choice of 60 years old as a basis for the shock, requesting further justification.

271. On the granularity of the shocks, stakeholders were divided: some preferring more risk-sensitive calculations, others welcome EIOPA's proposal not to further increase granularity.

b. Assessment

272. EIOPA tried to limit the burden of insurance undertakings and has chosen not to request information to insurance undertakings given the level of granularity that would have been needed. The Human Mortality Database is publicly available, which ensures replicability of the results, and is recognised as a reliable source of information. EIOPA agrees that insured population may differ from the general population, however it is difficult to assess whether risks would be higher or lower. EIOPA could have taken a prudency margin to allow for this risk but given the lack of clear evidence has not chosen to do so.

273. EIOPA agrees with the points raised by stakeholders on the methodology used to assess mortality risk. The methodology has been adapted to take account of stakeholders' comments – see advice.

274. On the assumption of taking age 60 to calibrate the shocks, stakeholders did not provide evidence of a new age to be used as underlying assumption. The age 60 had been carefully chosen by CEIOPS and EIOPA does not see a reason to change.

275. Given the mixed feedback of stakeholders on granularity, EIOPA maintains its advice not to increase granularity and to have a unique stress for all age groups. The stress factors per age will be part of the documentation, so that insurance undertakings can carry out an assessment of the appropriateness of the shocks on their own portfolio.

3.4. Feedback statement on the main comments received to the discussion paper

Model selection

a. Main comments from stakeholders

276. Most stakeholders were in favour of using a Lee-Carter model. According to them, it is a well-known model often applied in the insurance industry. Other stakeholders suggested using as well another model to take account of cohort effects. The Cairns-Blake-Dowd model was provided as a possible alternative to compensate for the shortcomings of the Lee-Carter model. A combination of several models could be used to take into account model and parameter risks.

277. Some stakeholders suggested applying some level of prudence to take account of parameter and model risk.

b. Assessment

278. EIOPA has chosen to implement the Lee-Carter and the Cairns-Blake-Dowd models as a way to take into account model risk.

Data selection

a. Main comments from stakeholders

279. Stakeholders confirmed that the Human Mortality Database is a reliable source of data to calibrate mortality models. They also suggested that the data be complemented by other source of information using national specific database.

280. Stakeholders agreed that the mortality rates of the general population differ from the ones the insured population. However there is no consensus stemming from comments that mortality rates of the general population are higher or lower.

b. Assessment

281. EIOPA confirms its intention to use the Human Mortality Database (HMD) as one of the most reliable source of information for different countries. The use of this unique set of data has the advantage that all data are in the same format and procedures can be automated. EIOPA has also asked NSAs for national specific mortality tables but, in the end, has chosen to rely on the HMD.

282. Since EIOPA did not have access to insured population data, it has considered that the mortality rates are the same as the ones observed in the general population.

Derivation of stress factors and granularity of the stresses

a. Main comments from stakeholders

283. Most of stakeholders agreed with the methodology used by EIOPA in its discussion paper (EIOPA-CP-16/008) to derive longevity stresses.

284. Most of stakeholders seem to be in favour of more granular stresses, for instance per age group. However all did not agree and some expressed their preference for keeping the current design of the standard formula.

b. Assessment

285. EIOPA used the discussion paper methodology to derive mortality and longevity stresses.

286. EIOPA discusses the costs and benefits of using a more granular approach.

3.5. Advice

3.5.1. Previous advice

287. CEIOPS-DOC-42/09: "Life underwriting risk"²²

3.5.2. Analysis

Life expectancy approach

288. Life insurance portfolios are in general undertaking specific. The nature of the insured population as well as the nature of the products in such portfolios do vary over different insurance undertakings. As a result the liabilities for such portfolios do vary and show different sensitivities with respect to mortality characteristics, cash flows patterns and interest rates used for discounting.

289. Mortality sensitivity can be measured by changes in life expectancies.

290. Define $q_x(t)$ to be the 1-year death rate, i.e. the probability that someone alive at January 1st of year t and who was born on January 1st of year $t-x$, has died before January 1st of year $t+1$.

291. Now given a series of (projected) mortality rates:

$$q_x(t), q_{x+1}(t+1), q_{x+2}(t+2), \dots$$

the expected future **cohort** life time at time t for age x is defined as:

$$e_x(t) = \frac{1}{2} + \sum_{k=1}^{\infty} \prod_{s=0}^{k-1} (1 - q_{x+s}(t+s))$$

292. Note that:

$$\begin{aligned} \prod_{s=0}^{k-1} (1 - q_{x+s}(t+s)) &= (1 - q_x(t))(1 - q_{x+1}(t+1)) \cdot \dots \cdot (1 - q_{x+k}(t+k-1)) \\ &= p_x(t)p_{x+1}(t+1) \cdot \dots \cdot p_{x+k}(t+k-1) = {}_k p_x(t) \end{aligned}$$

Or the k -year survival probability for a life aged x at time t .

293. Substituting this into the expression for $e_x(t)$ we arrive at:

$$e_x(t) = \frac{1}{2} + \sum_{k=1}^{\infty} {}_k p_x(t)$$

294. To take account of eventual additional granularity with respect to the (remaining) term of insurance policies next to the definition above, the **n**-

²²<https://eiopa.europa.eu/CEIOPS-Archive/Documents/Advices/CEIOPS-L2-Final-Advice-on-Standard-Formula-Life-underwriting-risk.pdf>

year temporary expected future **cohort** life time at time t for age x is defined as:

$$e_{x:n}(t) = \frac{1}{2} + \sum_{k=1}^{n-1} {}_k p_x(t) + \frac{1}{2} \cdot {}_n p_x(t)$$

295. The **period** life expectancy is based on (observed) mortality rates within a period of one calendar year. By combining such mortality rates to calculate the life expectancy, one arrives at the period life expectancy. As a single life can only take one specific age in a single calendar year it is more logical to combine mortality rates in consecutive (future) calendar years to arrive at the **cohort** life expectancy.

296. The expected future **period** life time at age x is based on a similar formula, however uses a series of observed mortality rates in year t , i.e. $q_x(t)$, $q_{x+1}(t)$, $q_{x+2}(t)$, ..., and hence does not take into account future mortality rate improvements.

297. Given the definition of the expected future cohort lifetime at time t for age x it is straightforward to show the effect of an instantaneous decrease of 20% in mortality rates as currently applied in the standard formula for longevity risk, i.e.

$$e_x^{shocked}(t) = \frac{1}{2} + \sum_{k=1}^{\infty} \prod_{s=0}^{k-1} (1 - 0.8 \times q_{x+s}(t+s))$$

298. Estimating up-to-date cohort life expectancies requires estimates of current mortality rates as well as future developments of these rates, i.e. level and trend. Therefore a suitable stochastic mortality model is needed which appropriately captures these mortality rate characteristics.

Stochastic mortality models

299. Many common mortality models can be expressed in the standard framework of generalized linear or non-linear models comprising of four components:

1. A random component capturing the statistical behaviour of the number of deaths in the model;
2. A systematic component or predictor capturing the effects of age, calendar year and year-of-birth;
3. A link function associating the random component and the systematic component;
4. A set of parameter constraints as most stochastic mortality models are only identifiable up to a transformation and therefore require parameter constraints to ensure unique parameter estimates.

300. To demonstrate the proposed methodology two commonly used mortality models will be used. The results of both models will be combined to incorporate to some extent the effects of model risk.

301. The models used are the Lee Carter model and the Cairns-Blake-Dowd (CBD) model.

302. For both models the random component will be based on the Binomial distribution, i.e. the number of deaths of age x in calendar year t - $D_x(t)$ - follow the Binomial distribution:

$$D_x(t) \sim \text{Binomial}(E_x(t), q_x(t))$$

where $E_x(t)$ is the initial exposed to risk at age x in year t .

303. Note that:

$$\mathbb{E} \left[\frac{D_x(t)}{E_x(t)} \right] = q_x(t)$$

304. For the Lee Carter model the systematic component is defined as:

$$\eta_x(t) = a_x + b_x k_t$$

where:

$$k_t = k_{t-1} + \theta + \varepsilon_t \quad \text{with } \varepsilon_t \sim N(0, \sigma^2)$$

305. For the CBD model the systematic component is defined as:

$$\eta_x(t) = k_{1t} + (x - \bar{x})k_{2t}$$

where:

$$k_{it} = k_{it-1} + \theta_i + \varepsilon_{it}, i=1,2 \quad \text{with } \begin{pmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \end{pmatrix} \sim N \left(\begin{pmatrix} 0 \\ 0 \end{pmatrix}, \begin{pmatrix} \sigma_1^2 & \sigma_{12} \\ \sigma_{12} & \sigma_2^2 \end{pmatrix} \right)$$

306. For both models the logit link function will be used, i.e.

$$\eta_x(t) = g \left(\mathbb{E} \left[\frac{D_x(t)}{E_x(t)} \right] \right) = g(q_x(t)) = \ln \left(\frac{q_x(t)}{1 - q_x(t)} \right) \Leftrightarrow q_x(t) = \frac{e^{\eta_x(t)}}{1 + e^{\eta_x(t)}}$$

307. As the CBD model is fully identifiable we don't need any restrictions on the parameters. However as the Lee Carter model is not fully identifiable we used the following parameter constraints to arrive at unique parameter estimates:

$$\sum_x b_x = 1, \quad \sum_t k_t = 0.$$

Data selection and estimation

308. For the updated calibration, mortality data at the total level (males and females together) has been used from the Human Mortality Database (HMD) for the following countries: France, Germany, Netherlands, Italy, Poland, Spain, United Kingdom, Belgium, Denmark, Sweden & Greece. This ensures that more than 80% of the EEA population is taken into account in the calibration.

309. The data is taken over the period 1985 – 2013/2014/2015 depending on the availability of the data in HMD.

310. Note: for Germany data has only been taken from 1990 onwards as being the first year for combined (former) West/East Germany data.

311. Both models have been estimated over the ages 40-90 for all countries using the "StMoMo"-Stochastic Mortality Modeling package from the R-software.

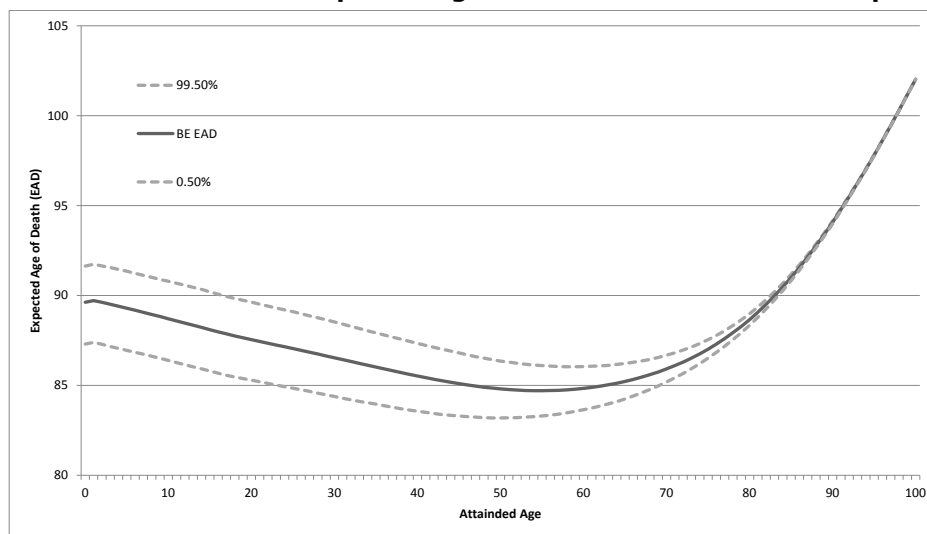
312. Using the Kannisto-rule all mortality tables have been "smoothly" extrapolated up to the age of 120 years old. After that age mortality rates are set equal to the mortality rate for age 120 years.

Calibrating age-dependent mortality and longevity stresses

313. Based on the parameter estimates for each model and country 5000 cohort mortality tables have been simulated. Using these simulated tables the simulated life expectancies $e_x(t)$, $e_{x:5}(t)$, $e_{x:10}(t)$, $e_{x:15}(t)$, $e_{x:20}(t)$, $e_{x:25}(t)$ and $e_{x:30}(t)$ for each age (40,...,120) have been calculated. Based on the 5000 (temporary) life-expectancy outcomes for each age, country and model the 0.5%-percentile and the 99.5% percentile have been calculated.

314. The expected age of death (EAD) is defined as the attained age plus the life-expectancy for that age. Using the simulated life-expectancies Figure 3.1 shows an example of the best estimate EAD-values and the corresponding 0.5%/99.5% percentiles. Note that this figure corresponds to the analysis performed in EIOPA-CP-16-004: it is based on mortality parameters calibrated on Dutch population data.

Figure 3.1 – Distribution of expected age of death: best estimate and percentiles

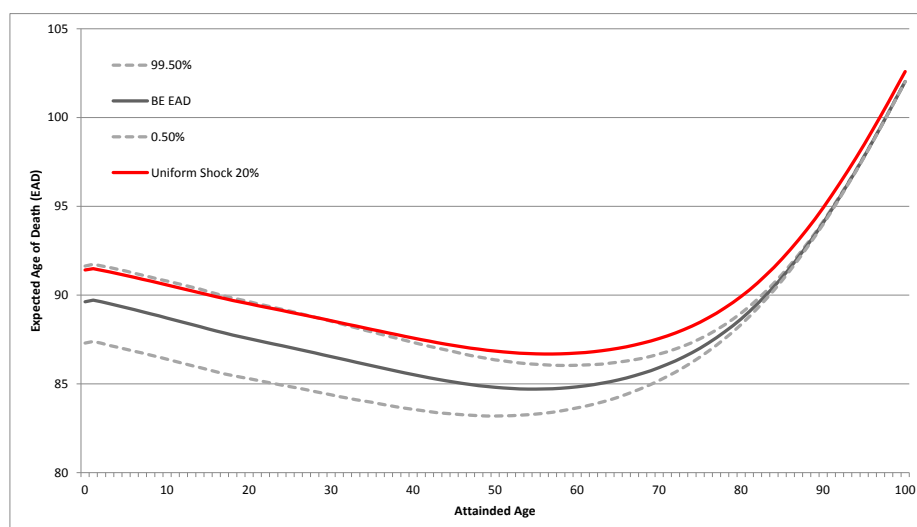


315. The downward sloping shape of the curve in Figure 3.1 is a result of younger persons benefiting more from future mortality improvements than older persons. The upward sloping shape to the right is a result from having attained this higher age already, i.e. the expected age of death is conditional on the attained age.

316. The best estimate of the expected age of death (BE EAD) is the most likely outcome or central forecast, ignoring the error terms for the future trend development.

317. The effect on the best estimate expected age of death taking account of the 20%-longevity shock from the standard formula is represented in Figure 3.2 by the red line:

Figure 3.2 – Expected age of death for an instantaneous decrease of 20% in mortality rates



318. For the next step the age dependent shocked temporarily life expectancy is defined according to:

$$e_{x:n}^{(h)}(t) = \frac{1}{2} + \sum_{k=1}^{n-1} {}_k p_x^{(h)}(t) + \frac{1}{2} \cdot {}_n p_x^{(h)}(t)$$

$$\text{With: } {}_k p_x^{(h)}(t) = \prod_{s=0}^{k-1} (1 - (1 + h(x, n)) \times q_{x+s}(t + s))$$

$$(t) = \frac{1}{2} +$$

319. Each future mortality rate is being multiplied by a factor $1+h(x,n)$, which is dependent on both the age x at time t as well as the calculation horizon n at time t , i.e. both at start of the valuation.

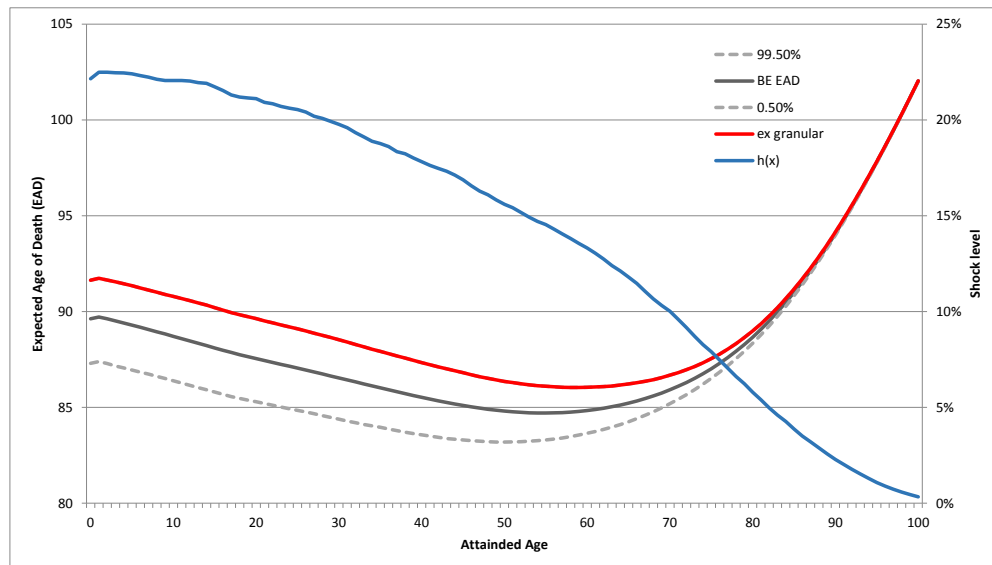
320. Now for each age x and calculation horizon n the $h(x,n)$ -constant can be numerically solved for:

1. $e_{x:n}^h(t) = e_{x:n}^{99.5\%}(t)$, for longevity
2. $e_{x:n}^h(t) = e_{x:n}^{0.5\%}(t)$, for mortality

321. For each age x and horizon n the squared errors $(e_{x:n}^h(t) - e_{x:n}^{99.5\%}(t))^2$ for longevity resp. $(e_{x:n}^h(t) - e_{x:n}^{0.5\%}(t))^2$ for mortality are being minimized as function of the respective $h(x,n)$.

322. A typical example of the results for such a longevity-match are given in Figure 3.3.

Figure 3.3 - Expected age of death including an attained age depended shock



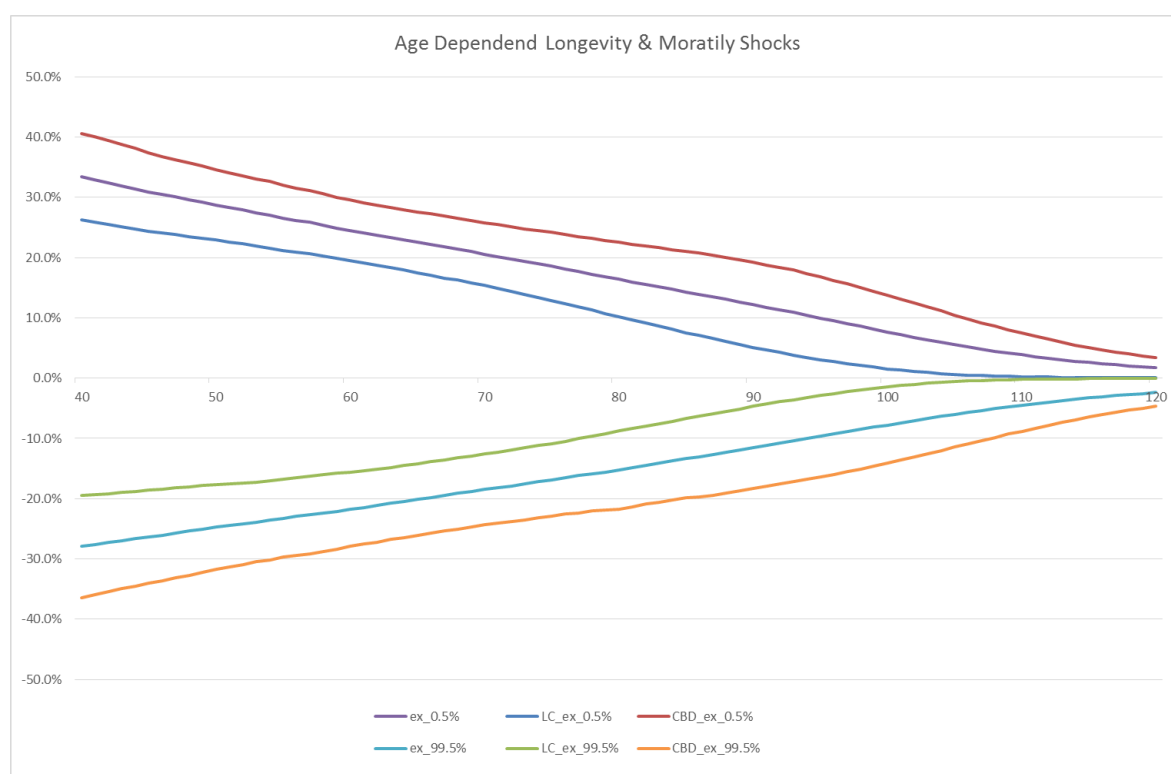
323. The results in Figure 3.3 are for illustration purposes only and taken from the original discussion paper (EIOPA-CP-16-008).

324. From the figure it is clear that for each age when applying the respective $h(x)$ for that age, the shocked life expectancy equals the 99.5% percentile for that age.

Results

325. In the final step the $h(x)$ for each model are combined into a weighted average $h(x)$ over all countries using the exposures per country²³ as weights and finally the resulting weighted $h(x)$ are averaged over both models to take account of model error.

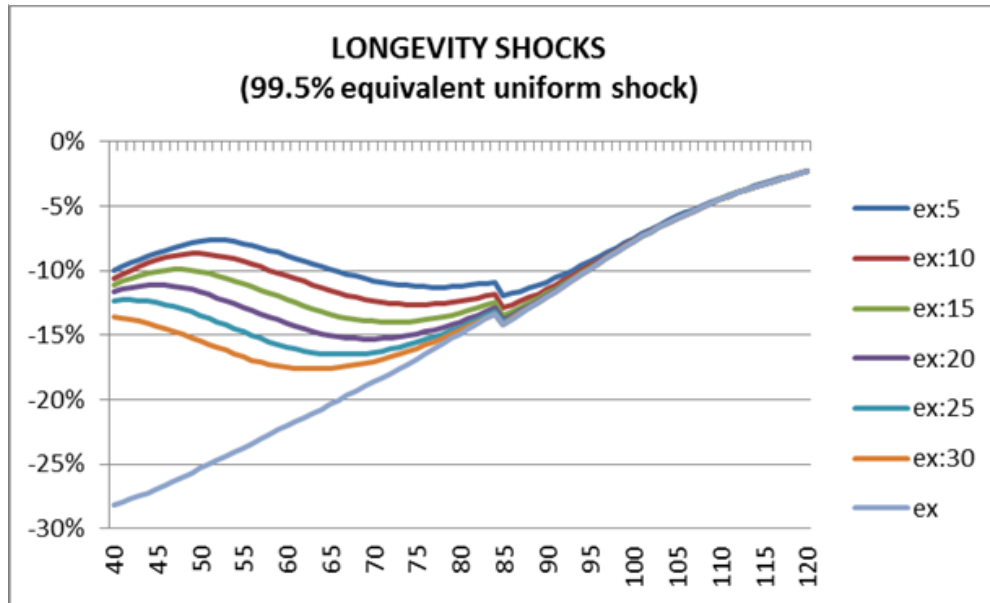
Figure 3.4 – Age dependent longevity and mortality shocks for the LC and CBD models



326. For longevity the resulting $h(x,n)$ over all considered ages x and calculation horizons n are demonstrated in the following graph:

²³ Exposure used is total population.

Figure 3.5 – 99.5% Equivalent longevity shock factors

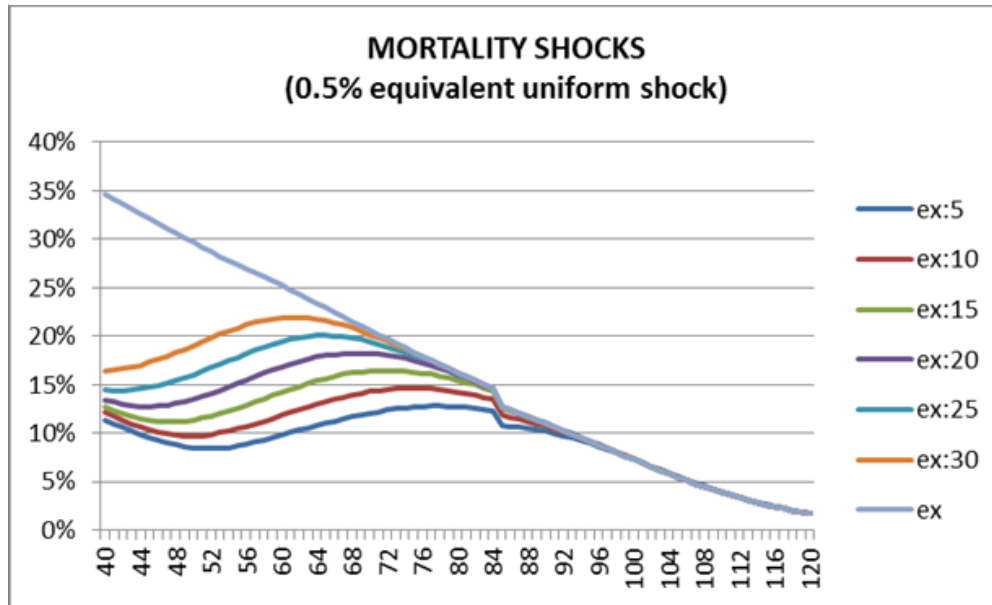


327. Based on these results the following table has been derived demonstrating a possible more granular approach to longevity shocks. Age and remaining term (i.e. calculation horizon) are as at the valuation date. The maximum remaining term for life long policies is defined as 120 minus attained age.

h(x) longevity	Remaining term to maturity							
Attained Age	> 0	> 10	> 20	> 30	> 40	> 50	> 60	> 70
≤ 40	-9%	-12%	-14%	-17%	-20%	-23%	-25%	-28%
≤ 60	-8%	-12%	-15%	-18%	-22%	-25%		
≤ 80	-12%	-14%	-16%	-18%				
> 80	-11%							

328. For mortality the resulting $h(x,n)$ over all considered ages x and calculation horizons n are demonstrated in the following graph:

Figure 3.6 – 99.5% Equivalent mortality shock factors



329. Based on these results the following table has been derived demonstrating a possible more granular approach to mortality shocks. Age and remaining term (i.e. calculation horizon) are as at the valuation date. The maximum remaining term for life long policies is defined as 120 minus attained age.

h(x) mortality	Remaining term to maturity							
Attained Age	> 0	> 10	> 20	> 30	> 40	> 50	> 60	> 70
≤ 40	10%	14%	17%	20%	24%	27%	31%	34%
≤ 60	10%	14%	18%	22%	26%	30%		
≤ 80	14%	16%	19%	21%				
> 80	11%							

Analysis of results

330. Article 105 of the Solvency II Directive provides that mortality and longevity risks should reflect the risk of loss resulting from changes in the level, trend or volatility of mortality rates.

331. The work summarised above captures the risk of loss resulting from changes in trend. The trend is captured due to the fact that we use the estimated trend for the forecast and development of future cohort mortality tables.

332. The level risk is not captured due to the fact that the best estimate mortality tables from this analysis will differ from the ones being used in practice. However due to incomplete information on mortality tables being used in practice EIOPA has not been able to assess this risk any further.

333. As for the risk of loss resulting from changes in the volatility and parameter uncertainty, it can be assumed to be captured by applying the two models on seven data sets and taking the average over all results.

334. The following limitations can be identified in the method:

- It is based on general population of 11 countries and not on the insured population from these countries. However it is difficult to foresee whether this would have an increasing or decreasing effect. In general, insured people are wealthier and therefore tend to leave longer, which could argue in favour of a prudence factor in the longevity stresses. On the other hand, some claim that the recent improvements in mortality benefit mainly the general population instead of the insured population only. Therefore one might argue that is not necessary to account for additional prudence here.
- It does not take into account events that are not in the data, such as new cures. These events are required to be modelled in the best estimate calculation via Article 29 of the Delegated Regulation ("expected future developments in the external environment"). But these are best estimate expected future developments and do not necessarily correspond to the future developments for the SCR. These events are not taken into account into the calculation.
- The stresses defined above are "equivalent stresses". The mortality/longevity risk that affects the own funds corresponds to changes in the mortality rates used in the best estimate calculation. These mortality rates are defined via a mortality table which gives, for each entry age, the 1-year probability of dying every year of the best estimate projection until the age limit (e.g. 120 years old). In theory, there should be one stress for each age and each year of the projection. However, given the complexity it would introduce, we define an equivalent stress that is applied to all mortality rates of an insured person over the specific projection horizon (i.e. remaining term to maturity of the respective policy). The outcome is the same as if we would have defined a mortality stressed table.

335. We observe that for age close to 60 years old, a uniform longevity stress of 20 % is more or less confirmed. Given the uncertainties described above that are not fully taken into account, the 20 % stress appears appropriate.

336. For mortality stresses, the consultation paper provided for a stress of 25 % for age 60 years old, which is higher than the current stress of 15 %. It is clear from the more granular approach for mortality shocks that this level of 25% is deemed too high. Given the uncertainties described above that are not fully taken into account, EIOPA proposes to continue the current uniform level of 15% mortality shock for all ages and remaining maturities.

Granularity

337. The stresses provided in the current Delegated Regulation are not very granular: they are single stresses that apply to all mortality rates, whatever their differences. The *Best Estimate* is expected to be calculated with much more granularity. One could think of different mortality rates per

- Age or age groups (e.g. 10 or 5 years);

- Gender;
- Type of products;
- Socio-economic factors such as job or wealth;
- Geographical localisation.

338. As one can observe in the results displayed in the graphs that the stresses are different depending on the age of the insured person. In particular younger persons would need to have higher stresses given that they benefit more from future mortality improvements than older persons. It appears that more granular stresses per age group would provide for a more risk-sensitive SCR calculation.

339. On the other hand, several difficulties have been identified if more granular stresses are provided.

340. First are implementation costs by (re)insurance undertakings which have currently implemented a unique stress factor.

341. Second are costs due to complexity. The *Best Estimate* is calculated on the basis of a much greater granularity. Against this granularity, stresses per age groups appear not sufficiently granular at all. The age plays a role in the different stresses, but so do other factors identified above (gender, socio-economic factors ...) The granularity of the *Best Estimate* depends on each undertaking so that it fits its risk profile. The model points are different from one undertaking to another. For instance, age groups can be different (4 years, 5 years, 10 years). Further granularity in the SCR should not match the granularity of the *Best Estimate*. Also, the age bands that would be defined in a more granular SCR stress could impact the model points designed to calculate *Best Estimates*. Say in the *Best Estimate* the mortality rates are calculated for age bands of 10 years and that in the SCR it is defined for age bands of 5 years for instance; or the other way around.

342. Finally, one of the key objectives of this SCR review is to simplify, where possible, the standard formula. Increasing granularity in an arbitrary manner compared to the *Best Estimate* would cause more complexity and implementation costs than benefits.

3.5.3. EIOPA's advice

Mortality and longevity stresses

343. In order to assess the adequacy of mortality and longevity stresses in the standard formula, EIOPA has:

- used publicly available data from the Human Mortality Database; data cover more than 80% of the EEA population;
- calibrated two models widely used by (re)insurance undertakings and academics: the Lee Carter model and the Cairns-Blake-Dowd model;
- simulated cohort mortality tables and life expectancies to derive the mortality and longevity stresses.

344. This ensures that the method is transparent and replicable.

345. On the basis of this method, EIOPA advises to maintain the -20 % stress factor for longevity risk and the 15 % mortality stress factor for mortality risk, which both appear appropriately calibrated.

Granularity

346. EIOPA does not advise improving the granularity of the mortality and longevity stresses: the added complexity due to the interaction with the *Best Estimate* model points, the implementation costs and the fact that it would not be in line with simplifying the standard formula provide for more arguments against than in favour.

4. Health catastrophe risk

4.1. Call for advice

The Delegated Act provides simplifications for many, but not for all, calculations in the standard formula. For example, no simplifications are provided for the non-life lapse risk submodule and the submodules of the non-life catastrophe risk.

EIOPA is asked to:

- Provide information on the current use of the existing simplifications and, where relevant, on reasons why these simplifications are not used.
- Suggest improvements for the existing simplifications and explore and propose methods and criteria for further simplifications, in order to ensure that simple and easy to apply methodologies are provided for all standard formula calculations, bearing in mind the need to strengthen a proportionate application of the requirements.

(...)

The counterparty default risk module and as the non-life catastrophe risk submodule require complex calculations.

EIOPA is asked to:

- Provide information on the relative significance of capital requirements related to these modules.
- Assess if this complexity is proportionate to the nature, scale and complexity of these risks, in particular for small and medium-sized undertakings.
- Where appropriate, develop suggestions for simpler structures for these modules, respecting their existing scope.

4.2. Composition of the CAT WS

347. In order to gain a sound basis for any decision on Catastrophe risk sub-modules, EIOPA decided to include external stakeholders from the Cat risk modelling community in the relevant EIOPA working structure, the Catastrophe risk work-stream (CAT WS).

348. The CAT WS is composed of:

- 13 experts from NSAs and EIOPA staff
- 3 model vendor representatives
- 5 insurance industry representatives
- 5 reinsurance industry representatives

- 2 academics
- 1 European Commission representative as observer

349. The CAT WS prepared all EIOPA decisions on simplifications and recalibrations by in-depth analysis.

4.3. Legal basis

Solvency II Directive

350. Article 105: Calculation of the Basic Solvency Capital Requirement, and in particular paragraph (4):

The health underwriting risk module shall reflect the risk arising from the underwriting of health insurance obligations, whether it is pursued on a similar technical basis to that of life insurance or not, following from both the perils covered and the processes used in the conduct of business.

It shall cover at least the following risks:

[...]

(c) the risk of loss, or of adverse change in the value of insurance liabilities, resulting from the significant uncertainty of pricing and provisioning assumptions related to outbreaks of major epidemics, as well as the unusual accumulation of risks under such extreme circumstances.

351. Article 109: Simplifications in the standard formula

352. Article 111: Implementing measures, and in particular paragraph (1)(l)

Delegated Regulation

353. Article 144: Health underwriting risk module

1. The health underwriting risk module shall consist of all of the following sub-modules:

[...]

(c) the health catastrophe risk sub-module.

354. Article 88: Proportionality

4.4. Feedback statement on the main comments received to the consultation paper (EIOPA-CP-17-006)

a. Summary of the comments received

355. In general, the changes proposed by EIOPA were well received as they intend to simplify these submodules.

356. It was also welcomed the fact that EIOPA gathered expertise in the CAT-WS.

Mass-accident risk simplification

a. Summary of the comments received

357. Stakeholders support the removal of the 10-year scenario and the recalibration of the remaining scenarios. However, some raise concerns about the high calibration in particular for the permanent disability scenario.

358. A respondent stated that calibration of the whole scenario could not be appropriate but did not provide further evidence. Some responders targeted their comments to the permanent disability scenario change from 1.5% to 3.5%, which they find too high.

359. Another respondent made a drafting suggestion, not to refer to that the 10-year scenario is “deleted” but “moved to the 1 year and permanent scenario”.

b. Assessment

360. EIOPA welcomes the input provided and also appreciates the positive feedback on the proposal to remove the unclear 10-year scenario. EIOPA’s advice is indeed in that direction. EIOPA understands the concerns about the “disability that lasts 10 years” scenarios due to the fact that it appears uncertain whether people who are disabled for up to 10 years would recover.

361. The consequence is that people who were subjected to the 10 years disability scenario effect in the previous calibration, are now either subjected to the 1 year disability scenario (in majority) or subjected to permanent disability (in minority). See the advice part for further explanations.

Accident concentration risk simplification

a. Summary of the comments received

362. Some stakeholders indicated that the information related to the buildings with the highest concentration is not necessarily known or difficult to reconstruct on the basis of the usual policy information. Therefore for the sake of prudence and as an approximation, it is sometimes considered to be the biggest insurance policy where the insured are supposed to work all together in the same building.

b. Assessment

363. EIOPA is reluctant to make changes in the delegated regulation in order to include the simplifications discussed, as they have been proved to be counterproductive in certain cases. Authorising these approximations would reduce level playing field given the high volatility in the results.

Pandemic risk simplification

a. Summary of the comments received

364. Most respondents agreed that a pan-European unified approach/parametrisation would be neither appropriate, nor risk-sensitive, and they welcome the proposal for supervisors to provide this information.

They note that undertakings which can make a tailored assessment of their claim costs should not be obliged to use any industry-wide averages.

b. Assessment

365. EIOPA welcomes the positive acceptance of its proposal and agrees with the comments made by respondents summarised above. A unified approach/parametrisation would be neither appropriate, nor risk-sensitive.

366. EIOPA agrees that the maximum unit claim costs should be determined individually by each NSA.

4.5. Feedback statement on the main comments received to the discussion paper

Mass-accident risk simplification

a. Summary of the comments received

367. Several stakeholders believe that this sub-module has several difficulties linked to the estimation of benefits payable in all the scenarios and especially for the scenario "disability that lasts 10 years".

368. In some countries, disability is temporary for a certain period of time before being permanent. Where this period is shorter than 10 years, stakeholders requested clarifications as to the application of this scenario and whether it should automatically lead to a permanent disability.

b. Assessment

369. EIOPA understands the concerns about the "disability that lasts 10 years" scenarios due to the fact that it appears uncertain whether people who are disabled for up to 10 years would recover.

370. As a simplification measure, it was proposed to delete this scenario and increase the ratio of persons affected by other event types. As a consequence, mass-accident risk and concentration risk would only rely on 4 scenarios: accidental death, permanent disability, 1 year disability and medical expenses.

371. The consequences is that people who were subjected to the 10 years disability scenario effect in the previous calibration, are now either subjected to the 1 year disability scenario (in majority) or subjected to permanent disability (in minority). See the advice part for further explanations.

Accident concentration risk simplification

a. Summary of the comments received

372. Some stakeholders indicated that the information related to the buildings with the highest concentration is not necessarily known or difficult to reconstruct on the basis of the usual policy information. Therefore for the sake of prudence and as an approximation, it is sometimes considered to be

the biggest insurance policy where the insured are supposed to work all together in the same building.

b. Assessment

373. EIOPA has investigated whether there could be simplifications for the accident concentration sub-module. However no simplification leading to an appropriate assessment of the risks was found. Please refer to the analysis part.

Pandemic risk simplification

a. Summary of the comments received

374. A number of stakeholders commented on the pandemic risk sub-module:

375. It would be complicated to make assumptions or estimates about, e.g., the hypothetical number of days in hospital, admissions in an intensive care unit, hospitalizations out of place of residence and other circumstances that could modify the value of benefits payable by the health insurance company.

376. It would be difficult to assess the benefits for the scenario-type “no formal medical care requested”.

377. It would be difficult to estimate the unit claim cost in the case where the policy covers workers that are usually travelling or working abroad.

b. Assessment

378. EIOPA has analysed the drivers of the medical costs per claim per example case of France:

- Hospitalisation costs : hospitalisation days, income protection, state intervention on an occasional basis
- Consultation costs : number/degree of consultation, request for multiple sources
- ‘no formal medical care’ : pharmaceutical costs due to products buying that do not require a prescription by a doctor

379. The results were found to vary across Member States, such that a unified approach/parametrisation would be neither appropriate, nor risk-sensitive.

4.6. Advice

4.6.1. Previous advice

380. CEIOPS-DOC-43/09 "CEIOPS' Advice for Level 2 Implementing Measures on Solvency II: SCR standard formula - Health underwriting risk module"²⁴

381. CEIOPS DOC 79/10: "Catastrophe Task Force Report on Standardised Scenarios for the Catastrophe Risk Module in the Standard Formula"²⁵

4.6.2. Analysis

Mass accident risks

382. Following the difficulties in implementing the "10a disability" scenario outlined above, EIOPA investigated whether this scenario is actually needed.

383. EIOPA and the CAT task force (CTF) had calibrated a total of 5 scenarios in its 2010 study (see for reference CEIOPS DOC 79/10 Catastrophe Task Force report on standardised scenarios for the catastrophe risk module in the standard formula).

384. In its calibration, the CTF focused on data collected from the World Trade Center attack ("World Trade Center Cases in the New York Workers' Compensation System", New York State Workers' Compensation Board, September 2009). The following table summarizes the outputs of the CTF work:

- first column represents the World Trade Center figures as per the study mentioned;
- second column represents the initial calibration discussed at CEIOPS based on these figures;
- third column represents final view of CEIOPS and is the actual standard formula calibration.

²⁴ <https://eiopa.europa.eu/CEIOPS-Archive/Documents/Advices/CEIOPS-L2-Final-Advice-on-Standard-Formula-Health-underwriting-risk.pdf>

²⁵ <https://eiopa.europa.eu/CEIOPS-Archive/Documents/Reports/CEIOPS-DOC-79-10-CAT-TF-Report.pdf>

Table 4.1: CEIOPS calibration

		WTC figures		Initial proposal		Final proposal	
Accidental death		12 %		12 %		10 %	
Permanent disability	Total	3.2 %	0.2 %	1 %	1 %	1.5 %	1.5 %
	Partial		3 %		0 %		0 %
Temporary disability	1 year	6 %	NA	9 %	6 %	18.5 %	5 %
	10 years		NA		3 %		13.5 %
Medical/injuries		3.5 %		25 %		30 %	

385. The initial work performed by CEIOPS consisted first in splitting partial permanent disability into both total permanent disability and temporary disability, and then in splitting temporary disability between a 1 year scenario and a 10 years scenario.

386. On a second step, some figures were stressed in order to take into account three main drawbacks of the World Trade Center data highlighted by CEIOPS:

- there was a low occupancy of the buildings at the time of the attack, leading to an underestimation of temporary disability and injuries;
- bombings generate more permanent injuries than building collapses, leading to an underestimation of permanent and temporary disabilities;
- many injured people are uninsured or did not claim, leading to an underestimation of injuries.

This puts into question the need to have a “permanent disability” scenario and a “disability that lasts 10 years” scenario.

387. Indeed, in some member states, disability is temporary for a certain period of time before being permanent. The scenario introduces complexity since a judgment needs to be made whether the person disabled during 10 years would recover or not.

388. As a simplification measure, it was proposed to delete this scenario. As a consequence, mass-accident risk and concentration risk would only rely on 4 scenarios: accidental death, permanent disability, 1 year disability and medical expenses.

Accident concentration risk simplification

389. EIOPA has considered two options for simplification of the accident concentration sub-module:

1. For the ‘largest number of persons’ of Article 162 (3) of the Solvency II Delegated Regulation, it was considered to use the biggest collective contract as a proxy, where this type of contract is part of an undertaking’s portfolio.

Even if this approach can be considered reasonable on a number of cases, it is not systematic. The following example provides a case where this simplification would not be appropriate:

The calculation was carried out according to the standard formula calculation of gross exposure for accident concentration risk. Costs involved were assumed to be constant, since hospital costs were found to be comparably stable. The number of insured people was adapted to match the different contracts.

A change in the gross exposure was also included in the scenario when accepting the largest policy as a proxy.

The example used was that of an insurance company which has group insurance agreements for a majority of the people working in the public sector (hospitals, elderly care and schools). Using 'the largest policy' as a proxy would imply that all employees working for the public sector would be involved in one accident. This was not regarded as a reasonable assumption, as the number of insured individuals rose to 600,000. The gross exposure was roughly estimated to be 300 times larger.

It was found that a strict application of the 'biggest collective contract' option would give unreasonable results, since it cannot be assumed that group insurance policies follow geographical patterns.

2. For 'the persons that are working in the same building' of Article 162 (3)(c), a major hit to the headquarter of the undertaking was considered.

Sensitivity analyses carried out showed that this simplification would not result in an appropriate outcome in a certain number of cases. In an example based on real undertaking data, the number of insured people dropped from 200 to 20, compared to the current Standard Formula approach. This resulted in a drop of the SCR of around 90%, which showed that this simplification is not appropriate.

390. The two main proposals for simplification turned out not to be appropriate in a number of cases. Therefore no simplification is proposed for this calculation.

Pandemic risk simplification

391. EIOPA has considered two simplifications for pandemic risk:

392. A first simplification could be to allow for grouping the countries where the exposure is assessed as not proportionate.

393. A second possibility could be to provide maximal unit claim costs per scenario and country. This would allow undertakings for which the risk is not proportionate to take these maximal costs.

394. EIOPA's analysis concluded that hospitalization costs, consultation costs and the concept of 'no formal medical care' vary drastically across Member States, such that a unified approach/parametrisation would be neither appropriate, nor risk-sensitive.

395. The variation is driven by the idiosyncratic features, cost structures and chargeabilities of the national health care system in each Member State.

396. Against this background, EIOPA concluded that it should be proposed that the maximum unit claim costs should be determined individually by each NSA.

397. EIOPA provides some ideas to NSAs, how the cost drivers could be captured on a national basis:

398. Possible Methodologies are

- For hospitalisation costs :
 - Fixed amount per hospitalisation day based on past claims ;
 - Mean annual hospitalisation cost per person ;
 - (not) accounting for income protection ;
 - Mean, quantile or maximum costs ;
 - (not) modelling state intervention ;
- For consultation costs ;
 - Fixed amount per consultation based on past claims ;
 - Number of consultations =1, when assuming that not all infected will consult a practitioner ; or >1 when assuming pandemically infected request crossed advices ;
- No formal medical care :
 - Zero costs when no formal medical care is covered ;
 - Mean annual pharmaceutical costs, depending on cover.

4.6.3. EIOPA's advice

Mass accident and concentration risks

399. Due to the difficulties regarding the application of the "disability that lasts 10 years" scenario, it is proposed to remove this scenario in order to simplify the standard formula and increase the ratio of persons affected by other event types. As a consequence, mass-accident risk and concentration risk would only rely on 4 scenarios: accidental death, permanent disability, 1 year disability and medical expenses.

400. In order to delete the 10 years disability scenario and to remain consistent with initial data and the previous CEIOPS calibration, it is proposed to:

- not modify the 10 % accidental death scenario and the 30% medical expenses scenario;
- retain 3.5 % for the permanent disability scenario, which appears consistent with World Trade Center data, even if for the sake of simplicity only total permanent disability is to be modelled;
- retain 16.5 % for the temporary (1 year) disability scenario, in order to stick to the global 60 % injured people hypothesis.

401. The consequence is that people who were subject to the 10 years disability scenario effect in the previous calibration, are now either subjected to the 1 year disability scenario (in majority) or subjected to permanent disability (in minority).

402. The following table recaps this new calibration.

Table 4.1: Comparison of calibrations with WTC observation

	WTC figures	CTF proposal	New EIOPA proposal
Accidental death	12 %	10 %	10 %
Permanent disability	3.2 %	1.5 %	3.5 %
Temporary disability (1 year)	6 %	18.5 %	16.5 %
Medical/injuries	3.5 %	30 %	30 %

5. Man-made catastrophe risk

5.1. Call for advice

The Delegated Act provides simplifications for many, but not for all, calculations in the standard formula. For example, no simplifications are provided for the non-life lapse risk submodule and the submodules of the non-life catastrophe risk.

EIOPA is asked to:

- Provide information on the current use of the existing simplifications and, where relevant, on reasons why these simplifications are not used.
- Suggest improvements for the existing simplifications and explore and propose methods and criteria for further simplifications, in order to ensure that simple and easy to apply methodologies are provided for all standard formula calculations, bearing in mind the need to strengthen a proportionate application of the requirements.

(...)

The counterparty default risk module and as the non-life catastrophe risk submodule require complex calculations.

EIOPA is asked to:

- Provide information on the relative significance of capital requirements related to these modules.
- Assess if this complexity is proportionate to the nature, scale and complexity of these risks, in particular for small and medium-sized undertakings.
- Where appropriate, develop suggestions for simpler structures for these modules, respecting their existing scope.

5.2. Composition of the CAT WS

403. In order to gain a sound basis for any decision on Catastrophe risk sub-modules, EIOPA decided to include external stakeholders from the Cat risk modelling community in the relevant EIOPA working structure, the Catastrophe risk work-stream (CAT WS).

404. The CAT WS is composed of:

- 13 experts from NSAs and EIOPA staff
- 3 model vendor representatives
- 5 insurance industry representatives
- 5 reinsurance industry representatives

- 2 academics
- 1 European Commission representative as observer

405. The CAT WS prepared all EIOPA decisions on simplifications and recalibrations by in-depth analysis.

5.3. Legal basis

Solvency II Directive

406. Article 105: Calculation of the Basic Solvency Capital Requirement, and in particular paragraph (2):

The non-life underwriting risk module shall reflect the risk arising from non-life insurance obligations, in relation to the perils covered and the processes used in the conduct of business.

It shall take account of the uncertainty in the results of insurance and reinsurance undertakings related to the existing insurance and reinsurance obligations as well as to the new business expected to be written over the following 12 months.

It shall be calculated, in accordance with point (2) of Annex IV, as a combination of the capital requirements for at least the following sub-modules:

[...]

(b) the risk of loss, or of adverse change in the value of insurance liabilities, resulting from significant uncertainty of pricing and provisioning assumptions related to extreme or exceptional events (non-life catastrophe risk).

407. Article 109: Simplifications in the standard formula

408. Article 111: Implementing measures, and in particular paragraph (1)(l)

Delegated Regulation

409. Article 119: Non-life catastrophe risk sub-module

1. The non-life catastrophe risk sub-module shall consist of all of the following sub-modules:

[...]

(c) the man-made catastrophe risk sub-module;

410. Article 128: Man-made catastrophe risk sub-module

1. The man-made catastrophe risk sub-module shall consist of all of the following sub-modules:

(a) the motor vehicle liability risk sub-module;

(b) the marine risk sub-module;

(c) the aviation risk sub-module;

(d) the fire risk sub-module;

[...].

411. Article 88: Proportionality

5.4. Fire risk sub-module

5.4.1. Feedback statement on the main comments received to the consultation paper (EIOPA-CP-17-006)

a. Summary of the comments received

412. Some respondents confirmed that the standard approach is not unreasonable, albeit they believe it is a little conservative. The capital risk sensitivity of the requirement for a total loss could be improved by introducing multi-level damage zones.

413. There were split views on the choice not to use Possible Maximum Loss (PML) or Expected Maximum Loss (EML) in the calculation. Some respondents were of the opinion that such volume measures would improve the risk sensitivity of the calculation, as they are derived with consideration to construction material, the use of firewalls and other preventative measures. Some other respondents welcomed the fact that EIOPA has not taken these concepts into its advice since they would introduce an inappropriate element of subjectivity to the standard formula.

414. The option to use a simplification for the calculation of the fire catastrophe risk sub-module was welcomed by most of the respondents. However, according to some respondents the suggested simplification does not solve the main issue with finding the highest exposure within a 200m radius. One respondent proposed to restrict the calculation requirements to the 200m radius around the largest three (and not five) exposures per industrial and commercial risk types.

415. Several respondents commented on the lack of clarity of the wording on the simplification for fire risk. There was a request to provide additional guidance on how to apply the proposed simplification as it can be interpreted in different ways. According to one comment, it was not possible to discuss or challenge the simplification since it is not worked out in detail.

416. According to some stakeholders the underpin calculation described in section 31 "*Annex to chapter 5 – Fire risk simplification*" should also be mentioned explicitly in the advice. In case of insurance markets where companies operate mainly or exclusively in specific regions, an application of the market share in the underpin formula should be replaced by the regional share. One respondent also points out that the underpin factor should be sufficient to assess the exposure from residential risk.

b. Assessment

417. EIOPA believes that the existing methodology is an appropriate approach and recommends that this remains the default calculation. Introducing multi-

level damage zones would result in unjustified complexity of the standard formula.

418. The proposed simplification could address a number of difficulties raised previously by stakeholders. EIOPA will try to clarify the proposed language. However, the number of exposures (five) will not be reduced as this would understate the risk.

419. EIOPA understand that the simplification may not be appropriate for certain undertakings with a homogeneous residential portfolio. Therefore, an underpin calculation for these undertakings is proposed. This underpin would not be enough to assess residential risk in other cases as it may underestimate the risk.

420. In this respect, EIOPA believes that it is important to clarify that the market share mentioned in the underpin calculation may be a regional market share if this is more representative for the undertaking.

5.4.2. Feedback statement on the main comments received to the discussion paper

a. Summary of the comments received

421. Stakeholders believe that Fire CAT is too complex and its complexity lies in the need to identify the highest total exposure within a radius of 200 meters. For instance it was mentioned that the data concerning all insured buildings within a radius of 200m are usually not available.

422. Some stakeholders considered it also to be too conservative due to the length of the radius (200 meters) and due to the assumption of total loss: "a circle of 200m radius with 100% of losses correspond of having more than 2 big trucks full of explosive".

423. In addition, feedback was also provided on the use of Possible Maximum Loss and/or Estimated Maximum Loss measure instead of sum insured. However, stakeholders were divided as to whether these would be more appropriate measures because of the subjectivity they introduce. Therefore they have not been considered further.

b. Assessment

424. EIOPA has addressed the task to develop an alternative calculation for the fire risk submodule, aiming at its simplification.

425. Investigation by EIOPA suggests that difficulties and cost in assessing the value of the exposure can arise from the following:

- a) Technology to automate the 200m calculation based on a geocoded portfolio can be expensive, unavailable or lack accuracy
- b) Undertakings are manually assessing the exposure
- c) Large amount of data cleansing/validation required due to;
 - a. Inconsistencies between underwriting process and fire risk submodule calculations

- b. Incorrect data collection
- c. Changes or additions to address/postcodes

5.4.3. Advice

5.4.3.1. Previous advice

426. CEIOPS-DOC-41-09 "CEIOPS' Advice for Level 2 Implementing Measures on Solvency II:SCR standard formula – Article 111 Non-Life Underwriting Risk"²⁶.

427. CEIOPS DOC 79/10: "Catastrophe Task Force Report on Standardised Scenarios for the Catastrophe Risk Module in the Standard Formula"²⁷

5.4.3.2. Analysis

428. EIOPA discussed the feedback and analysed different alternatives for simplification.

429. These covered using the largest exposure measure with an adjustment for conflagration, using the simplification of QIS 5 (a factor based approach), to reflect market share, building density and reconstruction costs and to limit the scope of the identification to the largest concentration of risk within a 200m radius circle to, at a minimum, the top five exposures per risk type (industrial, commercial, residential).

430. EIOPA main goal was to reduce the calculation burden, while maintaining an adequate level of risk sensitivity and incentivising better risk management practices. In addition, EIOPA also believes it is important for undertakings to understand their exposures and risks. Therefore the principles underlying the current approach have been assessed appropriate: a scenario based approach using the sum insured as input parameter.

431. Whilst having considered to reduce the 200m radius for exposure inclusion, it was decided to discard such alternative approach as it would not appropriately cover all risks that the scenario comprises.

²⁶ <https://eiopa.europa.eu/CEIOPS-Archive/Documents/Advices/CEIOPS-L2-Final-Advice-SCR-Non-Life-Underwriting-Risk.pdf>

²⁷ <https://eiopa.europa.eu/CEIOPS-Archive/Documents/Reports/CEIOPS-DOC-79-10-CAT-TF-Report.pdf>

5.4.3.3. EIOPA's advice

432. EIOPA believes that the existing methodology is an appropriate approach and recommends that this remains the default calculation.

433. However, it is also recognised that there are a number of difficulties with the current methodology and therefore EIOPA recommends that a simplified calculation should be made available, under the framework of Article 88 of the Delegated Regulation.

434. In this respect, EIOPA recommends, for the identification of the largest risk concentration within a 200m radius circle around insured property and as a simplified calculation, to allow for reducing the number of considered per-address exposures to – at a minimum – the top five exposures per risk type (residential, commercial, industrial) in the portfolio. This approach assumes that the largest concentration of exposure within any 200m radius will have one of the largest five exposures, per risk type, as a central point.

435. This assessment shall be subject to an underpin based on the relevant market share of the undertaking for portfolios of homogenous properties where the largest risks are less likely to provide the proxy for concentration.

436. The resulting formula would be $SCR_{fire} = \max (SCR_{firei}, SCR_{firec}, SCR_{firer})$

Where

$SCR_{firei} = \max(E_{1i}, E_{2i}, E_{3i}, E_{4i}, E_{5i})$

$SCR_{firec} = \max(E_{1c}, E_{2c}, E_{3c}, E_{4c}, E_{5c})$

$SCR_{firer} = \max(\Theta, E_{1r}, E_{2r}, E_{3r}, E_{4r}, E_{5r})$

E_{xi} = Total exposure (building, content and business interruption) within 200m radius of xth largest industrial exposure.

E_{xc} = Total exposure (building, content and business interruption) within 200m radius of xth largest commercial exposure.

E_{xr} = Total exposure (building, content and business interruption) within 200m radius of xth largest residential exposure.

$\Theta = \bar{S} \times 500 \times \max(5\%, \text{undertaking's relevant market share}(\%))$

437. $\bar{S}$ Average sum insured of insurer's portfolio

5.5. Marine risk sub-module

5.5.1. Feedback statement on the main comments received to the consultation paper (EIOPA-CP-17-006)

a. Summary of the comments received

438. Almost all respondents expressed their approval of the change where “tanker” is replaced by “vessel”. Although some respondents stated that every foreseeable scenario cannot be included in a standard formula. One responded asked for a definition of a vessel. Some respondents asked for more information on the scenarios that are to be addressed by the formula (e.g. two ships hitting each other / one ship hitting an oil tanker / one ship hitting an oil platform).

439. In several answers the threshold limit of EUR 100,000 was criticised as being too low. Amounts such as EUR 250,000; EUR 500,000; EUR 1,000,000; EUR 2,000,000 and EUR 5,000,000 were given as an alternative to avoid capturing “pleasure crafts and small boats”.

440. Regarding the relevant heads of damage, one respondent indicates that it is not realistic to assume that firms would have to pay 3 times the sum insured. According to this view, this is definitely more sensible to assume that the sum insured will be paid 2 times.

b. Assessment

441. EIOPA believes that the change “tanker” by “vessel” is justified.

442. Regarding the threshold limit, EIOPA will propose an increase to EUR 250,000 (where the maximum hull value insured is less than EUR 250,000 then no consideration need be calculated in relation to SCR_{vessel}) which would exclude pleasure craft or rigid inflatable boats (“ribs”), from entering the marine risk SCR.

5.5.2. Feedback statement on the main comments received to the discussion paper

a. Summary of the comments received

443. EIOPA received the following feedback on the issue of Marine risk: “If one has no oil tankers or oil/gas platforms insured the calculation is straightforward since it does not fit the scenario and would result in zero capital. This makes the methodology disputable.”

b. Assessment

444. Currently, the scenarios in Solvency II Delegated Regulation are ‘tanker collision’, and ‘platform explosion’. Since Article 130 of the Delegated Regulation refers to ‘tankers/platforms insured by the undertaking’, it can happen that there is no CAT charge at all for companies active in marine: i.e. a particular undertaking has marine exposure by providing cover for other

vessels than 'tankers' or 'platforms' or for other types of events than 'collision' or 'explosion'.

445. For such undertakings, there is clearly a risk (cf. Costa Concordia for instance) that the scenarios given in the Delegated Regulation EU/2015/35 would falsely result in zero modelled claims according to the calculated SCR.

446. Specifically in relation to Protection & Indemnity Clubs, there might be some of them which do not insure 'tankers' or 'platforms', but only cargo ships for instance, or Cruise ships.

5.5.3. Advice

5.5.3.1. Previous advice

447. CEIOPS-DOC-41-09 " CEIOPS' Advice for Level 2 Implementing Measures on Solvency II:SCR standard formula – Article 111 Non-Life Underwriting Risk"²⁸.

448. CEIOPS DOC 79/10: "Catastrophe Task Force Report on Standardised Scenarios for the Catastrophe Risk Module in the Standard Formula"²⁹.

5.5.3.2. Analysis

449. As described in the response to the SCR review discussion paper, what is required is not a simplification, but rather a wider range of exposures to be taken into account when assessing the risk of a given portfolio, namely vessels beyond oil tankers and drilling platforms/rigs.

450. This could be inspired by events like the 2012 Costa Concordia disaster at the Italian Mediterranean sea shore, where over 30 fatalities, numerous casualties and a complex salvage procedure might have resulted in claims comparable to those of some vessel/platform catastrophes.

451. One could add an additional term into the original formula to include cruise/cargo/bulker/other, which would render a likewise arbitrary restriction.

452. As the types of physical risks to other vessels (as a collective term for cargo ships, cruise ships and further, unspecified large watercraft) are exposed to, are different to those born by oil platforms, but largely similar to oil tankers and rigs, it seems justified and straightforward to extent the coverage of the SCR_{tanker} term to vessels in general (" SCR_{vessel} ") within the calculation of Marine risk SCR in Article 130 (1) of the Delegated Regulation.

453. $SCR_{(vessel,t)}$ could have been potentially included in the calculation of L_{vessel} for the relevant heads of damage. This would normally be Sue & Labour,

²⁸ <https://eiopa.europa.eu/CEIOPS-Archive/Documents/Advices/CEIOPS-L2-Final-Advice-SCR-Non-Life-Underwriting-Risk.pdf>

²⁹ <https://eiopa.europa.eu/CEIOPS-Archive/Documents/Reports/CEIOPS-DOC-79-10-CAT-TF-Report.pdf>

Total Loss and Removal of Wreck i.e. 3x the TL SI. Under a marine policy there can be considerable expenditure in trying to save a vessel (Sue & Labour). The vessel can subsequently be lost (Total Loss). The wreck may be a navigation or environmental hazard and then need removing (Removal of Wreck). Allowing for all relevant heads of damage recognises that the vessel SI is not the maximum amount payable under a marine policy and is in the spirit of a 1-in-200 years event. Also, this allows for variation in policy form to include only those heads of damage insured. Where such risk is included in contracts, it should be integrated to $SI_{(liab,t)}$. This clarification can be provided via Q&A.

5.5.3.3. EIOPA's advice

454. EIOPA suggests a change under Article 130 of the Delegated Regulation to replace the "tanker" scenario with "vessel" type to allow for the SCR to arise from any source, Bulker, Container ship, Roll on Roll off, Cruise Ship, Fishing vessel etc. This will fit better with the needs of small companies not insuring global vessels.

455. The change from a tanker specific scenario to any vessel type will include all insurance entities writing marine business without adding any complexity to the formula.

456. It is proposed to introduce a threshold of EUR 250,000: where the maximum hull value insured is less than EUR 250,000 then no consideration need be calculated in relation to SCR_{vessel} . This prevents very low exposure, such as pleasure craft or rigid inflatable boats ("ribs"), from entering the marine risk SCR.

457. All ships have potential pollution liability exposure and therefore there is no need to modify the formula for non-tankers.

5.6. Motor vehicle liability risk sub-module

5.6.1. Feedback statement on the main comments received to the consultation paper (EIOPA-CP-17-006)

a. Summary of the comments received

458. There were only a few comments on motor vehicle liability risk. They both welcomed the idea that EIOPA clarifies the application of this sub-module through its Q&A process. One of the respondents reminded in this context of the importance of full, correct and transparent documentation by EIOPA. This is necessary to enable consistent application of the framework across all jurisdictions.

b. Assessment

459. Given the comments received, EIOPA believes that the Q&A process on the Delegated Regulation is the proportional way of dealing with the clarity issues.

5.6.2. Feedback statement on the main comments received to the discussion paper

a. Summary of the comments received

460. Several stakeholders expressed some doubts as regards the specifications of this sub-module on limited and unlimited liability. It seems apparently difficult to apply in practice this distinction in some cases.

461. According to the Motor Insurance Directive (2009/103/EC)³⁰ the claim amount depends on the statutory limits in the country where an accident occurred. It is not sufficiently clear how the number of vehicles insured by the undertaking should be allocated to those with policy limit "above EUR 24 Million" and those with policy limit "below or equal to EUR 24 Million", as required by Article 129 (1)(a) and (b) of the Delegated Regulation, if the statutory policy limit is below EUR 24 Million ("limited") in the home country of the undertaking but greater than EUR 24 million ("unlimited") in the neighbouring countries.

b. Assessment

462. All possible cases under the scenario of Article 129 of the Delegated Regulation, including claims from vehicles insured under the domestic <24mn EUR limited cover regime being involved in accidents happening abroad under a >24mn EUR limited cover or unlimited regime, have actually been covered in the current Standard Formula approach:

³⁰ Directive 2009/103/EC of the European Parliament and of the Council of 16 September 2009 relating to insurance against civil liability in respect of the use of motor vehicles, and the enforcement of the obligation to insure against such liability, OJ L 263.

463. In the Article 129 formula on the Motor vehicle liability risk sub-module

$$L_{\text{motor}} = \max\left(6\,000\,000; 50\,000 \cdot \sqrt{N_a + 0,05 \cdot N_b + 0,95 \cdot \min(N_b; 20\,000)}\right)$$

464. The term N_b (the number of contracts under the domestic <24mn EUR limited regime) enters in two parts, where, roughly speaking, the weights of which add up to 1. Apparently, the part $0,05 \cdot N_b$ contributes to the overall loss in the same way as N_a , with the latter being the number of >24mn EUR/unlimited contracts. This amounts precisely to assuming that 5% of the vehicles insured under the domestic <24mn EUR limited regime trigger claims from “unlimited EU Member States”, which contribute to motor losses in the same way as the N_a unlimitedly insured vehicles. For 95% of the contracts under limited cover, a cap is introduced by the term $\min(N_b; 20\,000)$ in the loss equation. This cap represents the limited cover.

465. Consequently, there is no need to further split N_b with respect to undertaking-specific assumptions on the likelihood of 2.a. cases happening to their portfolio, as the structure of L_{motor} already takes into account what the CAT TF assumed to be a EU-wide average for the split of claims for limited cover contracts between domestic and abroad accidents (95% vs, 5%).

466. EIOPA regards as sufficient to clarify the application of the MTPL Standard Formula approach according to the previous section through EIOPA’s Q&A process on the Delegated Regulation (<https://eiopa.europa.eu/regulation-supervision/q-a-on-regulation>).

467. Furthermore, EIOPA proposes to investigate the potential introduction of a parameter reflecting the split of N_b between limited vs. unlimited cover events for the undertaking’s individually observed split (currently 95% and 5% are uniformly imposed).

468. Such additional parameter would add some complexity to the Standard Formula approach to MTPL risk, but would most likely increase the risk-sensitivity of the approach.

5.7. Identification of largest man-made catastrophe exposures on gross against net of reinsurance basis risk sub-module

5.7.1. Feedback statement on the main comments received to the consultation paper (EIOPA-CP-17-006)

a. Summary of the comments received

469. Most of the stakeholders supported the added risk-sensitivity of the calculation with the new proposal. Only one stakeholder assessed the added complexity as an issue, the others explaining the real underwriting risk should be measure on a net basis.

470. Some stakeholders requested clarifications on the impact of the proposal on the counterparty default risk module.

b. Assessment

471. In view of stakeholders' feedback, EIOPA confirms its advice to identify the largest exposure on a net of reinsurance basis.

472. Further clarifications have been provided for the counterparty default risk module.

5.7.2. Feedback statement on the main comments received to the discussion paper

a. Summary of the comments received

473. A majority of respondents was in favour of changing the basis for the calculation of the SCR calculation within Marine, Fire and Aviation ("MFA") sub-modules to net of reinsurance – as opposed to the current gross of reinsurance approach.

474. Stakeholders were in most cases referring to the accurate "risk retained" view, which the net approach would implement.

475. Few stakeholders raised concerns regarding additional complexity the net approach could introduce, whereas others explicitly excluded that this could be an issue, as undertakings would currently have to track their reinsurance arrangements anyway for purposes of SCR calculation.

b. Assessment

476. EIOPA investigated whether the identification of the largest risk exposure within the MFA sub-modules should be altered to be carried out on a net of reinsurance basis.

477. At present, the identification is carried out gross of reinsurance, as prescribed in recital 49 of the Delegated Regulation.

478. The largest risk exposures for the scenarios defined in the MFA submodules are:

- Marine risk: tanker/vessel with maximum sum insured and offshore platform with maximum sum insured;
- Aviation risk: aircraft with maximum sum insured;
- Fire risk: buildings within a radius of 200 meters with maximum sum insured.

479. EIOPA has given consideration to the issue and discussed different options.

5.7.3. Advice

5.7.3.1. Previous advice

480. CEIOPS-DOC-41-09 " CEIOPS' Advice for Level 2 Implementing Measures on Solvency II:SCR standard formula – Article 111 Non-Life Underwriting Risk"³¹.

481. CEIOPS DOC 79/10: "Catastrophe Task Force Report on Standardised Scenarios for the Catastrophe Risk Module in the Standard Formula"³².

5.7.3.2. Analysis

482. The issue of the distortion caused by carrying out the SCR calculation on a straight gross basis was raised in [EIOPA's Discussion Paper on the Review of Solvency II](#) in December 2016. The following example, provided by EIOPA, illustrates the issue.

EXAMPLE: Fire risk

Let's assume that a (re)insurance undertaking has the following risk exposures:

1. Exposure 1: set of buildings with the sum insured equal to 10m EUR, no reinstatement premium, reinsurance arrangement covers 9.5m XL 0.5m EUR;
2. Exposure 2: set of buildings with the sum insured equal to 5m EUR, no reinstatement premium, proportional reinsurance arrangement covers 70% of the exposure.

The following table clearly shows that the largest concentration of risk is different on a gross and net of reinsurance basis.

	Gross	Net
Exposure 1	10M EUR	0.5M EUR
Exposure 2	5M EUR	1.5M EUR

Impact of different types of reinsurance

483. Reinsurance cover for individual policies had the potential to distort the SCR calculation, as shown in EIOPA's example.

³¹ <https://eiopa.europa.eu/CEIOPS-Archive/Documents/Advices/CEIOPS-L2-Final-Advice-SCR-Non-Life-Underwriting-Risk.pdf>

³² <https://eiopa.europa.eu/CEIOPS-Archive/Documents/Reports/CEIOPS-DOC-79-10-CAT-TF-Report.pdf>

484. However, it was noted that impact of reinsurance covers for groups of policies (e.g. treaty covers) would, in most cases, not distort the calculation as the exposure for each policy would either be reduced proportionally or capped at a chosen level. For example, per risk XL contracts will reduce all exposures above a given level to the retention point.

Complexity and costs

485. It was believed that an undertaking's exposures, net of any per policy reinsurance, would likely be data that was readily available to each undertaking. Using this information in the identification of the largest risk exposure was therefore considered to be relatively trivial.

486. However, it was noted that introducing the requirement to identify the largest risks, net of all reinsurance could result in significant added complexity, in particular, for the fire risk submodule. The identification of the largest risk exposure would then strictly require undertakings to review every 200m radius where they had exposure and to apply the full reinsurance program to ascertain the highest net exposure. This could increase the calculation burden significantly for some undertakings.

487. It would create further complexity for undertakings which planned to use the proposed simplification for the fire risk submodule but which also had a reinsurance program with a maximum retention level which applied to multiple policies. In this case, there could be tens or hundreds of risks with the same maximum size.

Impact on counterparty default risk module

488. The calculation of the counterparty default risk module is based on the concept of single name exposure. The loss-given default and the risk-mitigating effect of each single name exposure are calculated. The loss-given default takes into account the impact on underwriting and market risk due to the ineffectiveness of the risk-mitigation technique under a default scenario.

489. The risk-mitigating effect is calculated on the basis of the hypothetical SCR as defined in Article 196 of the Delegated Regulation. It is derived as the difference between the capital requirements for underwriting (or market risk if relevant) and the hypothetical capital requirements that would apply if the reinsurance arrangement did not exist.

490. Where the calculation of the capital requirements for man-made risks is based on the largest gross exposure, the hypothetical SCR always correspond to the same gross exposure, which causes that the loss-given default does not take into account the impact on underwriting risk according to the real risk exposure.

491. Where the calculation of the capital requirements for man-made risks is based on the largest net exposure, the hypothetical SCR would differ depending which single name exposure's risk mitigating effect is being assessed. This would first appear as an increase in the complexity.

492. However, for the calculation of the capital requirements for marine and aviation risks, the complexity does not appear to be an issue, since the sum insured is used as an input of the calculation.

493. For the calculation of the capital requirements for fire risk, the identification of the exposure in the 200m radius could raise an increase in complexity. On the other hand, EIOPA is proposing a simplified calculation for this sub-module which reduces the calculation burden of undertakings, since it is limited to the 5 biggest exposures. Where the calculation of the hypothetical SCR relies on this simplified calculation, the complexity does not appear blocking the proposed policy option of basing calculations on largest net exposures.

494. Given that the counterparty default risk module assesses the risk per single name exposure, this would actually reinforce the assessment of the counterparty default risk and make it more risk-sensitive as well.

Other considerations

495. Several other considerations were discussed which were relevant in the formation of the proposal.

496. Guideline 12 (1.29) of the existing EIOPA Guidelines on application of outwards reinsurance arrangements to the non-life underwriting risk submodule (EIOPA-BoS-14/173 EN), stipulates that undertakings should be able to satisfy their NSA that the purchase of outwards reinsurance has not been materially influenced by whether the risk is identified as the gross loss event or a contribution to this gross loss.

497. Undertakings are required to detail their top ten fire risk exposures as part of their existing reporting requirements.

498. Insurers may be using multiple covers in their reinsurance program.

5.7.3.3. EIOPA's advice

499. EIOPA recommends that the identification of the largest risk exposures within the Marine, Fire and Aviation risk sub-modules are altered to be carried out "net of reinsurance where that reinsurance cover alters the relative ranking of the exposure within the undertaking's portfolio, based on the size of the exposure. For example, facultative covers."
500. EIOPA believes that this strikes an appropriate balance between increased risk sensitivity and complexity of the standard formula. EIOPA expects this will remove the distortion within the SCR calculation in the majority of cases.
501. However, it notes that there could be examples of reinsurance programs where the distortion may persist. In these cases, the undertaking shall carry out the identification of the largest exposure within the Marine, Fire and Aviation risk sub-modules on the basis of gross exposures. The undertaking shall highlight the respective issue through their ORSA and coordinate with the responsible supervisor to ensure consistent and harmonised application of the principle.
502. This change also affects the calculation of the risk-mitigating effect in the counterparty default risk module: the calculation of the hypothetical capital requirement for Marine, Fire and Aviation risks referred to in Article 196(a) should also be carried out on the basis of the identification of the largest risk exposure net of reinsurance.
503. In the case of fire risk, and in order to limit the extent of the complexity introduced, EIOPA recommends that the hypothetical SCR is calculated using the simplification proposed in this advice (calculation on the basis of the top five exposures per risk type – residential, commercial, industrial).

6. Natural catastrophe risk

6.1. Call for advice

The Delegated Act provides simplifications for many, but not for all, calculations in the standard formula. For example, no simplifications are provided for the non-life lapse risk submodule and the submodules of the non-life catastrophe risk.

EIOPA is asked to:

- Provide information on the current use of the existing simplifications and, where relevant, on reasons why these simplifications are not used.
- Suggest improvements for the existing simplifications and explore and propose methods and criteria for further simplifications, in order to ensure that simple and easy to apply methodologies are provided for all standard formula calculations, bearing in mind the need to strengthen a proportionate application of the requirements.

(...)

The counterparty default risk module and as the non-life catastrophe risk submodule require complex calculations.

EIOPA is asked to:

- Provide information on the relative significance of capital requirements related to these modules.
- Assess if this complexity is proportionate to the nature, scale and complexity of these risks, in particular for small and medium-sized undertakings.
- Where appropriate, develop suggestions for simpler structures for these modules, respecting their existing scope.

6.2. Composition of the CAT WS

504. In order to gain a sound basis for any decision on Catastrophe risk sub-modules, EIOPA decided to include external stakeholders from the Cat risk modelling community in the relevant EIOPA working structure, the Catastrophe risk work-stream (CAT WS).

505. The CAT WS is composed of:

- 13 experts from NSAs and EIOPA staff
- 3 model vendor representatives
- 5 insurance industry representatives
- 5 reinsurance industry representatives

- 2 academics
- 1 European Commission representative as observer

506. The CAT WS prepared all EIOPA decisions on simplifications and recalibrations by in-depth analysis.

6.3. Natural Catastrophe risk sub-modules simplification

6.3.1. Legal basis

Solvency II Directive

507. Article 109: simplifications in the standard formula

Insurance and reinsurance undertakings may use a simplified calculation for a specific sub-module or risk module where the nature, scale and complexity of the risks they face justifies it and where it would be disproportionate to require all insurance and reinsurance undertakings to apply the standardised calculation.

Simplified calculations shall be calibrated in accordance with Article 101(3).

508. Article 111: implementing measures and in particular paragraph (1)(l):

the simplified calculations provided for specific sub-modules and risk modules, as well as the criteria that insurance and reinsurance undertakings, including captive insurance and reinsurance undertakings, shall be required to fulfil in order to be entitled to use each of those simplifications, as set out in Article 109;

Delegated Regulation

509. Article 88: proportionality

1. For the purposes of Article 109, insurance and reinsurance undertakings shall determine whether the simplified calculation is proportionate to the nature, scale and complexity of the risks by carrying out an assessment which shall include all of the following:

(a) an assessment of the nature, scale and complexity of the risks of the undertaking falling within the relevant module or sub-module;

(b) an evaluation in qualitative or quantitative terms, as appropriate, of the error introduced in the results of the simplified calculation due to any deviation between the following:

(i) the assumptions underlying the simplified calculation in relation to the risk;

(ii) the results of the assessment referred to in point (a).

2. A simplified calculation shall not be considered to be proportionate to the nature, scale and complexity of the risks where the error referred to in point (b) of paragraph 2 leads to a misstatement of the Solvency Capital Requirement that could influence the decision-making or the judgement of the user of the information relating to the Solvency Capital Requirement, unless the simplified calculation leads to a Solvency Capital Requirement which exceeds the Solvency Capital Requirement that results from the standard calculation.

6.3.2. Feedback statement on the main comments received to the consultation paper (EIOPA-CP-17-006)

a. Summary of the comments received

510. In general the simplifications proposed and in particular, the fact that the final simplification for non-allocated exposure is optional, were well received by most stakeholders.
511. Most stakeholders agree that an optional simplification is preferable to a change of the current standard formula approach. Respondents also note that option 5, mapping non-allocated exposure to the zone with the highest zonal weight, is a suitable option.
512. Some stakeholders note however that option 5 may give rise to excessive conservativeness and therefore these stakeholders would prefer option 3, use of risk factor for the region and applying a prudency factor for the undertaking's exposure. The level of prudency would have to be agreed between the supervisory authority and the undertaking, or option 6, allocation of the non-allocated part of the undertaking's exposure in the region on country level to the average of the undertaking within the region with subsequent application of the "normal" standard formula approach.
513. Regarding the two sub-options presented under option 5, respondents are divided.

b. Assessment

514. The option 5 has the merit of using factors which are already available. In this respect, option 3 would introduce an unnecessary level of subjectivity in the prudence factor and option 6 risks not being prudent enough.
515. From the two sub-options under option 5, the second, allocating the unallocated exposure to the zone which has the highest risk weight of the subset of zones, would reflect better the potential risk and may not penalise excessively the undertaking.
516. In this case, EIOPA believes that the undertaking should provide appropriate justification and documentation for this decision.

6.3.3. Feedback statement on the main comments received to the discussion paper

a. Summary of the comments received

517. Not all stakeholders agreed that simplifying the natural catastrophe risk sub-modules would be appropriate.
518. The stakeholders that disagreed to simplify the sub-modules explained that:
519. The complexity of these risks requires a matching complex/granular approach so that risk can be appropriately captured;

520. Undertakings have already put in place procedures to fit into the SF approach to catastrophe risks as it is, therefore significant changes in these sub-modules would cause additional costs to undertakings and work already done would not be useful anymore; this was especially pointed out regarding the geocoding/spatial allocation of exposure.

521. The loss of risk-sensitivity in the calculation may have, as a consequence, an increase in the SCR in some cases. That would be in particular true for diversified portfolio and where diversification benefits could disappear.

522. Other stakeholders argued that the high number of parameters may cause implementation issues for small or medium-sized undertakings. In cases where the exposure is not material, these stakeholders do not see the added value of such complexity.

b. Assessment

523. The concerns regarding potential duplication of work on geocoding of exposure were recognised. On the other hand it was also recognised that there are difficulties in spatially allocating exposure to risk zones. Examples given include insurance cover for pipelines, ranging across several risk zones with different risk profiles, or generally "mobile exposure", such as covered under transport insurance.

524. It is therefore proposed that the final simplification is an optional simplification under the framework of Article 88 of the Delegated Regulation, rather than a replacement of the current SF approach.

6.3.4. Advice

6.3.4.1. Previous advice

525. CEIOPS-DOC-79/10: "Catastrophe Task Force Report on Standardised Scenarios for the Catastrophe Risk Module in the Standard Formula"³³.

6.3.4.2. Analysis

526. EIOPA has considered the following options:

- 1) Use of risk zones that are less granular than the ones currently used, but more granular than the current regions (typically defined on country level)
- 2) Use of the risk factor for the region without consideration of risk zones for the (non-allocated part of the) undertaking's exposure
- 3) Use of the risk factor for the region without consideration of risk zones and applying a factor for prudence for the (non-allocated part of the) undertaking's exposure

³³ <https://eiopa.europa.eu/CEIOPS-Archive/Documents/Reports/CEIOPS-DOC-79-10-CAT-TF-Report.pdf>

- 4) Allocation of the (non-allocated part of the) undertaking's exposure in the region to the average of the industry within the region with subsequent application of the "normal" standard formula approach
- 5) Allocation of the (non-allocated part of the) undertaking's exposure in the region to the CRESTA zone with the highest risk weight in the region
- 6) Allocation of the non-allocated part of the undertaking's exposure in the region on country level to the average of the undertaking within the region with subsequent application of the "normal" standard formula approach

6.3.4.3. EIOPA's advice

527. EIOPA has assessed 5 different options for simplifying the calculation of the capital requirements for natural catastrophe risks.

528. After assessment of the impact of each option, mapping non-allocated exposure to the zone with the highest zonal weight ("option 5") appears as most appropriate.

529. In particular, the simplification proposed meets the conditions in Article 88 of the Delegated Regulation in all realistic settings: this ensures that it may be used to a large extent. Furthermore the approach is easy to follow and straightforward, without the necessity of additional explanations by the (re)insurance undertaking. The proposed formulation would be:

- If a sum insured (SI) for windstorm/hail/earthquake/flood/subsidence risk for region r cannot be mapped to a specific zone i , but there is information about a specific set of zones in the region $(j_1 \dots j_n)$ where SI can possibly be geographically identified (and the others zones can be excluded), then SI should be added to SI_j of the zone $j \in (j_1 \dots j_n)$ that has the highest risk weight of the subset of zones. In case SI can only be allocated to the region $(j_1 \dots j_n)$, then this is regarded as the risk zone with highest weight in the region.

530. EIOPA recommends that the selection of the specific set of zones in the region $(j_1 \dots j_n)$ is well grounded and documented by the undertaking.

6.4. Recalibration of Natural Catastrophe Scenarios

6.4.1. Call for advice

531. *In addition to the advice on a possible simpler structure (section 3.1.3. above), 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.*

6.4.2. Legal basis

Solvency II Directive

532. Article 105: Calculation of the Basic Solvency Capital Requirement, and in particular paragraph (2):

The non-life underwriting risk module shall reflect the risk arising from non-life insurance obligations, in relation to the perils covered and the processes used in the conduct of business.

It shall take account of the uncertainty in the results of insurance and reinsurance undertakings related to the existing insurance and reinsurance obligations as well as to the new business expected to be written over the following 12 months.

It shall be calculated, in accordance with point (2) of Annex IV, as a combination of the capital requirements for at least the following sub-modules:

[...]

(b) the risk of loss, or of adverse change in the value of insurance liabilities, resulting from significant uncertainty of pricing and provisioning assumptions related to extreme or exceptional events (non-life catastrophe risk).

533. Article 111: Implementing measures, and in particular paragraph (1):

In order to ensure that the same treatment is applied to all insurance and reinsurance undertakings calculating the Solvency Capital Requirement on the basis of the standard formula, or to take account of market developments, the Commission shall adopt implementing measures providing for the following:

(a) standard formula in accordance with the provisions of Articles 101 and 103 to 109;

[...]

(c) the methods, assumptions and standard parameters to be used when calculating each of the risk modules or sub-modules of the Basic Solvency Capital Requirement laid down in Articles 104, 105 and 304[...]

(d) the correlation parameters[...]

Delegated Regulation

534. Article 114: Non-life underwriting risk module

535. Article 119: Non-life catastrophe risk sub-module

1. The non-life catastrophe risk sub-module shall consist of all of the following sub-modules:

(a) the natural catastrophe risk sub-module;

[...]

536. Article 120: Natural catastrophe risk sub-module

1. The natural catastrophe risk sub-module shall consist of all of the following sub-modules:

(a) the windstorm risk sub-module;

(b) the earthquake risk sub-module;

(c) the flood risk sub-module;

(d) the hail risk sub-module;

[...]

537. Article 121: Windstorm risk sub-module

538. Article 122: Earthquake risk sub-module

539. Article 123: Flood risk sub-module

540. Article 124: Hail risk sub-module

541. Article 126: Interpretation of catastrophe scenarios

6.4.3. Feedback statement on the main comments received to the consultation paper (EIOPA-CP-17-006)

a. Summary of the comments received

542. Most stakeholders welcome this recalibration exercise (both the inclusion of additional country factors and the revision of existing), particularly due to reasons such as the progress in meteorological, physical, engineering and other sciences, as well as progress in modelling, potential changes in vulnerabilities or data availability.

543. To address the issue of cross-border consistency, stakeholders understand that a full European-wide recalibration of the Windstorm and Flood scenarios would provide a consistent and justifiable calibration. In doing so, respondents highlight the role of the CAT WS.

544. In parallel, it is also mentioned by a respondent that it is justified that country factors might look extremely different even for neighbouring countries and for the same peril as country factors include country-specific modelling assumptions.

545. Another stakeholder urges EIOPA to publish all documentation supporting the CAT WS recommendations.

546. While some recalibrations are welcomed by respondents others are found to be on the conservative side. Strong evidence for these statements is not always provided.

547. A respondent commenting on the earthquake scenarios states that the results are overly conservative, as the recalibration may not adequately incorporate the presence of policy conditions (sub-limits and deductibles) on local risk portfolios particularly for IT.

b. Assessment

548. EIOPA welcomes the fact that stakeholders understand and appreciate the need for this recalibration exercise. As mentioned in the summary of comments received as well as in the consultation paper, there is a wide range of reasons that justify such exercise.

549. Concerning the comments from stakeholders, evidence to support the statements on over-calibration was not sufficiently convincing. In this respect, the proposals made by EIOPA below include both quantitative information (from the results of vendor models, internal models, etc....) as well as qualitative information provided by experts (on natural phenomena, local infrastructure, local policy conditions, etc....).

550. This explains why in some cases, the numerical results from vendor models, or an average of them; do not correspond with the proposal made.

551. With reference to the earthquake scenarios, EIOPA can confirm that the models for IT_EQ used incorporate local policy conditions, as for any other scenario.

552. Regarding the request to publish all documentation supporting the CAT WS recommendations, EIOPA is aware that there is a trade-off between transparency and confidentiality on the models used. In this respect, EIOPA intends to disclose in the scenarios documentation as much information as possible however respecting the rights of the model contributors.

553. In various instances, the lower recommendations for future country risk factors (main SCR determinants in the Standard Formula, see below) were challenged by stakeholders. These reductions were suggested by the consulted models across the board and were explained by model owners as being due to:

- Progress in meteorological, physical, engineering (i.e. in relation to vulnerability) and other sciences,
- Progress in modelling (adopted scientific results, manageable computational burden, available observation data),

- Changes in vulnerabilities (differences in construction due to emerged building codes, improvements in hazard prevention/risk mitigation measures),
- Data availability (exposure, damages, losses)
- The Solvency II requirement for approval of internal models and the related validation work has forced undertakings to ask more and more specific questions on Cat risk models to vendors. The vendors, as a result, have had to significantly improve their client documentation. Many reinsurance brokers and reinsurers have set up or increased the level of resourcing in their Cat risk research and model evaluation teams. Again, this has increased the pressure on the model vendors to implement up-to-date scientific findings to their models.

554. EIOPA also notes that the factors are expected to be revised in the future, with regular recalibrations, to take into account future developments, as well as the potential effect of climate change³⁴.

6.4.4. Feedback statement on the main comments received

555. The relevance of the recalibration of the parameters for Natural Catastrophe sub-modules was ascertained by an information request to national insurance associations from December 2016 to March 2017, coordinated by Insurance Europe. The associations were asked to provide indications for the material inappropriateness of the current calibration.

556. Based on analysis of the evidence received, it was assessed which parameters need to be recalibrated.

6.4.5. Advice

6.4.5.1. Previous advice

557. CEIOPS-DOC-41/09: "CEIOPS' Advice for Level 2 Implementing Measures on Solvency II: SCR standard formula – Article 111 Non-Life Underwriting Risk"³⁵.

558. CEIOPS-DOC-79/10: "Catastrophe Task Force Report on Standardised Scenarios for the Catastrophe Risk Module in the Standard Formula"³⁶.

559. CEIOPS-SEC-40/10: "QIS5 Calibration Paper"³⁷.

³⁴ <https://publications.europa.eu/en/publication-detail/-/publication/4f366956-a19e-11e7-b92d-01aa75ed71a1/language-en/format-PDF/source-62199934>

³⁵ <https://eiopa.europa.eu/CEIOPS-Archive/Documents/Advices/CEIOPS-L2-Final-Advice-SCR-Non-Life-Underwriting-Risk.pdf>

³⁶ <https://eiopa.europa.eu/CEIOPS-Archive/Documents/Reports/CEIOPS-DOC-79-10-CAT-TF-Report.pdf>

³⁷ http://ec.europa.eu/internal_market/insurance/docs/solvency/qis5/ceiops-calibration-paper_en.pdf

6.4.5.2. Analysis

Recalibrated scenarios

560. Analysis of the feedback received from national supervisors and insurance associations during the information request mentioned showed a case for recalibration of the following scenarios:

Country	Risks	Country factors to be recalibrated?	Zone relativities/ aggregation matrices to be recalibrated?
Czech Republic	Hail	Not currently in DR	Not currently in DR
Finland	Windstorm	Not currently in DR	Not currently in DR
Greece	Earthquake	Yes	Yes
Slovenia	Windstorm	Not currently in DR	Not currently in DR
	Hail	Not currently in DR	Not currently in DR
Sweden	Windstorm	Yes	Yes - specific zones highlighted
Hungary	Flood	Yes	Yes – specific zones highlighted
	Windstorm	Not currently in DR	Not currently in DR
Slovakia	Earthquake	Yes	Yes
Spain	Windstorm	Yes	-
Germany	Windstorm	Yes	Not priority
	Flood	Yes	Not priority
Italy	Earthquake	Yes	-

561. However, to capture better the impact of spatially large perils to adjacent scenarios, all scenarios per peril that are currently contained in the Delegated Regulation were re-assessed, in order to explicitly pay attention of pairs/groups of countries that are likely to be hit simultaneously by windstorm or flood (“holistic recalibration approach”).

562. EIOPA conducted the holistic approach for windstorm and flood only. Reasons for this are that earthquake and especially hail do in most cases either not have a spatially widespread impact that would give rise to significant changes at country level, or the particular set of just recalibrated EQ and HL scenarios and the associated magnitude of the changes made to these does not point to material inconsistencies with adjacent scenarios.

563. Against this background, the following scenarios/parameters were recalibrated:

- a. WS scenarios, country factors: AT, BE, CZ, CH, DK, FR, IE, LU, NL, NO, PL, UK;
- b. FL scenarios, country factors: AT, BE, BG, CZ, CH, DK, FR, IT, PL, RO, SK, SI, UK

- c. Re-assessment/re-calibration of the cross-country aggregation matrix for WS and FL

564. The Standard Formula (SF) 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 zones³⁸:

- *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 , $W_r < 1$ means that, on average, there is less risk in zone r , than the average risk at country level; $W_r > 1$ means there is more risk; $W_r = 1$ means that exposure in zone r bears exactly the countrywide average risk; W_r needs to be consistent with the risk in neighboring zones (but only those within the same country) in terms of hazard, vulnerability, policy conditions and concentration of exposure.
- *zone correlations* ($\text{Corr}_{\text{peril,region}}$): the values $\text{Corr}_{\text{peril,region},i,j}$ are organised in a symmetric $n \times n$ 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 ($\text{Corr}_{\text{peril,region},i,j} \in \{0, .25, .5, .75, 1\}$), including the zone i itself ($\text{Corr}_{\text{peril,region},i,i} = 1$).³⁹ Due to the way $\text{Corr}_{\text{peril,region}}$ matrices are constructed, they are so-called 'aggregation matrices', as they are calibrated in an iterative approximation process.⁴⁰

565. Some stakeholders proposed to have only physical hazard correlations represented by $\text{Corr}_{\text{peril,region}}$ instead of its current meaning. These stakeholders advocate that correlations would be easier to understand from a physical hazard point of view.

³⁸ The country factors and risk zone weights are given in terms of occurrence-losses, i.e. they are not losses aggregated over a certain period of time; to obtain the losses that correspond to the SF definition, scenarios are to be applied using the sets of parameters;

³⁹ In principle $\text{Corr}_{\text{peril,region},i,j} = 0$ means statistical independence of insurance losses in two distinct zones, and $\text{Corr}_{\text{peril,region},i,j} = 1$ means (deterministic) dependence (insurance losses in zone i means also parallel losses of same relative size in zone j and vice versa).

⁴⁰ They are not calculated like Pearson correlations (values between -1 and +1). This would make no sense, as there would be no meaning to any negative value of elements in $\text{Corr}_{\text{peril,region}}$ (by definition, no peril causes increases in the value of exposure).

566. However this view largely ignores the vulnerability of exposure to the peril and the distribution of exposure to the peril, which both determines to a large extent the insurance losses caused by an event. The current Standard Formula approach captures the vulnerability and distribution of exposure implicitly in both the regional risk factor and the zonal calibration. This is needed, as the exposure vulnerability and exposure concentration varies across zones and regions, similarly to the exposure volume, but not as a function thereof. Moving implicit vulnerability to only one of these granularity levels (either 'zone', or 'region') would reduce the risk sensitivity of the Standard Formula approach.

567. Arguably, the meaning of the elements of $\text{Corr}_{\text{peril,region}}$ is difficult to understand and some of the values might seem counterintuitive when comparing them with pure hazard correlations. Nevertheless this option appears the most risk-sensitive, hence ensuring that the capital requirements are appropriately calibrated.

Recalibration process

568. EIOPA used the expertise of various stakeholders with professional background in Catastrophe risk modelling or management for performing the recalibration of the Standard Formula NatCat scenarios. The number of models, the exposure data used and the number of results per scenario are detailed in the individual scenario documentation.

569. In addition, these stakeholders contributed by providing input on the specific scenarios to the responsible expert group (the "Catastrophe risk work-stream", CAT WS), by discussing the available information and by deciding on a recommendation for recalibrated values. The subsequent results were approved by EIOPA's members for consultation.

570. For each scenario, experts discussed the proposed calibration values against the background of additional information on the models that were used to calculate the proposed parameter value, such as a country risk factor for a given scenario. At this stage, expert judgement is key in order to take into consideration issues such as recent changes in local policy conditions, improvement of infrastructure reducing the risk (e.g. flood defence) and comparison with internal model results were considered

571. The subsequent results were discussed by EIOPA's members and shared with national insurance associations for consultation. As part of such consultation, a conference call was organised with national insurance associations as well as the IRSG. Their feedback was processed by EIOPA and, where appropriate, has been reflected in the final proposal.

Specific information per recalibrated scenario – Windstorm

572. The recalibration of Windstorm scenarios during the "holistic approach" exercise during Nov 2017 to Jan 2018 was performed by considering three disjoint groups of countries, which were assumed to have commonalities in terms of the physical exposure to the Windstorm peril, mainly in terms of geographical location across Europe. The first group consists of the

northern/Scandinavian countries (DK, FI, NO, SE). The second group consists of Western European scenarios (BE, ES, FR, IE, LU, NL, UK). Central and Eastern European countries were jointly considered in the third group (AT, CH, CZ, DE, HU, PL, SI).

573. Denmark (Old factor = proposal, 0.25%). The proposal is to keep the current country factor which is still within the range of 4 models and appears appropriate when comparing to neighbour countries.
574. Finland - (Proposal 0.04%). Forestry has been excluded from the scope of Windstorm risk given the low exposure of most undertakings. It is proposed to be more conservative than the range of models to include some prudence for the lack of models (only 2) and experience. This would also bring the FI_WS result in line with neighbour countries and would mean a reduction from the value consulted (0.06%).
575. Sweden - (Old factor 0.09%, Proposal, 0.085%). The proposal goes slightly above the current range of models because the range of model outputs was very wide, to be in line with surrounding scenarios as well as to include forestry.
576. Norway - (Old factor = proposal, 0.08%). The current country factor is still within the range of 4 model outputs, and similar to the mean 0.078%. No obvious reason to change it.
577. Belgium - (Old factor = Proposal 0.16%). Given the model range a significant change would not be justified. It was agreed that in general small changes should not be proposed. Proposals for neighbour countries also argue in favour of no change.
578. Spain – (Old factor 0.03%, Proposal 0.01%). In the case of the Spanish Windstorm scenario additional model input was provided in order to take into account the specificities of the Spanish 'Consorcio de Compensación de Seguros'. Similar to the consulted value. Please also refer to section 36 *"Annex to chapter 6 – Spanish Windstorm country factor recalibration"*.
579. France - (Old factor = Proposal 0.12%). It was decided to exclude storm surge, which is a risk covered by CCR. The factor proposal is a bit higher than the 4 models average and mean (0.10%). This is justified given internal models calibrations: a comparison of several internal model results with standard formula results was made. The sample of undertakings included large insurers, with exposures to Windstorm risk distributed across France such that they were assessed as representative. The comparison showed that the current country factor is within the lower end of the range of internal models results. Finally, the proposal is calibrated excluding storm surge. This is due to the fact that the reinsurance scheme supported by the French State (namely Caisse Centrale de Réassurance, or CCR) would usually cover losses related to storm surge, through the natural catastrophe inter-ministerial order process, and not the losses related to wind. As a consequence, modelling storm surge losses in the standard formula would prove complex, especially when it comes to reinsurance application, while its impact on (net) SCR is deemed non material. Proportionality should therefore apply. It is

however worth noticing that, should the storm surge secondary peril prove material for a given undertaking (e.g. if the CCR cover is not purchased), then the undertaking should take it into consideration in its ORSA report.

580. Ireland - (Old factor 0.20%, Proposal 0.22%). It was found that the models results justified an increase of the old factor, which was below the current average and median of 4 models' results (around 0.21%).
581. Luxembourg - (Old factor 0.10%, Proposal 0.12%). The previous factor was similar to the model that gave the lowest result and below the 4 models median and average so an increase is proposed. It is also more in line with neighbouring countries.
582. Netherlands - (Old factor = Proposal 0.18%). Given that the country factor is still within the 4 models range, no change is proposed. This was also confirmed by an analysis of exposure and losses data reported by Dutch insurers in a national specific template. Under this template, undertakings specify their gross losses for a number of return periods and for a number of vendor models and/or internal models. Combining these information confirmed the models range and that the current country factor is still appropriate.
583. UK - (Old factor = Proposal 0.17%). The proposed factor is within the range of 4 models. It is on the conservative side as current models do not model all costs/geography of the UK, as well as to account for storm surge.
584. Austria - (Old factor 0.080%, Proposal 0.060%). The models' output justifies a decrease as the old factor was above the range of results from the 4 models. It was found that a larger decrease than the proposal would not be appropriate given the already significant decrease and as the new proposal is within the range of models.
585. Switzerland - (Old factor 0.080%, Proposal 0.090%). A small increase is proposed given the range of 3 models (average is 0.085%).
586. Czech Republic- (Old factor 0.030%, Proposal 0.040%). It was found that an increase would be needed as both average and median of 3 models are below the previous factor (0.04%).
587. Germany - (Old factor 0.090%, Proposal 0.070%). Similar to the consulted value. Model results indicated that a decrease may be appropriate. However, a too significant decrease has been avoided, given that most of the neighbouring countries do not see their country factor decrease and given the range of internal models analysed.
588. Hungary - (Proposal 0.020%). Similar to the consulted value. The proposal includes a small margin of prudence justified by the fact that there is only one model result and little experience with this scenario.
589. Poland - (Old factor = Proposal 0.04%). The current country factor is still within the range of models. A very small decrease may have been justified but it was agreed that small changes should be avoided.

590. Slovenia - (Proposal 0.04%). In line with the results from 2 models derived from comparison with neighbouring countries, a small decrease is proposed from the consulted value (0.05%).

Specific information per recalibrated scenario – Flood

591. The recalibration of Flood scenarios during the “holistic approach” exercise during Nov 2017 to Jan 2018 was performed by considering two disjoint groups of countries. The first group consists of the countries in the rivershed of the Danube river (AT, BG, CZ, DE, HU, RO and SK). The second group consists of the remaining scenarios to be recalibrated, comprising Western and Central European countries (BE, CH, FR, IT, PL, SI and UK).

592. Austria (Old factor = proposal, 0.13%). It is proposed to keep the old value even if the range of 6 models would argue in favour of a small increase (the average of models is above the proposal, 0.136%). This decision takes into account the recent developments in infrastructure (flood defences) and contractual limits.

593. Bulgaria - (Old factor = proposal, 0.15%). No model available, therefore no change is proposed.

594. Czech Republic - (Old factor = proposal, 0.30%). The average of the 5 models (0.32%) indicated that an increase of the factor could be needed however it was found that recent changes to local policy conditions and infrastructure / flood defence would have to be taken into account for models to be sufficiently accurate.

595. Germany - (Old factor = proposal 0.20%). The current country factor is within range of 4 model outputs (average 0.16%). No significant change would be appropriate; therefore the country factor is proposed to be kept at 0.20% to avoid the sense of spurious accuracy of 0.195%.

596. Hungary – (Old factor 0.40% new factor 0.25%). The previous consulted factor was perceived as spurious accuracy and revised to 0.25%. A too large change has been avoided for keeping country factors consistent.

597. Romania - (Old factor 0.40% new factor 0.30%). No model available. Given the neighbouring countries, a decrease appears justified.

598. Slovakia - (Old factor 0.45% new factor 0.35%). Models output argue in favour of a decrease. Given AT is being unchanged, 0.35 was seen as appropriate and is within the models range.

599. Belgium - (Old factor = proposal 0.10%). Given the lack of model the proposal was not to change the country factor.

600. Switzerland - (Old factor 0.15% new factor 0.30%). The models' results suggested that an increase of the factor was needed (the three models give an average of 0.32%). The final factor could have been higher (to be above the models average) however an excessive steep increase has been avoided.

601. France - (Old factor 0.10% new factor 0.12%). It was agreed to have an increase as the previous factor equals the lowest result from the 3 models.
602. Italy - (Old factor 0.10% new factor 0.15%). The output of models indicated that an increase may be needed (e.g. a model offers a result of 0.20%).
603. Poland - (Old factor = proposal 0.16%). Given the range of models is similar to that of the previous calibration, and taking into account the local study conducted by NSA and local industry in 2011, conclusions of which are still valid, it is proposed to keep the old factor.
604. Slovenia - (Old factor = proposal 0.30%). The current factor is proposed to be kept, taking into account that there was only one model.
605. UK - (Old factor 0.10% new factor 0.12%). The proposal is an increase from the previous factor. A larger increase has been envisaged (as the average of the two models is above the new factor) but discarded on the basis of additional information coming from 11 internal models comparison.

Specific information per recalibrated scenario – Earthquake

606. Greece – (Old factor 1.85%, new factor 1.75%). All models suggested a value below 1.70%, in some cases even substantially lower than that. A slight decrease of the previous value was chosen in order to be still prudent.
607. Italy – (Old factor 0.80%, new factor 0.77%). Most conservative model used suggested something below 0.65%. The final value was chosen by an iterative process and in order to still account for model uncertainty and risks not modelled.
608. Slovakia – (Old factor 0.16%, new factor 0.15%). During EIOPA's request for input on the scope of the SCR several stakeholders, including the national supervisor advocated to reduce the risk charge for this scenario by referring to observed losses. Models indicated only a slight decrease of the country factor.

Specific information per recalibrated scenario – Hail

609. The Standard Formula currently assumes a fixed ratio of the property country risk factor to the corresponding one for motor risk of 1:5. The sum of these two "per-LoB" capital requirements is the total SCR. The fixed factor of five was shown to be wrong in general, as there are different drivers for both risks and each varies differently on a national basis. EIOPA recommends to introduce a national specific factor to the calculation of the Hail risk sub-module, which addresses the mentioned particularities. This was not taken into account during the current SCR review, as it would neither have rendered a simplification – rather to the contrary –, nor a recalibration of an existing factor, and would thus not have been covered by the SCR review mandate.
610. Czech Republic – (Proposal 0.045% for property). The choice of 0.045% is rather at the upper end of the range of model output values provided. This

was mainly driven by the fact that hail risk modelling contains significant uncertainty.

611. Slovenia – (Proposal 0.08% for property). The final country factor almost coincides with the model output value. Nevertheless, it is deemed prudent enough – even when considering model uncertainty.

Climate change and decreases in some country risk factors

612. In various instances, the lower recommendations for future country risk factors (main SCR determinants in the Standard Formula, see below) were challenged by stakeholders. These reductions were suggested by the consulted models across the board and were explained by model owners as being due to:

- Progress in meteorological, physical, engineering (i.e. in relation to vulnerability) and other sciences,
- Progress in modelling (adopted scientific results, manageable computational burden, available observation data),
- Changes in vulnerabilities (differences in construction due to emerged building codes, improvements in hazard prevention/risk mitigation measures),
- Data availability (exposure, damages, losses)
- The Solvency II requirement for approval of internal models and the related validation work has forced undertakings to ask more and more specific questions on Cat risk models to vendors. The vendors, as a result, have had to significantly improve their client documentation. Many reinsurance brokers and reinsurers have set up or increased the level of resourcing in their Cat risk research and model evaluation teams. Again, this has increased the pressure on the model vendors to implement up-to-date scientific findings to their models.

613. EIOPA believes that the process followed and the involvement of stakeholders with professional expertise in terms of modelling of such perils is a sound process that takes into account all recent development. It is based on the most up-to-date expertise and data, hence avoiding introducing too much of expert judgment.

614. EIOPA also notes that the factors are expected to be revised in the future, with regular recalibrations, to take into account future developments, as well as the potential effect of climate change. For climate change, it has not been analysed yet, whether and to what scale potentially large scale effects on the hazard side, such as for windstorm, flood and hail scenarios, need to be covered by SCR charges in addition to the recurring recalibrations and the implicit allowance by annual reinsurance renewal. EIOPA acknowledges work

on the EU⁴¹ and national level⁴² where climate change is explored as a potential new risk in the future.

Recalibration of zonal factors

615. According to the agreed scope of the SCR review, the following nine scenarios were reviewed on the zonal level - or newly introduced (*):

- Windstorm: Finland (FI_WS)*, Hungary (HU_WS)*, Slovenia (SI_WS)*, Sweden (SE_WS),
- Earthquake: Greece (GR_EQ), Slovakia (SK_EQ),
- Flood: Hungary (HU_FL) and
- Hail: Czech Republic (CZ_HL)* and Slovenia (SI_HL)*.

616. Only one model per scenario was available for parameter calibration on the zonal level in most of these cases. For CZ_HL and GR_EQ, the raw output of two models was averaged in a straightforward manner, before the rounding and normalisation was applied as described below under section 33 "*Annex to chapter 6 – Description of recalibration process*".

617. In order to improve the fit of the zonal calibration with the actual exposure in the national markets for these scenarios, EIOPA requested the percentage of industry exposure per zone from the relevant NCAs. If not indicated otherwise in the spreadsheet available from EIOPA's website, the column "IED%" contains the share (of a total of 100%) of the reported exposure that is located in the particular zone. For SI_WS and SI_HL, a population proxy per administrative zone was used instead of actual exposure data.

618. The IED% data, together with the rounded aggregation matrix ($\text{Corr}_{(\text{peril}, \text{region})}$), was used to normalise the raw zonal weights, as described under section 33 "*Annex to chapter 6 – Description of recalibration process*".

619. As discussed at the country level, some scenarios required addressing specificities of the respective market. These were taken into account in corresponding fashion at the zonal level: for FI_WS, it was decided not to consider forestry exposure in the scenario modelling, as it was found the risk pattern embodied in the country factor, zonal weights and aggregation matrix would correspond better to actual loss numbers than those obtained under inclusion of forestry. For SE_WS, it was decided to include forestry in the parameter set obtained, given the materiality of the losses.

⁴¹ E.g. <https://publications.europa.eu/en/publication-detail/-/publication/4e95ef89-c8ee-11e7-9b01-01aa75ed71a1/language-en/format-PDF/source-49056862> or <https://www.preventionweb.net/publications/view/55081>.

⁴² E.g. in the Netherlands (https://www.dnb.nl/en/binaries/Waterproof_tcm47-363851.pdf?2017110615) or in the UK (<https://www.bankofengland.co.uk/-/media/boe/files/prudential-regulation/publication/impact-of-climate-change-on-the-uk-insurance-sector.pdf?la=en&hash=EF9FE0FF9AEC940A2BA722324902FFBA49A5A29A>).

6.4.5.3. EIOPA's advice

620. In order to gain a sound basis for any decision on Catastrophe risk sub-modules, EIOPA decided to include external stakeholders from the Cat risk modelling community in the relevant EIOPA working structure, the Catastrophe risk work-stream (CAT WS).

621. The CAT WS prepared all EIOPA decisions on simplifications and recalibrations by in-depth analysis.

622. Having assessed the recommendations of the CAT WS and after having consulted with national Insurance associations, EIOPA advises the following recalibrations.

Recalibrated country factors:

- AT_WS: 0.06% (previous value: 0.08%)
- BE_WS: 0.16% (previous value: 0.16%)
- CZ_WS: 0.04% (previous value: 0.03%)
- CH_WS: 0.09% (previous value: 0.08%)
- DE_WS: 0.07% (previous value: 0.09%)
- DK_WS: 0.25% (previous value: 0.25%)
- ES_WS: 0.01% (previous value: 0.03%)
- FI_WS: 0.04% (new scenario)
- FR_WS: 0.12% (previous value: 0.12%)
- HU_WS: 0.02% (new scenario)
- IE_WS: 0.22% (previous value: 0.20%)
- LU_WS: 0.12% (previous value: 0.10%)
- NL_WS: 0.18% (previous value: 0.18%)
- NO_WS: 0.08% (previous value: 0.08%)
- PL_WS: 0.04% (previous value: 0.04%)
- SI_WS: 0.04% (new scenario)
- SE_WS: 0.085% (previous value: 0.09%)
- UK_WS: 0.17% (previous value: 0.17%)

- AT_FL: 0.13% (previous value: 0.13%)
- BE_FL: 0.10% (previous value: 0.10%)
- BG_FL: 0.15% (previous value: 0.15%)
- CZ_FL: 0.30% (previous value: 0.30%)
- CH_FL: 0.30% (previous value: 0.15%)
- DE_FL: 0.20% (previous value: 0.20%)
- FR_FL: 0.12% (previous value: 0.10%)
- HU_FL: 0.25% (previous value: 0.40%)
- IT_FL: 0.15% (previous value: 0.10%)
- PL_FL: 0.16% (previous value: 0.16%)
- RO_FL: 0.30% (previous value: 0.40%)
- SI_FL: 0.30% (previous value: 0.30%)
- SK_FL: 0.35% (previous value: 0.45%)
- UK_FL: 0.12% (previous value: 0.10%)

- GR_EQ: 1.75% (previous value: 1.85%)
- IT_EQ: 0.77% (previous value: 0.80%)
- SK_EQ: 0.16% (previous value: 0.15%)
- CZ_HL: 0.045% (property, new scenario)
- SI_HL: 0.08% (property, new scenario)

623. Updated aggregation matrix for Windstorm scenarios on region/country level:

	AT	BE	CH	CZ	DE	DK	ES	FI	FR	UK	HU	IE	IS	LU	NL	NO	PL	SE	SI	GU	MA	SM	RE
AT	1.00	0.25	0.50	0.25	0.25	0.00	0.00	0.00	0.25	0.00	0.50	0.00	0.00	0.25	0.25	0.00	0.00	0.00	0.50	0.00	0.00	0.00	0.00
BE	0.25	1.00	0.25	0.25	0.50	0.25	0.00	0.00	0.50	0.50	0.00	0.25	0.00	0.75	0.75	0.00	0.25	0.00	0.00	0.00	0.00	0.00	0.00
CH	0.50	0.25	1.00	0.25	0.25	0.00	0.25	0.00	0.50	0.00	0.25	0.00	0.00	0.25	0.25	0.00	0.00	0.00	0.25	0.00	0.00	0.00	0.00
CZ	0.25	0.25	0.25	1.00	0.25	0.00	0.00	0.00	0.25	0.00	0.25	0.00	0.00	0.25	0.25	0.00	0.25	0.00	0.25	0.00	0.00	0.00	0.00
DE	0.25	0.50	0.25	0.25	1.00	0.50	0.00	0.00	0.50	0.25	0.00	0.25	0.00	0.50	0.50	0.25	0.50	0.00	0.00	0.00	0.00	0.00	0.00
DK	0.00	0.25	0.00	0.00	0.50	1.00	0.00	0.00	0.25	0.25	0.00	0.00	0.00	0.25	0.50	0.50	0.25	0.50	0.00	0.00	0.00	0.00	0.00
ES	0.00	0.00	0.25	0.00	0.00	0.00	1.00	0.00	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.25	0.00	0.00	0.00	0.00	0.00
FR	0.25	0.50	0.50	0.25	0.50	0.25	0.25	0.00	1.00	0.25	0.00	0.00	0.00	0.50	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UK	0.00	0.50	0.00	0.00	0.25	0.25	0.00	0.00	0.25	1.00	0.00	0.50	0.00	0.25	0.50	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HU	0.50	0.00	0.25	0.25	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.00	0.00	0.00	0.00
IE	0.00	0.25	0.00	0.00	0.25	0.00	0.00	0.00	0.00	0.50	0.00	1.00	0.00	0.25	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LU	0.25	0.75	0.25	0.25	0.50	0.25	0.00	0.00	0.50	0.25	0.00	0.25	0.00	1.00	0.50	0.25	0.25	0.00	0.00	0.00	0.00	0.00	0.00
NL	0.25	0.75	0.25	0.25	0.50	0.50	0.00	0.00	0.50	0.50	0.00	0.25	0.00	0.50	1.00	0.25	0.25	0.00	0.00	0.00	0.00	0.00	0.00
NO	0.00	0.00	0.00	0.00	0.25	0.50	0.00	0.25	0.00	0.25	0.00	0.00	0.00	0.25	0.25	1.00	0.00	0.50	0.00	0.00	0.00	0.00	0.00
PL	0.00	0.25	0.00	0.25	0.50	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.25	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
SE	0.00	0.00	0.00	0.00	0.00	0.50	0.00	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.00	1.00	0.00	0.00	0.00	0.00	0.00
SI	0.50	0.00	0.25	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
GU	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	0.00
MA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	0.00
SM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	0.00
RE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00

624. Updated aggregation matrix for Hail scenarios on region/country level:

	AT	BE	CZ	FR	DE	IT	LU	NL	CH	SI	ES
AT	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BE	0.00	1.00	0.00	0.00	0.00	0.00	0.25	0.25	0.00	0.00	0.00
CZ	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FR	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DE	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
IT	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
LU	0.00	0.25	0.00	0.00	0.00	0.00	1.00	0.25	0.00	0.00	0.00
NL	0.00	0.25	0.00	0.00	0.00	0.00	0.25	1.00	0.00	0.00	0.00
CH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
SI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00
ES	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00

625. As only windstorm and hail scenarios were newly introduced, the region level aggregation matrices for earthquake and flood did not need any update.

Recalibrated zonal weights:

626. Following the recalibration process outlined above, recalibrations for zonal risk weights of the following scenarios are proposed:

- Windstorm: Finland (new scenario); Hungary (new scenario); Sweden; Slovenia (new scenario)
- Earthquake: Greece; Slovakia
- Flood: Hungary
- Hail: Czech Republic (new scenario); Slovenia (new scenario)

627. The listing of the recalibrated zonal risk weights (CRESTA relativity factors) and the respective aggregation matrices for these scenarios can be downloaded from the EIOPA web page:

<http://eiopa.europa.eu/Publications/Consultations/Annex%20to%20section%206%20-%20Natural%20Catastrophe%20Risk%20-%20Zonal%20Calibration.xlsx>

6.5. Contractual limits and natural catastrophe risk

6.5.1. Legal basis

Delegated Regulation

628. Recital 54

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.

6.5.2. Feedback statement on the main comments received to the consultation paper (EIOPA-CP-17-006)

a. Summary of the comments received

629. Most stakeholders are in favour of the suggested ex-post adjustment. However, some also mention that for most catastrophe scenarios, severe restrictions would need to apply before any benefit was obtained from the adjustment. Other stakeholders also mention that it may add complexity to the formula.

b. Assessment

630. The proposed adjustment allows taking into account the specific exposure of undertakings that sell contracts with policy conditions different than the average undertaking. Further granularity (individual policy limits) would introduce even more complexity.

6.5.3. Feedback statement on the main comments received

a. Summary of the comments received

631. Stakeholders claimed that evidence of historical events and their related losses, as well as the results of evaluations carried out by specialised software, showed inappropriate results for some scenarios. In particular it was concluded that the standard formula approach did not adequately incorporate the presence of policy conditions (indemnity limits and deductibles) for certain scenarios. Some stakeholders believe that the sum insured used as input in the CAT risk calculations should be adjusted to take account of specific contractual limits.

b. Assessment

632. EIOPA has assessed whether it would be possible to take into account not average – as is the case now –, but rather individual risk profiles regarding contractual limits.

633. As individual contractual limits and deductibles are currently not explicitly entering the SCR calculation within the relevant NatCat risk sub-modules, a complete re-design of the SF approach would be needed for every affected

sub-module. Such new approach would severely increase the complexity of the design of the standard formula, as it would need to start from the individual contract level, or at least from homogeneous contract level. Thus, there would be no difference anymore compared to the complexity of (partial) internal models.

634. That is why EIOPA believes that only an adjustment to the end results should be proposed.

6.5.4. Advice

6.5.4.1. Previous advice

635. CEIOPS-DOC-41/09: "CEIOPS' Advice for Level 2 Implementing Measures on Solvency II: SCR standard formula – Article 111 Non-Life Underwriting Risk"⁴³.

636. CEIOPS-DOC-79/10: "Catastrophe Task Force Report on Standardised Scenarios for the Catastrophe Risk Module in the Standard Formula"⁴⁴.

637. CEIOPS-SEC-40/10: "QIS5 Calibration Paper"⁴⁵.

6.5.4.2. Analysis

638. 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"*.

639. The risk weights and risk factors defined in Articles 120-125 of the Delegated Regulation have been calibrated by taking account of national market average contractual limits and national market 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.

640. 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."

641. 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,

⁴³ <https://eiopa.europa.eu/CEIOPS-Archive/Documents/Advices/CEIOPS-L2-Final-Advice-SCR-Non-Life-Underwriting-Risk.pdf>

⁴⁴ <https://eiopa.europa.eu/CEIOPS-Archive/Documents/Reports/CEIOPS-DOC-79-10-CAT-TF-Report.pdf>

⁴⁵ http://ec.europa.eu/internal_market/insurance/docs/solvency/qis5/ceiops-calibration-paper_en.pdf

since the input of the formula of Articles 120-125 should be the sum insured gross of deductibles and contractual limits.

642. 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.

643. Thus, only an adjustment to the end results would make sense.

6.5.4.3. EIOPA's advice

644. EIOPA has assessed how contractual limits, deductibles and other specific policy conditions are taken into within the standard formula, against the background that the actual risk exposure of undertakings should be captured in the calculation of the capital requirement for natural catastrophe risk.

645. The risk weights and risk factors for natural catastrophe risks have been calibrated by taking account of national market average contractual limits and national market 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.

646. In order to capture specific policy conditions that deviate significantly from the average and to avoid increasing the complexity of the standard formula in an undue manner, EIOPA proposes to introduce an "ex-post adjustment" that would work as follows for each peril:

- 1) 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 :

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

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

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

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

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

647. 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 insured than the average undertaking in case of catastrophic event, the "ex-post adjustment" avoids that the SCR of this specific undertaking becomes unrealistically large.

648. In some cases, the contractual limits may vary more greatly within a given zone. In that specific case, such an "ex-post adjustment" may be performed at a more granular level than for zones: for instance by group of homogeneous contracts.

649. Where undertakings make use of the proposed option and in particular in the case of further granularity, they should disclose it in their ORSA, with appropriate quantitative information: e.g. results of both 1) and 2) of above; the reduction in SCR to the respective contracts at the level of region, risk zone or homogeneous contract level.

7. Interest rate risk

7.1. Call for advice

650. The review of interest rate risk module is an EIOPA own initiative issue. In a questionnaire sent to NSAs during 2016, several NSAs suggested a review of the current interest rate risk module given the new interest rate environment. After having received the first call of advice EIOPA has identified interest rate risk as one of the most material own initiative issues for which it intends to provide a technical advice to complement the request from the European Commission.

7.2. Legal basis

Solvency II Directive

651. Article 105 (5a)

Delegated Regulation

652. Article 103: Simplified calculation of the capital requirement for interest rate risk for captive insurance undertakings

653. Article 165: General Provisions

654. Article 166. Increase in the term structure of interest rates

655. Article 167. Decrease in the term structure of interest rates

Guidelines

656. Guideline 4 of the "Guidelines on the treatment of market and counterparty risk exposures in the standard formula".

7.3. Feedback statement on the main comments received to the consultation paper (EIOPA-CP-17-006)

Timing and Scope of the review of the interest rate risk module

a. Summary of the comments received

657. Several stakeholders questioned the timing of the review of the interest rate risk module. In particular, they emphasized the material interconnectedness of changes in the interest rate risk module with the interest rate topics covered by the LTG project. Moreover stakeholders stressed it is important to assess all regulatory changes to interest rates as a whole and not in isolation. The stakeholders proposed to postpone potential changes to the interest rate risk module until the LTG package is reviewed in 2020.

658. Some stakeholders further questioned the scope of the review of the interest rate risk module. They criticized the isolated review of the methodology to derive stressed risk-free curves without reviewing the entire market risk module, particularly the market risk correlations. They argued changes of the methodology significantly affect the other market risk

correlations with the interest rate risk and thus these correlations should be assessed.

b. Assessment

659. EIOPA sees if at all only a weak link between the reviews of the interest rate risk module and the LTG review project. The extrapolation methodology for the risk-free interest rate term structure is within the scope of the LTG review, but the work conducted under the SCR review focused on changes of interest rates, rather than the extrapolation technique itself.

660. EIOPA reiterates that the current approach to calculate capital requirements for interest rate risk should be corrected to comply with the requirements of the Directive and be realistic. Stakeholders agree with the flaws of the current methodology, as the responses to consultation papers attest. Internal model users have implemented methodologies that allow reflecting the economic reality of low and negative yield environment. The risk is currently not measure in an appropriate manner and is severely underestimated: this should be corrected.

661. EIOPA acknowledges that changes in the interest rate risk module might affect the market risk correlations. In this first SCR review, EIOPA has given priority to adjust the interest rate risk methodology to better capture the risks in a low yield environment. However, a review of the market risk correlations could be part of a future review process.

Extrapolation of the stressed risk-free curves after the last liquid point (LLP)

a. Summary of the comments received

662. A vast majority of stakeholders argued that the extrapolation of the stressed risk-free curves is the only way to derive consistent, risk-sensitive and economically sound stressed risk-free curves in the illiquid part of term structure and the only way to compute the true loss in basic own funds. These stakeholders disagreed on all arguments provided by EIOPA to maintain the current approach of a linear interpolation of stress factors in the illiquid part of the term structure.

663. Many comments focused on the inconsistency between the risk measurement of interest rate risk and the valuation of own funds where an extrapolated risk-free curve is used. Many stakeholders stated, this inconsistency has the undesirable implication that the stressed risk-free curve can never become a realized risk-free curve.

664. Several stakeholders pointed out the inconsistency makes interest rate hedging much more complex.

665. Furthermore, many stakeholders argued the current approach does not reflect economic reality. They raised the issue that if a 1/200 interest rate shock occurred in reality, then the new risk-free curve would be determined by extrapolation after the LLP.

666. The current approach applies a stress on the UFR. According to several stakeholders, this is not in line with interest rate theory. They illustrated their argument by referring to mathematical interest rate models, where the long-term expected rate corresponding to the UFR, is modelled as a stable and non-decreasing rate. According to the stakeholders, a significant stress of a long-term rate could economically only be justified by a massive structural change in the economy. They further concluded that capturing such structural changes would go beyond the scope of the standard formula.
667. Moreover, some comments asked to incorporate the maximum annual change of the UFR according to the new UFR methodology (currently 15 bp) into the stressed interest rate curves. In particular, this would imply that the shock after the 90Y should not be a 20 % relative constant shock.
668. The majority of stakeholders doubted that an extrapolation of the stressed curves goes beyond EIOPA's mandate. EIOPA would just continue to publish stressed risk-free curves as it already does.
669. Many comments disagreed with the statement that extrapolation leads to additional complexity for the undertakings since the same Smith-Wilson methodology would just be applied to two different curves.
670. Several stakeholders argued that the extrapolation of the stressed curves after the LLP is a risk-sensitive approach. They pointed out, the magnitude of a shock (a large or a small shock) before the LLP is correctly transformed into the extrapolated part of the stressed curve. The stakeholders referred to the statistical argument that there is a comonotonicity (positive dependence of the marginal risk factors for different tenor points) of the marginal risk factors for the tenor points in the liquid part of term structure. A comonotonicity in the liquid part of the term structure would imply a comonotonicity in the illiquid part too. The comonotonicity would then ensure the corresponding 99.5 % (0.5%) quantiles are correctly determined.
671. Several stakeholders disagreed with EIOPA's observation that the changes of forward rates before the LLP are not sufficiently taken into account resulting in a potential underestimation of interest rate risk. In their view, only a methodology with an extrapolation of the stressed curves would ensure all forward rates before the LLP are adequately captured.
672. Several comments challenged the analysis by EIOPA with the result of a 19 % maximum annual change at the 90Y maturity. According to these comments, EIOPA's analysis does not prove the appropriateness of the current phasing-out approach.

b. Assessment

673. As already stated in the draft consultation paper, EIOPA recognizes that there is an inconsistency between the valuation of own funds and the risk measurement. However, EIOPA is still of the opinion that the current approach in the illiquid part of the term structure is simple and appropriate for a variety of reasons.

674. Firstly, EIOPA does not see serious hedging problems with the current approach.
675. Secondly, extrapolation of the stressed risk-free curves introduces additional complexity for the undertakings, which would have to implement the Smith-Wilson methodology on their own. It would not be proportionate for small undertakings which would need to invest lot of resources to understand how the stressed curves are derived and thus to be able to properly assess their interest rate risk.
676. Thirdly, EIOPA considers a shock on the UFR as appropriate and necessary since long-term expected rates also change with a changing economic environment. Moreover, EIOPA notes that the real shock on the UFR can go beyond the 15 bp.
677. Fourthly, an extrapolation of the stressed risk-free rate term structures would lead to an inconsistency on the asset side, where interest rate sensitive assets need to be revalued in the stress scenarios with market interest rate curves, which differ from the EIOPA risk-free curve.
678. Finally, applying the Smith-Wilson technique after the 20Y maturity would lead to smooth risk-free curves just after this tenor point, but in practice the curves will not be smooth at this part of the term structure. Accordingly, an extrapolation of the stressed curves after the 20Y maturity does not reflect economic reality. More importantly, it bears the risk to underestimate interest rate risk in the illiquid part of the term structure.
679. Given the considerations above, EIOPA still considers the current approach as more appropriate for the standard formula.

Mathematical approaches to derive the risk-free curves

a. Summary of the comments received

680. The vast majority of stakeholders disagreed with the EIOPA conclusion that proposal A and proposal B are appropriate candidates to adequately model interest rate risk in a low yield environment. Although many stakeholders admitted that proposal B is relatively preferable to proposal A, in essence they deemed both proposals as inappropriate and suggested to discard them.
681. The stakeholders criticized proposal A to be an overly simplistic approach that does not reflect economic reality, does not fit to the observed empirical data pattern and massively overestimates interest rate risk in the low yield environment. They especially emphasized that proposal A fully ignores the fundamental issue that large annual changes of interest rates observed at higher (moderate) interest rate environments cannot be equivalently transformed into the low yield environment.
682. Moreover, several stakeholders question the derivation of the lower bound under proposal A, in particular arguing that the Swiss Franc is not a suitable reference to derive a lower bound. It was suggested to rather derive a lower bound based on the cost of holding cash or to follow the former CEIOP's advice. Other stakeholders raised the issue that attention should be paid

when a lower bound is derived from central bank rates since swap rates are not equivalent to central bank rates.

683. The vast majority of stakeholders considered proposal B to be relatively more appropriate than proposal A. Some of the stakeholders considered proposal B as a risk-sensitive approach to model interest rate movements in the low yield environment. However, the majority of stakeholders also discards proposal B highlighting it has serious weaknesses as well. Proposal B is deemed too complex for the standard formula. Moreover, it lacks an economic rationale and it requires more expert judgement to determine its parameters.

684. Some stakeholders analysed the behaviour of forward rates under the two proposals. They found that forward rates exhibit an erratic behaviour due to the max, min operators in the two approaches (see figure 1 in "37. Annex to chapter 7 – Simple forward curves"). The erratic forward rate movement is deemed an undesirable feature, which in particular makes the economic scenario generator ("ESG") calibration more difficult.

685. The vast majority of stakeholders disagrees with EIOPA's conclusion that the shifted approach is not suitable candidate to model interest rates adequately in a low yield environment. Many comments highlighted the advantages of the shifted approach, which is in particular deemed a simple, data-driven, economically sound and risk-sensitive approach capable of adequately modelling interest rates in different yield environments. The slight majority of stakeholders seemed to prefer the simple relative shifted approach, while some stakeholders proposed to use a lognormal shifted approach.

686. Some stakeholders were able to calibrate the relative shifted approach such that it shows a sufficiently better performance in the test against historic data where daily breaches are counted. They proposed either to calibrate the relative shifted approach without applying principal component analysis or to apply the principal component regression on the original non-standardized data. This calibration procedure would ensure that no shortcomings in the test against historic data arise.

687. Some stakeholders analysed simultaneous breaches of different tenor points in the test against historic data for the shifted approach. They figured out that the empirical probability of 20 breaches on a specific day was zero, while the empirical probability of 9 or more breaches was 0.3 %. The stakeholders conclude from this finding that the marginal risk factors (stressed risk-free rates for a specific tenor) are calibrated in a prudent manner and particularly do not underestimate the 99.5% (0.5%) VaR.

688. Some stakeholders analysed the risk-sensitivity of the two proposals in the consultation paper and the shifted approach by comparing the interest rate level before the shock to the absolute annual interest rate change. They found that the shifted approach contains 21 breaches corresponding to an exact 99.5% (0.5%) quantile, while the two proposal in the consultation paper do not contain any breach. Moreover, they found that the realized annual absolute changes are closer to the stressed curve from the previous

year under the shifted approach, then under the two proposals in the consultation paper. The stakeholders' conclusion from this analysis was that the two approaches in the consultation paper are too conservative and overestimate the interest rate risk while only the shifted approach is a sufficiently risk-sensitive approach.

b. Assessment

689. EIOPA is aware of some of the mentioned drawbacks about proposal A and B, in particular, that proposal A might be overly simplistic in the low yield environment or that proposal B requires some additional expert judgement to set the parameters. These shortcomings have already been addressed in the draft consultation paper.

690. EIOPA has thoroughly analysed the stakeholders' proposals to improve the calibration of the shifted approach. EIOPA considers the second proposal where the principal component regression is retained, but this is performed on non-standardized data, as more appropriate. With this proposal, the main advantage of the principal component analysis of capturing the dependence of the entire term structure can be retained and at the same time, the risk-sensitivity of the shifted approach significantly improves, particularly in the interest rate down scenario.

691. Given the several advantages of the shifted approach already addressed in the draft consultation paper and the considerable improvement of the calibration, EIOPA proposes to model interest risk in the standard formula according to the shifted approach.

7.4. Feedback statement on the main comments received to the discussion paper

692. a. Summary of the comments received

693. Some stakeholders pointed out the review of the interest rate risk module is interconnected with the RFR/UFR and LTG projects. They suggest doing a comprehensive review of all elements of the long-term guarantee package in 2021.

694. Some stakeholders argued the interest rate risk module should not be reviewed in isolation without looking into the entire market risk module including the correlations.

695. Some stakeholders argued the Solvency II principle of avoiding procyclicality should be considered when interest rate risk is assessed.

b. Assessment

696. In the "*Discussion Paper on the review of specific items in the Solvency II Delegated Regulation*" EIOPA identified several shortcomings with the current approach. An improvement of the interest rate risk submodule is deemed necessary and in the scope of the SCR review. EIOPA recognizes that there is a connection of the interest rate risk with other market risk modules, particularly through the inherent correlations. However, in this review

process the focus is to properly resolve the main issues identified in the discussion paper.

Issues identified with the current relative approach

a. Summary of the comments received

697. The majority of the stakeholder's agrees with the main issues identified in "*Discussion Paper on the review of specific items in the Solvency II Delegated Regulation*". They also argue that the current relative approach is inappropriate in a low yield environment with negative interest rates in terms of underestimating the interest rate risk. Some of the stakeholders provided even further evidence of the inappropriateness of the current approach by including further results on the comparisons to historic data or results from internal models.

698. However, some other stakeholders tend to disagree with the main issues identified. Some of them argue from a macroeconomic perspective. A relative approach implies a lower capital requirement in a low yield environment and a higher capital requirement in a higher interest rate environment, which would lead to a reduction of procyclicality. Other stakeholders argue that the data period considered in the backtesting exercise indicating the problems of the current approach is too short and ask for further evidence.

699. Several stakeholders argue that the introduction of a minimum downward shock would not sufficiently resolve the issues identified. Some of them claim the 1% minimum shock would not be sufficient. Other stakeholders see more general issues with the introduction of a minimum downward shock. The calibration of a static minimum downward shock would to some extent be artificial and would require a more frequent recalibration. Some stakeholders argue that the minimum downward shock should not be static, but rather depend on the interest rate level.

700. Several stakeholders argue that the existence of a lower bound on interest rates should to be taken into account in the review of the interest rate risk module.

701. Some stakeholders point out that in a potential recalibration the performance of a new approach in a higher interest rate scenario should be taken into consideration as well.

702. Some stakeholders suggested to additionally review the correlations with other market risk modules arguing that correlations can flip in a low yield environment.

b. Assessment

703. EIOPA considers that comparisons to historic data provide sufficiently clear evidence that the current relative approach underestimates the real interest rate risk in a low yield environment. As already stated above, some stakeholders in addition provided further evidence about the inappropriateness of the relative approach in the current interest rate environment.

704. EIOPA considers a minimum downward shock as a simple solution that could at least partly resolve the main issues identified. It is noted that a proper calibration of a minimum downward shock might face a challenge, but with the available historical data, a sufficiently prudent minimum shock can be determined. EIOPA has considered both a static minimum downward shock and a more implicit dynamic type of a minimum shock, which depends on the interest rate level. Moreover, EIOPA has also determined a static lower bound on interest rates in one methodology. For further details on the minimum shock, please refer to the analysis section.
705. EIOPA recognizes the importance that a new methodology also provides adequate shocks in a higher interest rate environment. In all analysed methodologies, (see the analysis section for further details) a relative stress prevails in a higher yield environment. This is considered as an appropriate feature of the methodologies proposed.
706. EIOPA notes that the yield environment can also affect market risk correlations. However, an assessment of these correlations is not in the current scope of the review and will rather be part of future reviews.

Data issues

a. Summary of the comments received

707. Many stakeholders consider the EIOPA data set as one reasonable data set for the calibration, particularly because of the consistency to the valuation of liabilities. Those arguing against mainly consider the too short data history as a main drawback and suggest using data sets with a longer period.
708. Several stakeholders suggested to shock input data used to derive the smooth risk-free curve (e.g. swap data or zero coupon government bond data), particularly because this approach would ensure market consistency. Some stakeholders suggested to take the compounding convention for par swap yield fixed legs into consideration when converting to spots. It is further proposed to avoid spurious/illiquid points (11, 13, 14, 16 – 19 years) when calibrating spot curves.
709. Several stakeholders emphasized that for the interest rate SCR calculation the stress factors should only be applied until the last liquid point (LLP) and afterwards the extrapolation should be applied. The main argument is that only such an approach would ensure consistency with the valuation of own funds.

b. Assessment

710. The EIOPA data set contains historical risk-free curves for a variety of currencies. The entire data history goes up to 17 years of daily observations depending on the currency. Moreover, the data history captures different interest-rate environments. Accordingly, the data set can be considered as an appropriate data set to perform the calibrations.
711. EIOPA notes that the direct calibration on input data would be more market consistent. However as some stakeholders pointed out, such an approach has the drawback that a stress could not directly be performed on the illiquid

points. The smooth EIOPA risk-free curves do not have that disadvantage. Moreover, the difference between stressing liquid points on input data or on the smooth risk-free curve should not be considerable. Accordingly, a stress on the smooth risk-free curves deems appropriate.

712. EIOPA notes the point that an extrapolation with the Smith-Wilson methodology after the LLP would better ensure consistency with the valuation of the basic own funds. However, several counterarguments against an extrapolation can be provided. First, EIOPA has performed simulations with different UFR values indicating that the maximum annual change at the 90Y tenor point is at most 19 %. Accordingly, EIOPA considers that the 20% relative shock at the 90y maturity is appropriate. Second, an extrapolation would introduce additional complexity: from a practical point of view each undertaking would need to implement the Smith-Wilson methodology, unless EIOPA would do it which is not possible from a legal point of view because of the absence of empowerment in the Solvency II Directive. Third, there would also be a risk of not taking into account the changes in forward rates observed before the extrapolation that have a significant impact on the risk-free rates and hence underestimating the changes.

Mathematical approaches to derive the stressed risk-free curves

a. Summary of the comments received

713. The majority of stakeholders prefer keeping the principal component analysis in the methodology arguing it is a well-suited statistical tool to deal with highly dimensional and particularly highly correlated data.

714. Some stakeholders consider the affine approach as a suitable candidate to overcome the problems with the current relative approach, while others are rather reluctant to include such an approach. Some stakeholders provide the actuarial argument in favour of the affine approach that an affine form seems to fit in well with a 'normal distribution' of interest rates at low interest levels, and a 'lognormal distribution' at higher interest rates. Some stakeholders suggested to estimate the parameters of an affine model a and b with a quantile regression.

715. Several stakeholders are reluctant to introduce the intensity-based approach. They mainly argue that the approach overestimates interest rate risk.

716. Several stakeholders suggested using a relative shifted-approach to measure interest rate risk in the standard formula. Some stakeholders suggested applying a lognormal-shifted approach.

b. Assessment

717. EIOPA considers principal component analysis as an appropriate statistical tool to capture the high correlation in the data. The principal component analysis has been applied in the initial calibration of the relative stress factors. The same relative stress factors are used as input data in two methodologies at hand, see the analysis section. In the calibration of the shifted type approaches, principal component techniques were applied as well.

718. EIOPA does not consider the affine approach to be fully appropriate as a stand-alone approach. The affine approach in particular tends to overestimate interest rate risk in a higher yield environment. However, EIOPA considers that a properly calibrated simple affine approach is one appropriate model for a low yield environment. Accordingly, one methodology analysed builds upon the affine approach in the low yield environment.

719. EIOPA considers that the intensity-based approach is not an appropriate approach to model interest rate risk in the standard formula. This approach tends to significantly overestimate the interest risk.

720. EIOPA has taken the suggestions about the shifted approach into consideration and has provided a detailed analysis about this approach, for details see the analysis section.

7.5. Advice

7.5.1. Previous advice

721. In the initial CEIOPS' Advice for Answers to the European Commission on the second wave of Calls for Advice in the framework of the Solvency II project the following was included:

3.22 The multiplicative stress approach where the current interest rate is multiplied with a fixed stress factor to determine the stressed rates leads to lower absolute stresses in times of lower interest rates. This may underestimate in particular the deflation risk. In order to capture deflation risk in a better way, the floor to the absolute decrease of interest rates in the downward scenario could be introduced. As a pragmatic proposal, the absolute decrease could have a lower bound of one percentage point. If the interest rate for maturity 10 years is 2, the shocked rate would not be $(1-34\%)*2\%=1.32\%$, which is likely to underestimate the 1-in-200 years event, but $2\%-1\%=1\%$, which can be considered to be a more reasonable change. This minimum downward shock is not included in the current Delegated Regulation.

7.5.2. Analysis

722. The starting point of EIOPA's analysis is the important observation that the current relative approach significantly underestimates interest rate risk in a low yield environment with negative interest rates. The implementation of the former advice by CEIOPS does not sufficiently resolve the shortcomings of the current relative approach. This has extensively been illustrated in the *"Discussion Paper on the review of specific items in the Solvency II Delegated Regulation"*⁴⁶. The findings in the discussion paper have been confirmed by the majority of stakeholders as well. Even introducing a minimum downward shock of 1% as initially proposed by CEIOPS would not suffice. Such minimum downward shock would address the concerns of the currently very

⁴⁶ https://eiopa.europa.eu/Publications/Consultations/EIOPA-CP-16-008_Discussion_Paper_on_SII_DR_SCR_Review.pdf

low capital requirements for one of life undertaking's main risks: interest rate decreases, but the analysis in the Discussion Paper clearly indicates that interest rate decreases of more than 1% have occurred in the past.

723. EIOPA has analysed three potential approaches, which intend to mitigate the identified drawbacks of the current relative approach raised in the *"Discussion Paper on the review of specific items in the Solvency II Delegated Regulation"*:

1. A symmetric 200 basis point(bp) minimum shock with a static interest rate floor (Proposal A)
2. A combined approach (Proposal B)
3. Shifted approach

724. In the following, the analysis of each of the mentioned approaches is presented below.

A symmetric 200 basis point (bp) minimum shock with a static interest rate floor (Proposal A)

725. In a high-yield environment, the current relative approach of the Delegated Regulation is convincing enough. Stakeholders are also mostly of the same opinion. Therefore, it was concluded to build on the existing model and adjust it for different yield-environments in a simple and prudent way.

726. In a moderate-yield environment, one has observed substantial decreases in annual interest rates that are underestimated by the current relative approach. In the figure 7.1 below, the annual movements of daily observed RFR for different maturities are illustrated in dependence of the interest rate level. Each colour indicates a different calendar year. For instance, in turquoise, we observe the annual movements that occurred during 2008; in pink, the annual movements that occurred during 2015. One can observe that spot rates in 2011 (blue colour) have decreased significantly of around -2% (sometimes more). One can also observe that this decrease happened to several maturities, but not necessarily to all at the same time.

727. Given the evidence of these significant decreases a minimum decrease of -2% was introduced as a simple way to ensure that the SCR is not underestimated. The same is applied to an increase of rates:

$$r_t^{down}(m) = \min \left[r_t(m) - 2\% ; r_t(m) \cdot \left(1 - s^{down}(m) \right) \right] \quad (1)$$

$$r_t^{up}(m) = \max \left[r_t(m) + 2\% ; r_t(m) \cdot \left(1 + s^{up}(m) \right) \right] \quad (2)$$

728. The minimum absolute shocks of -2% is then phased-out to reach 0% at maturity 90 years, where rates are positive given the extrapolation towards the ultimate forward rate.

729. In order to mitigate the effect of the model on negative interest rates and to particularly take account of the fact that negative interest rates around -

2% have not been observed, a static floor to interest rates is introduced in the downward scenario.

730. That means that rates cannot decrease below this floor. The upward shock is kept at +2%. Using equations (3) and (4), we get:

$$r_t^{down,minshock} = \max\left(\text{floor}(m), \min\left[r_t(m) - 2\%; r_t(m) \cdot (1 - s^{down}(m))\right]\right) \quad (3)$$

$$r_t^{up,minshock} = \max[r_t(m) + 2\%; r_t(m) \cdot (1 + s^{up}(m))] \quad (4)$$

731. Some stakeholders have argued that the floor should be determined as the interest rate level under which (re)insurance undertakings would start shifting their investments to cash. They believe that the cost of holding cash would be preferable in such situation. If some undertakings have recently increased the relative weight of cash in their investment, this does not prove that most of the insurance market participants would and could do the same at the same time. This argument does not rely on empirical findings but on purely theoretical considerations. It relies on a strong assumption that has not been confirmed by facts and its practicality is highly questionable given the billions of investments. Therefore it was decided to calibrate the floor by using empirical evidence.

732. The calibration of the floor was based on the lowest rates observed across maturities: the lowest rates were reached for CHF and maturity 2 years at -1.22%. By adding a prudence factor, the floor is set up at -2%. This allows having a downward shock even if rates reach again their lowest value.

733. One can however observe that the minima reached for CHF and maturities 10, 15 and 20 years are not as low as -1.22%. By drawing the minima, one can observe a curve that looks like a linear function. For simplicity reason, the floor proposed is the following:

- A minimum rate of -2 % for maturity 1 year
- Minimum rates of -1 % for maturities 20 years and onwards
- Between maturities 1 and 20 years, a minimum floor based on a linear interpolation

Figure 7.1: Absolute annual changes of the EUR interest rates for selected tenor points in dependence of the corresponding interest rate level.

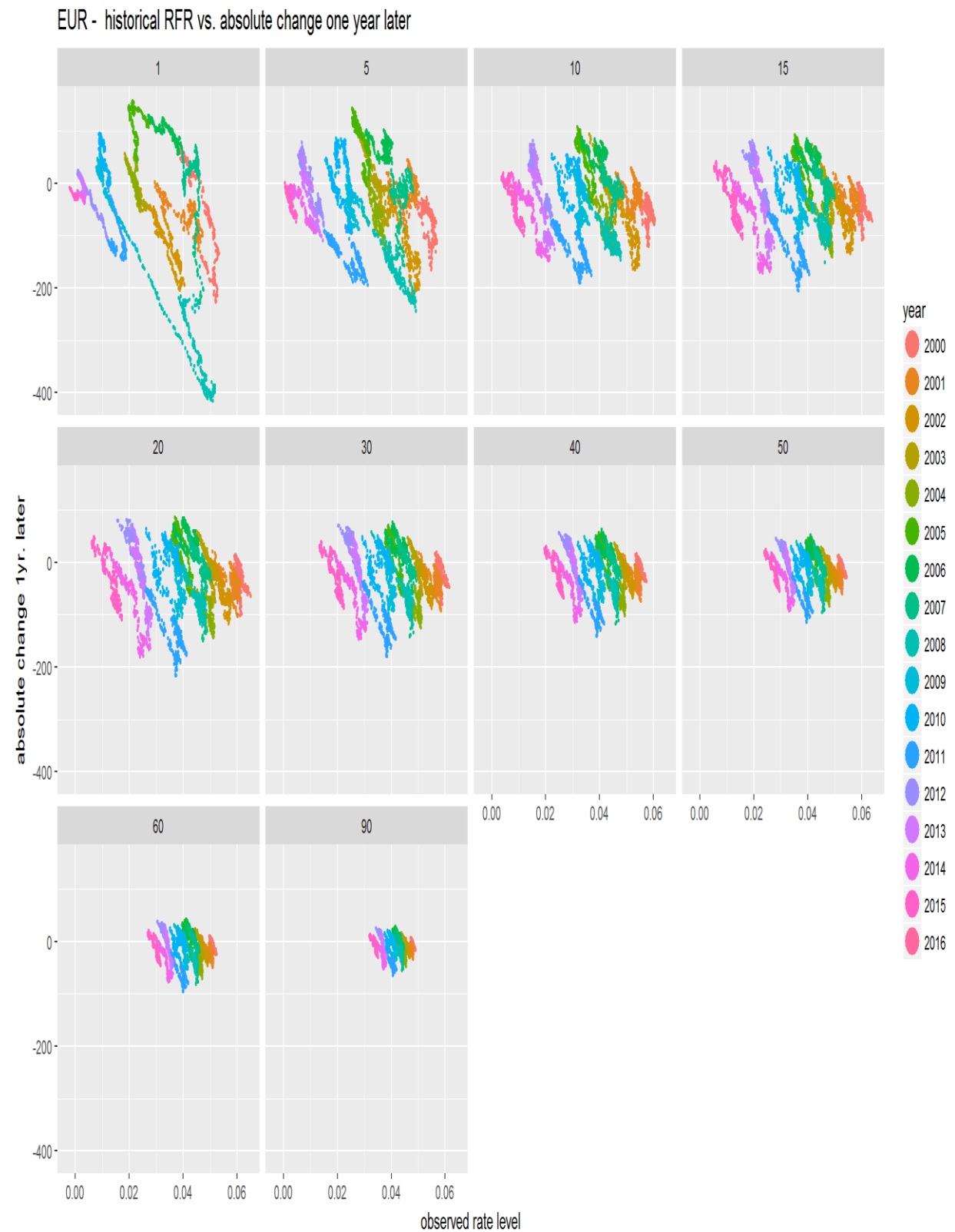
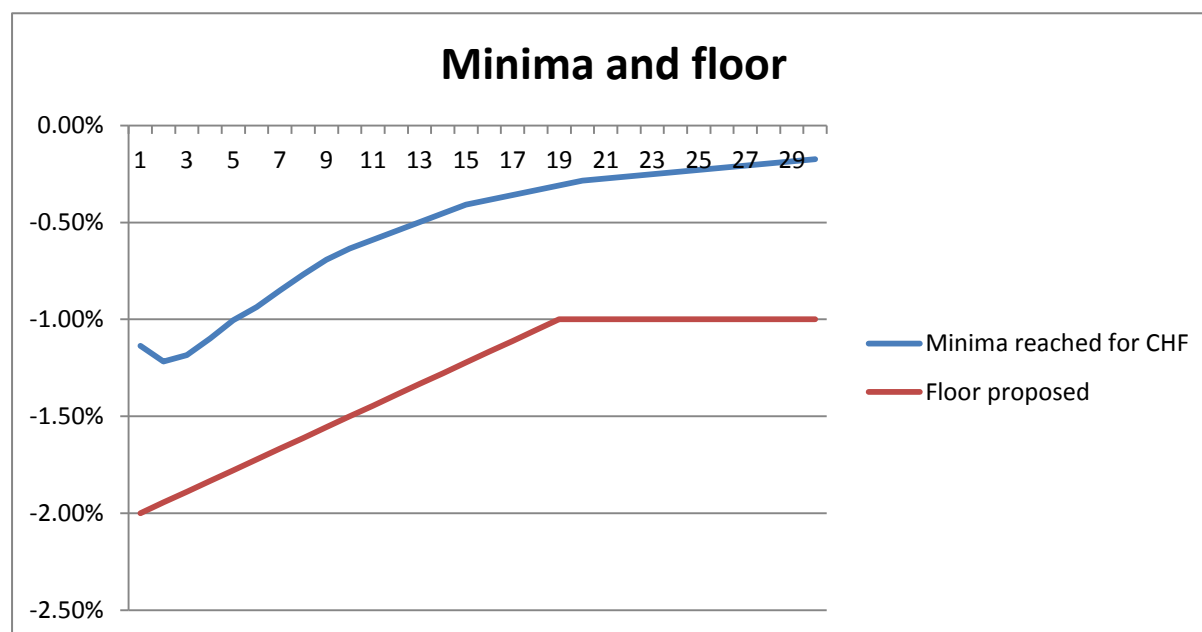


Figure 7.2: minima reached for CHF and floor proposed



A combined approach (Proposal B)

734. The starting point of the combined approach is the observation that the model under Proposal A captures interest rate risk appropriately in a high yield and to some extent in a moderate yield environment. As already stated above, in a high yield environment the relative approach is a sensible approach to model interest rate risk. In a moderate yield environment, where interest rates lie somewhere between 3 and 4 %, the largest annual movements in interest rates have been observed. This can further be seen in the second column in table 7.1, which displays the interest rate level before the maximum annual change. A 200 bps minimum shock is therefore a simple and prudent approach to capture interest rate risk in the moderate yield environment.

Table 7.1: Maximum 1 year changes observed for the euro RFR.

Maximum observed annual changes for the euro				
Maturity (A)	Rate one year before the shock (B)	Rate after shock (C)	Absolute annual change (D=B-C)	Date w.r.t. rate after shock (E)
1	5,1%	1,0%	4,1%	02.07.2009
5	4,9%	2,5%	2,4%	02.07.2009
10	3,3%	1,4%	1,9%	04.06.2012
15	3,6%	1,6%	2,1%	04.06.2012
20	3,7%	1,6%	2,2%	04.06.2012
30	3,8%	2,0%	1,8%	05.06.2012
40	3,9%	2,5%	1,4%	05.06.2012
50	3,9%	2,8%	1,1%	05.06.2012
60	4,0%	3,0%	0,9%	05.06.2012
90	4,1%	3,4%	0,6%	05.06.2012

735. However, in a low yield environment the introduction of a considerable minimum shock can be challenged to be an overly prudent approach. As the scatterplots in figure 7.1 above already indicate, for very low and negative interest rates no extreme annual movements above 100 bps have been observed. Moreover, one has not observed any negative interest rates significantly below -1 %.

736. The idea of the combined approach is henceforth to keep the notion of Proposal A in the moderate and high interest rate environment, but to add an affine model in a low yield environment.

737. More specifically, the affine stress is defined as⁴⁷:

$$r_t^{down,affine}(m) = \min(r_t(m), r_t(m) (1 - s^{down}(m))) - 1\% \quad (5)$$

$$r_t^{up,affine}(m) = \max(r_t(m), r_t(m)(1 + s^{up}(m))) + 1.4\%, \quad (6)$$

where the relative maturity-dependent shock factors $s^{down}(m)$ and $s^{up}(m)$ are taken from Articles 166 and 167 of the Delegated Regulation. The maturity and currency-independent additive stress components of -1 % and +1.4 % in the affine model were statistically estimated with the EIOPA RFR data set for different EEA currencies. A thorough statistical derivation is presented in "35. Annex to chapter 7 – Statistical estimation of the affine model". The affine stress contains an asymmetric additive stress component. The additive stress component is higher in the upward scenario than in the downward scenario. Economically, the higher additive component in the interest rate up scenario

⁴⁷ The Min and Max operators would just apply for negative interest rates.

implies that in the low yield environment where the affine shock prevails, a large increase in interest rates is more likely than a large decrease. As under Proposal A, either additive component is phased out from the 20y until the 90y maturity.

738. This affine stress is combined with Proposal A in such a way that

- a pure relative stress applies in a high yield environment,
- the high absolute changes (particularly downward changes) of about 200 bp are captured in a moderate yield environment,
- the affine model applies in a low yield environment.

739. More formally, we denote the combined shock as $r_t^{up,down,minshock}$. The combined stresses are defined as the following, using equations (5), (6), (7) and (8):

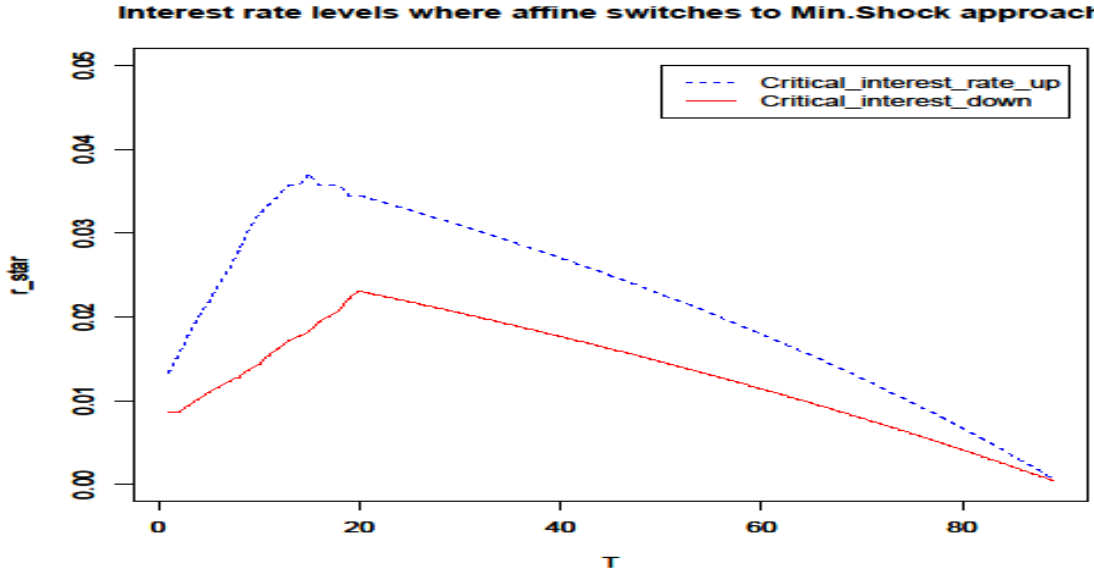
$$r_t^{down,combined}(m) = \max(r_t^{down,affine}(m); r_t^{down,minshock}(m)) \quad (7)$$

$$r_t^{up,combined}(m) = \min(r_t^{up,affine}(m); r_t^{up,minshock}(m)). \quad (8)$$

740. Accordingly, the combined stress is the larger (the lower) of the affine stress and the stress under Proposal A in the interest rate down (up) scenario. The formula-based specification of the combined stress has the advantage that an interest-rate environment (low yield or medium yield) need not to be defined a priori. Moreover, with the combined approach there is no need to define a static lower bound. The affine model determines an implicit dynamic lower bound that adjusts with the interest rate evolution.

741. Figure 7.3 shows the specific interest rate levels for each tenor point from 1 y to 90 y where the affine model switches into the model under Proposal A. The figure should be interpreted as such that for all interest rate levels below the blue (red) line the affine shock would prevail in the down (up) scenario. The figure confirms that the switching from the affine into the minimum shock occurs in a moderate yield environment. More specifically, one can observe that for most tenor points the affine shock turns into the minimum shock at the latest at an interest level of about 3.5 % in the interest down scenario. Due to the larger additive component in the interest rate up scenario, the switching occurs earlier than in the interest rate down scenario.

Figure 7.3: Interest rate levels where the affine shock turns into the 200 bp minimum shock approach for the interest rate down scenario (dotted blue line) and interest rate up scenario (red line). On the x-axis the tenor point is depicted, while the y-axis shows the critical interest rate level where the switching occurs.



Shifted approach

742. The shifted approach is an approach that is particularly widely used by Internal Model users to model interest rate risk adequately in a low yield environment with negative interest rates.

743. Intuitively, the shifted approach works as such that the current interest rate is shifted upwards in a first step. In a second step, based on this shifted spot rate, a relative stress is performed. In the last step, the relatively stressed shifted spot rate is shifted downwards by the same shift amount. It is important to emphasize that the methodology to derive the stressed curves under the shifted approach is almost the same as under the current standard formula approach, since a relative stress is still performed. Accordingly, the introduction of a shift approach would formally introduce a minor adjustment to the current methodology.

744. Formally, the stressed spot rates under the shifted approach are given by

$$r_t^{up}(m) = (r_t(m) - \theta_m) * (1 + s_m^{shift,up}(\theta_m)) + \theta_m \quad (9)$$

$$r_t^{down}(m) = (r_t(m) - \theta_m) * (1 + s_m^{shift,down}(\theta_m)) + \theta_m \quad (10)$$

where θ_m is a potentially maturity-dependent shift vector and $s_m^{shift,up}(\theta_m)$, $s_m^{shift,down}(\theta_m)$ are the maturity-dependent relative stress-factors, which itself depend on the shift-vector θ .

745. Equations (9) and (10) can be rewritten to obtain:

$$r_t^{up,down}(m) = r_t(m) * (1 + s_m^{up,down}(\theta_m)) - \theta_m s_m^{up,down}(\theta_m) \quad (11)$$

Accordingly, the shocked curves under the shifted approach are of the form

$$r_t^{up,down}(m) = r_t(m) * a_m + b_m, \quad (12)$$

$$\text{where } a_m = (1 + s_m^{up,down}(\theta_m)) \quad \text{and} \quad b_m = -\theta_m s_m^{up,down}(\theta_m).$$

746. The last representation shows that the shifted approach is a special affine model where the relative shock component $s_m^{up,down}(\theta_m)$ and the additive shock component b_m are linked through the shift vector θ . In general, it holds that the relative shock component $s_m^{up,down}(\theta_m)$ decreases with increasing absolute values of the shift, while the additive component b_m increases in absolute terms with an increasing absolute value of the shift parameter. The second effect of an increasing additive component slightly dominates the first effect. Consequently, it holds in general, that the stressed spot rates increase in absolute terms with an increasing shift parameter. This can be observed in the figures below.

747. In a first analysis, the shift approach is compared with the relative approach. Furthermore, the same analysis is used to investigate the sensitivity of the shift approach towards the shift parameter. In order to have a fair comparison between the shift approach and the relative approach, both approaches have been calibrated on the same valuation date. The calibration has been performed for the EUR with the EUR RFR historical data set from 4.01.1999 up to the considered valuation data. The different valuation dates reflect different interest environments.

748. This analysis in the figures 7.4 up to 7.7 provides the following main insights:

- In a moderate and higher interest rate environment (see figure 7.4 and 7.5), the shift approach is similar to the relative approach since in such an environment the relative component of the shift approach dominates. Accordingly, it is important to note that the shift approach provides reasonable shocks in such interest rate environments.
- In a low yield environment (see figure 7.6), the shifted approach significantly deviates from the relative approach. The implicit additive component prevails here and provides a sufficient correction to avoid an underestimation of interest rate risk.
- Accordingly, the shifted approach combines the advantages of a relative type approach in a higher interest rate environment and an affine model in a lower interest rate environment.
- These findings imply that a calibrated shift approach need not necessarily be recalibrated if the interest environment changes.

Figure 7.4: Comparison of the relative approach (solid red and blue line) with the shifted approach (dotted and dashed lines) for shift parameters $\theta = -3, -5$ and -10% based on a calibration on 30.12.2005 for the EUR. "Shift_rel_up, theta=-0.1" denotes the interest rate up curve calibrated by the shifted approach with $\theta = -10\%$, respectively. "Rel_up" denotes the interest rate up curve calibrated with the relative approach etc.

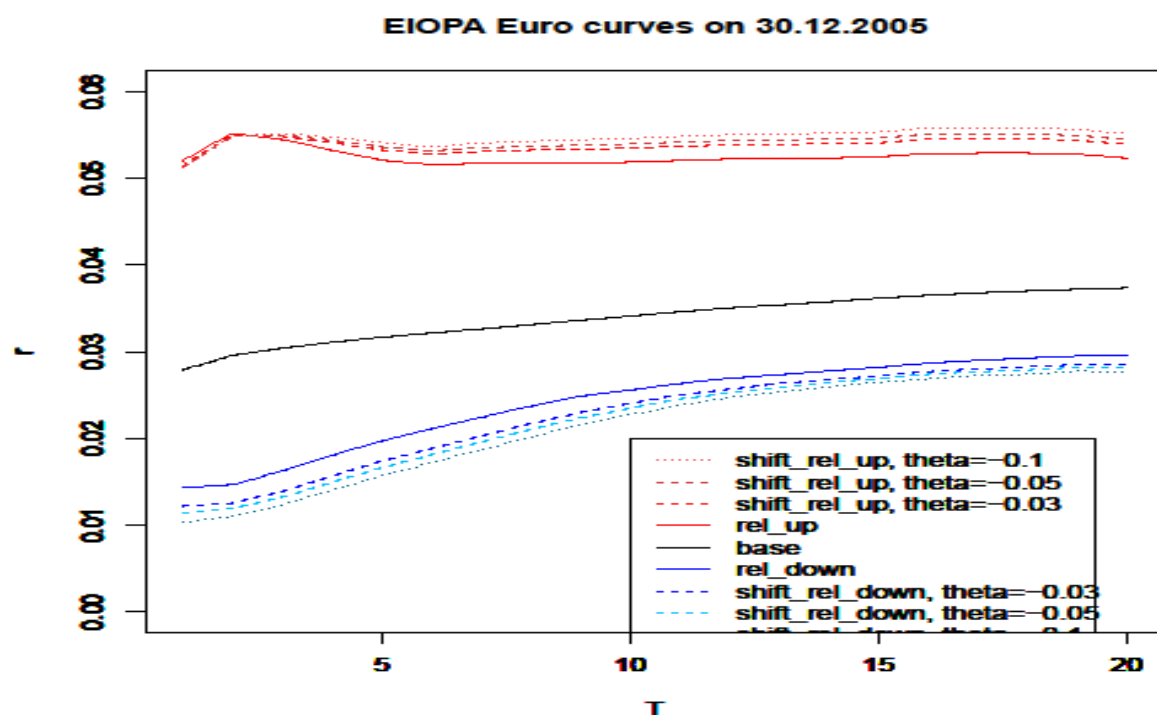


Figure 7.5: Comparison of the relative approach and the shifted relative approach for shift parameters $\theta = -3, -5$ and -10% based on a calibration on 31.12.2009 for the EUR. In this figure, the relative approach was mistakenly plotted with the dashed blue and red line (two curves next to the base curve).

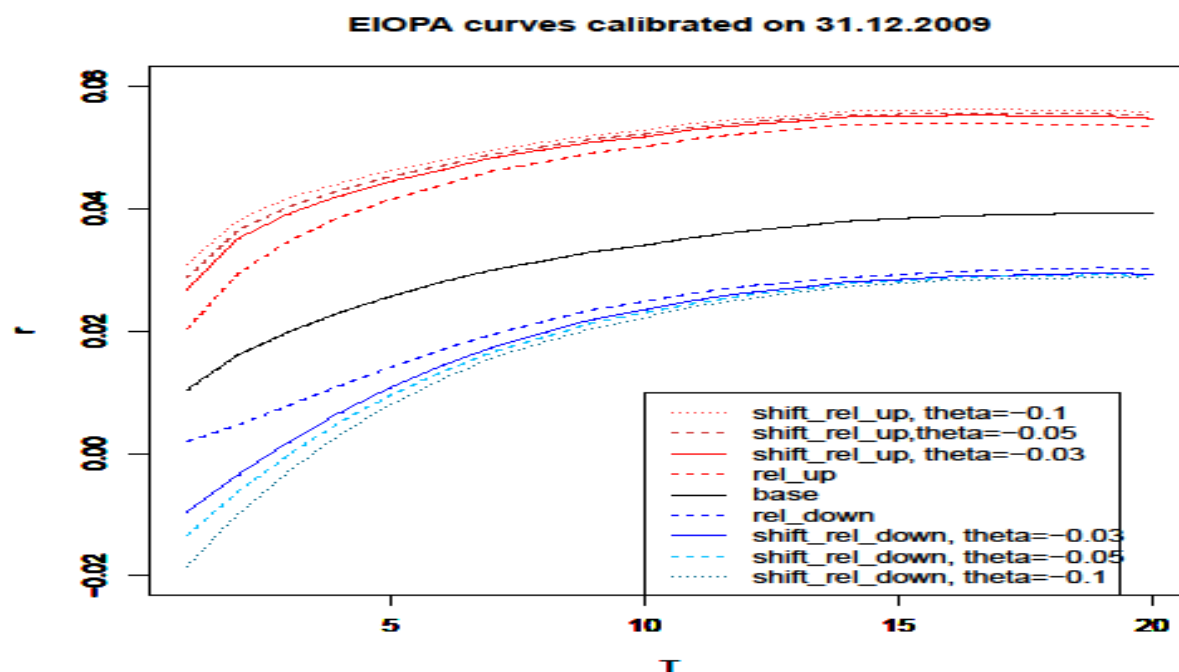


Figure 7.6: Comparison of the current relative and the shifted approach for shift parameters $\theta = -3, -5$ and -10% based on a calibration on 31.12.2012.

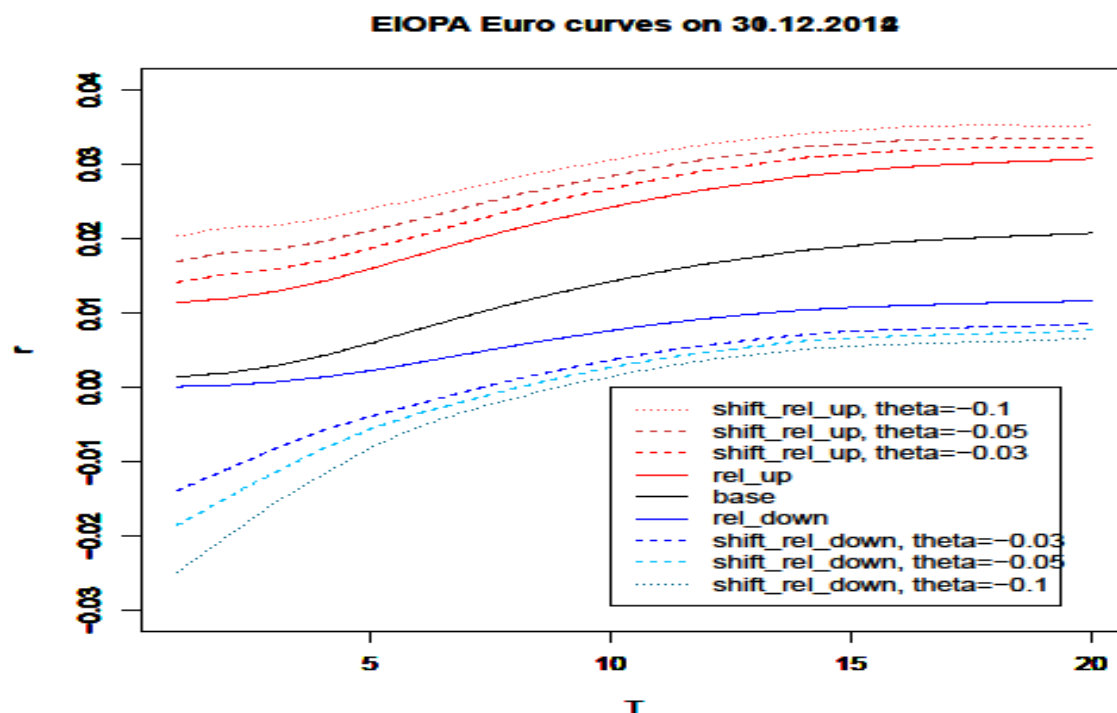
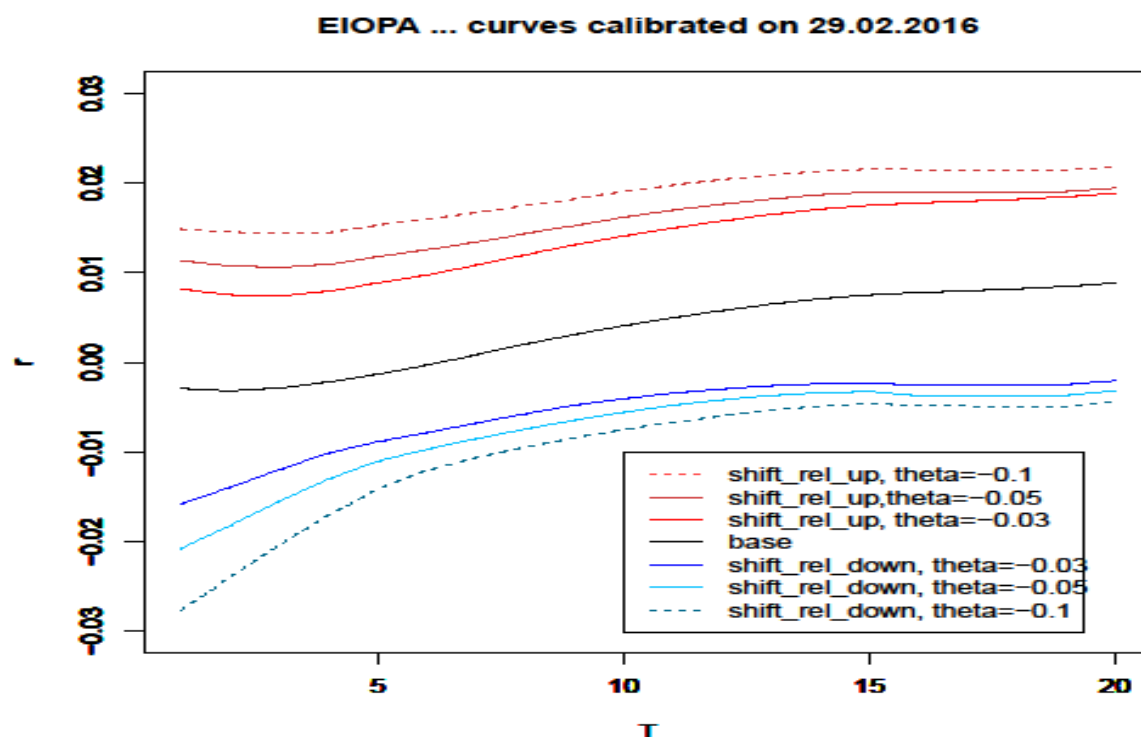


Figure 7.7: Comparison of the current relative and the shifted approach for shift parameters $\theta = -3, -5$ and -10% based on a calibration on 29.02.2016.



749. After this first analysis, several advantages of the shifted approach have been identified: it is a relatively simple and data-driven approach (all parameters can be estimated with the available EIOPA RFR data set). More

importantly, it is an approach that can be used to model interest risk in a variety of interest rate environments.

750. To calibrate the shift approach a reasonable shift parameter needs to be determined in the first step. It is important to note that there is not one correct value for the shift parameter, thus the determination of shift parameter will inevitably require some expert judgement. The shift parameter can be rather considered a meta parameter, which can be set by assessing different criteria. The sensitivity analysis above indicates that when a reasonable range of shift parameters is determined, the model risk is low.
751. EIOPA has distinguished the shift parameters for the upward and downward stresses.
752. For the upward shift parameter, it can be estimated non-parametrically by specifying a certain calibration condition. A non-parametric estimation has been performed by minimizing the absolute difference of the stressed curve in the interest rate up scenario under the shifted approach and the current standard formula interest rate up curve interest up curve under the constraint $-1 \leq \theta \leq m < 0$, where m is the smallest negative rate in the calibration data set of the corresponding currency. The estimation results performed for the valuation date 31.12.2016 indicate that for the low yield currencies as the EUR, CZK, BGN, DKK the estimated shift parameter is slightly above -3%, e.g. for the EUR the estimate was -3.1%.
753. It is also useful to compare the stresses obtained with different shift parameters with that of internal models. A study conducted on end 2015 data concluded that the median of the upward shocks of 14 different internal models was between 1.5% and 2% for maturities 5, 10, 15 and 20 years.
754. This is also in line with the estimate of the additive component in the combined approach which was +1.4%.
755. On this basis, it was decided to use a shift parameter of 3.5% for all maturities for the upward shock. This provides with upward shocks between 1.7% and 1.3% for maturities 5, 10, 15 and 20 years. It is also close to the shift parameter that minimizes the differences with the current standard formula upward shock.
756. For the downward shock, it is important to choose a value of the shift parameter that is high enough, such that reasonable relative stresses could be determined for negative interest rates and interest rates close to 0 (technical feasibility of the shift approach). For instance in the low yield environment with negative interest rates as shown in figure 7.7, reasonable relative stresses cannot be derived if the interest rate base curve is not shifted upwards by a certain shift amount.
757. If the value of the shift parameter is too great, then the additive component of the shifted approach is emphasized and has a bigger impact on the downward shock in the low-yield environment.
758. It was decided to introduce maturity-dependent shift parameters for the downward shock. This is justified economically speaking because the shorter

the maturity, the lower interest rates have been observed. Having a shift parameter for each maturity makes the approach more risk-sensitive: for very low rates, a higher shift parameter is needed. Maturity-dependent shift factors have also been considered by internal model users.

759. The shift parameters need to be sufficient to allow for stresses in case of negative rates. The lowest rates observed so far were reached for CHF (-1.22% at maturity 2 year and -0.28% at maturity 20 year, see proposal A). On the basis of this observation:

- The shift parameter for maturity 1 year is 2%;
- The shift parameter for maturity 20 years is 1%;
- The shift parameters for maturity 2 to 19 years are linearly interpolated.

760. It is important to note that introducing a maturity dependent shift parameter does not increase the complexity for insurance undertakings: there is one multiplicative and one additive component for each maturity, as for the upward shock.

761. Once the shift parameters are determined, a similar mathematical calibration procedure performed by CEIOPS in 2009 and described in the Discussion paper can be performed. One of the difference introduced is that instead of using a principal component regression on the 4 principal scores to determine the distribution with which the quantiles at 99.5% and 0.5% are determined, the quantiles were determined on the basis of the empirical distribution of the relative changes. This change has been introduced for the following reasons:

- First, this was one of the suggestions of stakeholders to ensure that the new calibration passes the back-testing.
- Second, the principal component regression requires that the quantiles are derived on the same distributions for all maturities. In other words, the different principal components are derived relatively to each other. Given that maturity dependent shift parameters have been derived, this now appears difficultly feasible.
- Third, the results of using the principal component regression or the empirical distribution of relative changes to derive the quantiles actually lead to almost identical results. This can be explained by the fact that the 4 principal components explain almost the entirety of the volatility.
- Fourth, this is even simpler.

762. The methodology is the following:

- a) In the first step, the time series of risk-free rates is shifted upwards for all tenor points up to the 20Y maturity. Let $(r_t(1), r_t(2), \dots, r_t(m))$ denote the historical time series of risk free rates for a specific currency and tenor points 1, 2, ..., m, ..., 20. Then the shifted historical time series is computed as $(r_t(1) + \theta, r_t(2) + \theta, \dots, r_t(m) + \theta)$.

- b) In the next step, annual percentage rate changes of the historical shifted time series are derived for each maturity m by applying the one year rolling window assumption, i.e.

$$\frac{\Delta(r_t(m)+\theta)}{r_{t-\omega}(m)+\theta} = \frac{r_t(m)+\theta}{r_{t-\omega}(m)+\theta} - 1 ,$$

(where $\omega=262$ due to the annual time window) for each maturity m .

- c) The empirical 99.5 % and 0.5 % quantiles from the empirical distribution of the shifted annual percentage rate changes yields the maturity-dependent relative stress factors $s_m^{shift,up}(\theta)$ $s_m^{shift,down}(\theta)$ for the interest rate up and down scenario respectively.
- d) For the determination of the upward shock, theta is set at $\theta_m = \theta = 3.5\%$. For the determination of the downward shock, θ_m is maturity dependent and steps a) to c) were performed on each maturity separately.

763. The last calibration step is to select a representative data set and to potentially aggregate the derived relative shocks for different currencies. The latter is important because the standard formula contains just one currency-independent calibration for the interest rate risk module.

764. EIOPA has decided to use the historical EIOPA risk-free rate data for the calibration of the shift approach. This data set contains daily historical risk-free curves for a variety of currencies. The data ranges from 4.1.1999 up to 2018 depending on the currency considered. The data set in particular contains interest rate data from different interest rate environments. Another main advantage of using the EIOPA historical data set is that the relative stress factors could be calibrated on the same data, which is used for the valuation of technical provisions and thus the consistency between the valuation and risk measurement is strengthened. In the response to the Discussion paper, the majority of stakeholders considered the EIOPA historical data set as a suitable data set to perform a recalibration of the interest rate risk module.

765. EIOPA has also tested increasing the length of the historical data, e.g. by using the government bonds of Germany, France and Italy before 1999. However, historical data were limited, in particular data for some maturities were missing, and it was only possible to gather data from 1995. Even if these data are not fully consistent with the EUR RFR historical data, tests were conducted on this extended dataset and results did not vary significantly from using the EUR RFR historical data only. Therefore the latter is the set of data EIOPA used in its analyses.

766. EIOPA has used the historical RFR data from the different EEA currencies in the calibration of the shifted approach.

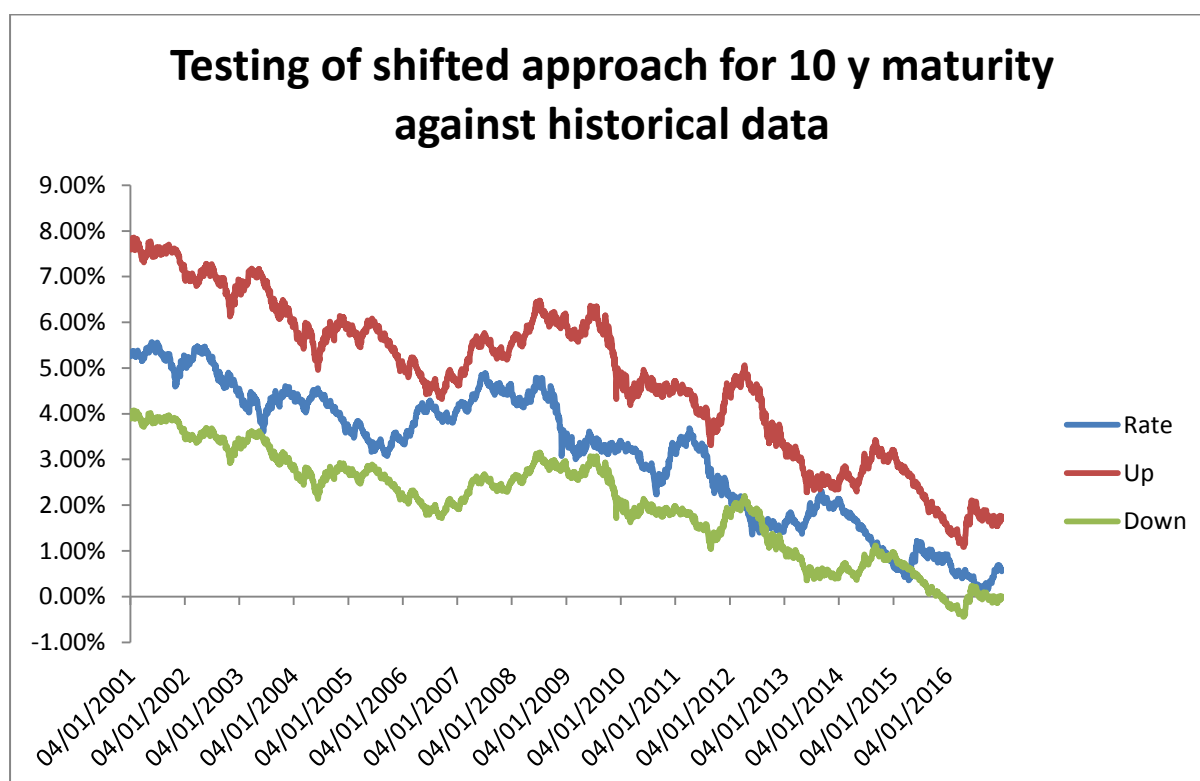
767. For the interest rate down calibration, the EUR RFR data set ranging from 4.1.1999 until 30.12.2016 has been used. The EUR RFR data set is considered as a representative data set to model interest rate down movements. The EUR has considerably been exposed to interest rate down movements in the recent years. Accordingly, these downward movements are

deemed suitable to capture a tail event as the 1-in-200 years event for the decrease of an interest rate term structure.

768. For the interest rate up calibration the relative shocks are derived from the 99.5 % quantile shocks of the different currency-specific shocks for each maturity. The result is that the interest rate up shocks mainly result from the two higher yield-currencies HUF and HRK, which historically have been most exposed to interest rate up movements. This ensures that the interest rate up shock under the shifted approach is not below the current standard formula up shock. Consequently, the risk of a large interest rate increase, which is considered one of the major risks by insurance undertakings, particularly in the low yield environment, is then sufficiently reflected in the calibration.

769. The initial calibration of the shift approach was performed as described above. However, a principal component regression was performed on a standardized (demeaned and unit variance) data set. This calibration had the serious shortcoming that the performance in the test against historic data was poor. In figure 7.8 below, the testing against historic interest rate movements derived from daily observations is shown for the 10 years maturity for the EURO. In blue, the observed rates are shown and in green and red the downward and upward stressed rates predicted one year before are displayed. In this test 210 daily breaches were counted in the interest rate down scenario, which clearly indicated a potential underestimation of interest rate risk by this calibration.

Figure 7.8: Comparison of the shifted approach for the 10 years maturity for the EURO to historic data. The shift is here of 3.5%.



770. EIOPA has analysed the stakeholder proposals to improve the mentioned shortcomings of the relative shifted approach. EIOPA has studied

- a) the proposal to neglect principal component analysis and to derive the relative shock factors directly from the empirical distribution of the shifted spot rate returns,
- b) to perform the principal component regression on a non-standardized data set.

771. As can be seen from figure 7.9 and 7.10, the performance in the test against historic data improves substantially with either proposal.

Figure 7.9: Testing against historic for the relative shifted approach and the 10 Y EUR under the new proposal to omit principal component analysis (PCA). In the interest rate down scenario 22 breaches are counted.

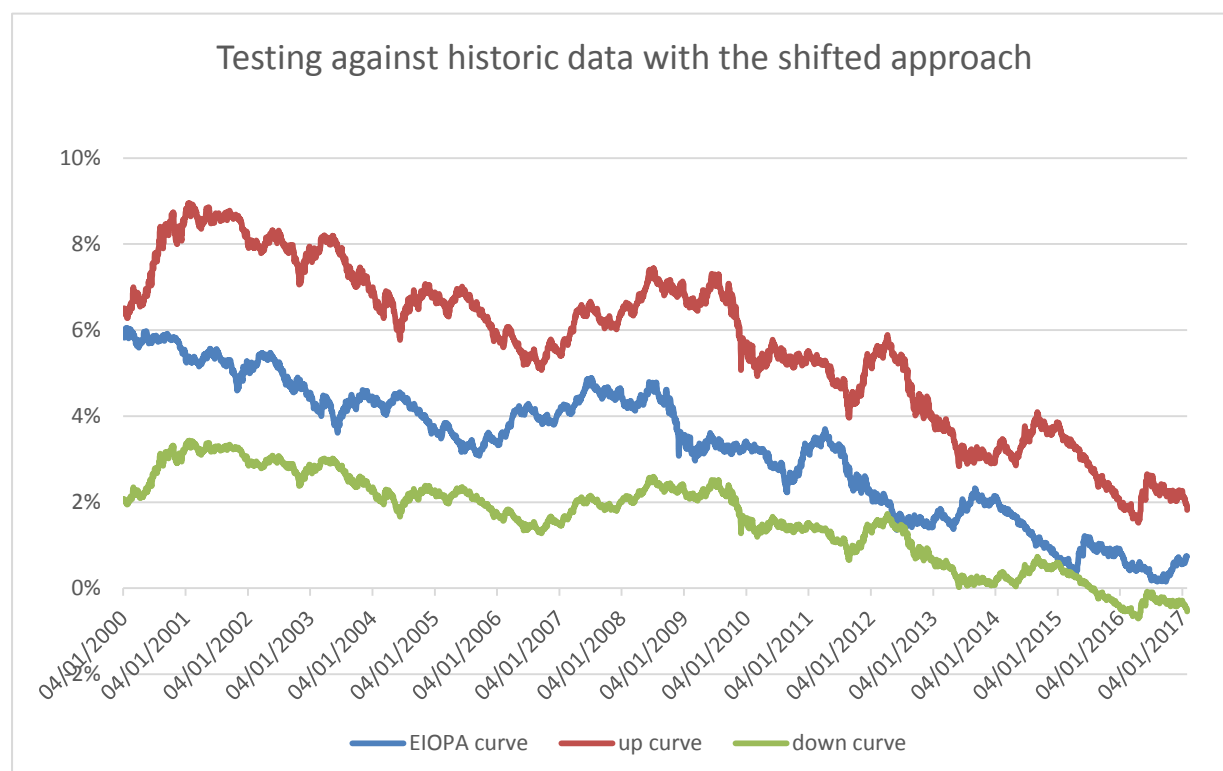
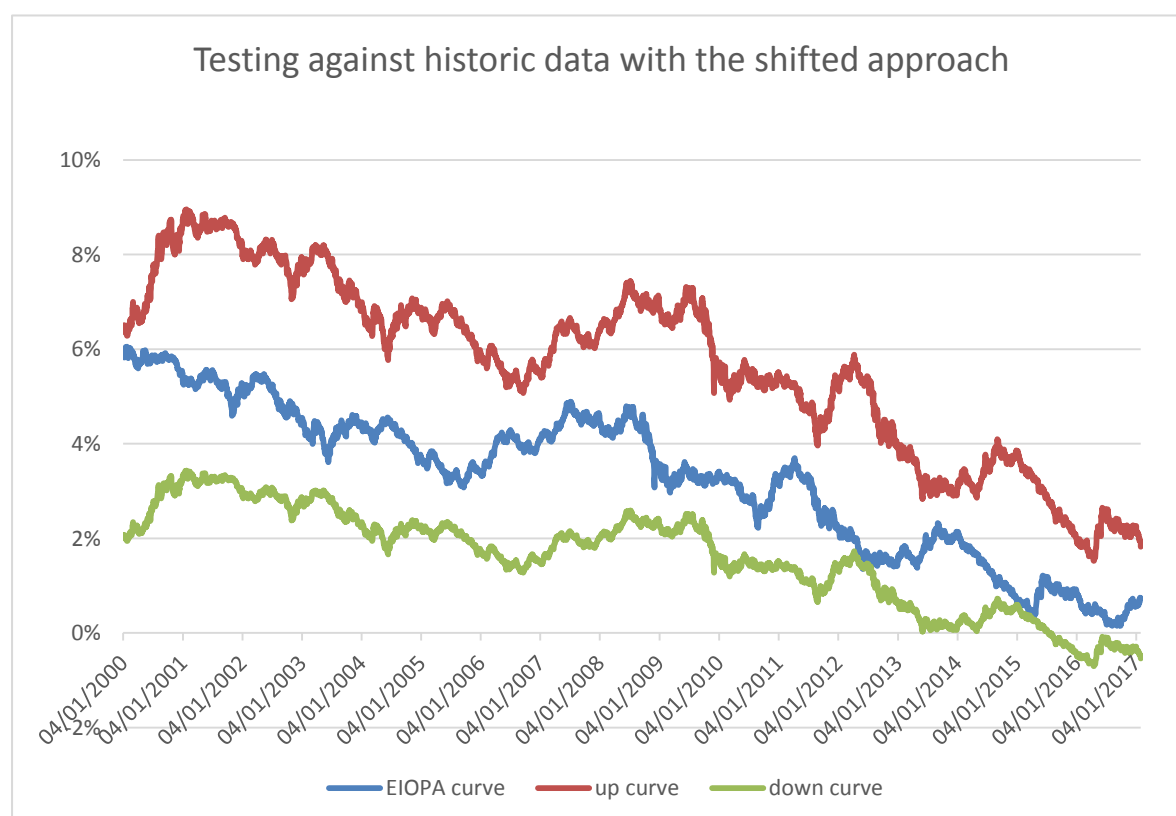


Figure 7.10: Backtesting for the relative shifted approach and the 10 Y EUR under the proposal to apply PCA regression on non-standardized data. In the interest rate down scenario 23 breaches are counted.



772. The following figures provide with the test against historical data with the shifted approach calibrated on the basis of maturity dependent shift parameters. They show that the new methodology is validated by this “back-testing”:

Figure 7.11: Backtesting for the relative shifted approach and the 1 Y EUR under the proposal to determine the quantile with the empirical distribution.

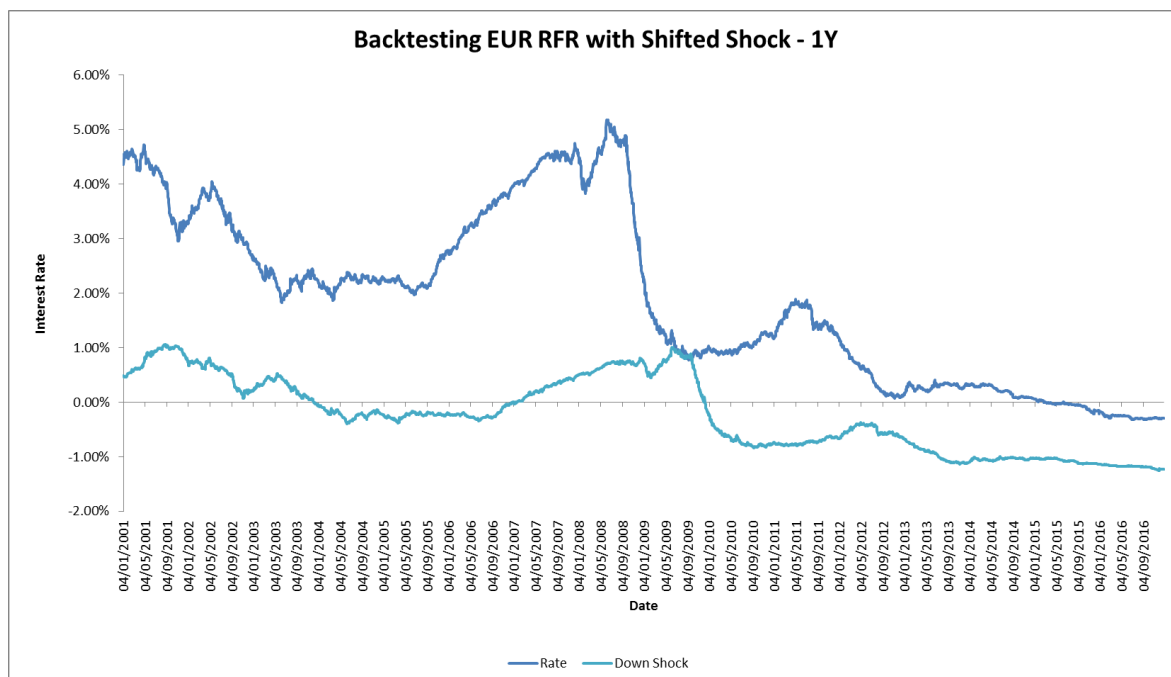


Figure 7.12: Backtesting for the relative shifted approach and the 10 Y EUR under the proposal to determine the quantile with the empirical distribution.

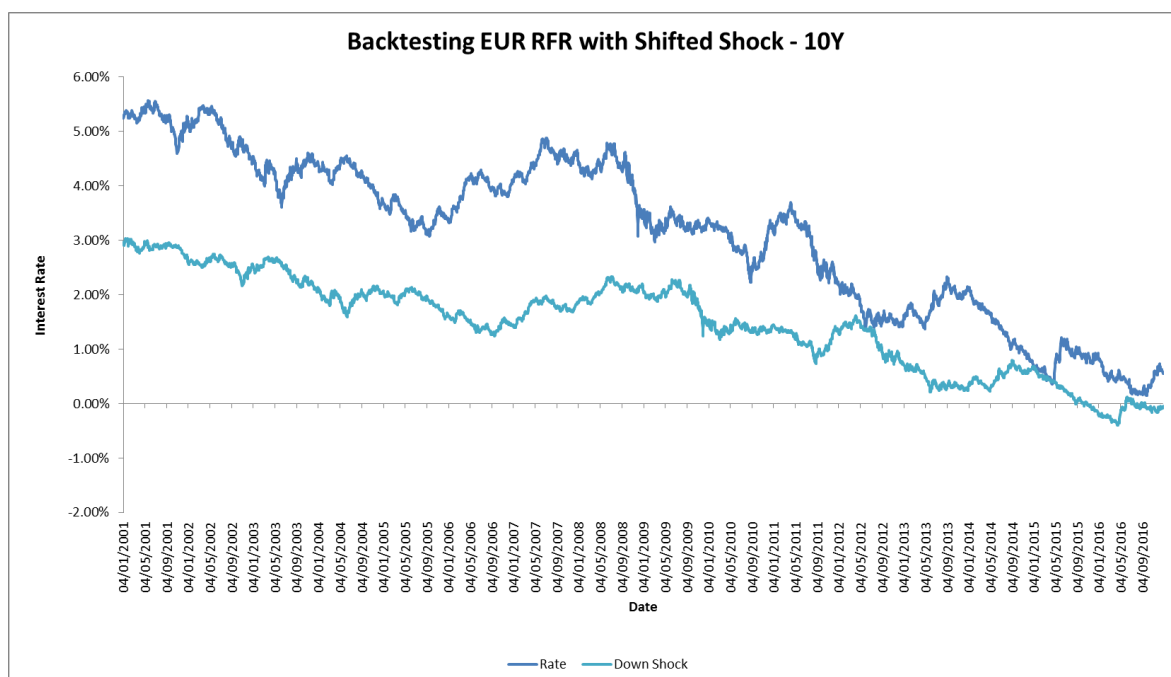
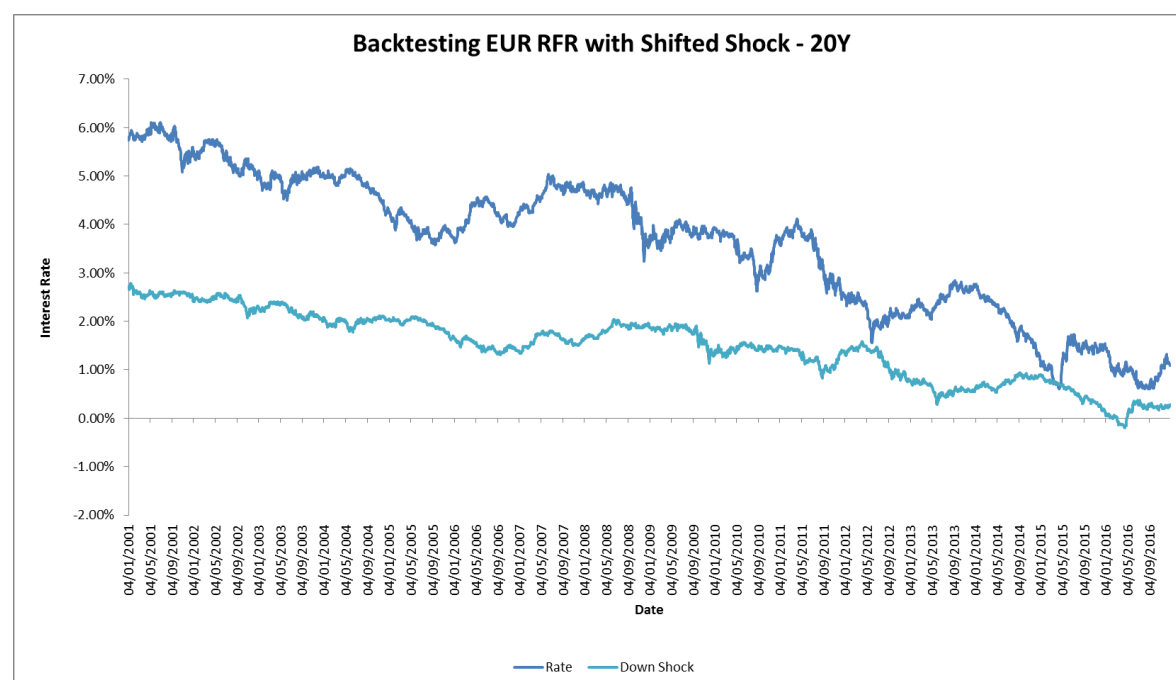


Figure 7.13: Backtesting for the relative shifted approach and the 20 Y EUR under the proposal to determine the quantile with the empirical distribution.



773. Moreover, EIOPA has extended the testing against historic data and performed a multivariate test.

774. In this test, the number of simultaneous daily breaches for different tenor points has been analysed. Detailed results are shown in table 1 in “36. Annex to chapter 7 – Multivariate testing against historic data”.

775. The multivariate test against historic data is more appropriate to assess the movements of the entire term structure of interest rates instead of solely considering movements of a single tenor point. Accordingly this form of test against historic data better assess the value at risk of the entire term structure.

776. For the calibrated shift approach with a principal component regression on non-standardized data, the number of 20 simultaneous breaches (breaches on the same date) is 0 for all EEA currencies. Moreover, the empirical probability of having more than 15 simultaneous breaches is considerably below 0.5 % for most currencies (it is important to note that the performance of the multivariate test against historic differs across currencies because the approach was calibrated on the EUR currency for the interest rate down scenario). Overall, one could conclude that the new calibration of the interest rate down scenario is sufficiently prudent on the European level.

777. The following table gives the final results of the maturity-dependent relative shock factors.

778. The increased term structure for a given currency is be equal to:

$$r_t^{up}(m) = r_t(m) * (1 + s_m^{up}) + b_m^{up}$$

where $r_t(m)$ denotes the risk-free rate in the corresponding currency, m denotes the maturity and b_m^{up} and s_m^{up} are given by the following table:

Maturity m	s_m^{up}	b_m^{up}
1	61%	2.14%
2	53%	1.86%
3	49%	1.72%
4	46%	1.61%
5	45%	1.58%
6	41%	1.44%
7	37%	1.30%
8	34%	1.19%
9	32%	1.12%
10	30%	1.05%
11	30%	1.05%
12	30%	1.05%
13	30%	1.05%
14	29%	1.02%
15	28%	0.98%
16	28%	0.98%
17	27%	0.95%
18	26%	0.91%
19	26%	0.91%
20	25%	0.88%

779. The decreased term structure for a given currency shall be equal to:

$$r_t^{down}(m) = r_t(m) * (1 - s_m^{down}) - b_m^{down}$$

where $r_t(m)$ denotes the risk-free rate in the corresponding currency, m denotes the maturity and b_m^{down} and s_m^{down} are given by the following table:

Maturity m	s_m^{down}	b_m^{down}
1	58%	1.16%
2	51%	0.99%
3	44%	0.83%
4	40%	0.74%
5	40%	0.71%
6	38%	0.67%
7	37%	0.63%
8	38%	0.62%
9	39%	0.61%
10	40%	0.61%
11	41%	0.60%
12	42%	0.60%
13	43%	0.59%
14	44%	0.58%
15	45%	0.57%
16	47%	0.56%
17	48%	0.55%
18	49%	0.54%
19	49%	0.52%
20	50%	0.50%

780. For the illiquid part of the euro RFR – after the 20 year maturity – it is proposed to keep the current stresses of 20% (upward and downward) at 90 year maturity, which are directly applied to the RFR (non-shifted). After the 90Y maturity the same constant 20% shock is applied. The shifted approach then needs to be phased out from the 20 Y maturity until the 90Y maturity.

781. EIOPA has performed simulations with different UFR values: new historical set of RFR were derived with new UFR determined on the basis of EIOPA's methodology (change of 15 bp). This indicated that the maximum annual change at the 90Y tenor point is at most 19 %. Accordingly, EIOPA considers that the 20% relative shock at the 90y maturity is appropriate.

782. The phasing-out approach is best described by the representation of the shifted approach as a special affine model, given in the equation (11) and (12) above.

783. It is proposed to phase out the relative shock factor $s_t^{up,down}(\theta)$ linearly such that one arrives at a +/-20 % relative shock for the 90Y maturity. For the

additive term b_t , it is proposed to phase-out this term faster than the relative shock factor $s_t^{up,down}(\theta)$. More specifically, the additive component in the shifted approach is proposed to be phased-out until the 60Y maturity. This is justified because for longer maturities it is not necessary to shift the curve to apply the relative stress factors: thanks to the extrapolation towards the ultimate forward rate, the illiquid part of the RFR cannot be negative.

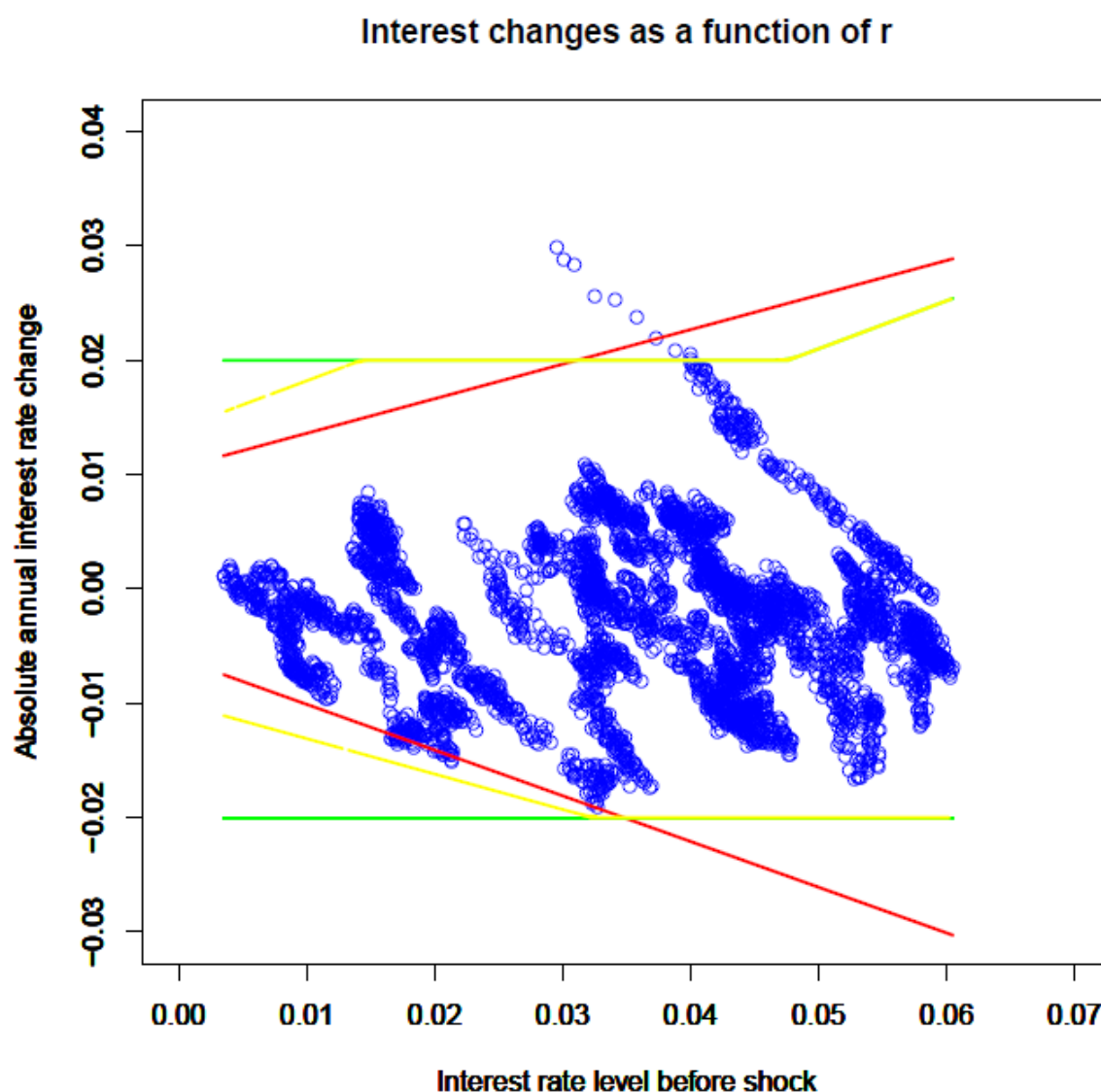
784. Finally, it is useful to assess the risk sensitivity of the three approaches. In figure 7.14 the risk sensitivity is assessed from a backward looking perspective. In this figure, the realized absolute annual interest rate changes are compared to the interest rate level before the change for the 10Y EUR historical RFR data ranging from 4.01.1999 until 31.12.2016. The solid lines indicate the absolute stresses implied by the three approaches in dependence of the interest rate level. An approach can be considered the more risk-sensitive,

- the closer the distance between the absolute stresses predicted by the considered approach to the realized annual absolute changes (blue points) is,
- if only a small number of realized annual absolute changes crosses the absolute stresses implied by the corresponding approach.

785. The first criteria guarantees that the approach neither under nor overestimates interest rate risk. The second criteria ensures that not more breaches of the stressed curves occur than a 99.5% (0.5%) VaR would imply. It is important to note that a small number of breaches can occur, this is in line with the corresponding the Value at risk

786. Given the latter considerations, one can deduct from figure 7.14 that the shifted approach is more risk-sensitive than Proposal A and Proposal B. The realized annual interest rate changes are closer to the absolute stresses implied by the shifted approach for both the interest rate up and the interest rate down scenario. The number of breaches under the shift approach is in line with the 99.5% and 0.5% Value at Risk. The number of breaches under Proposal A and Proposal B (namely 0) rather indicates that these approaches tend to overestimate the interest rate risk from a backward looking perspective, although Proposal B is more risk-sensitive than Proposal A. Specifically, the figure illustrates that an affine model performs well in the low yield environment. Moreover, figure 7.14 illustrates that the shifted approach is much simpler because it is a linear approach, while Proposal A and Proposal B both display kinks.

Figure 7.14: The figure shows the absolute annual interest changes (blue points) as a function of the observed interest rate level before the annual change for the 10Y maturity for the EUR. The solid red line shows the absolute stresses from the shifted approach as a function of the interest rate level, the solid yellow line the absolute stresses from Proposal B and the solid green line the absolute stresses from Proposal A.



Summary comparison of the approaches

787. To summarize, the main advantages of Proposal A are:

- It is a very simple approach.
- The model can capture large interest rate increases in the low yield environment.

788. The main drawbacks of Proposal A are:

- It incorporates expert judgment as to the extent by which decreases and increases observed in the past could occur again in a low-yield environment.

- The model introduces a floor to interest rates to mitigate the impact of large decreases in the low-yield environment. This floor necessarily incorporates an expert judgment component and provides for an approach that is less risk-sensitive than the shifted approach and than proposal B.

789. The main advantages of Proposal B are:

- The calibration of proposal B is partially data-driven since the included affine model is estimated on historical data.
- Due to the affine model component, the approach distinguishes yield environments and fits better the observed movements in the low yield environment and the interest rate down scenario.

790. The main drawbacks of Proposal B are:

- It is more complex than the shifted approach and Proposal A.
- The model involves some expert judgement in the parameter estimations of the additive components.

791. The main advantages of the shifted approach are

- The shifted approach combines the advantages of the relative approach in a medium-high and high yield environment and the advantages of an affine approach in a low yield environment in a simple way. Accordingly, the model is appropriate to model interest rate risk in a low yield, but also in a higher yield environment.
- The shifted approach is simple.
- It is mainly a data-driven approach.
- It reflects better than proposal A and B the extent of interest rate movements in the low yield environment.

792. The main drawbacks of the shifted approach are:

- The determination of the shift parameter requires some expert judgement.

793. The main shortcoming in the calibration of the shifted approach was that the approach could not pass the backtesting. With the amendments proposed by stakeholders and EIOPA in this advice, this shortcoming is resolved, EIOPA deems the shifted approach a simple and risk-sensitive approach to model adequately interest rate risk in different yield environments.

794. Consequently, EIOPA advises to adjust the current interest rate risk module according to the newly calibrated relative shifted approach.

795. The impact of the new methodology has been analysed on the basis of a specific information request. The impact of the methodology is material, in

particular for those undertakings where the liability cash-flows depend on the level of interest rates. For life undertakings that are exposed to the low-yield environment, the average impact on the solvency ratio is estimated being around 14 percentage points (from a solvency ratio of 216% to a solvency ratio of 202%).

796. The impact demonstrates that the current capital requirements are inappropriate and do not capture the risk of interest rates decreasing.

797. In light of the material impact, several options have been envisaged to allow for a gradual implementation of the full shifted approach:

- Introducing gradually minimum downward shocks into the current shocks of the standard formula.
- Extending the recovery period for those undertakings that would breach their solvency ratio.
- Gradually implementing the new approach.

798. The last option has the advantages that undertakings already implement the final approach and it smooths the effect on the solvency ratios. The impact assessment provides further information on this gradual implementation.

7.5.3. EIOPA's advice

799. Strong evidences have been gathered demonstrating that the current approach for calculating capital requirements for interest rate risk leads to a severe under-estimation of the risks:

- The reality of interest rate movements which have been much stronger than those provided by the stresses in the Delegated Regulation.
- The fact that the current approach does not stress negative rates, although reality has proven that rates can continue to decrease.
- The way internal model users measure interest rate risk significantly deviates from the current standard formula.
- The impact assessment of proposals demonstrates that the risk is material and that current capital requirements are not sufficient.
- There is a wide agreement among stakeholders that the current approach has severe flaws.

800. EIOPA believes that the current shocks provided in the Delegated Regulation for interest rate risk do not meet the requirements of Article 101(3) of the Solvency II Directive. Therefore EIOPA strongly advises the Commission to correct this unintended technical inconsistency and to modify the way capital requirements for interest rate risk are calculated in the Delegated Regulation.

801. EIOPA advises to model interest rate risk in the standard formula with a relative shift approach, parameters of which vary in function of the maturity. Shifted approaches are widely used by internal model users and most stakeholders have argued during the consultation phases that this is a robust and risk-sensitive way to measure interest rate risk.

802. The increased term structure for a given currency shall be equal to:

$$r_t^{up}(m) = r_t(m) * (1 + s_m^{up}) + b_m^{up}$$

where $r_t(m)$ denotes the risk-free rate in the corresponding currency, m denotes the maturity and b_m^{up} and s_m^{up} are given by the following table:

Maturity m	s_m^{up}	b_m^{up}
1	61%	2.14%
2	53%	1.86%
3	49%	1.72%
4	46%	1.61%
5	45%	1.58%
6	41%	1.44%
7	37%	1.30%
8	34%	1.19%
9	32%	1.12%
10	30%	1.05%
11	30%	1.05%
12	30%	1.05%
13	30%	1.05%
14	29%	1.02%
15	28%	0.98%
16	28%	0.98%
17	27%	0.95%
18	26%	0.91%
19	26%	0.91%
20	25%	0.88%
60	22%	0%
90	20%	0%

803. For maturities not specified in the table above, the value of s_m^{up} and b_m^{up} shall be linearly interpolated. For maturities shorter than one year the value of s_m^{up} and b_m^{up} shall be equal to 61% and 2.14% respectively. For maturities longer than 60 years, the value of b_m^{up} shall be equal to 0%. For maturities longer than 90 years, the value of s_m^{up} shall be equal to 20%.

804. The decreased term structure for a given currency shall be equal to:

$$r_t^{down}(m) = r_t(m) * (1 - s_m^{down}) - b_m^{down}$$

where $r_t(m)$ denotes the risk-free rate in the corresponding currency, m denotes the maturity and b_m^{down} and s_m^{down} are given by the following table:

Maturity m	s_m^{down}	b_m^{down}
1	58%	1.16%
2	51%	0.99%
3	44%	0.83%
4	40%	0.74%
5	40%	0.71%
6	38%	0.67%
7	37%	0.63%
8	38%	0.62%
9	39%	0.61%
10	40%	0.61%
11	41%	0.60%
12	42%	0.60%
13	43%	0.59%
14	44%	0.58%
15	45%	0.57%
16	47%	0.56%
17	48%	0.55%
18	49%	0.54%
19	49%	0.52%
20	50%	0.50%
60	33%	0%
90	20%	0%

805. For maturities not specified in the table above, the value of s_m^{down} and b_m^{down} shall be linearly interpolated. For maturities shorter than one year the value of s_m^{down} and b_m^{down} shall be equal to 58% and 1.16% respectively. For maturities longer than 60 years the value of b_m^{down} shall be equal to 0%. For maturities longer than 90 years the value of s_m^{down} shall be equal to 20%.

806. The impact of the new methodology has been analysed on the basis of a specific information request. The impact of the methodology is material, in particular for those undertakings where the liability cash-flows depend on the level of interest rates. For life undertakings that are exposed to the low-yield environment, the average impact on the solvency ratio is estimated being around 14 percentage points (from a solvency ratio of 216% to a solvency ratio of 202%).

807. The impact demonstrates that the current capital requirements are inappropriate and, in particular, do not capture the risk of interest rates decreasing.

808. In light of the material impact, EIOPA advises that such an approach is gradually implemented in the Delegated Regulation. EIOPA recommends to phase-in its proposal over the next 3 years, ensuring that, during the phasing-in of the approach, the interest rate risk is assessed in a robust way for all maturities and currencies. After the 3 years, the capital requirements for interest rate risk and their impact should then be assessed as part of the review of Solvency II that the Commission is required to undertake after five years of implementation.

809. The gradual implementation proposed is as follows:

- Only the downward shock is gradually implemented;
- The gradual implementation should not last longer than 3 years;
- When calculating the risk of a decrease in the term structure of interest rates for a given currency, undertakings should:
 - i. Determine the decrease in basic risk-free interest rates on the basis of the current standard formula approach (i.e. on the basis of the current provisions of Article 167 of the Delegated Regulation);
 - ii. Determine the decrease in basic risk-free interest rates on the basis of the shifted approach as specified above;

- iii. Calculate the loss in the basic own funds that would result from an instantaneous decrease in the basic risk-free interest rates determined, for each maturity:
- as in i. plus one third of the difference between ii. and i. the first year;
 - as in i. plus two third of the difference between ii. and i. the second year; and
 - as in ii. the third year.

8. Market risk concentration

8.1. Call for advice

EIOPA is asked to report on assumptions currently made by insurance and reinsurance undertakings when calculating the market risk concentration submodule and their impact.

8.2. Legal basis

Solvency II Directive

810. According to Article 105(5)(f) of the Solvency II Directive, the market risk concentration risk sub-module covers “*additional risks to an insurance or reinsurance undertaking stemming either from lack of diversification in the asset portfolio or from large exposure to default risk by a single issuer of securities or a group of related issuers*”.

Delegated Regulation

811. The provisions for the calculation of the capital requirement for market risk concentration are set out in Articles 182 to 187.

8.3. Feedback statement on the main comments received to the consultation paper (EIOPA-CP-17-006)

a. Summary of the comments received

812. Stakeholders welcomed the possibility that additional clarification is provided what single name exposures (“SNEs”) are but the Delegated Regulation was not deemed the appropriate place.

813. There were suggestion to expand the list of exempted exposures in Article 184 (all members of the own group, strategic participations, Member States sovereign bonds not denominated in local currency).

814. There was the suggestion to allow the use of the group rating for a single name exposure to a group.

815. Stakeholders expressed a slight preference for option 1

b. Assessment

816. EIOPA will consider whether further guidance should be provided on the definition of single name exposures.

817. EIOPA does not consider the exemption of the listed assets as appropriate as they are covered in the equity respectively spread risk sub-module.

818. EIOPA did not follow the suggestion to use group ratings as this would introduce an inconsistency with the determination of credit quality steps (CQS) in the spread risk sub-module.

819. For the chosen option and the rationale see section "Proposed change – Reverse mapping"

8.4. Feedback statement on the main comments received to the discussion paper

820. In the following the feedback from stakeholders on the assumptions made in the calculating of the capital requirement for market risk concentration is summarised. The number of respondents was quite limited and not all respondents answered all questions. EIOPA followed up with individual stakeholders to get additional clarifications where necessary.

Scope of exposures included in the market risk concentration sub-module

a. Summary of the comments received

821. No substantial comments were received on the statement in the discussion paper that the scope of the market risk concentration risk sub-module covers all assets held by an insurance or reinsurance undertaking except those listed in Article 184(2) of the Delegated Regulation. Areas where apparently different practices exist are the treatment of derivatives and of funds where a look-through is not possible (see separate sections below).

Treatment of funds where the look-through approach is not possible

b. Summary of the comments received

822. A number of respondents said that funds where a look-through is not possible should not be taken into account provided they are sufficiently diversified. Others treat such funds as single name exposures to the fund management company.

Treatment of risk-mitigating techniques

a. Summary of the comments received

823. It seems that most respondents do not take into account the value of collateral or risk mitigation techniques when calculating the capital requirement for market risk concentration. This might be different for derivatives that are not used for hedging. An example would be a long position in an equity index future that is entered into to gain exposure to equities as an alternative to a direct investment in the index.

b. Assessment

824. The source for different interpretations is probably the provision in Article 184(2)(d) of the Delegated Regulation which excludes exposures covered in the counterparty default risk module from the scope of the market risk concentration sub-module.

825. On this basis one could argue that derivatives are excluded. On the other hand one could point out that the counterparty default risk module covers the

risk of the counterparty defaulting or its credit quality deteriorating but not the potential market concentration risk in the underlying of the derivative.

826. From a risk perspective the treatment of a direct investment in a stock should not differ from the treatment of an equivalent exposure through a long future position. It should also be possible to reduce the market risk concentration risk charge by entering into a derivative which (partially) offsets exposures resulting from debt or equity investments. In order to support this view legally, the argument could be made that the term "exposure" is not defined in the Solvency II framework and that the exposure covered in the counterparty default risk module is the (adjusted) value of the derivative but not the exposure to the underlying.

Definition of exposure at default

a. Summary of the comments received

827. There is no definition of "exposure at default" in the Solvency II legal framework. Based on the comments received there seems to be generally agreement that for an asset in the scope of the market risk concentration risk sub-module the exposure at default should normally equal the value of the asset as determined in accordance with Article 75 of the Solvency II Directive.

Definition of single name exposure

a. Summary of the comments received

828. There is no definition of "single name exposure" in the Solvency II legal framework. Based on the answer provided by stakeholders no general statements about the assumptions used for determining whether exposures belong to a single name exposure are possible.

829. Regarding the question whether exposures to separate counterparties that are owned by the same public entity should be considered as a single name exposure, the answers were split. Two respondents say that they treat such cases not as a single name exposure. One respondent seems to do a relatively elaborated analysis based on criteria for interconnectedness from the Basel framework. One respondent does an "automated approach" based on LEI.

Interpretation of Article 186(2) to (5) of the Delegated Regulation

a. Summary of the comments received

830. Respondents mentioned different assumptions that they use to calculate the risk factor g_i :

- Unrated exposures belonging to a single name exposure which does not exclusively consist of exposures to a single solo insurance undertaking are assigned to a CQS of 5.
- The risk factor is computed based on the CQS for the group (which is calculated based on the external rating of the group).

- An weighted average CQS is computed in a “consistent” way with Article 186(2) of the Delegated Regulation (“Reverse Mapping approach”)

831. In terms of the assumptions used to determine if a credit assessment by a nominated ECAI is not available for an exposure, a few participants responded that if no rating for the issue is available, they use the rating of the issuer.

832. Based on the responses it seems that the assumptions used for the application of Articles 199(4) to (7) of the Delegated regulation do not differ from those used for Article 186(2) to (5) of the Delegated Regulation.

b. Assessment

833. The topic will be further discussed in the analysis section below.

Other responses

a. Summary of the comments received

834. Some stakeholders used the opportunity to provide general comments on the market risk concentration sub-module making the following suggestions:

- All strategic participations should be excluded from the sub-module;
- The rounding-up of the average credit quality step should be changed to rounding;
- Sectorial and/or geographical concentration should be taken into account;
- The exclusion of exposures to central government and central banks should not be contingent on the currency in which the asset is denominated.
- There should be a more favourable treatment of stocks in this sub-module (as stocks do not have an external rating they are assigned to the CQS 5).

8.5. Advice

8.5.1. Previous advice

835. CEIOPS gave recommendations on the design and calibration of the market risk concentration sub-module in the advice on the structure and design of the market risk module and the QIS5 calibration paper.^{48,49}

⁴⁸ CEIOPS (2009): CEIOPS’ Advice for Level 2 Implementing Measures on Solvency II: SCR Standard Formula Article 109 - Structure and Design of Market Risk Module. CEIOPS-DOC-40/09

⁴⁹ CEIOPS (2010): QIS5 Calibration Paper. CEIOPS-SEC-40-10.

8.5.2. Analysis

836. The stakeholder answers to the public consultation show that different assumptions are used in the application of Article 186(2) to (5) of the Delegated Regulation. EIOPA considered the following options:

- i. EIOPA provides clarification on the provisions applicable according to the current legal rules.
- ii. EIOPA proposes to the European Commission a change to the rules

837. For the reasons set out in section "Assessment of the alternatives" below EIOPA has chosen option (ii).

838. The examples for single name exposures in the table below will help to illustrate the current calculation of the risk factor g_i for exposures to (re)insurance undertakings and/or financial institutions as well as the change that EIOPA proposes:

SNE	SNE Description	Exposures ⁵⁰	Credit Rating	Solvency ratio
1	Insurer with SCR Ratio=x1 without credit rating	Insurer 1	NA	x1
2	Insurance group with EEA insurers	Insurer 2	CQS 3	x2
		Insurer 3	NA	x3
3	Financial group with EEA entities	Fin. Institution 1	NA	meets condition in Article 186(5)
		Insurer 4	NA	x4
4	Insurance group with non-EEA insurers	Insurer 5 with equivalent solvency regime	NA	meets condition in Article 186(4)
		Insurer 6 without equivalent solvency regime	NA	-

839. In the following the treatment of these SNE in the market risk concentration risk sub-module based on the Delegated Regulation is described. Then possible alternatives are set out and assessed.

⁵⁰ Insurers 1 to 4 are regulated under the Solvency II regime.

Current Delegated Regulation

840. According to the current Delegated Regulation the following rules should be applied to “mixed” exposures:

841. If a SNE does not exclusively consist of exposures to a single solo insurer, credit or financial institution, the risk factor for the market risk concentration should be determined with the weighted average CQS according to Article 186(1) of the Delegated Regulation. The weighted average CQS should be computed according to Article 182(4) of the Delegated Regulation and exposures without a CQS shall be assigned a CQS of 5 according to Article 182(5) of the Delegated Regulation in that calculation.

842. If a SNE consists exclusively of exposures to a single insurer, credit or financial institution, the risk factor should be determined according to Article 186(2) to (6) of the Delegated Regulation as applicable.

843. The following table sets out the consequences for the treatment of the example introduced above:

SNE	SNE Description	Risk Factor g_i calculation
1	Insurer with SCR Ratio=x1 without credit rating	Article 186 (2) or (3) based on the Solvency ratio=x1
2	Insurance group with EEA insurers	Article 186 (1) weighted CQS= weighted average of 3 and 5 (CQS of insurers 2 and 3 respectively)
3	Financial group with EEA entities	Article 186 (1) weighted CQS= 5
4	Insurance group with non-EEA insurers	Article 186 (1) weighted CQS= 5

844. With the current rules the treatment of the exposures to a solo insurer differs depending on whether or not it is part of a larger single name exposure. This can be illustrated with the following example:

845. A is an insurance undertaking with a solvency ratio of 196% for which a credit assessment by a nominated ECAI is not available. Insurer B is calculating its SCR and has exposures to A.

- Situation 1: A is part of a group and B has exposures to other parts of the group. Then the exposures to the insurer are assigned in accordance with Article 182(5) a CQS of 5.

- Situation 2: Insurer A is not part of a group. This means that according to Article 186(2), a risk factor of 12% is assigned to the exposures to A (corresponding to the risk weights for CQS 0 and 1).

846. This means that exposures to A may be assigned different risk factors depending on whether they belong to a group or not. The treatment of exposures to A would also change if B would exit all other exposures to the group.

Proposed change – Reverse mapping

847. EIOPA considered two options: “Reverse mapping” and “Average Risk factor”. As both produce nearly identical results, most stakeholders preferred the former option and no need to amend Article 185 arises, EIOPA chose the reverse mapping option described in the following.

848. If one wants to apply for some exposures the mapping from the solvency ratio to risk weights as set out in Article 186 (2) to (5) of the Delegated Regulation and for others the mapping from credit quality steps to risk weights as set out in Article 186(1) there are different possibilities.

849. One solution is a reverse mapping from solvency ratios to credit quality steps consistent with Article 186 whose resulting CQS are used to compute the weighted average CQS. The calculation involves the following steps:

- i. All the exposures to counterparties referred to in Article 186 (2) to (5) are mapped to a CQS consistent with the risk factor assigned in Articles 186 (2) to (5) and the table in Article 186 (1);
- ii. The remaining unrated exposures of the SNE receive a CQS of 5 in accordance with Article 182 (5);
- iii. The weighted average CQS for the SNE is computed as required by Article 182 (4);
- iv. The SNE is assigned a risk factor according to Article 186 (1).

850. The crucial element in this approach is the “mapping table”. EIOPA proposes the following mapping:

Table 8.1 – Exposures to an insurance or reinsurance undertaking for which a credit assessment by a nominated ECAI is not available and where the undertaking meets its Minimum Capital Requirement

Solvency Ratio	CQS
<= 95%	5
100%	3.82
122%	3
175%	2
>=196%	1

851. If the solvency ratio lies between these values then the CQS has to be linearly interpolated.

852. Exposures to insurance or reinsurance undertakings not meeting their Minimum Capital Requirement, should be assigned a credit quality step of 6.

853. For certain other exposures the following mapping should be applied:

Table 8.2 – Other exposures for which a credit assessment by a nominated ECAI is not available

Type of counterparty	CQS
Insurance and reinsurance undertakings as referred to in Article 186 (4)	3.82
Credit or Financial institution as referred to in Article 186 (5)	3.82

854. Exposures to insurers from third countries with equivalent solvency regimes that do not meet the local solvency requirement and for which a credit assessment by a nominated ECAI is not available should be assigned a CQS of 5.

855. Exposures to credit institutions and financial institutions referred to in Article 186(5) which do not comply with the solvency requirements in the banking regulation and for which a credit assessment by a nominated ECAI is not available should be assigned a CQS of 5.

856. With this mapping the result for the example provided above would be as following:

SNE	SNE Description	Exposures	Credit Rating	Solvency ratio	CQS map
1	Insurer with SCR Ratio=x1 without credit rating	Insurer 1	NA	x1	N/A (Article 186 (2) or (3) apply)
2	Insurance group with EEA-insurers	Insurer 2	3	x2	3
		Insurer 3	NA	x3	According to Table 8.1
3	Financial group with EEA entities	Fin. Institution 1	NA	meets condition in Article 186(5)	According to Table 8.2
		Insurer 4	NA	x4	According to Table 8.1
4	Insurance group with non-EEA insurers	Insurer 5 and with equivalent solvency regime	NA	meets condition in Article 186(4)	3.82
		Insurer 6 and without equivalent solvency regime	NA	-	5

Assessment whether a change in the treatment of “mixed exposures” is appropriate

857. In principle there seem to be two possibly partially contradicting objectives that have to be considered in the assessment:

- i. The calculation of the market risk concentration submodule shall be in line with the requirement of Article 101(3) of the Solvency II Directive.
- ii. Where available and appropriate, alternatives to external ratings should be used to assess risk (avoid overreliance, costs).

858. On the one hand, the current treatment may result in higher risk charges than warranted by the credit risk of the counterparty. Alternatively, the counterparty would have to acquire a rating.

859. There is also the issue of consistency: Consider the case where a single name exposure comprised so far only exposures to a single insurance undertaking but then a new exposure to another insurer or a non-insurer is

added. Under the current rules the treatment would change completely and all exposures to the original insurer would have to be treated as unrated.

860. Similarly, in the case of two solo insurers representing two SNE one would use the respective solvency ratios while the approach is different in case they belong to one group.

861. On the other hand, while there are limitations of external ratings it is not obvious that solvency ratios produce more accurate results: The mapping between solvency ratio and CQS involves an element of judgement. Moreover, an external rating based on an in-depth analysis may reflect the credit risk better than the solvency ratio. Finally, the historical accuracy of external ratings can be assessed based on a long data series of default and recovery rates while this is not the case for solvency ratios.

862. If one considered that external ratings reflect the credit risk better than solvency ratios this would support to limit the use of the latter. There might also be an issue with "cherry-picking" if no rating is acquired because the application of the solvency ratio produces a lower capital requirement.

863. Based on the analysis so far "mixed" exposures seem to occur in the following situations:

- i. The insurer takes out reinsurance with several solo reinsurers within a group (to which the insurer does not belong).
- ii. The insurer has exposures to several entities within its own group.

864. Weighting the above described pros and cons EIOPA suggests to treat "mixed exposures" as outlined in the section on the inverse mapping.

8.5.3. EIOPA's advice

Assumptions used in the calculation of the market risk sub-module

865. In the following the feedback from stakeholders on the assumptions made in the calculating of the capital requirement for market risk concentration is summarised. The number of respondents was quite limited and not all respondents answered all questions. EIOPA followed up with individual stakeholders to get additional clarifications where necessary.

Scope of exposures included in the market risk concentration sub-module

866. No substantial comments were received on the statement in the discussion paper that the scope of the market risk concentration risk sub-module covers all assets held by an insurance or reinsurance undertaking except those listed in Article 184(2) of the Delegated Regulation. Areas where apparently different practices exist are the treatment of derivatives and of funds where a look-through is not possible (see separate sections below).

Treatment of funds where the look-through approach is not possible

867. A number of respondents said that funds where a look-through is not possible should not be taken into account provided they are sufficiently

diversified. Others treat such funds as single name exposures to the fund management company.

Treatment of risk-mitigating techniques

868. It seems that most respondents do not take into account the value of collateral or risk mitigation techniques when calculating the capital requirement for market risk concentration. This might be different for derivatives that are not used for hedging. An example would be a long position in an equity index future which is used to gain exposure to equities as an alternative to a direct investment in the index.

869. The source for different interpretations is probably the provision in Article 184(2)(d) of the Delegated Regulation which excludes exposures covered in the counterparty default risk module from the scope of the market risk concentration sub-module.

Definition of exposure at default

870. There is no definition of "exposure at default" in the Solvency II legal framework. Based on the comments received there seems to be generally agreement that for an asset in the scope of the market risk concentration risk sub-module the exposure at default should normally equal the value of the asset as determined in accordance with Article 75 of the Solvency II Directive.

Definition of single name exposure

871. There is no definition of "single name exposure" in the Solvency II legal framework. Based on the answer provided by stakeholders no general statements about the assumptions used for determining whether exposures belong to a single name exposure are possible.

872. Regarding the question whether exposures to separate counterparties that are owned by the same public entity should be considered as a single name exposure, the answers were split. Two respondents say that they treat such cases not as a single name exposure. One respondent seems to do a relatively elaborated analysis based on criteria for interconnectedness from the Basel framework. One respondent does an "automated approach" based on LEI.

Interpretation of Article 186(2) to (5) of the Delegated Regulation

873. Respondents mentioned different assumptions that they use to calculate the risk factor g_i :

- i. Unrated exposures belonging to a single name exposure which does not exclusively consist of exposures to a single solo insurance undertaking are assigned to a CQS of 5.
- ii. The risk factor is computed based on the CQS for the group (which is calculated based on the external rating of the group).
- iii. An weighted average CQS is computed in a "consistent" way with Article

186(2) of the Delegated Regulation ("Reverse Mapping approach")

874. In terms of the assumptions used to determine if a credit assessment by a nominated ECAI is not available for an exposure, a few participants responded that if no rating for the issue is available, they use the rating of the issuer.

875. Based on the responses it seems that the assumptions used for the application of Articles 199(4) to (7) of the Delegated regulation do not differ from those used for Article 186(2) to (5) of the Delegated Regulation.

Other responses

876. Some stakeholders used the opportunity to provide general comments on the market risk concentration sub-module making the following suggestions:

877. All strategic participations should be excluded from the sub-module;

878. The rounding-up of the average credit quality step should be changed to rounding;

879. Sectorial and/or geographical concentration should be taken into account;

880. The exclusion of exposures to central government and central banks should not be contingent on the currency in which the asset is denominated.

881. There should be a more favourable treatment of stocks in this sub-module (as stocks do not have an external rating they are assigned to the CQS 5).

Treatment of "mixed" exposures

882. The calculation of the risk factor for single name exposures (SNE) which include but do not consist exclusively of exposures to single solo insurer, credit or financial institution should be determined in the following steps:

- i. All the exposures for which a credit assessment by a nominated ECAI is not available to counterparties referred to in Article 186 (2) to (5) are mapped to a CQS based on the tables below;
- ii. The remaining unrated exposures of the SNE receive a CQS of 5 in accordance with Article 182 (5);
- iii. The weighted average CQS for the SNE is computed as required by Article 182 (4);
- iv. The SNE is assigned a risk factor according to Article 186 (1).

883. The above mentioned mapping should follow the following rules:

Table 8.1 – Exposures to an insurance or reinsurance undertaking for which a credit assessment by a nominated ECAI is not available and where the undertaking meets its Minimum Capital Requirement

Solvency Ratio	CQS
<= 95%	5
100%	3.82
122%	3
175%	2
>=196%	1

884. If the solvency ratio lies between these values then the CQS has to be linearly interpolated.

885. Exposures to insurance or reinsurance undertakings which do not meet their Minimum Capital Requirement, should be assigned a credit quality step of 6.

886. For certain other exposures the following mapping should be applied:

Table 8.2 – Other exposures for which a credit assessment by a nominated ECAI is not available

Type of counterparty	CQS
Insurance and reinsurance undertakings as referred to in Article 186 (4)	3.82
Credit or Financial institution as referred to in Article 186 (5)	3.82

887. Exposures to insurers from third countries with equivalent solvency regimes that do not meet the local solvency requirement and for which a credit assessment by a nominated ECAI is not available should be assigned a CQS of 5.

888. Exposures to credit institutions and financial institutions referred to in Article 186(5) which do not comply with the solvency requirements in the banking regulation and for which a credit assessment by a nominated ECAI is not available should be assigned a CQS of 5.

889. The same provisions should be applied for the counterparty default risk module (Article 199(4) to (7) of the Delegated Regulation).

9. Currency risk at group level

9.1. Call for advice

890. The European Commission's call for advice requested EIOPA to investigate if the approach taken to group currency risk adequately covers the risk to which the group is exposed, taking into account the incentives given to the group's risk management, and suggest modifications where appropriate.

The application of the accounting consolidation based method to calculate the Solvency Capital Requirement under the standard formula with respect to the calculation of currency risk (under the empowerment in Article 234 of Directive 2009/138/EC).

The calculation of currency risk within the standard formula may penalize holding own funds to cover a related undertaking's Solvency Capital Requirement in the currency in which this undertaking's assets and obligations are denominated.

EIOPA is therefore asked to:

- *Provide information on currencies chosen by insurance groups to hold their own funds.*
- *Investigate if the approach taken to group currency risk adequately covers the risk to which the group is exposed, taking into account the incentives given to the group's risk management, and suggest modifications where appropriate.*

9.2. Legal basis

Delegated Regulation

891. Article 188 (1) of the Solvency II Delegated Regulation defines capital requirement for currency risk as the sum of the capital requirements for currency risk for each foreign currency. For each foreign currency, the capital requirement for currency risk is determined by the loss in basic own funds arising from a stress of 25% to the value of foreign currency against local currency (see Article 188 (2)).

892. Where the consolidated group SCR is calculated on the basis of the standard formula, the local currency is the currency used for the preparation of the consolidated accounts, as per Article 337 of the Solvency II Delegated Regulation.

9.3. Feedback statement on the main comments received to the consultation paper (EIOPA-CP-17-006)

a. Summary of the comments received

893. Stakeholders welcomed EIOPA's proposal of giving insurers flexibility to select a reference currency other than the one used to prepare financial statements for the purpose of determining group currency risk capital requirements. There were suggestions for extending the scope to solo undertakings.

894. Concerns were raised that EIOPA's proposal will benefit only some insurance groups.

895. Some respondents suggested amending the proposal to allow insurers to use a basket of currencies as reference currencies rather than one particular currency.

896. The analysis presented by EIOPA does not provide clarity on how groups are choosing to hold their own funds; the extent to which they are incurring penalty because their subsidiaries hold own funds in their local currencies.

897. Some stakeholders disagreed with EIOPA's grounds for rejecting the following formula which was proposed for calculating group currency requirement:

$$25\% * [\text{Max}(0, (\text{Exp}_{fi} - \text{LFX}_{\text{maxfi}})) + \text{Max}(0, (\text{LFX}_{\text{minfi}} - \text{Exp}_{fi}))]$$

where

Exp_{fi} is the value of the aggregate asset exposure for foreign currency i

$\text{LFX}_{\text{minfi}}$ is local Minimum Foreign Currency requirement = *local liabilities + any local SCR*

$\text{LFX}_{\text{maxfi}}$ = local Maximum Foreign Currency requirement = Total assets * $\{\text{LFX}_{\text{minfi}} / \sum_{i=1}^n \text{LFX}_{\text{minfi}}\}$

898. Other stakeholders agreed with EIOPA's assessment that the formula will overstate diversification benefits. They argued that if the local currency own funds may move up and down with a currency, the local SCR would do so as well. They proposed adjustments to the formula:

(group OF -/- group SCR) before shock -/- (group OF -/- group SCR) after shock

899. The intention was to take account of the FX impact on SCR and to make allowance for diversification.

b. Assessment

900. EIOPA's analysis focused on treatment of currency risk at the group level as requested in the call for advice. Stakeholder did not provide evidence that

currency risk is a material issue for solo undertakings and the exposure to foreign currencies is usually more material for groups. Generally, what is acceptable at group level is not necessarily acceptable at solo level as due to complexity of groups, they are expected to be able to have more complex calculations. Furthermore, at solo level there does not appear to be issues in terms of risk management incentives: assets denominated in another currency can be balanced with insurance liabilities denominated in the same currency.

901. EIOPA acknowledges that the proposal will benefit only some insurance groups with significant exposure to a particular currency, but that is due to their specific risk profile. EIOPA assessed other options for changing the group currency requirement calculation but concluded that those are not feasible in a standardised approach.
902. EIOPA considers that in practice it will be difficult to implement the approach based on basket of currencies as setting out a reliable way of defining it could be challenging and as diversification is already taken into account in the 25% stress.
903. The information available and the quality of group reporting were limited to carry out a detailed analysis of own funds and therefore only currency of assets was considered for this purpose.
904. EIOPA considers that this formula will overstate the diversification benefits. The diversification benefits with other sub-modules in the market risk module remains calculated in the same way, although "removing" some assets means that at least a part of them is not diversifiable: assets are only removed in the currency risk sub-module and not in other market risk sub-modules (for the purpose of the calculation of diversification benefits). The 25% currency risk charge was calibrated on a diversified portfolio of currency exposures and therefore it implicitly takes diversification between currencies into account. By "removing" some of the assets, it is assumed that the same diversification benefits stand. The 25% currency risk charge was calibrated on a diversified portfolio of currency exposures and therefore it implicitly takes diversification between currencies into account. By "removing" some of the assets, it is assumed that the same diversification benefits stand. The ratio used in the proposal is based on solo balance-sheet items whereas the calculation is made at group level: there could also be an overestimation of the amount of assets that are actually held in the consolidated data, net of intra-group transactions (i.e. the formula could allow more assets than actually held being "removed").
905. The new formula proposed tries to correct some of the deficiencies identified. EIOPA understands that the formula tries to reflect the effect of a change in currencies in the SCR calculated at solo level. As stakeholders noted themselves when providing this alternative, it would imply to re-assessing the solos SCR after a currency shock, which would be quite complex and depart from assumptions used in other modules of the standard formula.

9.4. Feedback statement on the main comments received to the discussion paper

a. Summary of the comments received

906. A number of respondents commented that a group with exposure to multiple currencies would be increasing its risk if it chose to hold all its capital in the reporting currency since if the group did incur the losses implied by the group SCR, a portion of those losses would have to be settled in a currency different from the reporting currency. The current treatment is therefore – quote – “perverse” in the sense that it encourages groups to hold capital in the reporting currency even though this increases risk. Groups should not be penalised for foreign currency exposures which are held to meet undertakings’ local capital requirements.

907. A few commented that the current methodology incentivises hedging currency risk at the group level (i.e. hedging in the currency used to prepare consolidated accounts) even though the firm may be backing local liabilities with local currency at the solo level or foreign exchange (“FX”) risk may be hedged at the solo level. This makes no economic sense and it can actually create real FX risk because hedging the currency exposure at group level can potentially expose the group to insolvency.

908. Some respondents proposed that the standard formula should be modified to take into consideration the proportion of the diversified SCR of the undertaking in that currency, where a methodology for allocating the diversification benefits has to be devised as the SCR is calculated in aggregate. Two respondents proposed a formula which they argued would result in sound risk management practices such as either pro-rating own funds across different currencies according to liability exposures or holding all surplus in group currency should not generate FX translation risk capital. This formula is set out below:

$$25\% * [\text{Max}(0, (\text{Exp}_{fi} - \text{LFX}_{\text{maxfi}})) + \text{Max}(0, (\text{LFX}_{\text{minfi}} - \text{Exp}_{fi}))]$$

where

Exp_{fi} is the value of the aggregate asset exposure for foreign currency i

LFX_{minfi} is the local Minimum Foreign Currency requirement = *local liabilities + any local SCR*

LFX_{maxfi} = local Maximum Foreign Currency requirement = Total assets * $\{\text{LFX}_{\text{minfi}} / \sum_{i=1}^n \text{LFX}_{\text{minfi}}\}$

b. Assessment

909. EIOPA does not find the argument referred to above convincing as it is not clear that holding assets in the group reporting currency to back local capital requirements and liabilities would reduce the capital because SCRs for the solo undertakings would increase in such cases. Holding all surplus assets in the group reporting currency or pro-rata based on own funds across different currencies would expose the group to the risk of having the surplus assets in the wrong currency in the event of a stress.

910. EIOPA is concerned that the requirements of the Prudent Person Principle may not be satisfied if assets are not held locally. Article 132 of the Solvency II Directive requires that all assets, in particular those covering the MCR and the SCR, shall be invested in such a manner as to ensure the security, quality, liquidity and profitability of the portfolio as a whole. In addition, the localisation of those assets shall be such as to ensure their availability.

911. EIOPA disagrees with the argument that hedging FX risk at the group level can create FX risk for the group. It is possible to hedge FX risk at the level of the group without impacting the SCR of solo undertakings, e.g. by entering in to suitable risk mitigation contracts. It is a commercial decision to determine whether the cost of hedging is justified to reduce the currency risk capital requirement at the group level.

912. The formula proposed will overstate diversification benefits for two reasons. Firstly, it assumes that all surplus above what is needed to cover local liabilities and local capital requirements is pro-rata based on a certain measure. Secondly, it assumes that all surplus above local liabilities and local capital requirements is held in the local currency of the group. In other words, it excludes surplus assets (i.e. assets in excess of liabilities and local capital requirements) from a currency risk capital charge. This approach can be justified where surplus is not fungible across the group.

9.5. Advice

9.5.1. Analysis

Currencies chosen by insurance groups to hold their own funds

913. A total of 294 groups were assessed as there were issues with data quality of some groups. Of this set, 38 groups have more than 50% of their assets in foreign currencies (25 groups with more than 60% in foreign currencies).

914. Exposure to number of currencies, in which assets are held, varies widely across groups. The maximum exposure by a group is to 60 different currencies and median is 4. There are 24 groups with exposure to 30 or more currencies, 9 groups with exposure to 40 or more currencies and 5 groups with exposure to 50 or more currencies.

915. Overall, groups have most exposure to Euro dominated assets, followed by sterling and USD. The following table summarises exposure by currency of assets for the top 10 currencies in terms of the amount held.

Table 10.1: Total exposure

Currency	Total Exposure EUR bn
EUR	9,829.23
GBP	886.15
USD	784.96
SEK	144.95
CHF	90.89
NOK	72.98
JPY	67.15
DKK	57.19
ZAR	28.60
AUD	26.67

916. As a foreign currency (other than the currency used to prepare consolidated accounts), group have most exposure to assets denominated in USD, followed by Euro and Swiss Franc. The table below summaries the results for the top 10 foreign currencies in terms of the amount held.

Table 10.2: Exposure as currency other than the local currency

Currency	Exposure as foreign currency EUR bn
USD	776.25
EUR	201.08
CHF	90.89
GBP	72.30
JPY	67.15
SEK	40.97
DKK	33.68
ZAR	28.60
AUD	26.67
CAD	26.29

Note: Exposures where no currency was mentioned or it was stated as "local" in the look-through template were ignored in this assessment.

Options for amending the standard formula

917. EIOPA has considered different options for determining the currency risk capital requirement at the group level.

918. The first option considered was to exclude assets that cover locally the MCR from the currency risk charge at group level. However it is difficult and complex to propose a simple way to take account of individual MCR when assessing the currency risk of assets determined through the accounting-consolidation process.
919. A further disadvantage is that groups with significant exposures to foreign currencies would not have benefited from this option, which is close to the current treatment. The data analysis showed that some groups may have such significant exposure.
920. Therefore another option has been envisaged for these groups with significant exposures to foreign currencies, for which the current treatment could be seen as too penal.
921. Groups could be given flexibility to select a 'local' currency other than the one used for their consolidated accounts. This choice would need to be based on objective criteria, such as being the currency in which a material amount of the group's technical provisions or own funds are denominated.
922. The reason to allow this treatment would be that in principle a group can change the currency in which it creates its consolidated financial statements.
923. For example, consider a European group that many years ago started operating in South America. It still reports in Euro, but its Brazilian operation have grown enormously, and currently the amount of own funds / TPs in Brazilian Real are about 60% of OFs & TPs on current FX rates. Its Euro exposure is now 10%, with another 10% each in Swedish Krona, Swiss Francs, and Venezuelan Bolivar. In this case it is arguably too penalising to ask for the group to calculate the charge on the assumption that the Real and other currencies depreciate by 25% against Euro. The group may still have its financial accounts in Euro, but economically the real risk for them is how other currencies move against the Real. So it would be fair for them to calculate the group FX charge as if the Real were the local currency, even if the Euro is still the currency of financial statements.
924. The reason to allow this treatment would be that in principle the group can change the currency of financial statements to Real, and create its consolidated financial statements in Real. But rather than require them to do this, the NSA may be content for them to carry on using Euro as the reporting currency, but recognise that the real source of FX risk is how other currencies perform against the Real.
925. This would option would allow groups to determine the FX risk capital requirement based on a more appropriate source of FX risk.
926. It would however "only" benefit groups with significant exposure to one particular currency but use a different currency to prepare consolidated financial statements.
927. For these groups with less significant exposure, the current standard formula appears an appropriate trade-off between simplicity of calculation at group level and risk sensitivity. Indeed:

- The 25% charge is based on a diversified portfolio of currency exposures. Therefore, it implicitly takes diversification into account but it is a simplification.
- If diversification was to be allowed then it would require determining pairwise currency risk charges and correlations. EIOPA considers that the pairwise currency risk charges can be a lot higher than 25% for some currency pairs and therefore, may not reduce the capital requirement.
- Assets denominated in a different currency than the group reporting currency may be worth less when they are needed to be transferred. Changes in exchanges rates against the group reporting currency can affect solvency ratio of a solo entity and therefore it makes sense to measure the foreign exchange risk against the group reporting currency in most cases.

9.5.2. EIOPA's advice

928. EIOPA has found that currency exposure can vary considerably from one group to another.

929. A total of 294 groups were assessed as there were issues with data quality of some groups. Of this set, 38 groups have more than 50% of their assets in foreign currencies (25 groups with more than 60% in foreign currencies).

930. Exposure to number of currencies, in which assets are held, varies widely across groups. The maximum exposure by a group is to 60 different currencies and median is 4. There are 24 groups with exposure to 30 or more currencies, 9 groups with exposure to 40 or more currencies and 5 groups with exposure to 50 or more currencies.

931. If the current standard formula seems an appropriate trade-off between simplicity of calculation at group level and risk sensitivity in cases where the exposure is not important, this may be different for groups with significant exposure.

932. Therefore, EIOPA advises to provide these groups with the flexibility to select a 'local' currency other than the one used for their consolidated accounts, for the purpose of the calculation of the currency risk sub-module. This choice would need to be based on objective criteria, such as being the currency in which a material amount of the group's technical provisions or own funds are denominated.

10. Unrated debt

10.1. Call for Advice

933. EIOPA is asked to provide clear and conclusive criteria applicable to bonds and loans for which no credit assessment by a nominated ECAI is available, in order to identify certain instruments, which would then be allowed to receive the calibration associated with credit quality step (CQS) 2.
934. Where EIOPA identifies alternative criteria which would identify instruments with a better or a lower risk profile, these two types of criteria should also be provided. The corresponding instruments would then be allowed to receive the calibration associated with credit quality step 1 and 3 respectively.
935. Such criteria can be related to the financial state of the debtor, in particular on the basis of its financial statements.
936. Such criteria can also be related to the features of the instrument concerned, in particular to its position in the credit hierarchy in case of default and to the transparency offered to investors as regards the debtor.
937. In addition to features potentially considered by ECAIs when providing a credit assessment, such criteria can also be related to the insurer's own risk management system, to ensure their ability to manage properly risks related to investments in bonds and loans for which no credit assessment by a nominated ECAI is available.
938. The criteria related to the debtor and to the instrument concerned should be designed to ensure that sufficient risk-sensitivity is introduced, given that no credit assessment by a nominated ECAI is available, and considering that the criteria related to the risk management would result in reinforced risk management by insurance undertakings compared to investments in bonds and loans for which a credit assessment by a nominated ECAI is available.

10.2. Legal basis

939. The treatment of bonds and loans for which a credit assessment by a nominated ECAI is not available in the spread risk sub-module is set out in Article 176(4) and (5) of the Delegated Regulation. The rules for deciding whether a credit assessment by a nominated ECAI is available can be found in Article 5 Delegated Regulation.

10.3. Feedback statement on the main comments received to the consultation paper (EIOPA-CP-17-006)

Internal assessment approach

Scope

a. Summary of the comments received

940. There was a clear preference by stakeholders to expand the approach to CQS 3. Arguments in favour were among others the larger volumes of CQS 3 borrowers and the possibility to spread the costs for an internal assessment of the credit quality over a larger volume.

b. Assessment

941. EIOPA decided to expand the scope to CQS 3.

Financial ratios

a. Summary of the comments received

942. Stakeholders were overall supportive of the internal assessment approach. Most of them indicated their preference for the "threshold approach".

943. Some stakeholders suggested requiring compliance with at least one ratio within each single category and not necessarily compliance with all ratios as they deemed this too strict.

944. Some stakeholders questioned the use of the same ratios for all sectors as some of them might not be appropriate for certain sectors.

945. Some stakeholders proposed to change or remove some ratios (for example the quick ratio).

b. Assessment

946. EIOPA has opted for the threshold approach for the reasons set out in section "Approaches for determining the relevant financial ratios and their relevance".

947. EIOPA has decided to keep the less complex approach where all financial ratio requirements have to be met. The fact that this criterion is more demanding has been taken into account in the selection of the threshold values.

948. EIOPA decided to follow the simpler approach of using only one set of financial ratios for all sectors. EIOPA has tried to identify financial ratios that are relevant for all sectors. The limitations of this approach have been considered when setting the threshold values.

949. EIOPA has narrowed down the set of financial ratios for the threshold approach presented in the consultation paper to EBITDA margin, Total Debt/Free Cash Flow, EBITDA/Interest Expense and Net Debt/Total Equity.

Yield criterion

a. Summary of the comments received

950. Some stakeholders voiced concerns that the yield criterion would exclude a large amount of debt and that its accuracy is impaired by an illiquidity premium on unrated debt

951. Some stakeholders proposed to use the yield as an additional indicator rather than a necessary condition.

952. One stakeholder suggested to use the spread instead of the yield as floating rate debt does not have a fixed yield.

b. Assessment

953. EIOPA decided to keep the yield criterion. The yield reflects the risk perceived by lenders. Based on the analysis performed by EIOPA it has a good discriminatory power.

954. In order to allow for components in the yield on the debt of the borrower that are not related to credit risk, EIOPA has introduced a 0.5 % add-on (see section "Yield criterion").

955. EIOPA decided in the end not to change the criterion from yield to spreads. Most stakeholders seemed to be fine with the use of yields. In addition, with yields there is no need to define a benchmark risk-free fixed investment. Finally, where a clear case can be made that the results are (nearly) identical, the insurer can use spread instead of yield differences.

Other criteria

a. Summary of the comments received

956. The stakeholders were generally supportive of the other criteria proposed stating that they are in line with the criteria used by financial analysts in practice.

957. Stakeholders made some suggestions for changes.

b. Assessment

958. EIOPA changed the requirement for semi-annual financial statements to annual statements.

959. EIOPA revised the definition of seniority to allow for different structures that exist in practice (the example provided by a stakeholder were "bi-lateral loans secured against specific assets and the whole company which could be regarded as "more senior").

960. EIOPA reviewed the requirement for the debt issuer to have limited liability, as some stakeholders voiced the concern that this would exclude mutual companies. No revision was made as unrated insurance mutual companies would be covered by existing provisions in Article 180 (4), and other mutual companies are excluded as financial companies are out of scope.

961. EIOPA expanded the scope to companies incorporated in the OECD in addition to the EEA.

Internal Process

a. Summary of the comments received

962. In general stakeholders were supportive of the need for the insurer to have an internal process around any investments in unrated debt. They stated that this should be built on existing requirements, such as the requirements around risk management and the prudent person principle, and not put entirely new requirements on insurers.

963. One stakeholder commented that environmental, societal and governance (ESG) related factors have not been addressed and these should be integrated into the approach.

b. Assessment

964. EIOPA agrees that much of the listed requirements can be seen as a corollary of existing provisions but would note that there are specificities of unrated debt that affect the associated credit risk. There is therefore value in stating the requirements that have to be met explicitly, even if not all are new.

965. The insurer will consider ESG related factor - where material for the credit risk - in its internal assessment.

Use of the results of approved internal models

a. Summary of the comments received

966. Most stakeholders were supportive of the approach, but expressed concerns that the proposed requirements (retention rules and disclosure requirements) are too onerous. They stated that they are not reflective of current market practice and will not be applicable in practice.

967. Some stakeholder emphasised the risks (moral hazard, informational asymmetry without an own credit assessment, calibration for the specific debt items that the insurer invests may not be adequate).

968. Some stakeholder suggested that the approach should be expanded to relationships with companies that are not banks (asset managers and other financial intermediaries).

969. Some stakeholders suggested that the advice should be amended to allow also the use of internal ratings of an insurer that has received approval for a (partial) internal model.

b. Assessment

970. EIOPA understands that the proposed requirements may be in some cases difficult to meet but deems them necessary in order to ensure that the resulting credit quality steps adequately reflect the risk.

971. EIOPA considers that the proposed requirements mitigate the identified risks to a sufficient degree.

972. Given that the use of an assessment by another party creates some issues EIOPA considers that a supervisory approval of the internal model is crucial to ensure its accuracy. Therefore EIOPA suggests not to accept other models.

973. The results of an approved insurance internal model can also be used provided the relevant conditions are met.

10.4. Feedback statement on the main comments received to the discussion paper

Scope

a. Summary of the comments received

974. Some stakeholders pointed at what they consider inconsistencies in the treatment of commercial real estate (CRE). For CRE they suggested an approach similar to the Basel II slotting table.

975. Other types of debt that stakeholder suggested for consideration were corporate debt and mortgage loans.

b. Assessment

976. Please see section "Scope of the Analysis".

Methods

a. Summary of the comments received

977. Some stakeholders suggested allowing internal ratings by insurer based on relevant information like financial ratios, competitive position of the borrower, quality of management, terms of the debt item etc. The proposals included also possible requirements on the process. There was also the suggestion to derive criteria that use only financial ratios of the borrower.

978. Another proposal was to allow the use of "proxy ratings". The reference could be the issuer rating of the borrower, the rating for another debt item of the borrower or the rating for a similar borrower.

b. Assessment

979. EIOPA proposes an approach in which the internal assessment of the borrower and the debt item by the insurer is an integral part.

980. An assessment based exclusively on the financial ratios of the borrower seems not sufficiently risk sensitive.

981. The Delegated Regulation already allows in certain cases the use of “proxy” ratings (including issuer ratings). The use of ratings for other borrowers would only produce accurate results if the risk was sufficiently similar. This assessment would be quite involved.

982. “Notching” (i.e. the adjustment of the credit quality step for an externally rated debt item to account for differences in seniority and other risk relevant factors) for cases not covered in Article 5 of the Delegated Regulation creates similar problems.

Risk relevant factors

983. Stakeholders identified a number of risk relevant factors like subordination, guarantees, collateral and covenants.

Information on unrated debt

984. Stakeholders provided a meaningful amount of information on the characteristics of unrated debt.

10.5. Advice

10.5.1. Previous advice

985. CEIOPS provided advice on the treatment of unrated debt in the spread risk sub-module in the CEIOPS Advice on the calibration of the market risk module and the QIS5 Calibration Paper.^{51,52}

10.5.2. Analysis

10.5.2.1. Scope of the Analysis

986. The call for advice does not further specify which unrated debt should be considered. EIOPA has focused on debt issued by corporates as there are already specific rules for unrated qualifying mortgages, sovereign exposures and infrastructure project debt.

⁵¹ CEIOPS (2010): CEIOPS’ Advice for Level 2 Implementing Measures on Solvency II: SCR Standard Formula Article 111b Calibration of Market Risk Module. CEIOPS-DOC-66/10.

⁵² CEIOPS (2010): QIS5 Calibration Paper. CEIOPS-SEC-40-10.

Types of borrowers

987. The aim was to cover all industry sectors unless this results in high complexity or insufficient accuracy.

988. Debt issued by corporates from the financial sector was however excluded from the analysis as there are already provisions for these exposures based on the solvency ratio in Commission Delegated Regulation (EU) 2015/35 (in the following "Delegated Regulation"). The same line of reasoning applies for infrastructure corporates.

989. Borrowers in the same group as the insurer calculating its capital requirement were also excluded from the scope. As debt of financials is not considered this should have no material impact.

Types of debt

990. Both loans and bonds are considered.

991. In terms of credit quality the call for advice also mentions debt with a risk similar to rated debt with credit quality steps ("CQS") 1 and 3 but puts the emphasis on credit quality step 2 (which would normally correspond to "A" for several Credit Rating Agencies)⁵³.

992. EIOPA covered in the consultation paper only CQS 2. In response to stakeholder comments the internal assessment process now covers CQS 3 as well. The other approach which uses the results of approved internal models covers "by design" all credit quality steps. As there are very few unrated corporates with a risk similar to rated debt with CQS 1 this was not further explored.

993. The approaches apply only to debt items for which a credit assessment by a nominated ECAI is not available in accordance with Article 5 of the Delegated Regulation (in the following for the sake of brevity "unrated debt").

994. In terms of seniority only senior exposures are considered as this reduces the complexity of the assessment. Moreover, junior exposures are unlikely to have the targeted low credit risk.

10.5.2.2. Approaches

995. Based on its analysis EIOPA has developed two approaches to determine the credit quality step for unrated debt. The first one follows the specifications in the additional request for technical advice as regards unjustified constraints to financing from the 21st of February 2017 with criteria and processes which form the basis for the assessment by the insurer ("internal assessment approach").

⁵³ Commission Implementing Regulation (EU) 2016/1800.

996. The second approach is based on the request in the second part of the call for advice to explore methods for reducing reliance on external ratings. One of the stakeholder proposals was that - where a bank and insurer co-invest in loans - the insurer can use results from the approved internal model of the bank to determine for them its regulatory capital charge.

997. As mentioned in the first consultation paper published in July, EIOPA decided to analyse this approach in the context of the work on the second part of the call for advice.

10.5.2.3. Internal assessment approach

998. Accounting and market based methods provide valuable information. Nevertheless, also qualitative information (e.g. on competitive position and quality of management) is of crucial importance. All of them should be part of the assessment. But regulation can never cover all relevant aspects and reflect all specificities of individual borrowers. Therefore this has to be complemented by an internal assessment process of the insurer.

999. On the basis of these considerations EIOPA proposes the following approach:

1000. In order to qualify for the same spread risk charge as rated debt assigned to CQS 2 respectively CQS 3, an unrated corporate debt item has to meet all of the following conditions:

1. Selected financial ratios of the borrower meet certain requirements.
2. The yield on the debt of the borrower does not exceed the yield observable in the market for rated debt with CQS 2 respectively CQS 3 by a too wide margin.
3. The borrower and the specific debt item meet additional conditions (e.g. place of incorporation, history of operations).
4. The insurer performs an additional assessment ("internal process") demonstrating that the debt has a risk similar to rated debt with CQS 2 respectively CQS 3.

1001. There might be incentives for the insurer to come to an overly optimistic assessment in its internal process as the outcome influences the level of capital requirements. Combined with requirements on the process the first three conditions provide safeguards against such biases.

1002. EIOPA has considered whether the only possible outcome of the above process should be a more favourable treatment or whether for debt with very low credit quality there could actually be an increase in the risk charge. EIOPA decided against this as there would only be a meaningful difference to the current treatment for unrated debt with a risk similar to CQS 5 or 6.

1003. It seems also reasonable to assume that the allocation of insurers to debt with such low credit quality is rather limited in accordance with the prudent person principle.

1004. With the internal assessment approach restricted to CQS 2 (as initially proposed in the consultation paper), unrated debt could not have qualified despite being secured by collateral of good quality and issued by corporates with a risk comparable to investment grade rated debt, as not all requirements on the company level are met.

1005. For this reason, EIOPA analysed whether, beyond the cases in which the provisions in Article 176(5) of the Delegated Regulation apply, it should be possible for such collateralised debt to qualify for the same treatment as rated debt with CQS 2. Stakeholders were also asked for information on the relevance of the issue and possible approaches.

1006. As EIOPA decided to expand the scope of the internal assessment process to CQS 3 and stakeholders seemed to consider the issue as of limited importance, the recognition of collateral was not explored further. Nevertheless, the (non-)existence of collateral may be a relevant factor in the internal assessment of the insurer.

1007. The following sections discuss the details of the individual components described above.

Financial ratios

A. Introduction

1008. Financial ratios are an essential input for the assessment of credit risk.

1009. Based on the financial ratios of companies with different external ratings EIOPA has worked on criteria for the financial ratios of the borrower that should be met for the debt to be treated as rated debt with a CQS of 2 respectively 3.

1010. It was decided to use one set of financial ratio requirements for both CQS 2 and CQS 3. This simplifies the approach and reduces the risk that borrowers with a credit quality between CQS 3 and 4 qualify.

Advantages and disadvantages of criteria based on financial ratios

1011. Statistically there is a clear connection between financial ratios and credit risk. Moreover, criteria on financial ratios are relatively objective and easy to evaluate. This allows the insurer to avoid unnecessary costs as no other criteria have to be evaluated if the financial ratio criteria are not met.

1012. On the other hand, financial ratios will vary depending on the applicable accounting rules. Even for companies subject to the same rules financial ratios may not be fully comparable due to differences in accounting policies. Allowing adjustments can mitigate this but also introduces an element of judgement.

The objective in determining the specific criteria

1013. The number of borrowers with a higher credit risk than CQS 2 or 3 ("false positives") that meet the requirements on financial ratios should be limited. At the same time there should not be too many "false negatives" (i.e.

CQS 2 or 3 debt issues that does not qualify). Otherwise the insurer would have no incentives to perform the assessment (especially as the number of CQS 2 corporate exposures is limited). It has also to be considered that there are other criteria as well as the internal assessment process of the insurer to “sort out” higher credit risk debt.

1014. There could be different criteria on the financial ratios for each industry sector or at least groups of industry sectors. EIOPA decided instead to aim for one single set of criteria applicable to all industry sectors. This reduces the complexity and avoids the necessity to calibrate the ratios for individual industry sectors on a limited amount of data.

1015. There are of course clear differences across industry sectors in the financial ratios of companies with a certain CQS. The insurer should include a comparison with the “typical” financial ratios in the sector of the borrower in its internal assessment.

Selection of ratios

1016. The set of possible candidates was based on the ratios that rating agencies, central banks providing credit assessments and internal models for credit risk use. In addition, EIOPA performed a systematic search for possible ratios in the literature on replicating external ratings. A list of possible financial ratios that EIOPA considered can be found in “38. Annex to chapter 10 – Possible financial ratios” of the consultation paper.

1017. Ratios can be calculated based on the most current financial statements or on averages over a number of years. Both possibilities have advantages. Profits of a company may be exceptionally high or low in a single year so that averages could better reflect the economic situation. They also produce a more stable assessment. At the same time averages are slow to response to changes in fundamentals.

1018. EIOPA decided to base the financial ratios on five year averages. But the insurer should consider the trend in the financial ratios in its internal assessment.

1019. The ratios were calibrated based on IFRS accounting figures as well as non-European GAAP figures. If the borrower uses local GAAP the insurer would have to demonstrate why the ratios calculated on this basis are sufficiently similar.

1020. EIOPA tried to identify financial ratios that are relevant for assessing the credit risk but at the same time do not vary substantially between different accounting rules. Computing ratios based on averages over a number of years already mitigates the effect of differences in revenue and expense recognition. Using ratios based on cash flows rather than profit and loss figures has also the potential to reduce the differences across accounting systems.

1021. EIOPA explored possible simplifications for the task to demonstrate that the financial ratios based on local GAAP are sufficiently similar. Stakeholders were also asked for feedback. But there were no specific suggestions from

them and the further analysis that EIOPA performed did not identify such simplifications.

1022. The calculation of the ratios should be based on the audited financial statements. If the insurer has no access to this information then the debt should not be eligible for a potentially more favourable treatment.

Approaches for determining the relevant financial ratios and their relevance

1023. EIOPA consulted on two possible approaches (threshold approach and “weighted-average” approach) for deriving the relevant financial ratios and their respective “weights” in the financial ratio requirement. Their respective advantages and disadvantages were set out in the consultation paper.

1024. EIOPA opted for the threshold approach as both approach produce similar results and the threshold approach is simpler and was the preferred one by stakeholders.

1025. The proposed calibrations for the threshold approach are based on end 2016 financial ratios of European and non-European non-financial companies with a publically available external rating. Ideally, the analysis would only use European data to reflect any geographical specificities and to avoid the use of non-IFRS figures. But the total number of European companies with an external rating is limited. Moreover, the ratings agencies use one global methodology.

1026. Expanding the dataset to previous years might at first glance seem desirable. But the financial ratios associated with a specific rating change over time. Moreover, in case averages over a number of years are used the additional information is limited. EIOPA decided therefore against looking at other periods.

1027. The relative weight of industry sectors for companies with external rating will most likely deviate from the sector allocation of insurers to unrated debt. But accurate predictions are difficult. The used sample of rated companies is balanced in terms of industry sectors and the “typical” financial ratios for the industry sector of the borrower are part of the internal assessment. EIOPA decided therefore against adjustments to the industry weights in the rated sample.

1028. EIOPA retrieved financial ratios for European and non-European companies which had a rating by Fitch, Moody’s or Standard & Poor’s at the end of 2016.

1029. In order to broaden the database EIOPA considered the additional use of external ratings by other ECAIs. For the same reason the alternative of using probabilities of default (or ratings inferred from them) was explored. One idea contemplated was to calculate probabilities of default using the Bloomberg function DRSK and to map them to credit quality steps.

1030. At the end EIOPA did not explore these possibilities further as the existing database was deemed as sufficiently broad and the approach to use probabilities of default creates methodological challenges.

B. "Threshold approach"

Introduction

1031. With this approach the debt item is only eligible if all selected financial ratios for a borrower are higher, not higher or not lower than certain thresholds (as applicable). This approach is followed by one central bank recognized as an ECAI. The catalogue developed by the German Insurance Association for internal ratings also uses thresholds (though with the possibility of an "override").

1032. The potentially relevant financial ratios were selected from the financial ratios used by ECAIs and central banks. Based on individual company data the thresholds are chosen so that as many "A"- respectively "BBB"-rated corporates as possible qualify while the vast majority of corporates with lower ratings does not meet the requirement.

Proposed financial ratios and threshold values

1033. The table below set outs the proposed financial ratios and threshold values that have to be met for a debt item to pass the financial ratio requirements. They apply for both CQS 2 and CQS 3. Where the term "average" is used this means the average of the annual figures for the last five financial years. The term "current" means the value at the end of the last financial year.

Financial ratio	Condition	Threshold value
EBITDA margin ⁵⁴ (average)	>	0 %
Total Debt (current)/Free Cash Flow (average)	<=	6.5
EBITDA (average)/Interest Expense (current)	>=	6.5
Net Debt (current)/Total Equity (current)	<=	1.5

1034. The table should be read as follows: The borrower meets the requirements if the average EBITDA margin over the last five years was positive, the Total Debt at the end of the last financial year did not exceed 6.5 times the average of the annual Free Cash Flows over the last five years and so on.

⁵⁴ EBITDA/Revenues

1035. When choosing the financial ratios EIOPA followed three objectives: First and foremost, there has to be the right trade-off between "false positives" and "false negatives", Second, differences in national accounting rules should - to the extent possible - not affect the financial ratios. Third and much less important, the number of financial ratios should be as small as possible.
1036. With the values presented above, roughly 2/3 of the corporates rated "A" in the sample meet all requirements. The number of "BBB/Baa"-rated corporates qualifying is somewhat below 50 %. The number of non-investment grade borrowers that meet the condition above is in the low double digits.
1037. The financial ratios mentioned in the consultation included pre-tax income and net income margin. They were dropped as a satisfactory discriminatory power can be achieved using only the EBITDA margin. At the same time, the EBITDA margin is not sensitive to differences in local accounting rules for depreciation and amortisation.
1038. While expressing some doubts the consultation paper presented as a possible financial ratio the quick ratio. Based on stakeholder comments and as satisfactory results can be achieved without it, this ratio was dropped.
1039. There is also the yield criterion, the internal assessment of the insurer has to include an analysis of the specific financial ratios which are most relevant for the industry sector of the borrower and a satisfactory discriminatory power can be achieved with fewer financial ratios. For these reasons EIOPA decided to reduce their number to the three proposed.

Yield criterion

Rationale

1040. The lender requires a yield that reflects the perceived credit risk of the borrower and has a substantial economic incentive to demand an adequate compensation for the risk. Therefore the yield on the debt should not deviate too much from the yield for comparable traded bonds with an external rating corresponding to CQS 2 respectively 3.
1041. At the same time the insurer may invest in unrated debt because of its perceived better risk/return profile compared to traded bonds (e.g. a somewhat higher yield compared with CQS 2 or 3 bonds for a "CQS 2 or 3 like" risk). This may for example be the compensation for the higher illiquidity.

The criterion

1042. Based on these considerations EIOPA proposes the following criterion:
1043. The yield on the debt in which the insurer invests as well as on other similar debt that the borrower issued in the previous three years – where necessary adjusted in accordance with paragraph 1051 - should not exceed the respective applicable threshold for CQS 2 respectively CQS 3 defined in the next paragraphs.

CQS 2:

1044. The respective relevant threshold should be calculated based on the yields at the time of the issuance for two indices which meet the following requirements:

1. Broad index of externally rated traded bonds
2. The constituent bonds and the debt item are denominated in the same currency
3. The bonds have a CQS of 2 ("A") and 4 ("BB"/"Bb") respectively.
4. The bonds have a similar maturity as the debt item

1045. The respective relevant threshold is the maximum of the two following figures:

1. The average of the two indices referred to in the previous paragraph.
2. The yield on the CQS 2 index referred to in the previous paragraph plus 0.5 %.

CQS 3:

1046. The critical threshold for CQS 3 is calculated in the same way as for CQS 2 (i.e. including the 0.5 % add-on) with the difference that the CQS 2 and CQS 4 indices are to be replaced by indices that have bonds with CQS 3 and CQS 4 as constituents and which meet the requirements 1, 2 and 4.

1047. Where differences in non-credit risk related factors between the bonds in the indices and the debt item other than illiquidity have a material impact on the yield difference (e.g. the effect of prepayment options), the insurer shall adjust the yield of the debt item to reflect these differences in order to ensure comparability.

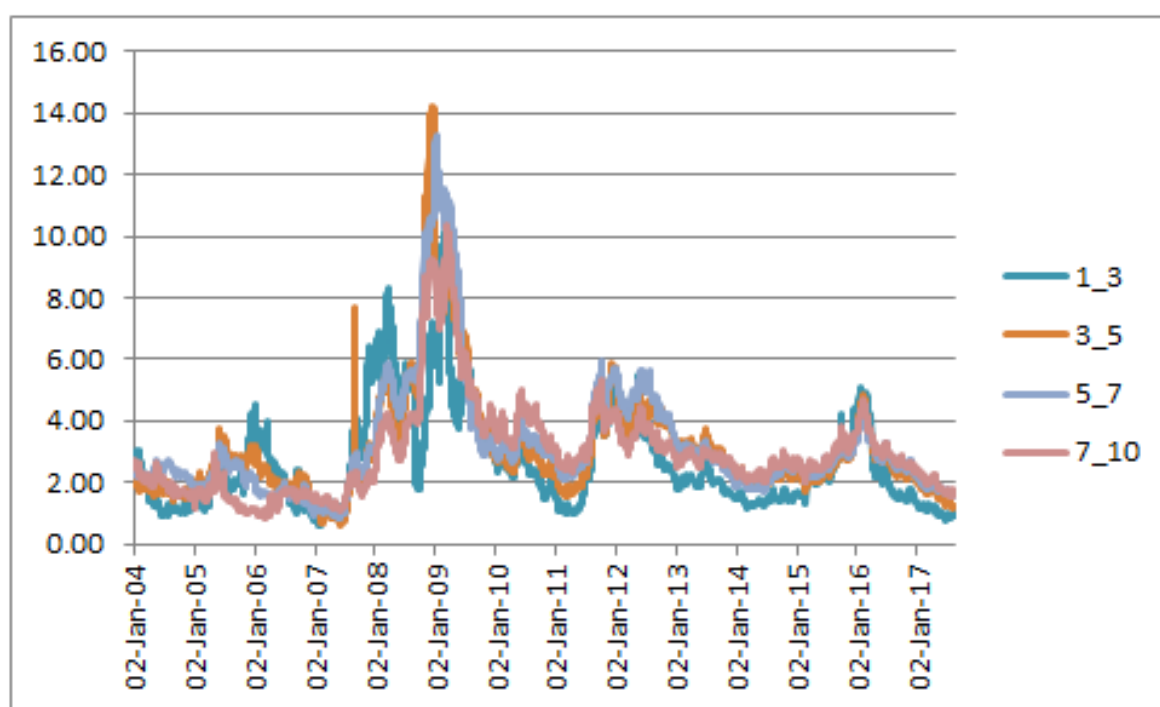
1048. The index values serve as proxies for the "market" yield. Together with the requirement in the previous paragraph, the conditions on the indices ensure that the yields on the debt item and the indices are comparable.

1049. There are times when the difference in yields between "A"- and "BB"-rated bonds (respectively "BBB"- and "BB"- rated bonds) is relatively small (like in early 2007 or currently). If the yields for "A"- and "BB"-rated debt were for example 3 % and 3.8 %, then debt with a yield of 3.5 % would not meet the criterion even though the additional yield could be attributable to non-credit risk related factors (e.g. an illiquidity premium). For this reason, EIOPA introduced the 0.5 % "add-on".

1050. The following example explains how the criterion works: The insurer provides a loan with a 4 % yield. The borrower has not issued comparable debt in the last three years. Based on broad indices for "A"- and "BB"-rated bonds such bonds yield at this time on average 3.5 % and 6 % respectively. The yield criterion is met, as the yield for the loan is below the maximum of 4.75 % and 4 %. At a later stage the borrower takes out another comparable loan with a yield of 5 %. If the yield for "A"- and "BB" rated bonds at this

point in time were 2.5 % and 7.5 % respectively (i.e. the critical threshold is 5%), the yield criterion would still be met. But if the values were 2.5 and 5 % instead (i.e. the critical threshold is the maximum of 3.75% and 3 %), then the debt instrument would no longer qualify.

1051. The following graph shows for illustration the development in the difference between the yields for Markit iBoxx EUR Non-Financials indices for A- and BB-rated bonds and different “maturity buckets” between 2004 and 2017:



1052. If the debt item underwritten by the insurer does not meet the yield criterion then it cannot qualify at a later stage. In contrast, if the yield criterion is violated at a later stage because the borrower issues subsequent debt with too high a yield, compliance with the yield criterion can be restored at a later stage.

1053. EIOPA has considered the incentive problem for the insurer that linking the treatment of a debt item to the conditions of this debt item may create. But the risk of an “under-pricing” by the insurer seems limited.

Additional conditions

1054. In addition to the financial ratio and yield criteria a debt item should meet further conditions.

1055. Compared with infrastructure projects, qualitative factors like the quality of management have a higher relevance for the credit risk.⁵⁵ The operating environment for a corporate is normally also more dynamic and the competitive position more difficult to assess.
1056. It is therefore very challenging if not impossible to capture all credit risk relevant factors adequately in a restricted list of easily checkable criteria. The alternative is a more principle-based approach with a meaningful element of judgement on a case-by-case basis.
1057. The analysis performed by EIOPA indicates that this assessment should be incorporated in the internal process of the insurer described in the following section. The insurer has to identify the relevant risk drivers and to decide for each of them what constitutes the attributes characteristic for debt with a risk similar to CQS 2 respectively CQS 3 rated debt.
1058. There are nevertheless criteria that are relevant for all companies and that can be easily verified. There is consequently no need to incorporate them in the internal assessment of the insurer.
1059. EIOPA suggests the following criteria that apply both for CQS 2 and CQS 3:

Borrower

- Corporate with limited liability
- Incorporated in EEA or OECD
- Majority of revenues are generated in EEA or OECD countries
- Has Operated for at least 10 years without credit event
- Has been larger than a Small- Sized Enterprise as defined by the Commission Recommendation (2003/361/EC) in the last three years⁵⁶
- The borrower is contractually obliged to provide audited financial data to the lender at least annually and to notify him of any material events that could affect the credit risk.
- Covenants exist such that the issuer cannot unilaterally change the terms of the debt, or make other changes to the business, that materially affect the credit risk of the unrated debt issue. These should include, but are not limited to, a negative pledge clause, issue and issuer specific definitions of default events, and change of control clauses.

Debt item

- Senior debt: The item and other pari passu instruments have a rank senior to all other claims except for:

⁵⁵ One reason why the quality of management is more important is that the field of possible actions is wider.

⁵⁶ http://ec.europa.eu/growth/smes/business-friendly-environment/sme-definition_en

- statutory claims;
 - an immaterial amount (e.g. less than 5% of senior debt) of other debt that is more senior in the right of payment under certain circumstances;
 - claims of trustees; and
 - claims of derivatives counterparties.
- Bonds or loans that provide a fixed redemption payment on the date of maturity or before, as well as a return payment, in the form of a regular coupon payment on a fixed or floating interest rate basis; structured notes, collateralised securities and derivatives are excluded

Internal process of the insurer

Rationale

1060. The credit risk depends on many – often qualitative - factors whose relevance can differ meaningfully across industry sectors. Many of them are difficult if not impossible to capture with a restricted list of easily verifiable criteria.
1061. Therefore the internal process of the insurer is essential to “sort out” debt items with a credit quality lower than CQS 2 respectively CQS 3 that meet the other criteria. The insurer can adjust its process to the specifics of the debt it underwrites (e.g. in terms of sectors).
1062. The partial reliance on the internal process of the insurer also allows keeping the other criteria relatively “light”.
1063. Irrespective of any regulatory requirements an insurer investing in unrated corporate debt needs the ability to separate debt items with higher and lower credit risk and has consequently already implemented internal processes for this. The idea is therefore to build on these existing processes.
1064. The internal assessment is in principle independent from the evaluation of the criteria in the three previously described steps. For example, the insurer may consider that different financial ratios are relevant for a specific industry sector.

Requirement for the process

1065. The internal process should produce an assessment whether a debt item can be treated as a rated item assigned to CQS 2 respectively CQS 3 for the purpose of calculating the regulatory capital.
1066. Given its importance a robust process producing reliable outcomes is crucial.

1067. One factor to consider though is that EIOPA is planning to provide guidance on internal assessments as mentioned in the first set of advice to the European Commission.⁵⁷ Providing specifications in the context of the call for advice could pre-empt the results of this future work. In addition, more time to analyse this complex topic thoroughly may be beneficial.

1068. Based on these considerations the best approach seems to specify only some high-level requirements for the process which are then to be complemented later by the planned guidance.

1069. In the following these high level criteria are set out:

- i. The undertaking has to produce its own internal credit assessment of the debt item and allocate it to one of the following two categories:
 - a. For CQS 2: credit quality steps 3 and lower or credit quality step 2 and higher.
 - b. For CQS 3: credit quality steps 4 and lower or credit quality step 3 and higher.
- ii. The internal assessment and the allocation shall reliably identify “qualifying” debt items. For qualifying debt items the treatment as bonds and loans with an assigned credit quality step 2 respectively 3 determined in accordance with Title I Chapter I Section 2 in the spread risk sub-module adequately reflects the risks.
- iii. The assessment has to cover all factors with a material effect on the credit risk associated with the debt item.
- iv. The factors considered for the internal credit assessment shall include but not be limited to:
 - competitive position
 - quality of management
 - financial policy
 - country risk (where relevant)
 - covenants
 - history of the company (number of years in operations etc.)
 - diversification/size
 - Impact of the current debt issuance on the company (quantitative assessment of the ratios before and after the debt issuance)

⁵⁷ See paragraph 111 in EIOPA (2017): EIOPA’s first set of advice to the European Commission on specific items in the Solvency II Delegated Regulation. EIOPA-CP-17/280.

- Ownership structure of the company (especially relevant where the ultimate parent is a government body)
 - Complexity of the business model
- v. The internal assessment should use all relevant information (both quantitative and qualitative).
 - vi. The internal assessment and the allocation for each debt item has to be well documented.
 - vii. The internal assessment takes into account the characteristics of comparable companies with an external rating.
 - viii. The internal assessment takes into account the trends in the financial performance of the borrower.
 - ix. The internal assessment is independent from the underwriting function.
 - x. The internal assessment is subject to a regular validation.

10.5.2.4. Use of results from approved internal banking or insurance models

Introduction

1070. The second approach that EIOPA proposes is a stand-alone alternative to the internal assessment approach described previously. It applies to loans and bonds.

1071. This option was considered by EIOPA in response to a submission to EIOPA's Call for Evidence. EIOPA identified some practical and prudential concerns that are described below. But it considers that the proposed requirements mitigate them to a sufficient degree.

1072. There are insurers that invest alongside banks in portfolios of unrated corporate loans. The bank underwrites the loans and performs the associated administrative tasks. The insurer purchases a part of the portfolio with the same rights as the bank (i.e. no differences in terms of seniority, collateralisation, etc.)

1073. If the bank has an approved IRB model for quantifying the credit risk a standard formula insurer could use the probabilities of default ("PD") that the internal model produces to determine whether the debt can be treated as rated debt with a certain credit quality step for the purpose of the spread risk sub-module.

1074. This “mapping” can be based on a table that is similar to the one used for producing the Implementing Technical Standard on ECAI mappings⁵⁸ or an “inversion” of the table in Article 199(2) of the Delegated Regulation.^{59,60}

1075. The discussion below focuses on the use of IRB models. But most considerations apply as well for the use of the results of an approved (partial) internal model developed by an insurer. The question of “mapping” may actually not arise in case the model already produces a credit quality step.

Requirements for the approach

1076. The insurer outsources the underwriting and the assessment of the credit risk to the bank. This creates a classical principal-agent situation. The insurer needs sufficient information about the underwriting process, the properties of the debt item and the functioning of the IRB model to limit the resulting risks. Moreover, there have to be proper incentives for the bank to underwrite debt with low credit risk.

1077. Based on the analysis EIOPA proposes the following criteria:

i. Underwriting process

- a. Only IRB banks in the EU or EEA are eligible.
- b. Bank and insurer agree beforehand about the type of debt to be underwritten and the applicable assessment criteria.
- c. The borrowing entity is a corporate established in the EU or EEA with a majority of revenues from EEA or OECD countries which has been larger than a Small-Sized Enterprise as defined by the Commission Recommendation (2003/361/EC) in the last three years.

ii. Transparency criteria

- a. The bank provides sufficient details about the underwriting process, in particular criteria, organisational structure and controls.
- b. The bank provides data on all debt applications (i.e. also those rejected).
- c. The bank provides details on why a debt application was accepted/rejected.

iii. Criteria for avoidance of cherry-picking/Adverse selection

- a. The bank retains an exposure of at least 50 % of the nominal value of the debt.
- b. The same underwriting criteria are applied to the debt items into which the bank and insurer co-invest as to other comparable loans that the bank underwrites alone.

⁵⁸ Commission Implementing Regulation (EU) 2016/1800.

⁵⁹ In the former case ratings were allocated to different CQS based on average historical default rates.

⁶⁰ This table maps the credit quality steps to probabilities of default for the purpose of calculating the capital requirement for counterparty default risk on type 1 exposures.

c. The insurer invests in all debt items that are in the pre-defined scope.

iv. Criteria on transparency regarding the functioning of the model

The bank provides the insurer with information that allows an understanding of the internal model and its limitations, as well as its adequacy and appropriateness, in particular:

- Information on model description (i.e. input/risk factors, risk parameter quantification/method, history and methodology)
- Information on model use (i.e. internal use, reporting, calculation of own funds requirements)
- Information on model validation and other processes to ensure the appropriateness of the model (i.e. validation framework and results, internal audit results)

1078. It seems appropriate that the bank maintains an exposure of at least 50 % of the nominal value of the debt as it underwrites them and provides the insurer with the assessment of their credit risk. In contrast securitisations would currently typically be externally rated (i.e. there is a third party involved).

1079. As with the use of external ratings the insurer remains of course responsible for compliance with all the applicable requirements (e.g. prudent person principle).

1080. The insurer should question the results of the internal model as it should do with external ratings.

“Mapping” between the output of the internal model and credit quality steps

1081. The approved internal model produces a probability of default for the borrower. This has to be transformed with a “mapping” into a credit quality step.

1082. For this the table in Article 199(2) of the Delegated Regulation could be used. An alternative are the mapping table and the criteria developed for the Implementing Technical Standard (ITS) on the mapping between external credit ratings and CQS.

1083. EIOPA considers that the latter option is preferable as the unrated debt is to be treated as rated debt with a CQS that was assigned in accordance with the mentioned ITS.

1084. Consequently, the requirements on the mapping of ECAI ratings have been adjusted where necessary for the case that the insurer maps probabilities of default to credit quality steps.

Advantages and disadvantages of the approach

1085. The approach has a number of potential advantages:

1. The IRB bank has invested meaningful resources and expertise in the modelling of credit risk.
2. The IRB model has to meet high regulatory requirements, is regularly updated and subject to supervisory approval.
3. The additional costs are minimal.

1086. But there are also a number of possible disadvantages:

1. The insurer has outsourced underwriting and assessment of the loan.
2. Unless the bank is willing to share the necessary information on underwriting, quality of the loans and internal model, the insurer is not able to assess the risks properly.
3. As the results for the same debt item can differ widely across internal models there is a trend in banking regulation to reduce reliance on internal models.
4. The bank may use its informational advantage to the detriment of the insurer.
5. In case problems in the banking sector result from insufficient regulatory capital calculated with internal models, they are potentially transmitted to the insurance sector thus increasing interconnectedness.

1087. On balance, EIOPA considers that the pros outweigh the cons.

10.5.2.5. Limit on the scope of application for the internal assessment approach, the use of results from approved internal banking or insurance models and the similarity approach for equities

1088. The combination of conditions in the internal assessment approach should ensure that very few debt items with a risk higher than for rated debt with CQS 2 respectively 3 qualify. But there are necessarily limits to its accuracy. Moreover, the insurer has a certain - albeit limited - degree of influence on its regulatory capital requirement.

1089. The use of results from an approved internal model has also limitations that were previously discussed.

1090. EIOPA considers therefore that the total amount of unrated debt which is assigned a different risk factor than set out in Article 176(4) and (5) of the Delegated Regulation resulting from the use of one of these approaches plus the equity investments to which the similarity approach is applied should be limited to 5 % of all investments.

1091. Such limit is in line with the freedom of investment as stated in Article 133 of the Solvency II Directive: The insurer is free to invest as much in unrated debt as it wants as long as all applicable legal requirements are met (e.g. the prudent person principle). Debt items in excess of the 5 % simply do not benefit from the more favourable treatment in terms of regulatory capital.
1092. In this context, it seems worth mentioning that Article 111(4) in the original text of the Solvency II Directive of 25 November 2009 contained an empowerment for the European Commission to adopt implementing measures to lay down quantitative limits. While the legal means would be different in this case the introduction of such a limit under certain conditions seems therefore to be reconcilable with the freedom of investment principle which was already included in the original text.

10.5.3. EIOPA's advice

Internal assessment approach

1093. Bonds and loans described in the section "Scope" where all the applicable requirements outlined in the section "Criteria" are met may be assigned the spread risk factor for CQS 2 respectively CQS 3.

1094. This is subject to the restriction that the sum of the debt items where the risk charge is determined with the internal assessment approach or based on the results of an approved internal model plus the equity investments to which the similarity approach is applied does not exceed 5 % of all investments.

Scope

No external rating

1095. Debt items for which a credit assessment by a nominated ECAI is not available in accordance with Article 5 of the Delegated Regulation.

Types of borrowers

1096. Debt issued by corporates

1097. All industries except for financial and infrastructure sector

1098. Borrowers not part of the same group as the insurer

Types of debt

1099. Both loans and bonds

1100. Only senior exposures

Criteria

General framework

1101. The debt item complies with the following conditions:

- i. The financial ratios of the borrower meet the requirements set out in the section "Criteria financial ratios".
- ii. The yields on the debt of the borrower comply with the conditions set out in the section "Criterion yield".
- iii. The borrower and the debt item meets the requirements in the section "Additional conditions".
- iv. The internal process complying with the requirements set out in the section "Criteria internal process" demonstrates that the debt has a risk similar to rated debt with CQS 2 respectively 3.

Criteria financial ratios

1102. The calculation of the ratios is based on the audited financial statements. If the insurer has no access to this information then the debt is not eligible.

1103. The relevant financial ratios of the borrower are all higher, not higher or not lower than the respective threshold as applicable set out in the table below:

Financial ratio	Condition	Threshold value
EBITDA margin ⁶¹ (average)	>	0 %
Total Debt (current)/Free Cash Flow (average)	<=	6.5
EBITDA (average/Interest Expense (current)	>=	6.5
Net Debt (current)/Total Equity (current)	<=	1.5

1104. Where the term "average" is used this means the average of the annual figures for the last five financial years. The term "current" means the value at the end of the last financial year.

1105. The table should be read as follows: The borrower meets the requirements if the average EBITDA margin over the last five years was positive, the Total Debt at the end of the last financial year did not exceed 6.5 times the average of the annual Free Cash Flows over the last five years, and so on.

Criterion yield

1106. The yield on the debt the insurer invests in as well as on other similar debt that the borrower issued in the previous three years – where necessary adjusted in accordance with par. 1112 – does not exceed the respective relevant threshold applicable for CQS 2 respectively CQS 3 defined in the next paragraphs.

CQS 2:

1107. The respective relevant threshold for CQS 2 is calculated based on the yields at the time of the issuance for two indices which meet the following

⁶¹ EBITDA/Revenues

requirements:

1. Broad index of externally rated traded bonds
2. The constituent bonds and the debt item are denominated in the same currency
3. The bonds have a CQS of 2 ("A") and 4 ("BB"/"Bb") respectively.
4. The bonds have a similar maturity as the debt item

1108. The respective relevant threshold for CQS 2 is the maximum of the two following figures:

1. The average of the two indices referred to in the previous paragraph
2. The yield on the CQS 2 index referred to in the previous paragraph plus 0.5 %.

CQS 3:

1109. The respective relevant threshold for CQS 3 is calculated in the same way as for CQS 2 (i.e. including the 0.5 % add-on) with the difference that the CQS 2 and CQS 4 indices are to be replaced by indices that have bonds with CQS 3 and CQS 4 as constituents and which meet the requirements 1, 2 and 4.

1110. Where differences in non-credit risk related factors between the bonds in the indices and the debt item other than illiquidity have a material impact on the yield difference (e.g. the effect of prepayment options), the insurer shall adjust the yield of the debt item to reflect these differences in order to ensure comparability"

Additional conditions

Borrower

- Corporate with limited liability
- Incorporated in EEA or OECD
- Majority of revenues are generated in EEA or OECD countries
- Has operated for at least 10 years without credit event
- Has been larger than a Small- Sized Enterprise as defined by the Commission Recommendation (2003/361/EC) in the last three years
- The borrower is contractually obliged to provide audited financial data to the lender at least annually and to notify him of any material events that could affect the credit risk.
- Covenants exist such that the issuer cannot unilaterally change the terms of the debt, or make other changes to the business, that materially affect the credit risk of the unrated debt issue. These should include, but are not limited to, a negative pledge clause, issue and issuer specific definitions of default events, and change of control clauses.

Debt item

- Senior debt: The item and other pari passu instruments have a rank senior to all other claims except for:
 - i. statutory claims;
 - ii. an immaterial amount (e.g. less than 5% of senior debt) of other debt that is more senior in the right of payment under certain circumstances;
 - iii. Claims of trustees; and
 - iv. Claims of derivatives counterparties.
- Bonds or loans that provide a fixed redemption payment on the date of maturity or before, as well as a return payment, in the form of a regular coupon payment on a fixed or floating interest rate basis; structured notes, collateralised securities and derivatives are excluded

Criteria internal process

- i. The insurer produces its own internal credit assessment of the debt item and allocates it to one of the following two categories:
 - a. For CQS 2: credit quality steps 3 and lower or credit quality step 2 and higher.
 - b. For CQS 3: credit quality steps 4 and lower or credit quality step 3 and higher.
- ii. The internal assessment and the allocation identify “qualifying” debt items reliably. For qualifying debt items the treatment as bonds and loans with an assigned credit quality step 2 respectively 3 determined in accordance with Title I Chapter I Section 2 in the spread risk sub-module adequately reflects the risks.
- iii. The assessment covers all factors with a material effect on the credit risk associated with the debt item.
- iv. The factors considered for the internal credit assessment include but are not be limited to:
 - competitive position
 - quality of management
 - financial policy
 - country risk (where relevant)
 - covenants
 - history of the company (number of years in operations etc.)

- diversification/size
 - Impact of the current debt issuance on the company (quantitative assessment of the ratios before and after the debt issuance)
 - Ownership structure of the company (especially relevant where the ultimate parent is a government body)
 - Complexity of the business model
- v. The internal assessment uses all relevant information (both quantitative and qualitative).
 - vi. The internal assessment and the allocation for each debt item is well documented.
 - vii. The internal assessment takes into account the characteristics of comparable companies with an external rating.
 - viii. The internal assessment takes into account the trends in the financial performance of the borrower.
 - ix. The internal assessment is independent from the underwriting function.
 - x. The internal assessment is subject to a regular validation.

Use of result approved internal models

1111. Where the insurer and a bank agree ex-ante on co-investing in bonds or loans described in the section "Scope", the insurer may determine the risk factors for all bonds and loans ("debt items") underwritten under this agreement in accordance with the requirements set out in the section "Determination of the credit quality step" provided the conditions set out in the section "Criteria on governance and risk management" are met.
1112. This is subject to the restriction that the sum of the debt items where the risk charge is determined with the internal assessment approach or based on the results of an approved internal model plus the equity investments to which the similarity approach is applied does not exceed 5 % of all investments.
1113. It is not possible to apply the approach only to a subset of the loans in which the insurer co-invests.
1114. The resulting risk factor for loans may be higher than determined in accordance with Article 176(4) and (5) of the Delegated Regulation.
1115. The insurer remains responsible for compliance with all the applicable requirements (e.g. prudent person principle) and should question the results of the internal model.

1116. Unless stated otherwise the provisions apply mutatis mutandis in case the standard formula insurer uses the results of an internal model as defined in Article 100 of Solvency II.

Scope

No external rating

1117. Only debt items for which a credit assessment by a nominated ECAI is not available in accordance with Article 5 of the Delegated Regulation.

Types of borrowers

1118. Debt issued by corporates

1119. All industries except for financial and infrastructure sector

1120. Borrowers not part of the same group as the insurer

Types of debt

1121. Both loans and bonds

Criteria on governance and risk management

i. Underwriting process

- a. Only IRB banks in the EU or EEA are eligible.
- b. Bank and insurer agree beforehand about the type of loans to be underwritten and the applicable assessment criteria.
- c. The borrowing entity is a corporate established in the EU or EEA with a majority of revenues from EEA or OECD countries which has been larger than a Small- Sized Enterprise as defined by the Commission Recommendation (2003/361/EC) in the last three years.

ii. Transparency criteria

- d. The bank provides sufficient details about the underwriting process, in particular criteria, organisational structure and controls.
- e. The bank provides data on all debt applications (i.e. also those rejected) .
- f. The bank provides details on why a debt application was accepted/rejected.

iii. Criteria for avoidance of cherry-picking/Adverse selection

- d. The bank retains an exposure of at least 50 % of the nominal value of the debt.
- e. The same underwriting criteria are applied to the debt items into which the bank and insurer co-invest as to other comparable loans that the bank underwrites alone.
- f. The insurer invests in all debt items that are in the pre-defined scope.

iv. Criteria on transparency regarding the functioning of the model

The bank provides the insurer with information that allows to understand the

internal model and its limitations, as well as its adequacy and appropriateness, in particular:

- Information on model description (i.e. input/risk factors, risk parameter quantification/method, history and methodology)
- Information on model use (i.e. internal use, reporting, calculation of own funds requirements)
- Information on model validation and other processes to ensure the appropriateness of the model (i.e. validation framework and results, internal audit results)

Determination of the credit quality step

Use of the results of a bank internal model

1122. The credit quality step of the debt item is determined based on the latest probability of default (PD) that the approved internal model of the bank has produced based on a “mapping” which meets the following requirements:

- a) The mapping ensures that the resulting level of capital for the debt items in scope under the spread risk sub-module is appropriate.
- b) For the mapping, Table 1 in Annex I of COMMISSION IMPLEMENTING REGULATION (EU) 2016/1799 (“the ITS”) is used.⁶²
- c) Where necessary to ensure compliance with (a), adjustments are made in a prudent manner to the PDs before the mapping as set out in (b) is applied.
- d) Reasons for adjustments include but are not limited to the qualitative factors set out in Article 7 of the ITS.
- e) An adjustment to the PD is always necessary where
 1. the time horizon covered by the internal model deviates significantly from the time horizon set out in Article 4(2) of the ITS
 2. the definition of default used in the internal model deviates significantly from the one set out in Article 4(4) of the ITS

Use of the results of an approved insurance internal model

1123. In case an approved insurance internal model produces credit quality steps, which ensure that the resulting level of capital for the debt items in scope under the spread risk sub-module is appropriate, these credit quality steps can be used.

⁶² The mapping does not include CQS 0. But this is not considered an issue given the limited number of AAA-rated smaller corporates.

11. Unlisted equity

11.1. Call for Advice

1124. EIOPA is asked to provide clear and conclusive criteria applicable to portfolios of equity from the European Economic Area (EEA) which are not listed, in order to identify those instruments which could benefit from the same risk factor as listed equity.
1125. Such criteria can be related to the characteristics of the portfolio, in particular the diversification achieved, either directly or through funds, and the transparency offered to the investor on the company in question, either by the fund manager or by the company itself. The consideration taken for environmental, social and governance aspects could also be taken into account.
1126. Such criteria can also be related to the asset management skills and strategy and to the insurer's own risk management system, to ensure their ability to pursue investments in unlisted equity and to manage properly risks related to them, either directly or through funds.
1127. These criteria should ensure that insurers have the ability to finance the development of companies in the EEA, regardless of their size or of the range of products offered, where they decide to dedicate sufficient resources to pursue and manage these investments and where these investments offer sufficient transparency.

11.2. Legal basis

1128. Unlisted equities other than strategic equity investments and investments in qualifying infrastructure are part of the type 2 equities as defined in Article 168(3) of the Delegated Regulation. The capital requirement for these type 2 equities is set out in Article 169(2)(b) of the Delegated Regulation.

11.3. Feedback statement on the main comments received to the consultation paper (EIOPA-CP-17-006)

Scope

- a. Summary of the comments received

1129. One stakeholder stated that - subject to the national interpretation of the definition of leverage - a large majority of AIFs/unlisted equities (especially the segment private equity) already receives the type 1 equity risk charge as it is covered by Article 168 (6) of the Delegated Regulation.

- b. Assessment

1130. See section "Scope"

Risk profile of private equity

a. Summary of the comments received

1131. Some stakeholders from the private equity industry argued that a risk charge of 39 % does not adequately reflect the low risk of private equity investments.

b. Assessment

1132. See section "Specificities of private equity"

Simplicity of the approach

a. Summary of the comments received

1133. A number of stakeholders from the insurance sector emphasised that the approach should be manageable and applicable in practice without high effort.

b. Assessment

1134. With the proposed beta approach the insurer can check the similarity criterion by performing some simple calculations. There is no judgement involved. Therefore EIOPA considers that the suggested approach is both clear and conclusive as well as easy to apply.

Alternative approach

a. Summary of the comments received

1135. Some stakeholders expressed a preference for a more qualitative approach.

b. Assessment

1136. See section "General approach to identify qualifying unlisted equities".

Similarity approach

a. Summary of the comments received

1137. A number of stakeholders from the insurance sector supported the similarity approach (notably the IRSG). Some suggestions for changes were made. Some critical comments were made about the assumptions and calculations underlying the two suggested methods.

b. Assessment

1138. Assessing the risk of unlisted equities is not a trivial task. In order to decide whether the same risk charge as for listed equities can be applied, EIOPA considers it a sensible approach to check the similarity of the unlisted equities to listed ones in terms of fundamental risk drivers.

1139. In addition, the alternatives proposed by stakeholders have meaningful disadvantages (see section "General approach to identify qualifying unlisted

equities”). Finally yet importantly, the proposed similarity approach has the advantage of simplicity.

11.4. Feedback statement on the main comments received to the consultation paper

1140. EIOPA published in April 2017 a call for evidence to gather stakeholder input on the topics of the additional request for technical advice.

Scope

a. Summary of the comments received

1141. Some stakeholders argued that the scope of the call for advice is too narrow and that a better treatment than type 1 for unlisted equities would be warranted (see section “Suggested approaches” in the consultation paper).

b. Assessment

1142. Irrespective of any other advantages or disadvantages of expanding the scope of the call for advice, based on the analysis EIOPA is currently not convinced of the merits of the proposed methods to derive an alternative lower risk charge.

Risk relevant factors

a. Summary of the comments received

1143. Some stakeholders voiced the view that the characteristics of private equity (longer holding period, different governance structure, investment strategy etc.) result in a different risk profile compared to listed equities and that these particularities should be taken into account. They argued also that the risk of forced sales for private equity is very limited and can be managed.

1144. Some stakeholders emphasised the importance of diversification and proper due-diligence before investing.

1145. Some stakeholders saw transparency and high quality information as a necessary condition before and after the investment is made, but considered this as not sufficient to lower investment risk substantially.

1146. Some stakeholders considered leverage and size to be relevant risk factors but emphasised that there are no significant differences in terms of the risk relevant factors between listed and buyout companies.

b. Assessment

1147. Based on the analysis EIOPA is not convinced that the mentioned specificities of private equity are relevant for the risk measurement under Solvency II (see section “Specificities of private equity”).

1148. The similarity approach that EIOPA suggests is only applicable for sufficiently diversified portfolios.

1149. EIOPA agrees on the importance of due-diligence.

1150. EIOPA agrees that transparency and disclosure are important.

Suggested approaches

a. Summary of the comments received

1151. One stakeholder suggested a calibration below the type 1 equity risk charge based on a study performed by CEPRES where the risk was measured with a large dataset based on annual net asset value (NAV) VaRs each calculated with 100.000 stress test scenarios.

1152. These investments should be in the form of an Alternative Investment Funds. Not more than 30% of the NAV should be allocated to one investment and the AIF portfolio should contain on average 6 to 8 investments. Information and reporting obligations under AIFMD should be relevant. Some other requirements were also suggested.

1153. Another stakeholder suggested two possible simple approaches: First an extension of the type 1 equities definition to listed and unlisted companies in EEA and OECD. Second, a risk charge for unlisted equities that is not more than 5 % higher than the type 1 risk charge.

b. Assessment

1154. With respect to the first proposal please see the section "Specificities of private equity".

1155. EIOPA agrees that the proposed two other approaches are simple but has doubts whether they are also sufficiently risk sensitive.

Further information

1156. Stakeholders provided a meaningful amount of information on investments in private equity (investment vehicles, due diligence, etc.)

11.5. Advice

11.5.1. Previous advice

1157. CEIOPS provided advice on the treatment of unlisted equities in the equity risk sub-module in the CEIOPS Advice on the equity risk sub-module and the QIS5 Calibration Paper.^{63,64}

⁶³ CEIOPS (2010): CEIOPS' Advice for Level 2 Implementing Measures on Solvency II: Article 111 and 304. Equity risk sub-module. CEIOPS-DOC-65/10.

⁶⁴ CEIOPS (2010): QIS5 Calibration Paper. CEIOPS-SEC-40-10.

11.5.2. Analysis

Scope

1158. Based on data from the annual reporting unlisted equities other than strategic participations, investments in financials and equities backing unit-linked business represent a low single digit percentage of all investments by European insurers.
1159. The call for advice restricts the scope to equity investments in companies in the EU/EEA.
1160. The proposed approach includes all industry sectors except financials and infrastructure. For infrastructure corporates there are already specific provisions in the Delegated Regulation. The rationale for excluding financials is explained in the section on the beta approach.
1161. The approach EIOPA proposes covers direct investments by insurers in unlisted equities.
1162. EIOPA explored diligently which other unlisted equity investments may be considered. One obvious candidate are private equity (PE) funds (and funds of funds).
1163. According to one stakeholder, a large majority of these investments already receive an equity risk charge of 39 % as they fall under Article 168(6) (c) of the Delegated Regulation.
1164. This provision states that closed-end unleveraged alternative investments funds (AIF) qualify for the type 1 equity risk charge.
1165. What "leverage" for AIF means is defined in the Alternative Investment Fund Manager Directive (AIFMD) and the related Level 2 texts.
1166. Some market participants stated in the consultation that there could be different interpretations of some of these provisions.
1167. More specifically, they claim that PE funds using borrowing arrangements as defined in Article 6(4) or derivatives for hedging currency risk as defined in Article 8(7) of Commission Delegated Regulation (EU) No 231/2013 might be classified as leveraged depending on the jurisdiction.
1168. The mentioned borrowing arrangements are temporary in nature and fully covered by contractual capital commitments from investors in the AIF. They arise when short-term borrowing facilities are used to bridge the period between the time payments are due and investors provide called up funds.
1169. After further exchanges with stakeholders, EIOPA decided to seek input from ESMA on its interpretation of the relevant provisions in the AIFMD and the related Level 2.

1170. As the topic arose relatively late in the process it was not possible to reflect the answer in this document. EIOPA will inform the European Commission about the result.
1171. If ESMA should answer that the use of borrowing arrangements or derivatives described in Par. 1169 would result in the fund being considered as leveraged under the AIFMD, then the following considerations apply:
1172. From a risk perspective the use of derivatives for currency hedging seems preferable to unhedged currency positions. The transactions have to meet the requirement that no incremental exposure, leverage or other risks are added. Moreover, the European Market Infrastructure Regulation (EMIR) has introduced mechanisms (in particular the obligatory exchange of variation margin) to reduce the counterparty risk of derivative transactions.
1173. The use of bridge loans seems from the perspective of the private equity fund investor less problematic in terms of the risk than "normal" leverage.
1174. The approach developed by EIOPA allows reflecting the risk of the arrangements mentioned above in the SCR calculation. In case the available information about the assets and liabilities of the fund should not be sufficient to perform a look-through as set out in Article 84 of the Delegated Regulation, then the type 2 equity risk charge applies.
1175. **In case** ESMA should answer as set out in paragraph 1175, EIOPA suggests therefore the following: The 39 % risk charge is applied to fund shares in private equity funds which use the arrangements described above (and therefore do not qualify under Article 168 (6)) but do not use other arrangements that result in them being considered as leveraged under the AIFMD, provided that the conditions in the sections "Beta method" and "Requirements on the investment vehicle and on the risk management of the insurer in the similarity approach" are met.
1176. With this amendment all private equity investments except potentially for "registered" AIF (see below) that stakeholders identified as relevant can qualify for the type 1 equity risk charge.
1177. The **alternative outcome** is that according to ESMA the use of borrowing arrangements or derivatives described in Par. 1169 would not result in the fund being considered as leveraged under the AIFMD.
1178. In this case, also without amendments all private equity investments except potentially for "registered" AIF (see below) that stakeholders identified as relevant can qualify for the type 1 equity risk charge. The EIOPA advice covers therefore only direct investments in unlisted equities by insurers.
1179. Some stakeholders from the private equity industry (there were notably no such comments from the insurance industry) also voiced concerns that AIF that are managed by AIFM as defined in Article 3(2) of the AIFMD ("registered" AIF) could not be considered as AIF as defined in Article 4(1)(a) of the AIFMD and would therefore not fall under Article 168(6) of the Delegated Regulation.

1180. EIOPA does not see incentives for standard formula insurers to invest in funds run by smaller Alternative Investment Managers as desirable. EIOPA also understands that these funds may often focus on venture capital investments. Finally, based on the lack of responses from the industry the matter seems to be of limited relevance for insurers.

1181. On this basis, EIOPA would not recommend an expansion of the type 1 equity risk charge to “registered” AIF **in case they should not already be captured by Article 168(6) of the Delegated Regulation.**

1182. In order to achieve legal clarity for stakeholders EIOPA decided nevertheless to ask ESMA also for a clarification whether AIF that are managed by AIFM as defined in Article 3(2) of the AIFMD (“registered” AIF) are not considered as AIF as defined in Article 4(1)(a) of the AIFMD.

General approach to identity qualifying unlisted equities

1183. The recommendation to introduce the approach described below for certain private equity investments **depends on the answer by ESMA** (see previous section “Scope”).

1184. EIOPA proposes the following approach:

Private Equity Funds

1185. A “look-through” to the underlying portfolio companies is performed. In case

- a. the risk profile of the unlisted companies is sufficiently similar to the listed companies which were used to derive the type 1 risk charge;
- b. the investment vehicle does not add material risks; and
- c. additional requirements on risk management are met

the type 1 equity charge can be applied to the equity investments in the unlisted companies.

1186. The overall risk charge on the fund share in a private equity fund is then determined based on the look-through approach set out in Article 84 of the Delegated Regulation.

Direct Investments

1187. For direct investments only the points a. and c. above apply.

1188. This approach focuses on the underlying risks and compliance with the criteria is easy to check. One underlying assumption is that the risks of similar listed and unlisted companies are not materially different as the risks resulting from illiquidity can be adequately managed.

1189. Stakeholders suggested an alternative approach based on risk management in which the insurer would have to implement certain internal processes and procedures to benefit from a more favourable treatment.

3. While the EIOPA proposal incorporates some risk management requirements, the alternative approach is not deemed suitable for the following reasons:
- a. It is unclear how requirements on risk management, governance, transparency etc. alone result in risk similar to type 1. Equity investments carry inherent risks as they represent residual claims on the cash flows generated by companies. Risk management is crucial but cannot turn investments in higher risk companies into low risk investments. The similarity approach provides an objective quantitative measure for the risk of the equity investments.
 - b. Insurance stakeholders have emphasised that any approach should be manageable and applicable in practice without high effort. With the alternative approach the insurer has to develop criteria for unlisted equity investments with a risk similar to type 1 equities. Then processes have to be set up. Finally, there might be discussions with the supervisor on their appropriateness. In contrast, the similarity approach involves some simple and objective calculations.
 - c. The higher degree of judgement involved in a purely qualitative approach renders a harmonised approach across Europe more difficult.

Similarity approach: Introduction

1190. Unlisted equities do not trade on exchanges. This makes it more difficult to exit or adjust a position. Unlisted equities should not benefit from the absence of market prices (e.g. by using private valuations for the risk measurement). The similarity approach assumes that taking a public company private or listing a previously private company does not necessarily alter the risk. At the same time, the assumption is made that the risks resulting from the illiquidity can be largely mitigated. This is similar to the approach taken for debt in the Delegated Regulation, which makes no distinction between traded bonds and loans with the same credit quality step.
1191. The approach includes conditions on the vehicle used to gain exposure in order to avoid the creation of additional risks.
1192. EIOPA explored two possibilities for measuring the fundamental risk of the underlying companies: The Beta method and the stressed period loss method.
1193. Beta is established in the investment industry and academia. Moreover, it allows using more risk relevant factor. For these reasons EIOPA has chosen the beta method which is described in the next section.

Beta method

Overview

1194. The beta method uses the hypothetical beta of a portfolio of unlisted equity to determine its riskiness. It consists of the following simple steps:

1195. First, the hypothetical beta for each individual unlisted equity investment is calculated using a pre-defined function with selected financial ratios of the company as inputs ("beta function"). Second, the portfolio beta is calculated as the average of the individual betas weighted by the book values of the equity stakes. Third, if the beta of the portfolio does not exceed the cut-off value of 0.39/0.49, then the type 1 charge is applied.
1196. Beta measures the change in the excess individual stock return of an individual stock in response to a 1% change in the excess stock market return.⁶⁵ It is a well-known measure of the systematic (i.e. the non-diversifiable) risk of (a portfolio of) stocks. The lower the beta, the lower the systematic risk. Beta is often used in both academia⁶⁶ as well as practice.
1197. Beta is calculated by dividing the covariance between the return on an individual stock and the stock market return by the variance of the stock market return. Since individual stock returns are unavailable for unlisted equity, EIOPA determined a function to calculate the beta for an unlisted firm based on its financial ratios. This function is calibrated using betas and financial ratios for listed firms.
1198. EIOPA based the calibration on a data set that excludes financial companies since their financial ratios are very different from non-financial companies. This means that the beta approach is not accurate for financial companies and insurers have to apply the type 2 charge as set out in the current regulation instead.

Calibration

1199. EIOPA derived the beta function based on data downloaded from Bloomberg for the non-financial companies in the Stoxx 600 index. The data included the company betas for the period 2014 to 2016 calculated with monthly returns and the MSCI Europe index as market proxy. It also contains a large amount of information on firm characteristics (leverage, growth, margins, returns, stability, liquidity and size).
1200. A linear regression was estimated with OLS using the beta as dependent variable and a constant and a selection of the firm characteristics as independent variables. The latter were selected based on their statistical explanatory power and correlation with other firm characteristics.
1201. There is a trade-off between accuracy and simplicity. Models with fewer variables are simpler and therefore more intuitive and easier to use, but are less accurate.
1202. EIOPA opted for a smaller model with three explanatory variables since it is accurate enough. This model incorporates only the most significant variables with p-values smaller than 1%.

⁶⁵ The excess return is the return in excess of the risk-free rate.

⁶⁶ The Nobel Prize in Economics in 1990 was in part awarded for work on beta.

1203. Table 11.1 shows the results for the chosen model. It contains one constant and three variables that are all statistically significant and have sufficient explanatory power. With an overall R^2 of 19.7 % the fit is sufficient if the portfolio contains enough assets (see analysis in the following section).

1204. The beta for an individual company is calculated by multiplying the values in the column "coef" with the company specific values and then adding up these products. Hence, the beta is equal to **0.9478 – 0.0034*AvgGrossMargin + 0.0139*TotalDebt/AvgCFO – 0.0015*Avg Return on Common Equity**.

1205. In this formula "Avg" means the average of the annual figures for the last five financial years. Otherwise the value at the end of the last financial year has to be used.

Table 11.1: Regression results

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OLS Regression Results

Dep. Variable:	Beta monthly observed three years	R-squared:	0.197
Model:	OLS	Adj. R-squared:	0.189
Method:	Least Squares	F-statistic:	24.90
Date:	Tue, 23 Jan 2018	Prob (F-statistic):	1.97e-14
Time:	13:30:51	Log-Likelihood:	-24.540
No. Observations:	308	AIC:	57.08
Df Residuals:	304	BIC:	72.00
Df Model:	3		
Covariance Type:	nonrobust		

	coef	std err	t	P> t	[0.025	0.975]
const	0.9478	0.036	26.058	0.000	0.876	1.019
Avg Gross Margin	-0.0034	0.001	-4.899	0.000	-0.005	-0.002
Total Debt/Avg CFO	0.0139	0.003	4.142	0.000	0.007	0.021
Avg Return on common Equity	-0.0015	0.000	-3.002	0.003	-0.002	-0.001

Omnibus:	8.828	Durbin-Watson:	2.110
Prob(Omnibus):	0.012	Jarque-Bera (JB):	10.217
Skew:	-0.288	Prob(JB):	0.00605
Kurtosis:	3.681	Cond. No.	129.

Warnings:

[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.

Cut-off point

1206. As mentioned above a cut-off point of 0.39/0.49 is used, i.e. the type 1 shock is only applied if the portfolio beta does not exceed this value.

1207. The cut-off value is chosen for three reasons: First, only relatively safe portfolios of unlisted equity should qualify for the lower type 1 equity shock. Portfolios with a beta of 1 have average risk, while diversified portfolios with betas not higher than 0.39/0.49 are relatively safe.

1208. Second, a relatively low value provides a very high degree of certainty that portfolios with betas higher than 1 do not qualify.

1209. Third, investments in unlisted companies are typically riskier than in listed ones due to their lower liquidity. In order to compensate for this risk portfolios of unlisted companies should have a beta of at most 0.39/0.49 to ensure that their beta times the higher type 2 equity shock of 49% is at most 39%.

Accuracy of the method

1210. The accuracy of the method is analyzed in the following way: First, one million portfolios are created by randomly selecting non-financial Stoxx 600 companies. Second, the resulting portfolios are sorted into brackets based on their observed historical portfolio beta. Third, for each portfolio it is decided whether a type 1 or type 2 equity shock should be applied based on the portfolio beta estimated with the formula above and a cut-off point of 0.39/0.49. Fourth, the percentage of portfolios is calculated that are assigned the type 1 equity shock for each bracket.

1211. Table 2 illustrates the accuracy of the method. The first two columns contain the lower and upper bound for the portfolio beta for each bracket. The last four columns provide the percentage of portfolios that are assigned the type 1 equity shock for portfolios consisting of 2, 10, 20 and 50 equity investments. Ideally, this percentage is high for the lower brackets and low for the higher brackets. A value of 0.99 means for example 99%.

Table 11.2: Correct allocation for different portfolio betas

LB	UB	Assets: 2	Assets: 10	Assets: 20	Assets: 50
-10.00	0.65	0.544010	0.525972	0.516120	0.576068
0.65	0.70	0.496042	0.447521	0.418151	0.389719
0.70	0.75	0.435755	0.388141	0.344906	0.264367
0.75	0.80	0.372426	0.327140	0.260969	0.156697
0.80	0.85	0.328910	0.259483	0.182052	0.075815
0.85	0.90	0.323269	0.193748	0.111642	0.030486
0.90	0.95	0.311824	0.133524	0.060657	0.011424
0.95	1.00	0.280445	0.085122	0.030797	0.007423
1.00	1.05	0.256080	0.046761	0.015020	0.008071
1.05	1.10	0.200301	0.025687	0.008396	0.000000
1.10	1.15	0.160241	0.014317	0.010735	0.028571
1.15	10.00	0.041429	0.008171	0.008351	0.000000

1212. The table shows several important results: First, it illustrates the case for a relatively low cut-off point: For example, more than 99% of the 50-asset portfolios in the (1.00, 1.05] beta bracket do not qualify for the type 1 equity treatment. The drawback is of course that several relatively safe portfolios do not meet the requirement. As an example the correct type 1 shock is only applied to 58 % of the 50-asset portfolios in the lowest bracket.

1213. Another important result is that the accuracy improves with higher diversification. For example, 28% of the two equities portfolios in the bracket (0.95, 1.00] receive the (incorrect) type 1 treatment, whereas this figure decreases to less than 1% for the 50-equities portfolios. This suggests that for sufficiently diversified portfolios imprecisions in the beta formula average out.

1214. In summary, the method correctly disqualifies riskier portfolios with higher betas allowing the identification of safer portfolios in a prudent way.

1215. Based on the analysis each equity investment should not represent more than 10 % of the total value for the unlisted equity portfolio since the method is more accurate and beta is a more valid risk measure for more diversified portfolios.

Requirements on the investment vehicle and on the risk management of the insurer in the similarity approach

1216. The beta method ensures a sufficient similarity between the unlisted companies and the listed companies that were used to calibrate the type 1 equity risk charge. Unless the insurers invests directly, the investment vehicle should also meet certain conditions that prevent the creation of material additional risks. Finally, the risk management of the insurer should meet certain requirements.

1217. These requirements are discussed in the following:

Underlying investments

1218. The approach covers investments in the common equity of companies that are unlisted.

1219. The company should be established in the EU or EEA with a majority of revenues from EEA or OECD countries. It should have been larger than a Small- Sized Enterprise as defined by the Commission Recommendation (2003/361/EC) in the last three years.

1220. The latter requirement excludes companies which are very small or do not yet have marketable products.

1221. The call for advice refers to companies in the EU/EEA. The majority of staff that the company employs should consequently be located in the EU/EEA.

1222. Similar to unrated debt EIOPA recommends that the application of the similarity approach as well as the approaches suggested for unrated debt is restricted to 5 % of all investments.

Vehicle

1223. The following applies for obvious reasons only to investments in private equity funds.

1224. Only Alternative Investment Funds as defined in Directive 2011/61/EU of the European Parliament and of the Council ("AIFM Directive") should qualify.

1225. Other vehicles play according to stakeholders virtually no role. The AIF is also an established format with existing provisions that cover areas like disclosure and governance.

1226. In order to avoid that AIF other than private equity funds qualify the following requirements should be met:

- i. The fund invests in unlisted companies, listed companies that are to become unlisted as a result of the investment by the fund or listed companies as the temporary consequence of exiting the investment.
- ii. The investment strategy includes the intention to remain invested in the underlying companies for a number of years.
- iii. The manager of the fund has the power to appoint a director to the boards of the underlying companies. She or he takes an active role in the governance of the company with the aim to bring about a significant development or transformation.

1227. As the underlying companies are illiquid, the fund should be closed-end.

1228. The AIF uses only leverage as defined in Article 6(4) and Article 8(7) of Commission Delegated Regulation (EU) No 231/2013 (see discussion in section "Scope").

Diversification

Private Equity Funds

1229. Exiting from the investment is not easy and there are significant differences in the performance of funds. The insurer should therefore spread its investment across at least five independent fund managers.

Transparency

Private Equity Funds

1230. The insurer should have all information necessary to assess the performance of the fund manager (e.g. P&L, cash flows and profits of the portfolio companies at a meaningful level of aggregation) as well as for a proper due-diligence before investing.

1231. The requirements in the previous paragraph may already be covered by existing requirements on Alternative Investment Funds.

Direct investments

1232. Requirements seem unnecessary, as the insurer directly investing in a company should be able to obtain the necessary information.

Own risk management

Private Equity Funds

1233. Exiting these illiquid investments is very difficult and the abilities of the managers are very important. At the same time, a reduced risk charge applies.

1234. Therefore the following requirements should be met (which might partially or fully overlap with already existing requirements) in addition to any other relevant provisions:

- a. The insurer computes the portfolio beta whenever the SCR is calculated.
- b. The insurer follows a due diligence process prior to invest in the fund, which includes but is not limited to:
 - i. qualitative and quantitative analysis of the companies in which the manager has invested with its prior funds
 - ii. obtaining information on how the fund is managed and the processes followed before investing
- c. The insurer assesses the fitness of the fund manager on an on-going basis.
- d. The insurer benchmarks the performance of the fund against comparable funds.
- e. The insurer verifies that there are regular and reliable reporting lines between the fund manager and the undertaking.
- f. The insurer is able to challenge the investment decisions made by the fund manager (this implies that the fund manager provide sufficient information on the underlying assets).
- g. The insurer verifies that the manager of the fund regularly interacts with the management team of the companies in which the fund invests.

Direct investments

1235. The requirement a. applies also to direct investments.

1236. The table below summarises the considerations above:

Dimension	Criteria
Underlying investments	Common equity of unlisted companies Company established in the EU or EEA with a majority of revenues from EEA or OECD countries Company has been larger than a Small- Sized Enterprise as defined by the Commission Recommendation (2003/361/EC) in the last three years Majority of company staff located in EU/EEA
Vehicle	Private Equity Funds AIF Closed-end Only leverage as defined in Article 6(4) and Article 8(7) of Commission Delegated Regulation (EU) No 231/2013 Investments in unlisted companies, companies that are being taken private or temporary investments in companies that have been listed Intended holding period of a number of years Power to appoint a director to board of underlying companies. Active role in governance with aim of significant development or transformation
Diversification	Private Equity Funds At least 5 independent fund managers
Transparency	Private Equity Funds Necessary information for assessment of fund manager performance and due-diligence available
Own risk management	Private Equity Funds Regular calculation of portfolio beta Due diligence prior to investment including but not necessarily limited to: (i) Qualitative and quantitative analysis of companies the fund manager has previously invested in; and (ii) Evaluation of information on how fund is managed and its decision processes On-going assessment of fund manager fitness Benchmarking of fund performance Verification of regular and reliable reporting lines between fund manager and portfolio companies Ability of the insurer to challenge the investment decisions of fund manager Verification of regularly interaction between fund manager and management teams of portfolio companies Direct investments Regular calculation of portfolio beta

ESG factors

1237. One of the factors that the call for advice asks EIOPA to consider is the consideration taken for environmental, social and governance aspects.

1238. Respondents to the call for evidence mentioned that a number of Private Equity funds is managed according to ESG criteria (e.g. the Principles for Responsible Investment).⁶⁷

1239. Compliance with ESG criteria could be ensured by requiring a declaration of the investment managers that they conform to certain ESG standards. A more restrictive but also more expensive alternative would be to require an external assessment.

⁶⁷ <https://www.unpri.org/about>

1240. EIOPA considered whether any requirements regarding ESG factors should be included in the advice.

1241. The similarity approach measures whether the portfolio of unlisted companies is sufficiently similar to listed companies used for the type 1 equity calibration.

1242. EIOPA did therefore not see the necessity to include ESG factors in the proposed requirements.

Specificities of private equity

1243. Stakeholders from the private equity industry argue that there are certain specificities of private equity investments that justify a reduction in the calibration.

1244. One argument for a lower risk is the supposed better corporate governance compared to public companies. This could result in a better risk profile over the medium to long term. However, irrespective of the merits this argument might have, there can be doubts whether there is a reduction over the 12-month period relevant for the Solvency II risk measurement.

1245. Another argument is the degree of diversification that Private Equity investments achieve. While diversification in terms of the number of companies reduces the risk, some other aspects have to be considered as well: The listed companies that were used for the calibration of the type 1 risk charge are much larger and therefore more diversified in terms of business lines and geography than typical companies in which PE funds invest.

1246. Moreover, the marginal risk reduction from investing in more companies decreases with the number of investments (i.e. the diversification benefit from adding another company to an existing portfolio of 100 companies is much lower than for a portfolio with 20).

1247. Some stakeholders have argued that the evaluation of the risk for private equity should be based on Net Asset Values (i.e. mark to market or mark to model valuations). The topic has been discussed in detail in the Long Term Investments report that EIOPA published in 2013.⁶⁸ Based on the available information EIOPA would maintain the position expressed then: It does not seem warranted to give PE credit for the fact that the investment is illiquid and that market prices are not available.

⁶⁸ EIOPA (2013): Technical Report on Standard Formula Design and Calibration for Certain Long-Term Investments. EIOPA/13/513.

11.5.3. EIOPA's advice

1248. Direct investments in the equity of companies where the applicable conditions set out in the sections "Criteria on underlying equity investments", "Criteria on own risk management" and "Criterion on similarity" are met should be covered in the type 1 equity risk sub-module.

1249. *EIOPA suggests the following provisions for certain private equity investments **only in case** ESMA should confirm that private equity funds only using borrowing arrangements as defined in Article 6(4) or derivatives for hedging currency risk defined in Article 8(7) of Commission Delegated Regulation (EU) No 231/2013 would be considered as leveraged under the AIFMD (and would therefore not fall under the provision of Article 168(6) of the Delegated Regulation).*

1250. The equity risk charge for fund shares in private equity funds or private equity fund of funds where the applicable conditions set out in the sections

- i. "Criteria on underlying equity investments"
- ii. "Criteria on vehicle"
- iii. "Criteria on own risk management"; and
- iv. "Criterion on similarity"

are met, should be calculated based on the look-through approach set out in Article 84 of the Delegated Regulation applying the type 1 equity risk charge for the non-listed portfolio companies.

1251. This is subject to the restriction that the sum of

- i. the debt items where the risk charge is determined with the internal assessment approach
- ii. the debt items where the risk charge is determined based on the results of an approved internal model; and
- iii. the unlisted equity investments to which the similarity approach is applied

does not exceed 5 % of all investments.

Criteria on underlying equity investments

1252. Investments in the common equity of companies that are unlisted

1253. The companies are established in the EU or EEA with a majority of revenues from EEA or OECD countries.

1254. The companies have been larger than a Small- Sized Enterprise as defined by the Commission Recommendation (2003/361/EC) in the last three years.

1255. The majority of staff that the companies employ are located in the EU/EEA.

1256. For companies from industry sectors which are not covered in the criterion on similarity the type 2 equity risk charge should be applied.

Criteria on vehicle (only for private equity investments)

1257. Alternative Investment Fund (AIF) as defined in Directive 2011/61/EU of the European Parliament and of the Council ("AIFM Directive").

1258. The AIF is closed-end.

1259. The fund uses only leverage as defined in Articles 6(4) and Article 8(7) of Commission Delegated Regulation (EU) No 231/2013.

1260. The AIF meets the following requirements:

- i. The fund invests in unlisted companies, listed companies that are to become unlisted as a result of the investment made by the fund or listed companies as the temporary consequence of exiting the investment.
- ii. The investment strategy includes the intention to remain invested in the underlying companies for a number of years.
- iii. The manager of the fund has the power to appoint a director to the Boards of the underlying companies and takes an active role in the governance of the company with the aim to bring about a significant development or transformation.

Diversification

1261. The insurer invests through at least five independent fund managers.

Transparency

(These requirements may already be covered by existing requirements on Alternative Investment Funds or in Solvency II)

1262. The insurer has all the information necessary to assess the performance of the fund manager (e.g. P&L, cash flows and profits of the portfolio companies at a meaningful level of aggregation) as well as for a proper due-diligence before investing.

Criteria on own risk management

Private Equity Investments

1263. In addition to any other relevant provisions the following requirements should be met (which might partially or fully overlap with already existing requirements):

- i. The insurer computes the portfolio beta whenever the SCR is calculated.
- ii. The insurer follows a due diligence process prior to investing in the fund, which includes but is not limited to:
 - i. qualitative and quantitative analysis of the companies in which the manager has invested with its prior funds
 - ii. obtaining information on how the fund is managed and the processes followed before investing
- iii. The insurer assesses the fitness of the fund manager on an on-going basis.
- iv. The insurer benchmarks the performance of the fund against comparable funds.
- v. The insurer verifies that there are regular and reliable reporting lines between the fund manager and the undertaking.
- vi. The insurer is able to challenge the investment decisions made by the fund manager (this implies that the fund manager provide sufficient information on the underlying assets).
- vii. The insurer verifies that the manager of the fund regularly interacts with the management team of the companies the fund invests.

Direct investments

1264. The requirement i. applies also to direct investments.

Similarity criterion

1265. The approach can only be applied for portfolios where each equity investment does not represent more than 10 % of the portfolio value.

1266. The beta of the unlisted equity portfolio is determined in the following steps:

i. The hypothetical beta for each individual unlisted equity investment is calculated using the function set out below.

ii. The portfolio beta is calculated as the average of the individual betas weighted by the book values of the equity stakes.

1267. The similarity criterion is met if the beta of the portfolio does not exceed the cut-off value of 0.39/0.49.

1268. The beta for an individual unlisted equity investment is calculated with the formula: $0.9478 - 0.0034 * \text{AvgGrossMargin} + 0.0139 * \text{TotalDebt/AvgCFO} - 0.0015 * \text{Avg Return on Common Equity}$.

1269. In this formula "Avg" means the average of the annual figures for the last five financial years. Otherwise, the value at the end of the last financial year has to be used.

12. Strategic equity investments

12.1. Call for Advice

1270. EIOPA is asked to provide information on the application of the criteria of the Delegated Regulation for the identification of strategic equity investments by insurance and reinsurance undertakings as well as by National Supervisory Authorities ("NSAs"). Within the context of the Capital Markets Union, EIOPA is in particular asked to provide information on the investments currently covered by this asset class and by each Member State, notably in terms of size and sector of the underlying corporates, the purpose for the insurance undertaking of the investments, and in terms of size and type of the share and of holding period by the insurance or reinsurance undertaking.

12.2. Legal basis

Delegated Regulation

1271. The Delegated Regulation – with particular reference to Articles 169 to 171 – sets out specific risk factors for strategic equity investments, provided they satisfy certain criteria. This reduced calibration should reflect the likely reduction in the volatility of their value arising from their strategic nature and the influence exercised by the participating undertaking on those related undertakings.

1272. Equity investments of a strategic nature can benefit from a reduced risk charge of 22 %, when they meet the requirements of Article 171 of the Delegated Regulation.

Article 171 - Strategic equity investments

For the purposes of Article 169(1)(a) and (2)(a) and of Article 170(1)(b) and (2)(b), equity investments of a strategic nature shall mean equity investments for which the participating insurance or reinsurance undertaking demonstrates the following:

(a) that the value of the equity investment is likely to be materially less volatile for the following 12 months than the value of other equities over the same period as a result of both the nature of the investment and the influence exercised by the participating undertaking in the related undertaking;

(b) that the nature of the investment is strategic, taking into account all relevant factors, including:

(i) the existence of a clear strategy to continue holding the participation for long period;

(ii) the consistency of the strategy referred to in point (a) with the main policies guiding or limiting the actions of the undertaking;

(iii) the participating undertaking's ability to continue holding the participation in the related undertaking;

(iv) the existence of a durable link;

(v) where the insurance or reinsurance participating company is part of a group, the consistency of such strategy with the main policies guiding or limiting the actions of the group.

Guidelines

1273. EIOPA has also developed guidelines⁶⁹ on this topic (below is an extract).

Guideline 3 - Identification of a strategic participation (set of guidelines on treatment of related undertakings, including participations)

Participating undertakings should identify strategic participations in accordance with Article 171 of Commission Delegated Regulation 2015/35 as follows:

(a) participating undertakings using the standard formula to calculate their SCR should identify strategic participations regardless of whether their participation is in an insurance or reinsurance undertaking, in a financial or credit institution or in any other related undertaking;

(b) participating undertakings using an internal model to calculate their SCR need to identify strategic participations in financial and credit institutions only for the purpose of assessing whether Article 68(3) of Commission Delegated Regulation 2015/35 applies.

For the purpose of demonstrating their compliance with the requirements of Article 171 of Commission Delegated Regulation 2015/35, participating undertakings should not divide a participation into different parts, treating some parts as strategic and others not. Where a particular participation has been identified as strategic:

(a) in the case of a participation in a financial or credit institution, all investments in its own funds are strategic;

(b) in the case of any other related undertaking, all equity investments in the participation are strategic.

In demonstrating that the value of the equity investment is likely to be materially less volatile, in accordance with Article 171(a) of Commission Delegated Regulation 2015/35, participating undertakings should ensure that:

(a) consistent and appropriate valuations are applied over time both to the participation and to the other equities selected as a basis of comparison;

(b) they consider the impact of their influence on the participation's value.

In demonstrating that the nature of the investment is strategic, in accordance with Article 171(b)(i) to (iii) of Commission Delegated Regulation 2015/35,

participating undertakings should:

(a) indicate the period for which the strategy of holding the participation is intended to apply;

(b) consider the impact of market conditions on the main policies;

⁶⁹ https://eiopa.europa.eu/Publications/Guidelines/TRU_Final_document_EN.pdf

(c) identify any significant factors affecting, or constraints on, the participating undertaking's ability to maintain its strategy and how these could or would be mitigated.

In demonstrating the existence of a durable link, in accordance with Article 171(b)(iv) of Commission Delegated Regulation 2015/35, participating undertakings should consider the following criteria:

(a) whether a stable relationship between the two undertakings exists over time;

(b) whether that stable relationship results in a close economic bond, the sharing of risks and benefits between the undertakings or exposure to risks from one to the other;

(c) the form of the relationship between the two undertakings, which may include ownership, joint products or distribution lines, cross-selling, the creation of joint ventures or other long term operational or financial links.

In accordance with Article 171(b)(v) of Commission Delegated Regulation 2015/35, a participating undertaking that is part of a group should regard the main policies guiding or limiting the actions of the group as those defined by the ultimate parent undertaking or, if different, by the undertaking which sets the main policies for the group as a whole.

Participating undertakings should document their consideration of the matters set out in Article 171 of Commission Delegated Regulation 2015/35 and paragraphs 1.21 to 1.25, including any other relevant factors, together with relevant supporting material.

12.3. Feedback statement on the main comments received to the consultation paper (EIOPA-CP-17-006)

a. Summary of the comments received

1274. Stakeholders have welcomed the Commission's initiative put forward in the Call for Advice and the subsequent EIOPA's request for information to NSAs on strategic participations and on how the related qualifying criteria are applied in practice.

Critical elements of the framework

1275. Stakeholders that have commented the consultation paper have highlighted the following critical elements of the current framework contained in the Delegated Regulation:

- the approach for evaluating strategic participations on the basis of lower volatility is not considered appropriate, because in their opinion this criterion would not reflect the actual risks of such assets for insurers who take a long-term strategic view; therefore, the criterion in Article 171 (a) - requiring the demonstration of lower volatility in the next 12 months - is considered to be very difficult to be applied in practice because in contradiction with the long-term horizon associated with the nature of strategic participations;
- the minimum ownership and control threshold of 20% for an investment to qualify it as a strategic participation is considered too high; this

requirement is deemed to be unnecessary restrictive, particularly when considered alongside the other Article 171 criteria such as strategy to hold and ability to hold for a long period.

Proposal of review of the current framework

1276. Stakeholders have expressed that amending of the criteria of the article 171 would: i) make the strategic equity participations treatment workable in practice; ii) help improve identification of strategic participations and iii) help support increasing allocation to such assets, which are linked to long-term holding strategies that support the CMU objectives.

1277. More in particular, stakeholders have suggested the following proposals of review of the current regulation of article 171:

- the criteria should focus on the actual risks for an insurer and on the strong links between the insurer and the investee company, putting emphasis on the long-term holding capacity of the insurer and on its commitment to the activity of the investee company;
- the criterion in Article 171 (a), requiring the demonstration of lower volatility in the next 12 months, should be removed;
- the minimum ownership and control threshold for an investment to qualify it as a strategic participation should be reduced from 20% to 10% or 5%, applying the criteria for 'qualifying holding' as defined in Article 13 (21) of the Solvency II Directive, rather than the criteria for 'participation' (as defined in Article 13 (20)); it has been highlighted that Investments can be of a strategic nature for both, the investing and the participated companies, even if the ownership and control participation in the participation is lower than 20%;
- it is also observed that EIOPA could consider a separate sub-module for long-term equity investments.

b. Assessment

1278. EIOPA took note of stakeholders' request to further work on the criteria of Article 171 of the Delegated Regulation. However the scope of the Commission call for advice was restricted to EIOPA providing factual information, hence EIOPA did not consider policy options at this stage.

12.4. Responses provided by NSAs on strategic equity investments

1279. In order to provide the European Commission with the information and advice requested on strategic equity investments, EIOPA sent a questionnaire to the NSAs. The outcome of the questionnaire is summarised below.

12.4.1. Specific information on the strategic equity investments

1280. NSAs mention that at this stage there is limited information about these investments because there is so far not a lot of experience with this standard formula item. Those NSAs that have analysed the issue report that only a

limited number of undertakings in each market apply the provisions for strategic equity investments – with particular reference to Articles 169 to 171 of the Delegated Regulation.

1281. It is often mentioned that strategic investments are not material in certain markets. However, other NSAs have identified undertakings with a significant proportion of their assets in strategic investments (over 50%). Often, the undertakings have a very large proportion of the participating equity (100% or close to it) and the participated entities are insurance undertakings within the same insurance group.

12.4.2. Information on the criteria of Article 171 of the Delegated Regulation

Volatility assessment

1282. According to 171 (a), in order to qualify an equity investment as “strategic”, the insurer must demonstrate that the equity investment is likely to be materially less volatile for the following 12 months than the value of other equities over the same period as a result of both the nature of the investment and the influence exercised by the participating undertaking in the related undertaking.

1283. The majority of NSAs that have analyzed the issue mentioned that it is difficult to demonstrate that those criteria are met, particularly for unlisted equity investments. The demonstration of the lower volatility in the next 12 months has proven to be difficult for undertakings which intend to hold these participations over a longer time period.

1284. NSAs with experience on strategic equity investments report that for non-listed equities the lower volatility is often demonstrated by comparing financial statements or historical returns with those of competitors. For listed equities often an annual comparison between the volatility of the value of the strategic equity investment and the value of a benchmark index or a competitor is performed.

1285. Several NSAs rely, often exclusively, on qualitative information, such as the nature of the participated business and whether it is complementary to the undertaking (the most mentioned sectors are support services such as real estate, reinsurance, claims management, sales and marketing), the influence of the undertaking (by voting rights, presence in the AMSB, involvement on policymaking) or material transactions or the provisioning of essential technical information.

Clear strategy to hold

1286. NSAs report that undertakings mainly use already available information to prove the existence of a clear decisive strategy to continue holding the participation for long period such as the group strategic plan, ORSA, contingency plans, documents on governance, management actions, ALM policy, investment policy or internal agreements between the participating and the related undertaking.

1287. In some cases also past movements in the held share of the capital, the voting rights of the participating company in the related company or the nature of the participation as a proxy for the strategy to hold the investment (complementary business model) are taken into account.

Ability to hold for a long period

1288. Concerning the undertakings' ability to continue holding the participation for a long period, NSAs evaluate the financial strength of the undertaking, often based on cash-flow projections, the general ALM management and liquidity risk management of the undertaking.

1289. It is also reported that in some cases liquidity stress tests are conducted to ensure that, even in stressed situations, the undertaking would be able to keep holding the participation.

Durable link

1290. Regarding the existence of a durable link, several NSAs take into account the influence of the undertaking in the administrative, management or supervisory body (AMSB) or policy-making processes of the strategic participation. This is often verified in the undertaking's strategic plan or ORSA.

1291. In addition, also the integration of the participation within the undertaking's strategy or business model, including material transactions or the provisioning of essential technical information, the sharing of risks and benefits or exposure to risks or joint products or distribution lines, cross-selling arrangements and the creation of joint ventures are considered.

1292. A few NSAs also regard the holding of a significant share of voting rights or equity in the strategic participation (over 50%) as a valid durable link. In other cases the durable link is demonstrated by referring to the governance structure.

Consistency with the group strategy

1293. For most of the NSAs with experience on the issue, the consistency of the strategy of the participating company to continue holding the participation for a long period with the main policies guiding or limiting the action of the group is guaranteed by a strategic and planned dialogue among entities, that allows highlighting benefits and risks.

1294. In particular, the consistency is often demonstrated on the basis of strategies included in the business plan, business models, contingency plans, management actions, ALM policy, investment risk management policy, or liquidity risk management policy of the group.

1295. In many cases it can be proved that the nature of the investment is driven by the group strategy, which defines the investments strategy and the related governance.

1296. It is also highlighted that all entities within the group are subject to a "College of Supervisors", in turn promoting supervisory convergence.

1297. There was also the observation that when the majority of holdings are insurance undertakings already supervised, or ancillary service undertakings, there might be no reasons to require insurance companies to provide specific evidence of consistency with the group strategy.

1298. Further criteria/evidence considered where demonstrating the strategic nature of an equity investment, compared to those considered by the Article 171 of the Delegated Regulation.

1299. Further criteria/elements considered where demonstrating the strategic nature of an equity investment, as reported by NSAs, are indicated below:

- the existence of a prospective liquidity analysis embedded in the ORSA based on the ability of holding the strategic investment over the long term even in stressed market conditions;
- assessing the long-term nature of the investments by referring to the historical experience (for how long has the equity investment already been held) or by requiring a specific number of years of holding the participation;
- regarding the degree of control, introducing a minimum threshold of the share in the capital;
- specifying what kind of index or equity is appropriate to analyze volatility;
- assessing the undertaking's right to appoint director(s) in the participated entity;
- requiring a clear business rationale for the strategic equity investment (joint venture or investment in a business that provides key services to the company);
- asking the company's AMSB to evaluate the strategy (e.g. within the mid-term planning) and to give the declaration of its intentions in its future business plan.

12.4.3. Quantitative analysis

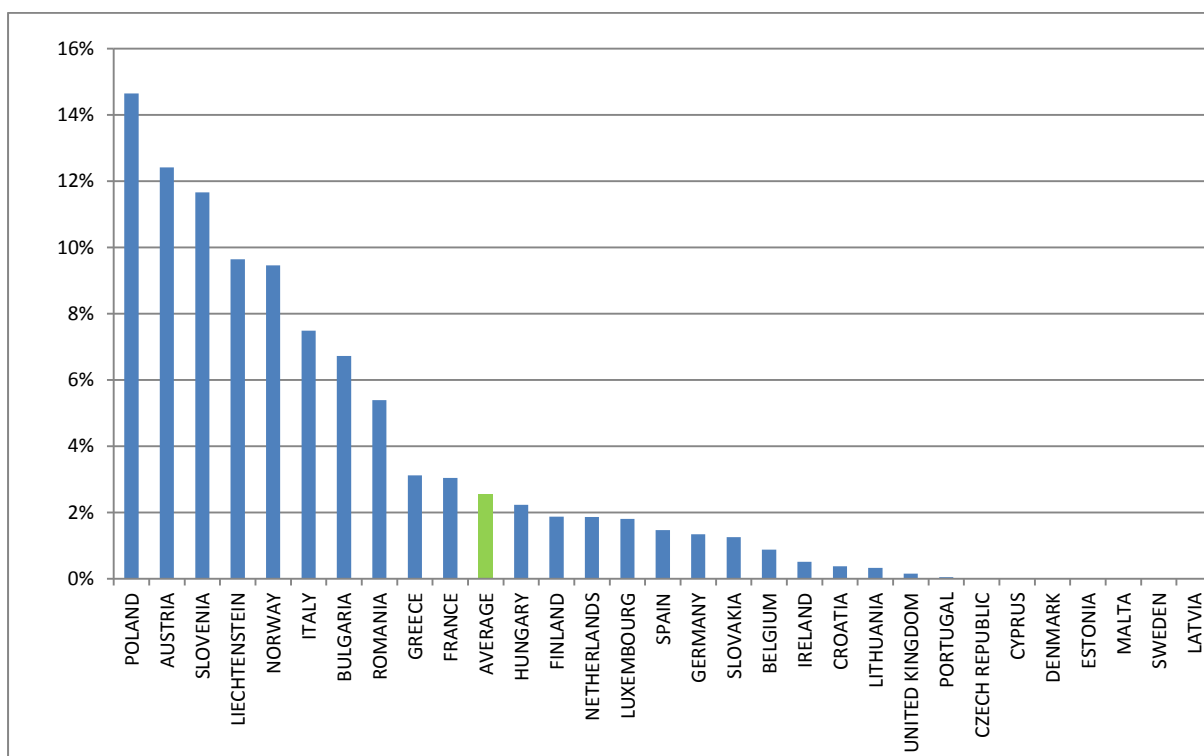
1300. Using the end 2016 annual reporting, the total value of strategic participations for undertakings using the standard formula is EUR 238 billion. In order to gather more detailed information, an information request was launched to NSAs and undertakings. In order to limit the burden of insurance undertakings, only those which have strategic equity investments representing at least one percent of the total assets have been included in the information request.

1301. The information request provided detailed information on 2,666 strategic participations by European insurance undertakings. Around 75 percent of these could be linked with the information available in the EIOPA database. These 75 percent account for EUR 174 billion in assets.

Proportion of strategic equity investments of total investments

1302. In proportion to the investments, strategic participations account for more than 10 percent of the total investments in Poland, Austria and Slovenia. The average amount of strategic investments is three percent of the total investments.

Figure 12.1. Proportion of strategic equity investments of total investments

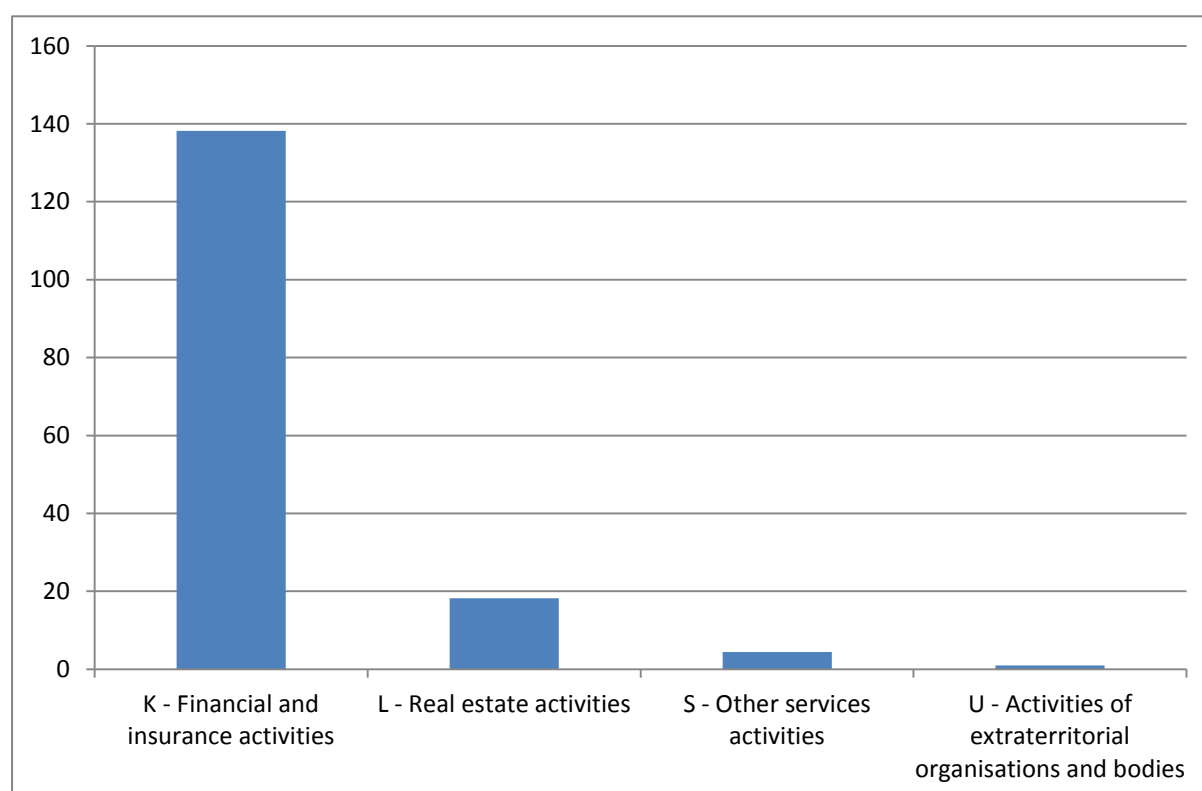


Sector of the strategic participations

1303. Data analysis shows that the vast majority of these strategic investments are related to investments in financial and insurance activities, followed to a lesser extent by investments in real estate (see figure 12.2). Strategic participations in other sectors not included in figure 12.2 account for less than EUR 1 billion and less than one percent of the total investments made by strategic participations.

1304. 38 percent of these strategic participations in financial and insurance activities relate to investments in life insurance, 25 percent to activities in holdings and 15 percent to strategic participations in the non-life insurance industry.

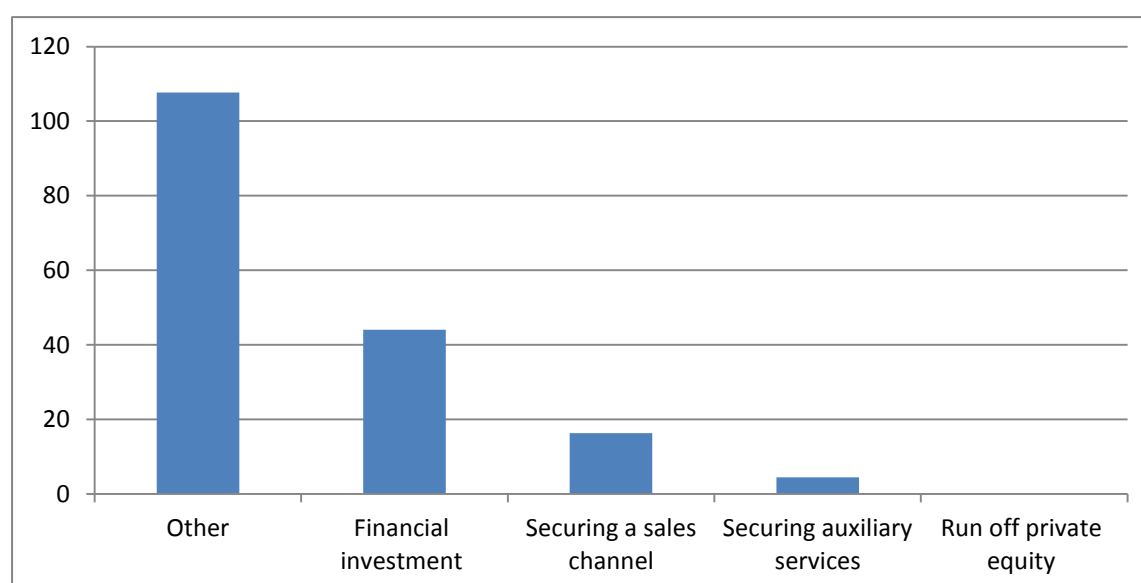
Figure 12.2. Sectors of the strategic participations (weighted, in billion EUR)



Purpose of the strategic participations

1305. The result varies significantly from one country to another. If one considers the overall invested amounts, the majority of investments cannot be defined by the broader categories financial investments or securing sales channels or auxiliary services (see figure 12.3). A significant part of the investments under the category “Other” appears to correspond to subsidiaries or other holdings of undertakings within a group. If one counts the number of strategic equity investments, in some countries the purpose of the majority of the strategic equity investments is to hold a “financial investment”.

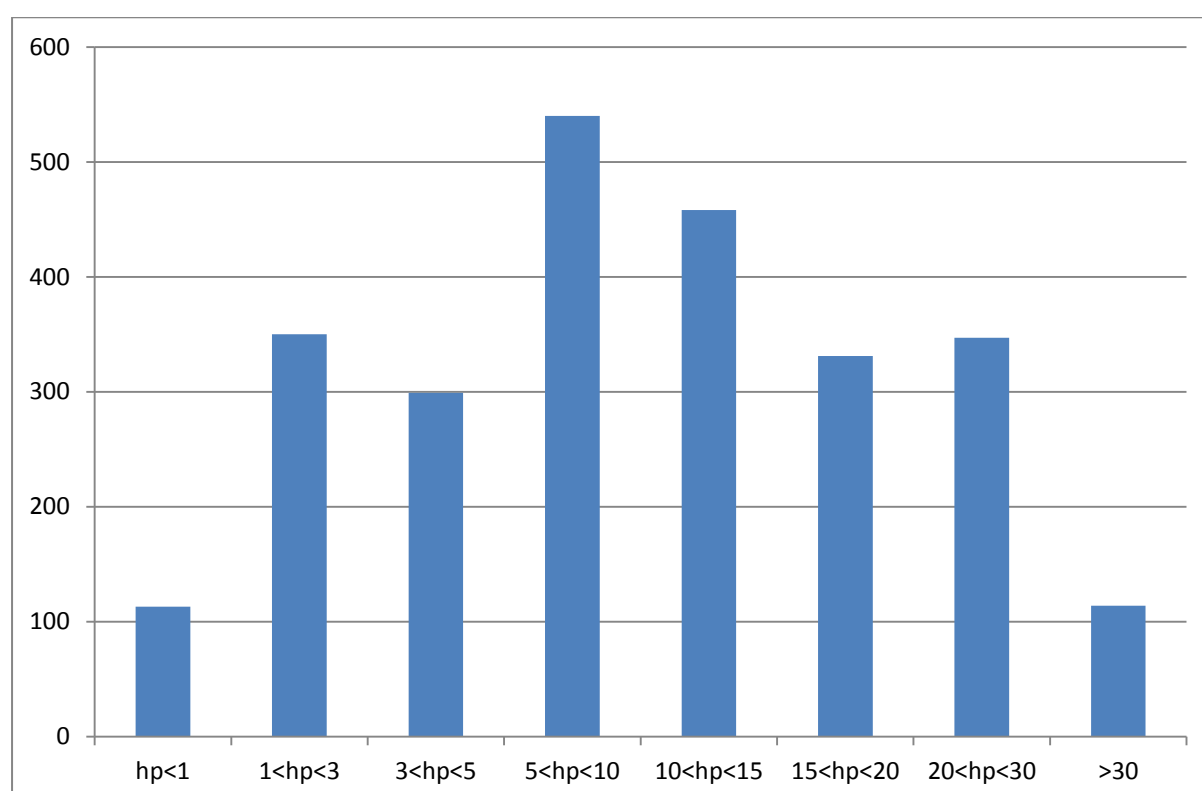
Figure 12.3. Purpose of the strategic participations (weighted, in billion EUR)



Past holding period of strategic participations

1306. Most of the 2,666 strategic participations were held for a period shorter than 10 years (see figure 12.4). In fact, there seems to be less strategic participations held for a longer time. Similar conclusions could be drawn considering the amount that was invested (i.e. where the average past holding period is calculated as an average weighted by the value of the strategic participations). However, the invested amount tends to be higher on average the longer a strategic participation had been held.

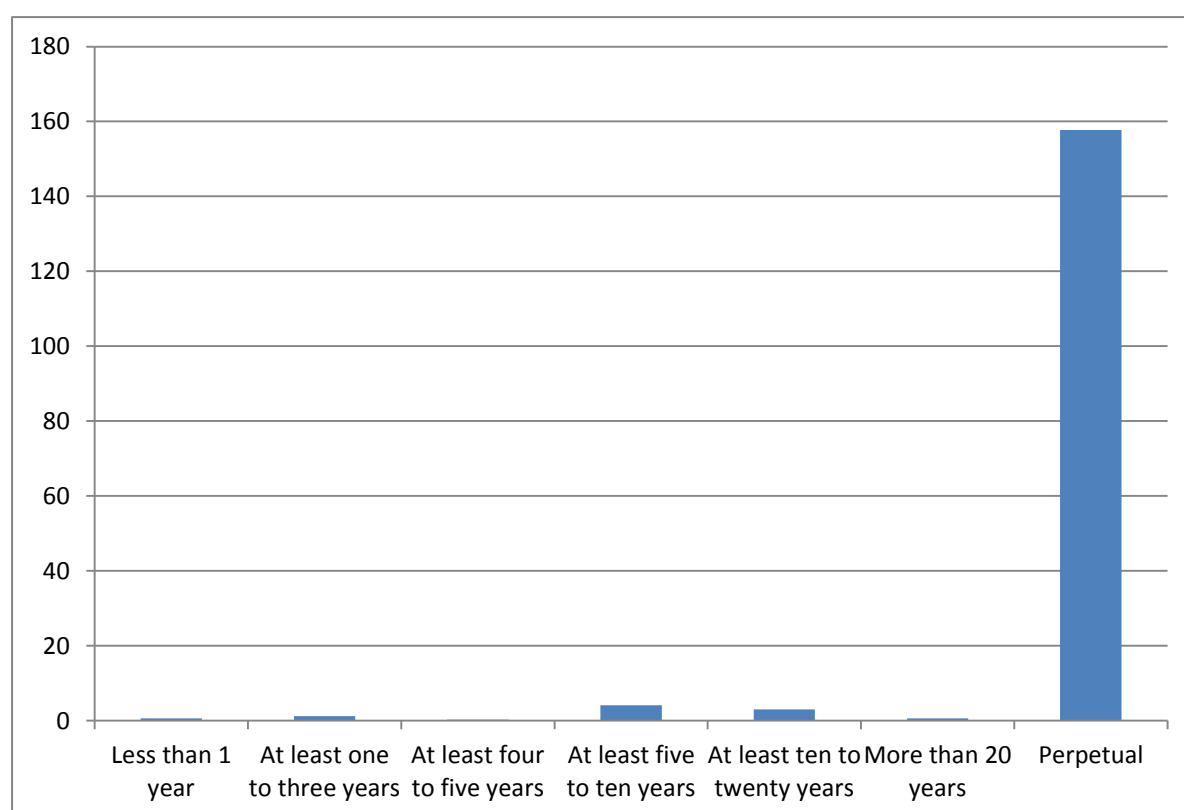
Figure 12.4. Past holding period of strategic participations (by number of responses)



Expected holding period of strategic participations

1307. In contrast to the period strategic participations are held, most of these are not expected to be sold in the (near) future. Indeed both in weighted terms or in absolute numbers, respectively 90 (see figure 12.5) and 80 percent of the strategic participations had an undefined expected holding period. Where this could be an indication of a contradiction between the actual holding and holding intention, both results do not necessarily contradict each other. Differences may be explained e.g. by changes in the group structure, mergers, or more outsourcing activities in last years.

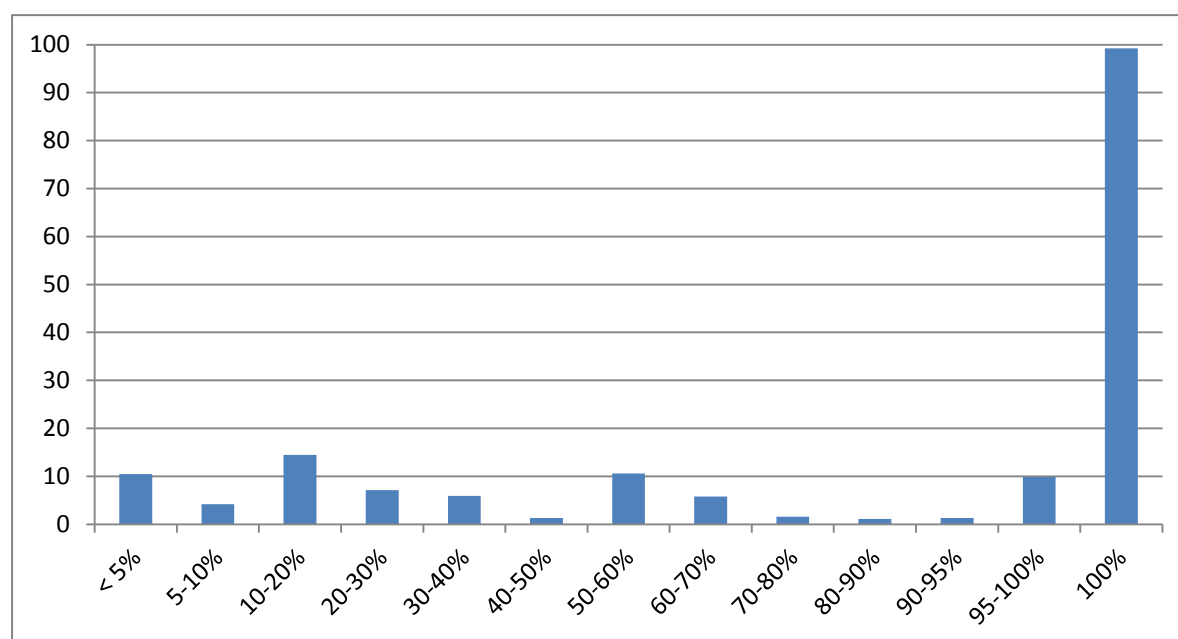
Figure 12.5. Expected holding period of strategic participations (weighted, in billion EUR)



Equity of the strategic participation held by (re)insurers

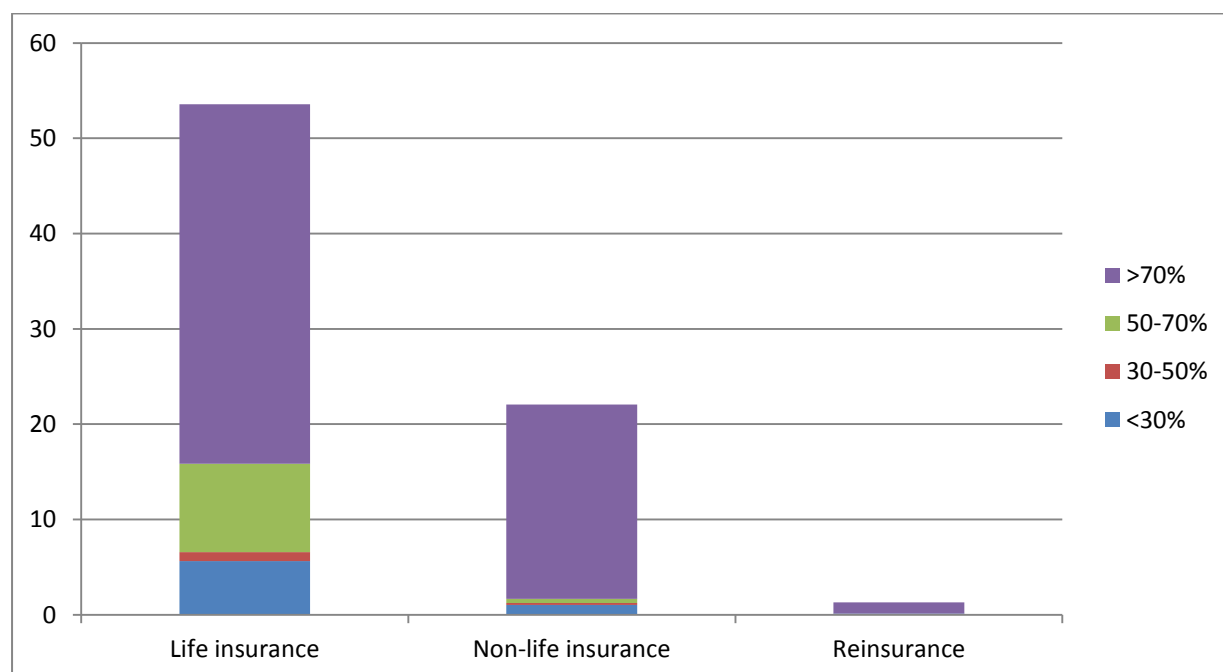
1308. The weighted average percentage of total equity of the strategic participation held (by the participating undertaking) is 74 percent. However, almost half of the undertakings hold strategic participations of (close to) 100 percent. Eight percent of the undertakings hold strategic participations of less than 10 percent (see figure 12.6).

Figure 12.6. Percentage of total equity of the strategic participation (weighted, in billion EUR)



1309. The percentage of equity held in insurance undertakings considered as strategic participation is very similar with most participations being at least 70 percent (see figure 12.7).

Figure 12.7. Percentage of strategic participations in insurance undertakings split by equity held (weighted, in billion EUR).



13. Simplification of the counterparty default risk

13.1. Call for advice

The counterparty default risk module and the non-life catastrophe risk submodule require complex calculations.

EIOPA is asked to:

- Provide information on the relative significance of capital requirements related to these modules.
- Assess if this complexity is proportionate to the nature, scale and complexity of these risks, in particular for small and medium-sized undertakings.
- Where appropriate, develop suggestions for simpler structures for these modules, respecting their existing scope.

13.2. Legal basis

Solvency II Directive

1310. Article 104(1) of the Solvency II Directive sets out that there shall be a counterparty default risk module in the standard formula. Article 105(6) describes the scope of this module.

Delegated Regulation

1311. Articles 189 to 202 and the simplifications in Articles 107 to 112.

Guidelines

1312. Guidelines 8 and 9 in the EIOPA Guidelines on treatment of market and counterparty risk exposure.

13.3. Feedback statement on the main comments received to the consultation paper (EIOPA-CP-17-006)

a. Summary of the comments received

1313. Most of stakeholders supported the EIOPA's set of proposals on simplifying the counterparty default risk. Stakeholders welcomed EIOPA's assessment of the current simplifications as well as the improvements and clarifications provided on them. Stakeholders also supported EIOPA in assessing if the complexity of the counterparty default risk module is proportionate to the nature, scale and complexity of the risk and in developing new simplifications where appropriate.

1314. However some stakeholders highlighted that the inclusion of excessive prudence in the EIOPA's proposals may discourage their widespread usage so they would welcome further details on the specifications of EIOPA's proposals.

1315. Stakeholders agreed with the EIOPA's proposal that a hedging strategy should be defined as a financial risk-mitigating technique but some of them would welcome pragmatic documentation requirements to enable full application of the proposal.
1316. Stakeholders would welcome also a clarification regarding which derivatives should be treated as type 1 exposure or how to calculate a risk mitigation effect for market risk and underwriting risk.
1317. Stakeholders highlighted that simplifications for LGD for reinsurance arrangements should be based on the solvency ratios or credit ratings but no concrete proposals were provided.
1318. Stakeholders provided also comments on issues which were not covered by the review of the Delegated Regulation and were not raised in the main comments received to the discussion paper (EIOPA-CP-16-008).

b. Assessment

1319. The QRTs show that 14% of all undertakings use one or more of the simplifications for the counterparty risk module and, on average, the risk is significant for all types of undertakings but it cannot be seen as the main risk relative to the BSCR. Since the simplifications are used to such a wide extent this indicates that new simplifications would be welcomed by stakeholders as well and that the calculations of that module are complex. EIOPA believes that the proposals of clarifying current and introducing new simplifications extend the scope of application of the simplifications and make them less complex which is in line with the proportionality principle.
1320. EIOPA does not believe that in EIOPA's proposals there is a risk for too much prudence as it was the intention of EIOPA to include prudent optional calculations in order to reduce the risk of underestimating of the counterparty default risk module. Moreover usage of simplifications is one of the options in calculating SCR and it might be used by an undertaking after fulfilling requirements of Article 88 of the Delegated Regulation. If a simplification does not take into account risk in an adequate way it should not be used by the undertaking.
1321. EIOPA does recognise the point regarding documentation of the hedging strategy but EIOPA believes that that documentation will be part of the Pillar 2 issues – Investment risk area according to Article 260(1c(iv)) of the Delegated Regulation.
1322. EIOPA will make clear that the credit derivatives shall not be covered in the counterparty default risk modules and there would be no double counting within the spread risk module.
1323. EIOPA agrees that while calculating risk mitigation effect reinsurance contract may cover both market and underwriting risk but EIOPA does not intend to suggest a clarification on this matter since the use of the method depends on the context it is used in. Moreover calculation of the hypothetical SCR for market and underwriting risk should be done according to appropriate articles of the Delegated Regulation.

1324. In EIOPA's opinion issues not covered by the review of the Delegated Regulation might be proposed outside of this review or be part of EIOPA's Question and Answer process on regulation (Q&A process).

13.4. Feedback statement on the main comments received to the discussion paper

Risk-mitigating derivatives

a. Summary of the comments received

1325. An input from stakeholders was that there is no clear definition of a risk-mitigating derivative.

1326. Some stakeholders only include derivatives that are not used for exposure steering in the counterparty default risk module due to the wording in Article 189(a) of the Delegated Regulation.

b. Assessment

1327. The lack of a clear definition can lead to diverging practises across Europe when it comes to handling derivatives in the standard formula. Therefore, it is important that there is no ambiguity regarding which derivatives are included in the module.

1328. The definition of a risk-mitigating derivative is closely related to the definition of a risk-mitigation technique. In the first call for advice, stakeholders also requested a clarification of what constitutes risk-mitigation techniques. Whether the risk-mitigation technique is related to a hedging strategy or an individual contract is crucial for understanding the term "risk-mitigating derivative". The legal definition of a risk-mitigation technique is currently being assessed.

1329. The materiality of the issue will be analysed further in the analysis section.

1330. All derivatives should be treated in the counterparty default risk module, irrespective of whether they are risk-mitigating or not. This could be clarified in the Delegated Regulation.

Collateral

a. Summary of the comments received

1331. Several stakeholders report that the Delegated Regulation is not clear on how to account for collateral when the collateral is posted on the net exposure to the counterparty.

b. Assessment

1332. Article 192(1) of the Delegated Regulation provides that the loss-given-default shall be equal to the sum of the loss-given-default on each of the exposures to counterparties belonging to the single name exposure.

Therefore, it is clear that the present calculation of loss-given-default should be carried out for each derivative. The paragraph also states that the loss-given-default shall be net of the liabilities towards counterparties belonging to the single name exposure given certain conditions are met.

1333. However, undertakings with contractual netting agreements post collateral on the net exposure to the single name exposure. Since undertakings have to calculate the loss-given-default according to Article 192(1) of the Delegated Regulation, undertakings with contractual netting agreements with their counterparties have to artificially divide the collateral between the exposures to the counterparty. EIOPA recognises the issue and will look further into it in the analysis section.

Grouping of exposures

a. Summary of the comments received

1334. Several stakeholders asked for a potential amendment of Article 110 of the Delegated Regulation in a way that would also allow for grouping of single name exposures in the risk-mitigating effect calculation of Article 196 of the Delegated Regulation.

1335. Moreover, some stakeholders required to allow for grouping of derivatives in the calculation for the risk mitigating effect of market risk. In other words, the stakeholders suggest allowing for a LGD calculation at counterparty level instead of doing it separately for each and every single derivative contract.

b. Assessment

1336. Article 110 of the Delegated Regulation allows for a computation of LGD for a grouping of single name exposures. However, the method for calculating this is not entirely clear (especially how to account for the risk-mitigating effect and collateral). A clarification on how the undertakings are supposed to calculate LGD for a group of single name exposures could be an improvement.

1337. The calculation of the risk-mitigating effect on single name exposures, i.e. grouping of derivatives, is relevant in relation to accounting for contractual netting agreements and will be looked further into in the analysis section.

Condition on the 60 % of the counterparty's assets subject to collateral in Article 192(2) of the Delegated Regulation

a. Summary of the comments received

1338. Several stakeholders argued that the 60 % condition in the LGD calculation for reinsurance arrangements is difficult to assess. Some stakeholders suggested to consider the condition as fulfilled when the reinsurer's rating is above a fixed credit quality step (CQS 3). This feature should be taken into account through the external rating process.

b. Assessment

1339. EIOPA would propose an optional simplification which could be applied in order to avoid the assessment of the 60 % condition in Article 192(2) of the Delegated Regulation.

Fixed risk-weight for bank exposures

a. Summary of the comments received

1340. Several stakeholders argued that for cash at bank exposures, there can be some issues regarding knowing the final counterparty. Stakeholders mention that this could be the case in clearing processes and when applying the look-through approach on investment funds. They claimed that it is too difficult to assign a proper CQS to these exposures.

1341. The stakeholders instead propose to align the treatment with the ICS treatment either by using the same stress factor of 0.4% or by using a more conservative rate e.g. 2% as a fixed risk charge for cash at bank.

1342. Stakeholders pointed out that the suggested treatment would reduce reliance on ratings.

b. Assessment

1343. EIOPA suggests not following this proposal. Stakeholders have not provided any assessment of the materiality of the issue and it is not possible to assess the materiality from the QRTs. Moreover, introducing a fixed risk-weight for cash would constitute a structural break in the general type 1 exposure calculation.

Calculation of the hypothetical SCR

a. Summary of the comments received

1344. Several stakeholders find it unclear how the life, health and non-life sub-modules should be aggregated and whether correlation factors should be used in the calculation of the hypothetical SCR.

1345. Article 196 of the Delegated Regulation uses the wording "(...) capital requirement for underwriting or market risk (...)". Reinsurance recoverables have influence on both underwriting risk (e.g. catastrophe risk) and market risk (interest rate risk, currency risk). It is not clear how the "or" in Article 196 should be interpreted in this case.

b. Assessment

1346. EIOPA will suggest clarifying the assumptions that should be used in the calculation of the hypothetical SCR.

1347. EIOPA agrees that it is not possible to see how the risk-mitigating effect on underwriting risks is supposed to be calculated directly from Article 196 as reinsurance contracts may cover both market risks and underwriting risks.

1348. Article 192 of the Delegated Regulation clearly states for each definition of LGD whether the risk-mitigating effect should be calculated on the basis of the underwriting risk or on the basis of the market risk. None of the LGD-formulas have defined the risk-mitigating effect on the basis of both underwriting risk and market risk, although reinsurance contracts may cover both risks. The “or” in Article 196 means that only the effect of one of these two modules is reflected in the calculation of the risk-mitigating effect.

1349. EIOPA does not intend to suggest a clarification on this matter, since the definition of the risk-mitigating effect is general and the use of the method depends on the context it is used in.

Simplified calculation for the risk-mitigating effect of reinsurance arrangements

a. Summary of the comments received

1350. Several stakeholders suggested to include a former QIS5 and CEIOPS advice simplified formula for the determination of the risk-mitigating effect of reinsurance obligations. It was further suggested to apply the formula per LOB if the reinsurance arrangement affects different LOBs and then to calculate the sum over all affected LOB to determine the total risk mitigating effect. If in addition market risks are affected by the reinsurance arrangement a correlation of 25 % was proposed.

1351. A stakeholder suggested a slightly modified formula compared to the original formula used for the QIS5:

$$\sqrt{\begin{aligned} & (NL_{cat}^{hyp} - NL_{cat}^{without})^2 + \left(3\sigma_{prem} (P_{lob}^{hyp} - P_{lob}^{without})\right)^2 + (3\sigma_{res} recoverables)^2 \\ & + 9\sigma_{prem} \sigma_{res} (P_{lob}^{hyp} - P_{lob}^{without}) recoverables \\ & + 1,5\sigma_{res} (NL_{cat}^{hyp} - NL_{cat}^{without}) recoverables \\ & + 1,5\sigma_{prem} (NL_{cat}^{hyp} - NL_{cat}^{without}) (P_{lob}^{hyp} - P_{lob}^{without}) \end{aligned}}$$

b. Assessment

1352. EIOPA finds the suggestion to include a closed-form optional simplification for the risk-mitigating effect of reinsurance arrangements useful. The proposal is thus analysed in the analysis section and a specific simplification is suggested.

Simplified calculation for type 1 exposures in Article 200 of the Delegated Regulation and correction of an error

a. Summary of the comments received

1353. The capital requirement for type 1 exposures is currently calculated as follows:

$$SCR_{def,1} = \begin{cases} 3 \cdot S & \text{if } S \leq 0.07 \cdot T \\ 5 \cdot S & \text{if } 0.2T \geq S > 0.07 \cdot T \\ T & \text{otherwise} \end{cases}$$

where the standard deviation S of the loss distribution of the type 1 exposures is calculated as:

$$S = \left(\sum_{j=1}^n \sum_{k=1}^n \omega_{ij} \cdot LGD_i \cdot LGD_j \right)^{1/2}$$

where n denotes the number of different counterparties, T denotes the sum of all LGD and

$$\omega_{ii} = PD_i(1 - PD_i) \quad i = 1, \dots, n$$

$$\omega_{ij} = \frac{PD_i(1 - PD_i)PD_j(1 - PD_j)}{1.25 \cdot (PD_i + PD_j) - PD_i \cdot PD_j} \quad i \neq j \quad i, j = 1, \dots, n$$

1354. A NSA recommended streamlining and simplifying the formula for the type 1 exposures in Article 200 of the Delegated Regulation to avoid the split between 3S and 5S.

1355. Accordingly, the formula in Article 200 could be streamlined and Article 200(1) and Article 200(2) could be merged by calculating

$$SCR_{type\ 1} = \min(3S, T).$$

1356. The main simplification would be that undertakings would no longer need to analyse and account for the step change between the 3S and the 5S.

1357. Several undertakings have also noted the lack of justification for the step change from 3S to 5S in the calculation in Article 200. Some undertakings report volatile behaviour in the formula due to this step change.

1358. Undertakings also report an inconsistency in Article 201(2) where it is unclear whether the sum for V_{inter} covers $j=k$ or not.

b. Assessment

1359. EIOPA recognizes that the step change from 3S to 5S might have some undesirable features from a risk management perspective. However, simply reducing $SCR_{type\ 1}$ to $\min(3S, T)$ could still underestimate the counterparty default risk in specific situations. EIOPA therefore proposes to include a prudent optional simplified calculation instead.

1360. The motivation for the step change is described in the CEIOPS advice. It is assumed that if the portfolio is sufficiently diversified or the credit quality

of the counterparties is high, the loss distribution is skewed and can be captured by a lognormal distribution. However, CEIOPS found that if a portfolio is dominated by a single or a small number of exposures with a high probability of default, the distribution will be significantly more skewed than the lognormal distribution. Therefore, CEIOPS advised for a quantile factor of 5 when the loss distribution exceeded a certain percentage of the overall loss-given-default for the type 1 exposures.

1361. The formula for V_{inter} is correct, so the word "different" should be deleted from point (a) in Article 201(2) of the Delegated Regulation.

Simplified approach for the loss distribution calculation in Article 201 of the Delegated Regulation

1362. Summary of the comments received

1363. A stakeholder suggested simplifying the variance calculation in Article 201 of the Delegated Regulation: Instead of differentiating between the different variance types the stakeholder proposed to follow a more simplified approach by assuming that a single default event follows a Bernoulli distribution and that then the total variance is derived by assuming certain correlations between different counterparties. Specifically the stakeholder suggested to:

1. Calculate the probability of default (PD) and loss-given-default (LGD) for each counterparty as currently
2. Calculate the variance of the expected loss distribution as a Bernoulli trial
i.e. $(1-PD) * PD * LGD^2 = \sigma^2$.
3. Calculate the overall variance of the expected loss distribution V by adding the σ values together via a correlation matrix, with e.g. 0.25 off the diagonal.

$$V = \sum_i^n \sigma_i^2 + 2 \sum_{i < j}^n \sigma_i \sigma_j \rho_{i,j}$$

The correlation is either constant (in the simplest case) or a correlation matrix is determined for different types of counterparties (banks, reinsurance obligations etc.).

4. Finally calculate the 1-in-200 years expected loss by taking $3\sqrt{V}$

b. Assessment

1364. This is a very simple credit risk modelling approach. Unlike the current approach, it does not sufficiently capture two important empirical findings:

1. Default probabilities vary over time
2. There is significant dependence across defaults

1365. The implementation of the variance formula for type 1 exposures is not considered as the major complexity of the counterparty default risk module. Accordingly, EIOPA suggests not following the proposal.

13.5. Advice

13.5.1. Previous advice

1366. Many of the recommendation in CEIOPS' Advice for Level 2 Implementing Measures on Solvency II: SCR standard formula – Counterparty default risk are already implemented in the Delegated Regulation.

1367. CEIOPS' advice clarifies that the class of type 1 exposures is intended to cover the exposures which may not be diversified and where the counterparty is likely to be rated. The class of type 2 exposures is intended to cover exposures which are usually diversified and where the counterparty is likely to be unrated.

13.5.2. Analysis

Relative significance of the counterparty default risk module

1368. EIOPA has been asked to assess the relative significance of the counterparty default risk module. For this purpose, EIOPA has used the gross solvency capital requirement for the counterparty default risk and the BSCR from the annual QRTs.⁷⁰

1369. To analyse this question in depth, the relative significance have been calculated for each type and size of undertaking.

1370. The size of each undertaking has been determined on the basis of the technical provisions. A small undertaking is defined as an undertaking that has technical provisions below the 25 percentile whereas large undertakings are undertakings with technical provisions above the 75 percentile. The rest of the undertakings are defined as medium-sized undertakings. The size of the undertakings is determined both irrespective of type of undertaking and for each type of undertaking.

1371. The relative significance of the counterparty default risk module is calculated for each undertaking as the gross solvency capital requirement for the counterparty default risk module in relation to the BSCR.⁷¹ The average relative significance for each segment can be found in the table below:

⁷⁰ Data has been cleaned e.g. undertakings that did not report any counterparty default risk even though they have derivatives and cash on their balance sheet are excluded. If these undertakings were to enter the analysis, they would decrease the relative significance of the module. 242 out of 2712 undertakings have been excluded.

⁷¹ BSCR is after diversification, therefore the sum of the resulting risks from each of the modules will exceed BSCR.

Average SCR CDR/BSCR Type	Small	Medium	Large	All
Life	16%	10%	10%	11%
Non-life	22%	18%	12%	17%
Composite	17%	13%	10%	13%
Total	21%	15%	10%	15%

Undertakings with full internal models are excluded

1372. The figures indicate that the relative significance of the counterparty default risk is greater for smaller undertakings. Differences are also observed between life and non-life undertakings, where the relative significance of the counterparty default risk seems greater for non-life undertakings.

1373. It is important to note that there is large variation in the relative significance of the counterparty default risk. This is valid for all sizes of undertakings. 14 % of all undertakings (accounting for 6 % of the total TP) have a relative significance greater than or equal to 30 %.

1374. Comparing these figures with findings in the QIS4-report as well as other analysis, the module has a higher relative significance than previously observed. As with QIS4, there are considerable differences between jurisdictions. However, on average, the counterparty default risk is not a major risk for the undertakings.

1375. The European Commission has asked EIOPA to assess if the complexity of the counterparty default risk module is proportionate to the nature, scale and complexity of these risks, in particular for small and medium-sized undertakings. In the table above, the relative significance shows that the risk is significant for all types of undertakings but it cannot be seen as the main risk relative to the BSCR.

1376. Undertakings report that the counterparty default risk module is the most burdensome module of all the modules compared to the significance of the capital requirement.

Use of simplifications

1377. 14% of all undertakings⁷² use one or more of the simplifications for the counterparty default risk module. The QRTs do not provide detailed information on which of the six simplifications each undertaking is using. The use of simplifications has also been analysed for each size of undertaking, cf. the table below.

⁷² Undertakings with full internal models are excluded.

Size of undertaking	Percentage of undertakings using one or more simplifications in the counterparty default risk module
Small	7 %
Medium	16 %
Large	16 %

Undertakings with full internal models are excluded

1378. The table shows that undertakings use the simplifications for the counterparty default risk module irrespective of size. However, small undertakings use the simplifications to a lesser extent. This finding may be due to several factors: Maybe the existing simplifications are not simple enough so that it makes sense for the small undertakings to use them. Another explanation could be that not all simplifications are reported. It is worth noting that 85% of the small undertakings are non-life undertakings.

1379. The use of simplifications differs significantly between jurisdictions.

1380. Previously, EIOPA has requested NSAs to provide information on the use of the specific simplifications, also on each of the six simplifications for counterparty default risk. Based on this information, each of the six simplifications are being used by undertakings in at least 10 different member states and each of the six simplifications are being used by at least 45 undertakings. Some simplifications are used by substantially more undertakings.

1381. The information from the NSAs also shows that the simplifications for the counterparty default risk module are among the most used simplifications.

1382. Since the simplifications are used to a wide extend, this could indicate that new simplifications would be used as well. Furthermore, the findings underline the complexity of the module.

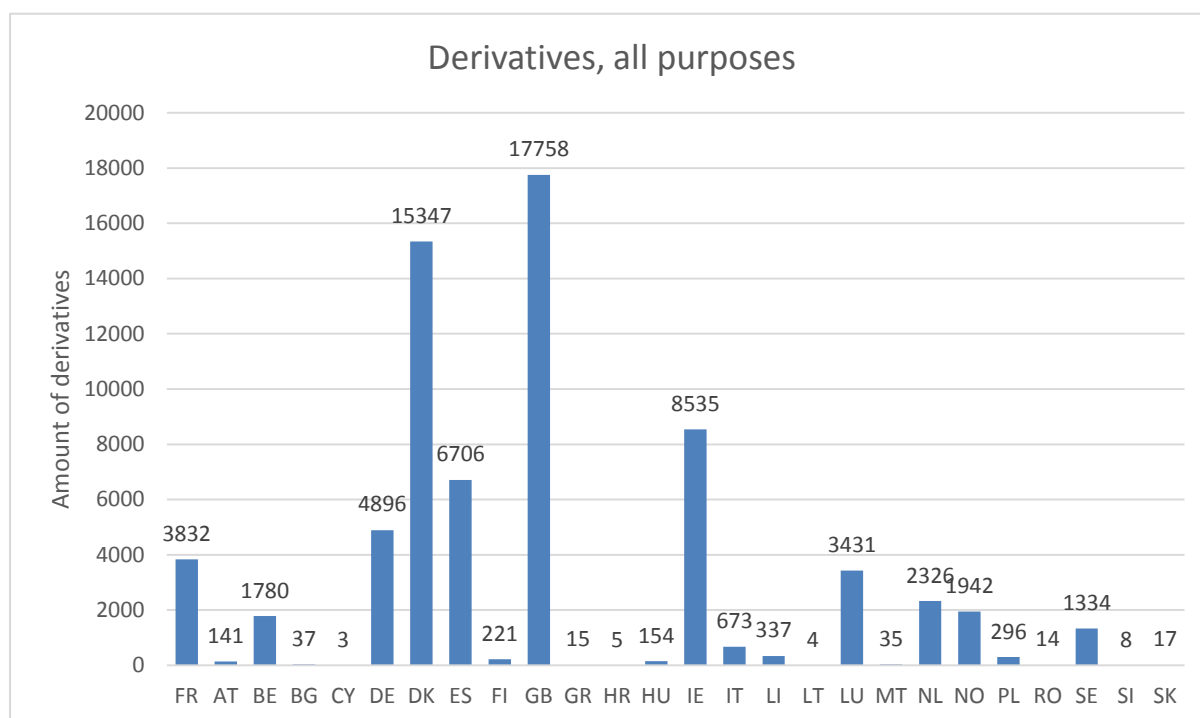
An overview on the use of derivatives

1383. Stakeholders raised several issues that have relevance for the treatment of derivatives in the counterparty default risk module. Therefore, this section analyses the undertakings' use of derivatives to assess the materiality of the issues. The analysis will cover several aspects including the use of derivatives for hedging risks.

1384. The following sections outline possible changes in the treatment of derivatives regarding grouping, collateral etc. The following chapter 15 discusses the implications of EMIR.

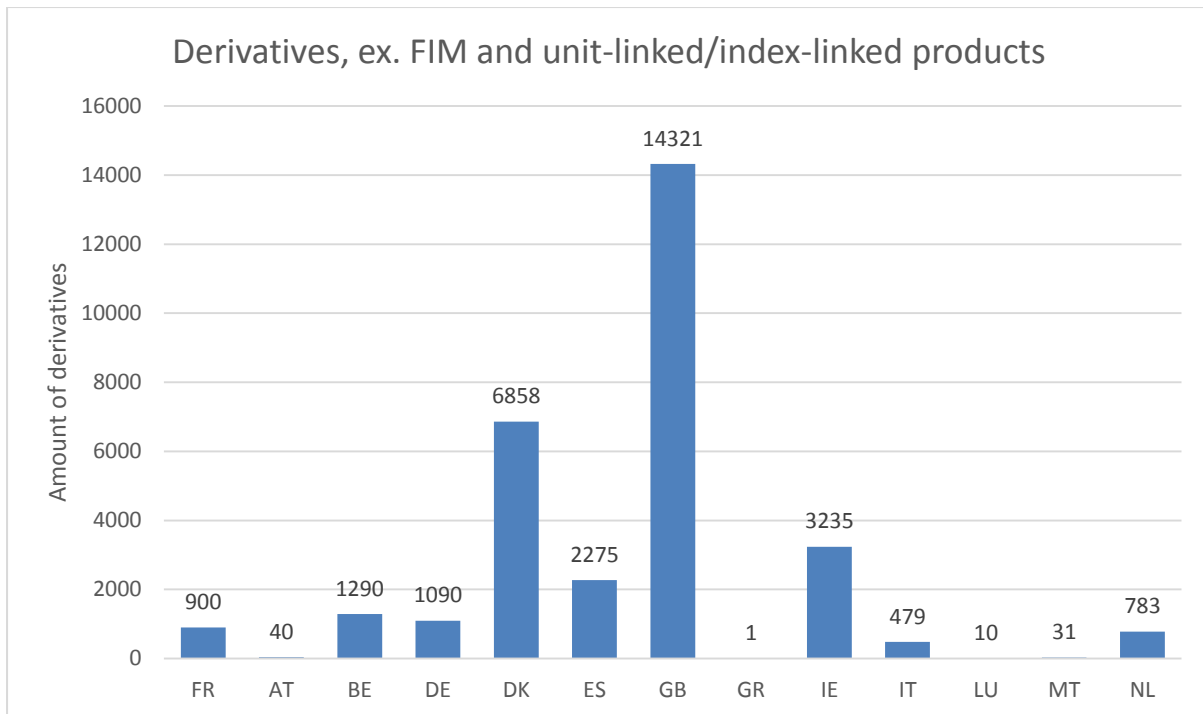
1385. Undertakings have reported a list of open derivatives in the annual QRTs. Undertakings are allowed to report one line for several derivative contracts, i.e. on an aggregated net basis, as long as the relevant characteristics are common and it is possible to properly fill in all items requested in the table. The lines reported therefore constitute a lower bound for the amount of open derivative contracts. Only derivatives held directly by the undertakings are reported in this template.

1386. In the graph below, the numbers of derivative contracts have been aggregated for each country. The compilation covers all derivatives (close to 70,000).



1387. The graph gives a clear picture that the use of derivative contracts varies a lot across Europe. Undertakings in 26 member states use derivatives but the use is very limited in half of the member states. In at least a handful member states, derivative are used to a wide extend.

1388. Derivatives held in unit-linked and index-linked products and derivatives held by undertakings that use a full internal model do not have to be considered. They are therefore excluded in the rest of the analysis.



1389. The graph above shows the number of derivatives excluding those mentioned in the last paragraph. The number of member states where derivatives are used is halved and the number falls to around 31,000. 96% of the derivatives are held by life and composite undertakings.

1390. Close to 8,000 of these derivatives are used for efficient portfolio management. These will not qualify as risk-mitigating derivatives.

1391. The most common types of derivative used for efficient portfolio management are forward exchange rate agreements and interest rate swaps (>40%). These types of derivatives are also the most commonly used derivatives for hedging purposes according to the QRTs (>55%).

1392. It has not been possible to use the information on the derivative counterparty from the annual QRTs to decide whether derivatives with different purposes are entered into with different counterparties. But there does not seem any obvious reason for undertakings to choose counterparties depending on the purpose of the derivative. The counterparty risk at default would not be different for the two derivatives.

1393. Based on these considerations, there does not seem to be a justification to classify derivatives as type 1 and type 2 respectively, purely based on the purpose of the derivative.

1394. It also does not seem intuitive if exposures with the same inherent risk that are entered into with the same counterparty are treated in different parts of the module.

1395. Accounting for contractual netting agreements would also require that all of the exposures are defined as type 1 exposures.

1396. The CEIOPS advice clarifies the background for the division of exposures into the two classes. The difference between type 1 and type 2 exposures are related to whether the exposures are diversified and whether the counterparty is likely to be rated. The treatment of derivatives as type 1 exposures irrespective of purpose would not contradict this assumption.

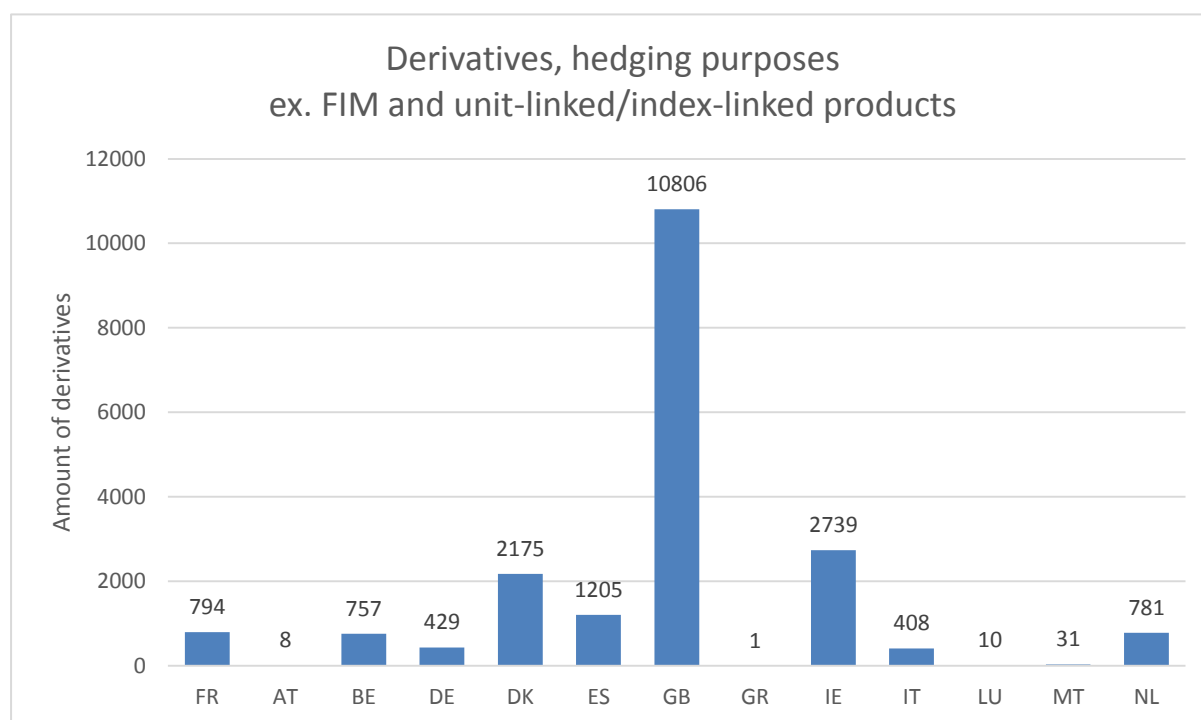
1397. EIOPA would suggest that all derivatives which do not meet criteria of Article 189(6) of the Delegated Regulation are defined as type 1 exposures and the LGD is calculated according to Article 192(3) for those derivatives. This would also clarify how derivatives that are not risk-mitigating should be treated.

1398. The present formulation of the LGD calculation in Article 192(3) of the Delegated Regulation takes the risk-mitigating effect on the market risk into account. EIOPA suggests clarifying that the risk-mitigation effect should be zero if the derivative is not risk-mitigating.

Risk-mitigating derivatives

1399. Undertakings report the purpose of each open derivative in the annual QRTs. Based on this information undertakings have entered into around 20,000 derivatives used for hedging purposes. This amounts to 64 % of all derivatives. In this context, hedging purposes is defined as derivatives used for macro or micro hedges.

1400. The following graph shows the number of derivatives used for hedging purposes per country.



1401. In the following, the focus will be on interest rate swaps. The reason for this is that the nature of guaranteed products is that the undertaking is obliged to pay a fixed cash flow in the future. A simple way to mitigate the

risk connected to this obligation is to hedge it with interest rate swaps that match the obligations. It can therefore be expected that some undertakings use interest rate swaps for hedging interest rate risk. This derivative would typically be a long position or, more specifically, a payment of a floating rate in exchange for a fixed rate.

1402. Additionally, one would assume that the reporting shows a use of short derivatives classified as hedging. When an undertaking needs to adjust the hedge of the interest rate risk, it can be cheaper to enter into a derivative in the opposite direction instead of partially or fully terminating the long position.

1403. From the QRTs, it can be seen that there are 6,130 interest rate swaps used for macro or micro hedges. This corresponds to 37 % of the derivatives used for hedging. Undertakings should report interest rate swaps in relation to the cash flows. However, for one third of the interest rate swaps undertakings have used the simpler categorization, where one indicates whether the position is long or short. In this analysis, this information is enough and all of the derivatives (with a classification) are included in the following.

Interest rate swaps	Amount of derivatives
Long	1,137
Short	907
Floating-to-fixed	1,730
Fixed-to-floating	1,327
Fixed-to-fixed	308
Floating-to-floating	133

1404. The figures show that there is an extensive use of long, short, floating-to-fixed and fixed-to-floating interest rate swaps.

1405. Even though undertakings have reported that all of these interest rate swaps are used for hedging purposes, it is not entirely clear whether each of them would be classified as a risk-mitigating derivative. The short interest rate swaps would not be risk-mitigating if assessed on a stand-alone basis. But if the risk-mitigating technique was to be understood as a hedging strategy, it would depend on the defined hedging strategy whether the short interest rate swap could be classified as a risk-mitigating derivative or not.

1406. Data also shows that undertakings that use derivatives actively often have both long and short positions.

1407. It is assumed that undertakings that enter both long and short derivatives use a limited number of counterparties. Therefore, in many cases, the undertaking will have both long and short positions towards the same counterparty. Since both the LGD calculation and the calculation of the risk-mitigating effect have to be performed for each derivative according to Article

192 and 196, the LGD will in many cases be floored to zero for the short position and the capital requirement will not reflect the reduced counterparty risk from the two combined positions

1408. EIOPA's advice is to clearly define a risk-mitigating derivative. This is closely related to the risk-mitigation technique and the definition of a risk-mitigating derivative could follow from a definition of the risk-mitigation technique.

1409. To capture the economic counterparty default risk even for relatively simple hedging strategies,⁷³ it is necessary to define the risk-mitigation technique as a hedging strategy. This would lead to a definition of a risk-mitigating derivative as a derivative that is a part of a well-defined hedging strategy.

1410. EIOPA suggests that a definition of a risk-mitigation technique as a hedging strategy could be combined with an extension of what a written policy on a risk-mitigating technique should cover. Instead of only covering the replacement of risk-mitigation techniques where the arrangements are in force for a period shorter than the next 12 months it could also cover risk-mitigation strategies where not all the contracts would qualify as risk-mitigation technique on an individual basis.

1411. Investment risk management policy should meet the requirements of Article 206(1c(iv)) of the Delegated Regulation if the (re)insurance undertaking uses a hedging strategy.

Collateral

1412. Collateral is in practise only posted on the net position when undertakings have a contractual netting agreement with a counterparty. This reflects that a potential default from the counterparty will be settled on an aggregated level.

1413. If a contractual netting agreement is in place with a counterparty, the transactions with the counterparty will be assessed on a net basis in the case of a default.

1414. To reflect this, the capital requirement for the counterparty default risk module should be calculated based on single name exposures for each single name exposure where there is a contractual netting agreement in place.

1415. This could be implemented by adding a sentence in both Article 192(3) and Article 196 of the Delegated Regulation stating that if a contractual netting agreement is in place (meeting some well-defined requirements) LGD

⁷³ Assume that the interest rate risk is hedged with long interest rate swaps but instead of closing the position down and entering a new position when adjusting the hedge, the long position remains unchanged but a short interest rate swap is entered into to reduce the hedge with the same economic effect. This way of hedging can be cheaper for the undertaking.

and the risk-mitigating effect should be calculated on the single name exposure and not for each derivative.

1416. At the moment, it is not possible to report on the undertakings' use of contractual netting agreements. However, the banking regulation recognises contractual netting agreements and therefore it can be assumed that this is used to some extent by the insurance undertakings.

1417. According to the QRTs, the ratio between the number of long and short derivatives undertakings enter into is almost 50/50. Furthermore, undertakings that have entered many derivatives often both use long and short derivatives.

Grouping of exposures

1418. The use of single name exposures in the standard formula is limited to aggregating LGDs for each derivative for the single name exposure. However, the simplified calculation in Article 110 allows for grouping of single name exposures in the calculation of LGD.

1419. The use of these simplifications is only allowed if undertakings comply with Article 88 of the Delegated Regulation. Calculating the counterparty default risk on derivatives that are e.g. covered by contractual netting agreements requires undertakings to manage the data on derivatives on a more granular level than without the use of contractual netting agreements, because undertakings have to know which derivatives are covered by the contractual netting agreements and which are not.

1420. Furthermore, undertakings that use both long and short positions are often using derivatives to a wider extent than undertakings that only use long positions and it would therefore in many cases not be appropriate to handle this calculation in a simplification.

1421. At the moment, it is not possible to report on the undertakings' use of contractual netting agreements. However, as previously mentioned, the banking regulation recognises contractual netting agreements and therefore it can be assumed that this is used to some extent by the insurance undertakings.

1422. To capture the economic effect of the contractual netting agreements, LGD, the risk-mitigating effect and the risk-adjusted value of collateral have to be calculated for the single name exposure. The posted collateral on the net exposure for the counterparties would not have to be divided artificially anymore, since the risk-adjusted value is calculated on the counterparty-level.

Simplified calculation for the risk-mitigating effect of reinsurance arrangements

1423. The suggestion of a modified formula is in fact more conservative than the former QIS5 formula.

1424. Both the QIS5 and the adjusted formula in particular rely on the assumption that the premium and reserve risks are considered as two

separate sub-risks and not as a one integrated risk as in the current standard formula. Moreover, the adjusted proposal additionally relies on an assumption about the correlation between CAT and premium risk, respectively reserve risk, which is not specified as such in the Delegated Regulation.

1425. A similar approximation of the risk-mitigation effect of reinsurance obligations can be developed (see "39. Annex to chapter 14 – Derivation of a simplification for the risk-mitigating effect of reinsurance arrangements"):

$$RM(RE) = \sqrt{\frac{(NL_{CAT}^{hyp} - NL_{CAT}^{without})^2 + (3\sigma_S(P_P^{hyp} - P_P^{without} + recoverables))^2}{+ 2 * 0.25 * 3 \sigma_S(P_P^{hyp} - P_P^{without} + recoverables)(NL_{CAT}^{hyp} - NL_{CAT}^{without})}} \quad (2)$$

where

- σ_S is the standard deviation for non-life premium and reserve risk as defined in Article 117(2) in the Delegated Regulation for the corresponding line of business
- $(NL_{CAT}^{hyp} - NL_{CAT}^{without})$ denotes the counterparty's share of CAT losses
- $(P_P^{hyp} - P_P^{without})$ is the reinsurance premium of the counterparty in the affected line of business
- *recoverables* are the reinsurance recoverables in relation to the counterparty in the affected line of business

1426. The formula (2) does not disentangle the premium and reserve risk and relies on the current correlation between the CAT and the non-life premium and reserve risk. Hence, the adjusted formula is more in line with the current design of the standard formula. Therefore it is suggested to introduce formula (2) as an optional simplification to derive the risk-mitigating effect of a reinsurance arrangement.

1427. If more than one LOB is affected by the reinsurance cover, the application of the formula becomes more complex. The main difficulty is to appropriately assign the reinsurance cover to the different LOBs. In particular, there is a risk that the total risk-mitigating effect might be underestimated for the LGD calculation if the reinsurance cover is not appropriately assigned to the different LOB.

1428. Accordingly, EIOPA proposes to apply this optional simplification only if the reinsurance arrangement affects one LOB. This is in line with the QIS 5 technical specification where the simplification for reinsurance arrangements was also only applicable if the reinsurance arrangement affected one LOB.

Adjustment of Article 107 and 108 of the Delegated Regulation

1429. It was proposed to amend Article 107 and Article 108 of the Delegated Regulation so that the optional simplifications would not be allowed if the reinsurance recoverables were negative.

1430. The mentioned simplifications do not provide sensible results if the reinsurance recoverables are negative. A small amendment of the corresponding articles ruling out negative reinsurance recoverables is therefore deemed appropriate.

13.5.3. EIOPA's advice

The relative significance of the counterparty default risk module

1431. Based on the gross solvency capital requirement for the counterparty default risk module relative to the BSCR, the relative significance of the counterparty default risk is higher for smaller undertakings. For small and medium-sized undertakings, the relative significance is 21 % and 15 % of BSCR respectively.

1432. Differences are also observed between life and non-life undertakings, where the relative significance of the counterparty default risk seems larger for non-life undertakings.

1433. It is important to note that there is a great variance in the relative significance of the counterparty default risk. This is valid for all sizes of undertakings. For 14 % of all undertakings (accounting for 6 % of the total TP) relative significance is 30 % of BSCR or higher.

1434. Comparing these figures with findings in the QIS4-report as well as other analysis, the module has a higher relative significance than previously observed. As with QIS4, there are considerable differences between jurisdictions.

1435. The relative significance shows that, on average, the risk is significant for all types of undertakings but it cannot be seen as the main risk relative to the BSCR.

Assessment of the complexity of the counterparty default risk module

1436. 14% of all undertakings use one or more of the simplifications for the counterparty default risk module. The QRTs do not provide detailed information on which of the six simplifications each undertaking is using.

1437. The QRTs also show that undertakings use the simplifications for the counterparty default risk module irrespective of size. However, only 7 % of the small undertakings use simplifications whereas medium-sized and large undertakings use these simplifications to the same extent. This finding may be due to several factors: Perhaps the existing simplifications are not simple enough so that it makes sense for the small undertakings to use them. Another explanation could be that not all simplifications are reported. It is worth noting that 85% of the small undertakings are non-life undertakings.

1438. For small undertakings the relative significance of the capital requirement on the counterparty default risk is highest. But on average, the risk from the counterparty default risk module is not the major risk and it should in many cases be possible for the small undertakings to meet the requirements of Article 88 of the Delegated Regulation and use the simplified

calculations.

1439. The use of simplifications differs significantly between jurisdictions.

1440. Based on information from the NSAs, each of the six simplifications are being used by undertakings in at least 10 different Member States and each of the six simplifications are being used by at least 45 undertakings. Some simplifications are used by substantially more undertakings.

1441. The information from the NSAs also shows that the simplifications for the counterparty default risk module are among the most used simplifications.

1442. Since the simplifications are used to such a wide extend, this could indicate that new simplifications would be used as well. Furthermore, the findings underline the complexity of the module.

Treatment of derivatives in the counterparty default risk module

1443. EIOPA advises that all derivatives which do not meet criteria of Article 189(6) of the Delegated Regulation are defined as type 1 exposures and that the loss-given-default is calculated according to Article 192(3) of the Delegated Regulation irrespective of whether the derivative is risk-mitigating or not.

1444. This will allow fully reflecting the economic effect of contractual netting agreements in the calculation of the counterparty default risk.

Definition of a financial risk-mitigation technique

1445. It is clear from the annual QRTs that undertakings use both long and short positions when they hedge their risks. However, it is unclear in the Delegated Regulation whether the term financial risk-mitigation technique is restricted to individual instruments or if it also covers well-defined hedging strategies.

1446. To capture the economic effect of these hedging strategies, EIOPA advises to define a financial risk-mitigating technique as a hedging strategy where the individual derivative contracts do not have to comply with all of the requirements for a risk-mitigating technique as long as the entire hedging strategy does. The essential part is that the derivatives do not have to comply with Article 210 (Effective Transfer of Risk) of the Delegated Regulation individually.

1447. In the above definition, an individual derivative that complies with all the requirements for risk-mitigation techniques is still defined as a risk-mitigation technique.

1448. EIOPA suggests that the risk-mitigation technique should be well-defined when the risk-mitigation technique is a hedging strategy. The existing requirement on a written policy on the replacement of a risk-mitigation technique in Article 209(3)(a) of the Delegated Regulation could be extended to include the definition of the risk-mitigation technique, when the technique is constituted by derivatives where not all of the derivatives would meet the

requirements for a risk-mitigation technique.

1449. EIOPA advises that the definition of a risk-mitigating derivative follows the definition of a risk-mitigation technique meaning that a derivative is risk-mitigating if it is a part of a well-defined risk-mitigating technique.

Calculation of the risk-mitigating effect of derivatives

1450. The following advice builds on the advices regarding the treatment of derivatives in the counterparty default risk module and the definition of risk-mitigating techniques.

1451. EIOPA advises that the calculation of the risk-mitigating effect in Article 196 of the Delegated Regulation recognises contractual netting agreements provided the contractual arrangement complies with Article 214 of the Delegated Regulation.

1452. This would mean that the risk-mitigating effect should be calculated on the basis of all of the derivatives that an undertaking has entered with the counterparty for which the contractual netting agreement had been concluded.

1453. Derivatives, which are a part of a well-defined risk-mitigating technique, would each have either a positive or a negative impact on the risk-mitigating effect and therefore the resulting risk-mitigating effect can hypothetically be negative on counterparty-level. EIOPA advises that the risk-mitigating effect on counterparty-level is floored to zero.

1454. To clarify Article 196 of the Delegated Regulation, it could be mentioned in the Article that the risk-mitigating effect is zero for derivatives that do not meet the requirements for risk-mitigation techniques.

Calculation of the loss-given-default on derivatives

1455. The following advice builds on the advices regarding the definition of risk-mitigation techniques and the calculation of the risk-mitigating effect of derivatives.

1456. Article 192(1) of the Delegated Regulation should be amended so that the economic effect from contractual netting agreements is recognised.

1457. Article 192(3) of the Delegated Regulation should be amended so that the economic effect from contractual netting agreements is recognised. Hence, in case a contractual netting agreement is in place, the calculation of the loss-given-default should be performed on the counterparty-level and not for each derivative. Therefore, the value of the derivatives, the risk-mitigating effect of the derivatives and the collateral in relation to the derivative should all be considered on a counterparty-level.

Clarification of the calculation of the hypothetical SCR

1458. There seems to be a lot of uncertainty on how to calculate the hypothetical SCR in both Article 196 of the Delegated Regulation and in the simplified calculation in Article 111 of the Delegated Regulation. EIOPA

therefore advises that it is clearly stated in the respective Articles whether the hypothetical SCR is calculated after the normal requirements for calculating SCR or if any other requirements apply, e.g. other correlation factors.

1459. EIOPA advises that calculation of the hypothetical SCR for market risk should be performed according to the relevant articles of the Delegated Regulation even if the dominant scenario in the hypothetical SCR would be different than within the interest rate risk.

Simplified calculation of Article 192(2) of the Delegated Regulation

1460. EIOPA proposes an additional optional simplification for the computation of the LGD for reinsurance arrangements in Article 192(2) of the Delegated Regulation. In this case the undertaking can directly compute the LGD as

$$LGD = \max\{90\%(Recoverables + 50\% RM_{RE}) - F Collateral, 0\}.$$

1461. The simplification is prudent and reduces the burden to assess the 60 % condition in Article 192(2) of the Delegated Regulation.

Simplified calculation for type 1 exposures in Article 200 of the Delegated Regulation

1462. EIOPA proposes an optional simplification for Article 200 of the Delegated Regulation:

Type 1 exposures

1463. Where Article 88 of the Delegated Regulation is complied with, insurance or reinsurance undertakings may use the following simplified calculations for the purposes of Article 200 of the Delegated Regulation:

- a. Where the standard deviation of the loss distribution of type 1 exposures is lower than or equal to 20 % of the total losses-given-default on all type 1 exposures, the capital requirement for counterparty default risk on type 1 exposures shall be equal to the following:

$$SCR_{def,1} = 5 \cdot \sigma$$

where σ denotes the standard deviation of the loss distribution of type 1 exposures.

- b. Where the standard deviation of the loss distribution of type 1 exposures is higher than 20 % of the total losses-given-default on all type 1 exposures, the capital requirement for counterparty default risk on type 1 exposures shall be equal to the total losses-given-default on all type 1 exposures.

1464. The simplification reduces the volatility in $SCR_{def,1}$ for undertakings where the standard deviation of the loss distribution of type 1 exposures is around 7 % and the $SCR_{def,1}$ would consequently shift from 3S to 5S or vice versa.

1465. The proposal is prudent and avoids the shortcomings of the step change

from the risk management point of view.

Clarification of Article 201 of the Delegated Regulation

1466. The word “different” should be deleted from Article 201(2)(a) of the Delegated Regulation to reflect that the sum in V_{inter} should cover all possible combinations (j,k) of probabilities, including $j=k$.

1467. Article 201(2)(a) of the Delegated Regulation would then read:

The sum covers all possible combinations (j,k) of probabilities of default on single name exposures in accordance with Article 199

Simplified calculation for the risk-mitigating effect of reinsurance arrangements

1468. EIOPA proposes an additional optional simplification for the computation of the risk-mitigating effect of reinsurance arrangements. The simplification applies only in the case where the reinsurance arrangement affects only one line of business. In this case the risk-mitigating effect can be computed as

$$RM(RE) = \sqrt{\frac{(NL_{CAT}^{hyp} - NL_{CAT}^{without})^2 + (3\sigma_S(P_P^{hyp} - P_P^{without} + recoverables))^2}{+ 2 * 0.25 * 3 \sigma_S(P_P^{hyp} - P_P^{without} + recoverables)(NL_{CAT}^{hyp} - NL_{CAT}^{without})}}$$

where

- σ_S is the standard deviation for non-life premium and reserve risk as defined in Article 117(2) of the Delegated Regulation for the corresponding line of business
- $(NL_{CAT}^{hyp} - NL_{CAT}^{without})$ denotes the counterparty's share of CAT losses
- $(P_P^{hyp} - P_P^{without})$ is the reinsurance premium of the counterparty in the affected line of business
- *recoverables* are the reinsurance recoverables in relation to the counterparty in the affected line of business.

Adjustment of Article 107 and 108 of the Delegated Regulation

1469. EIOPA advises to adjust Article 107 and Article 108 of the Delegated Regulation such that the optional simplifications could only be applied for the non-negative reinsurance recoverables.

Clarification of Article 110 of the Delegated Regulation

1470. The description of the simplified calculation for the calculation of loss-given-default for grouping of single name exposures is very brief. To avoid any misunderstanding, it would be useful to clarify that when the loss-given-default is calculated on a group of single name exposures, this also means that the risk-mitigating effect and risk-adjusted value of collateral is calculated based on this group of single name exposures as well.

14. Treatment of exposures to CCPs and changes resulting from EMIR

14.1. Call for advice

EIOPA is asked to:

- Provide information on the amounts of exposures to qualifying central counterparties and of exposures to derivatives.
- Develop an approach for qualifying central counterparties in the framework of the counterparty default risk module with a parameterisation that ensures consistency with the treatment of such exposures in the banking regulation.
- Suggest how the Solvency II framework could be updated in its approach to cleared derivatives to take account of the reduced counterparty risk.

14.2. Legal basis

Solvency II Directive

1471. Article 104(1) of the Solvency II Directive sets out that there shall be a counterparty default risk module in the standard formula. Article 105(6) describes the scope of this module.

Delegated Regulation

1472. Article 192 of the Delegated Regulation sets out the calculation of the loss-given-default. The determination of the probability of default is described in Article 199. The calculation of the capital requirement for counterparty default risk on type 1 exposures is set out in Articles 200 and 201.

Guidelines and Technical Standards

1473. EIOPA published Guidelines on the treatment of market and counterparty risk exposures in the standard formula.

14.3. Feedback statement on the main comments received to the consultation paper (EIOPA-CP-17-006)

CCP

- a. Summary of the comments received

1474. Some stakeholders requested adjustments to the requirements of Article 305 of CRR to make the framework workable for the insurance sector. The stakeholders stated that insurers usually do not obtain independent legal opinions on the consequences of a CCP default. They referred to a recent report from EBA and ESMA, which in their view confirms that the concept of legal opinion did not work properly in the past and adjustments to Article 305 of CRR are required.

1475. Most stakeholders supported option 1 for treatment of exposures to CCPs.

b. Assessment

1476. As the risks of insurers and banks in case of a default by a CCP are not different, EIOPA sees difficulties in arguing for a less restrictive approach (in particular if there is to be consistency in the treatment). In case there will be changes to the relevant CRR provisions then the Solvency II treatment would of course have to be reviewed for the need to reflect them.

1477. For the chosen option please see section "Chosen approach".

Reflection of the exchange of variation margin

a. Summary of the comments received

1478. The responses regarding the preferred option were split. At the same time a number of respondents complain that the current treatment does not reflect the changes resulting from EMIR.

1479. Many responses indicated that the 10% recovery rate is not reflective of the post EMIR environment.

b. Assessment

1480. EIOPA proposes an approach which reflects the reduced risk resulting from the exchange of variation margin. While EIOPA considers that this exchange reduces the exposure at default stakeholders provided no evidence or arguments why the recovery rate should increase.

14.4. Feedback statement on the main comments received to the discussion paper

Exposures to CCPs

a. Summary of the comments received

1481. Stakeholders were not aware of insurers which are clearing members and did not expect them to become ones.

1482. Some stakeholders mentioned that more and more repo transaction are centrally cleared

b. Assessment

1483. Please see the analysis section.

Treatment of CCP exposures

a. Summary of the comments received

1484. A number of stakeholders described the mechanisms to reduce the risk of a CCP defaulting (e.g. reserve fund) and argued for a substantially lower capital requirement to reflect the different risk compared with bilateral transactions.

1485. Some stakeholders pointed out that the requirement to have a legal opinion set out in the current Article 305 (2) (and also the legal review proposed by the Commission in its November 2016 draft) would create significant costs and burdens, in particular for small and medium sized insurers. As a solution it was suggested to establish a contractual standard for central counterparties and clearing members, that justifies a reduced solvency capital requirement.

1486. A number of stakeholders emphasised the importance of ensuring that future changes in the banking regulation are reflected in the Solvency II rules.

b. Assessment

1487. EIOPA acknowledges the beneficial effects of central clearing and the safety mechanisms that were introduced to reduce the risk for CCPs. For the consequences for the calibration please see the analysis section.

1488. It would be difficult to justify why the requirements for a reduced capital requirements on an indirectly cleared transaction should be weaker for insurers than for banks. There would also be the question how consistency could be achieved.

1489. EIOPA is aware of the discussion on future changes.

Reflection of changes introduced by EMIR

a. Summary of the comments received

1490. Stakeholder expressed the view that there is currently no interaction between EMIR and the Solvency II Delegated Regulations with respect to the treatment of derivatives and associated capital charges for counterparty default risk.

1491. Some stakeholders argued that the adjusted value of collateral is too low based on a comparison with collateral haircuts set out in the EMIR Regulatory Technical Standard for bilateral margining.

1492. One stakeholder claimed that the calculation of the counterparty default risk is too conservative based on the argument that the calculation implies that the default of the counterparty and the shock on the underlying of the derivative always occur together.

1493. It was suggested that the introduction of EMIR increases the recovery rate.

1494. Some stakeholders pointed out that there are some difficulties in the calculation when there are several derivatives with the same counterparty.

b. Assessment

1495. For an analysis of the interaction between the EMIR provisions and the calculations in the counterparty default risk please see the analysis section.

1496. A comparison between the adjusted value of collateral and the haircut-adjusted values in accordance with EMIR is not very meaningful as they aim to capture different risks (see analysis section).
1497. The calculation does not imply that the default of the counterparty and the shock on the underlying of the derivative always occur together as the correlation between the counterparty default risk module and the market risk module is lower than one.
1498. The bilateral margining rules in EMIR reduce the counterparty default risk. One can discuss how this could be reflected in the calculation. But based on the analysis it is less clear why EMIR results in higher recovery rates (see analysis section).
1499. For the treatment of several derivatives with the same counterparty in the counterparty default risk module, please see heading "Treatment of derivatives in the counterparty default risk module" in section 13.5.3

14.5. Advice

14.5.1. Previous advice

1500. CEIOPS provided advice on the counterparty default risk module.^{74,75}

14.5.2. Analysis

1501. EMIR introduced the obligation for financial counterparties including insurers to clear through authorised Central Counterparty Clearing (CCPs) OTC derivatives, which are standardised and liquid, in accordance with the assessment by ESMA. This makes the treatment of exposures to CCPs in the standard formula more relevant.
1502. For OTC derivative contracts not cleared by a CCP, financial counterparties have to exchange collateral on a timely basis. In particular, the frequent exchange of variation margin is required for all financial counterparties. In the following sections the implications of these changes in terms of capital requirements are explored.

Exposures to CCPS

Scope

1503. Based on the information available to EIOPA no European insurer is currently a clearing member of a Central Counterparty (CCP).
1504. Exposures to CCPs arise only when insurers enter into centrally cleared derivatives using the services of a clearing member (indirect clearing).

⁷⁴ CEIOPS (2009): CEIOPS' Advice for Level 2 Implementing Measures on Solvency II: SCR standard formula - Counterparty default risk module. CEIOPS-DOC-23/09.

⁷⁵ CEIOPS (2010): QIS5 Calibration Paper. CEIOPS-SEC-40-10.

1505. EIOPA considered whether the case of a standard formula insurer acting as a clearing member has to be covered as well in the advice. But as stakeholder apparently did not see this case as relevant it was decided against it.

1506. EIOPA also considered whether exposures that result from repo transactions should be covered. In principle the treatment outlined below can be applied to all exposures to CCPs. But stakeholders did not seem to consider repos as relevant exposures.

Requirements on the calibration and implications

1507. The proposed treatment should reflect the risks arising from CCP exposures adequately.

1508. Moreover, the call for advice requires that the treatment of CCP exposures in the standard formula is “consistent” with the banking regulation.

1509. According to the CRR derivative transactions are subject to capital requirements for counterparty credit risk, CVA risk and market risk.

1510. For counterparty credit risk the treatment of indirectly cleared exposures to CCPs is set out in Article 305 CRR with two different cases where the risk charges are lower than for bilateral transaction.

1511. It seems appropriate to differentiate the treatment of indirectly cleared derivatives in the standard formula based on the same cases: There is no obvious reason to deviate from the criteria for safer arrangements in the banking sector. Introducing different criteria would also make achieving consistency much more difficult.

1512. There are different possible interpretations what consistency means:

1. The ratio for the capital requirements of bilateral and indirectly cleared transaction is similar under the standard formula and the banking regulation.
2. The absolute level of the risk charges for indirectly cleared derivatives is comparable in the insurance and banking regulation.
3. The same outcome in incentivising central clearing is achieved.

1513. The first and third interpretations seem preferable: A stand-alone comparison of the capital requirements for a specific transaction in the banking and insurance regulation may not be very meaningful as the overall design of the regulatory capital requirements is very different.

1514. Another objective is simplicity. Where possible the treatment of indirectly cleared derivatives should be “fitted” into the existing structure of the counterparty default risk module.

1515. Based on the above considerations EIOPA developed two alternatives for the treatment of CCP exposures which are described below.

Benchmark for calculation of ratios between capital requirements

1516. EIOPA assumes the normal case to be that the indirectly cleared transactions meets the criteria in Article 305(2) CRR (i.e. the most favourable treatment in terms of capital requirements applies). The main target should therefore be to ensure consistency for this situation. EIOPA assumes further than the normal counterparty in a bilateral transaction would be a bank with an external rating which is assigned to credit quality step 2 (normally corresponding to "A").

Relevant provisions in the CRR

1517. In the following the relevant provisions in the CRR are described. In November 2016 the European Commission proposed amendments to the CRR. Of particular relevance in this context are the suggested changes to implement the standardised approach for counterparty credit risk (SA-CCR). Where relevant the proposed changes are covered as well.

CVA risk

1518. The provisions for CVA risk can be found in Articles 381ff. CRR. Transactions with a qualifying CCP via a clearing member are exempted (Article 382 CRR). For bilateral transactions the formula for calculating the risk charge with the standardised method can be found in Article 384 CRR. For the purpose of this paragraph the total counterparty credit risk exposure is calculated with the same methods as for the determination of the own funds requirements for counterparty credit risk.

Counterparty default risk

Bilateral derivative transaction

1519. The exposure value is calculated in accordance with the provisions in Article 273ff. While non-internal model banks can currently use different methods in future only the SA-CRR would be allowed.

1520. The weight for this exposure value in the case of a transaction with an institution is set out in Articles 120(1) or 121(1) CRR respectively.

1521. The resulting contribution to the overall capital requirement can be calculated with the formula *8 % times risk weight times exposure value*.

Indirect clearing as a client of a clearing member with a qualifying CCP

1522. If the provisions in Article 305 (2) or (3) CRR are met then the calculation can be performed in accordance with Article 306 CRR using risk weights of 2 % or 4 % respectively. Otherwise the rules for bilateral transactions (see above) apply.

1523. If Article 305 CRR is applicable the calculation of the exposure value is the same as for bilateral transactions.

1524. This means that the capital requirement for counterparty credit risk if the provisions in Article 305(2) are met would be 8 % times 2 % times exposure value.

Relative consistency approach

1525. The market risk of a derivative (i.e. the change in market value resulting from changes in the value of the underlying or other value relevant parameters) is covered in the respective modules of the standard formula. There is no need to make adjustments to the current rules.
1526. Therefore in the following consistency is only considered in terms of counterparty and CVA risk in the CRR.
1527. Indirectly cleared derivatives transactions are exempted from the CVA risk charge. Moreover, the counterparty credit risk charge is substantially lower than for bilateral transactions. As a result the risk charge for the indirectly cleared transaction would be less than 4 % of the risk charge for the same bilateral transaction with an "A"-rated bank.
1528. The exact relationship between the risk charges for indirectly cleared and bilateral transactions for banks would depend on the individual parameters of the transaction. One could calculate the exact values for different cases and try to determine a representative value. But as using the 4 % mentioned above already produces a very low Solvency II risk charge this does not seem necessary as not much is to be gained in terms of additional accuracy.
1529. According to the current Delegated Regulation indirectly cleared derivatives are covered in the type 1 counterparty default risk calculation. There is no reason to change this.
1530. In order to integrate the exposure in the type 1 calculation the probability of default (PD) and the recovery rate (RR) which is currently 10 % for bilateral derivative transactions that qualify as a risk mitigation technique have to be determined.
1531. It seems preferable to perform the calculations on a stand-alone basis, in other words the comparison is performed assuming that the indirectly cleared respectively bilateral transaction is the only type 1 exposure. This avoids the necessity to make assumptions about the type 1 exposure portfolio.
1532. Moreover, unless the derivative exposure represents a very meaningful part of the type 1 exposure portfolio the effects of diversification should be similar.
1533. Different combinations of PD and RR can be chosen to produce a stand-alone type 1 risk charge for the indirectly centrally cleared transaction equal to 4 % of the corresponding value for a bilateral transaction with an A-rated bank.
1534. Assuming the same RR of 10 % as for bilateral transactions the necessary PD is only $1/25^{\text{th}}$ of the PD for AAA-rated exposures. With a RR of 50 % the fraction is 12.95%.
1535. From a pure consistency perspective it is not clear which combination should be preferred. In order to minimise the changes in the standard formula the same probability as for AAA-rated exposures is used. This avoids

the creation of an additional “probability bucket”. In order to produce the stand-alone risk charge as described above the recovery rate has then to be set to 82 %.

1536. With the relative consistency approach the stand-alone type 1 risk charge for an indirectly cleared derivative would be 0.24 % of the exposure-at-default (EAD). The effective contribution to the overall SCR would be considerably lower due to diversification within the counterparty default risk module and across the risk modules as well as the possible loss absorbing effects of technical provisions and deferred taxes. Currently, the corresponding value for an AAA-rated counterparty would be 1.21%.

1537. For an indirectly cleared transaction that meets only the requirements in Article 305(3) CRR the risk charge for the indirectly cleared transaction would be less than 8 % of the risk charge for the same bilateral transaction with an “A”-rated bank. Using this 8 % the possible PDs and RRs to produce a consistent calibration can be derived analogously. In order to reduce the additional complexity for the type 1 risk charge calculation the same probability of default as for AA-rated exposures are used. The recovery rate is set to 84 %.

1538. EIOPA considered whether in addition to compliance with the conditions set out in Article 305 CRR additional requirements similar to relevant CRD provisions should be met to qualify for the treatment described above (e.g. in case certain risk management requirements should not be covered in the Solvency II framework) but did not see the need.

1539. According to Article 306(2) CRR for assets posted as collateral to a clearing member that are bankruptcy remote in the event that the CCP, the clearing member or one or more of the other clients of the clearing member becomes insolvent an institution may attribute an exposure value of zero to the counterparty credit risk exposures for those assets. The same should apply under the standard formula where insurer post collateral and the conditions above are met.

Alternative approach

1540. There are only a few CCPs. Moreover, there have been considerable efforts in the past years to increase their robustness. This makes it difficult to produce a calibration based on historical evidence in line with the requirements of Article 101(3) of the Solvency II Directive.

1541. On this basis one alternative is to use parameters that create incentives for central clearing but are closer to the existing ones for other exposures. One could assume for qualifying transactions the same probability of default as for AAA-counterparties and a recovery rate of 50 % (the same as for reinsurers). This produces a stand-alone risk charge corresponding to 0.67% of the EAD.

1542. The respective figures for AAA-, AA- and A-rated counterparties with the “default” RR of 90 % would be 1.21 %, 2.70% and 6.04%. With the current regulation where a credit assessment by a nominated ECAI is not available a

PD of 4.2 % would be used with the consequence that the stand-alone risk charge would correspond to the LGD (i.e. be equal to 90 % of the EAD).

1543. For indirectly cleared transactions which only meet the requirements of Article 305(3) CRR a recovery rate of 50 % and the probability of default for AA-counterparties can be used. This produces a stand-alone risk charge corresponding to 1.50 % of the EAD.

1544. This approach does not start from the requirements in the banking sector. But it acknowledges the limitations in terms of evidence and produces a low capital requirement – both in absolute and relative terms - which is consistent with the banking regulation. The absolute difference to the level of capital requirement derived with the relative consistency approach is small. It also provides incentives for central clearing.

Chosen approach

1545. The relative consistency approach ensures consistency with the banking rules on a relative basis. It provides incentives for central clearing.

1546. The alternative approach is easier to calibrate and acknowledges the limitations in terms of evidence. It produces a low capital requirement – both in absolute and relative terms - which is consistent with the banking regulation. The absolute difference to the level of capital requirement derived with the relative consistency approach is small. It also provides incentives for central clearing. Moreover, even before taking into account the effects of diversification and loss-absorbency, the difference in terms of the resulting capital requirements to the approach that starts with the rules in the banking sector are very small.

1547. As none of the two approaches is clearly better, EIOPA suggests using one of them.

Possible implications for the calculation of the Loss-Given Default

The effect of EMIR on the counterparty default risk in an OTC derivative transaction

1548. EMIR has introduced for non-centrally cleared transactions the obligation for counterparties to exchange initial margin for larger transactions as well as variation margin on a very frequent basis for all transactions. Initial margin has to be segregated.

1549. In the following the focus is on the effects that the requirement to exchange variation margin on a frequent basis have, as the Delegated Regulation allows capturing the effect of already collected margin. As variation margin has also to be posted on a frequent basis for indirectly centrally cleared transactions, the results are transferable.

Basic model

1550. The following assumptions are made:

- The insurer enters into an OTC derivative contract (as an example a put option on a listed stock is used) on January 1st. The value of the derivative at time t is denoted D_t
- The counterparty defaults at some point in time during the following 12 months
- The insurer does not take out a new contract after the default of the derivative counterparty
- The counterparty does post assets as initial margin at the outset of the transactions. The level of initial margin required does not change over the year with the movement of the stock price
- The collateral is collected in cash (i.e. for the time being changes in the value of the collateral can be ignored). The value of the collateral is denoted C .
- The value of the stock drops by the type 1 risk charge (39 %) over the following 12 months.
- The risk-mitigating effect of the derivative (RM) corresponds to the change in value of the derivative resulting from this drop (i.e. for the sake of simplicity no diversification effects are assumed).

Case 0: No exchange of variation margin

1551. The counterparty defaults at the point in time t . The insurer has a claim based on the then value of the derivative and can seize the assets that were posted as initial margin.

1552. Compared with the situation where the counterparty does not default the insurer has lost $D_1 - (\min(D_t; C) + 0.1 \cdot \max(0; D_t - C))$. In the case of an instantaneous shock at $t=0$ this becomes:

$$D_0 + RM - (\min(D_0 + RM; C) + 0.1 \cdot \max(0; D_0 + RM - C)) = 0.9 \max(0; D_0 + RM - C)$$

1553. This resembles closely the formula in Article 192(3) of the Delegated Regulation. In case a part of the 39 % decline in the stock price occurs after the default of the counterparty the loss is higher as the claim on the counterparty is lower.

Case 1: Exchange of variation margin and immediate shock

1554. The equity stock occurs instantaneously on January 1 and the counterparty defaults at the same time before further collateral can be exchanged. The loss is then the same as in the previous case without the exchange of variation margin.

Case 2: Exchange of variation margin and gradual decline in the price

1555. The 39 % decline occurs linearly over the year. Whether the default of the counterparty results in a loss depends on the time when the counterparty defaults. If the counterparty defaulted at the end of the year, then it has already posted variation margin to reflect the increased value of the

derivative. If the default occurs in the middle of the year the loss is half the full year loss.

1556. One can of course construct many other cases based on different intra-year stock behaviours but the general principle should be clear based on the simple case 2.

1557. In summary, the simple example illustrates that due to the collection of variation margin the insurer can protect the gains on the derivative until the default of the counterparty. But as it is assumed that no new contract is concluded the insurer loses the protection for the remainder of the year.

1558. So far it was assumed that there are no changes in the value of the collected collateral. The Delegated Regulation sets out an adjustment for this risk that covers two cases: First, the insurer may decide to take the collected collateral on its book after the counterparty defaulted. The resulting risks have to be reflected. Second, the value of the collateral could decline before the counterparty defaults. Under EMIR the second risk is mitigated as the counterparty has to compensate lower collateral values. This is of course again not relevant if one assumes an instantaneous shock.

Possible reflection in the standard formula calculation

1559. The collection of variation margin and the compensation on losses of already collected margin does reduce the counterparty risk as shown in the previous discussion. Moreover, the proposed standardised approach for counterparty credit risk in the banking regulation allows the recognition of variation margin.

1560. At the same time the mechanisms mentioned above have only an effect in case of a non-instantaneous shock. Reflecting them would make it necessary to deviate from this basic assumption of the standard formula. Moreover adequate shocks for periods shorter than 12 months would be needed. Therefore there are pros and cons for a change .

1561. One aspect to consider though is that there is no discretion involved. The exchange of variation margin and the compensation for losses on already posted collateral are legal requirements.

1562. On balance, EIOPA consider that there are more arguments for a change than against it.

1563. In order to reflect the effect of the exchange of variation the existing formula for the LGD could be rewritten as

$$\max \left((1 - RR)(\text{Derivative} + xRM_{fin}) - F'(y\text{Value} - z\text{Adjustment}_{\text{market risk}}); 0 \right)$$

with x, y and z between zero and one

1564. A value of x= 0.5;y=1;z=0.5 can be interpreted to mean that the default will occur on average after six months, the insurer can collect variation margin for half the protection reflected in the SCR calculation and receives compensation for half the loss in the value of the collateral from its counterparty.

1565. But with this formula it would still be necessary to calculate the adjustment for market risk. In order to simplify the calculation one can use the fact that $Value \geq Adjustment_{market\ risk}$ (except perhaps for some very exotic cases).
1566. This mean that the above LGD formula with the parameters $x=0.5; y=0.5; z=0$ provides a prudent upper bound for the LGD formula with $x=0.5; y=1; z=0.5$. EIOPA recommends to change the formula in the Delegated Regulation accordingly for derivatives transaction that are indirectly cleared with a CCP and for bilaterally cleared transactions.
1567. So far it was assumed that the insurer does not enter into a new contract after the counterparty defaults and that the insurer is subject to the risk of a loss in the value of the collected collateral. Relaxing this assumption could only be justified if there was sufficient certainty that the insurer is able to enter very quickly into a new contract and that the collected collateral is sold or posted as collateral for the new contract.
1568. Based on the analysis EIOPA has performed so far it seems doubtful that this sufficient certainty could be achieved. Therefore the possibility of a replacement should not be considered.

Further possible effects of EMIR

Possible effect on the factor 'F'

1569. The factor' F' allows taking into account the economic effect of the collateral arrangement in relation to the derivative in case of a credit event related to the counterparty.
1570. It depends on whether in case of insolvency of the counterparty, the determination of the insurance or reinsurance undertaking's proportional share of the counterparty's insolvency estate in excess of the collateral takes into account the received collateral or not.
1571. Where in case of insolvency of the counterparty, the determination of the insurer's proportional share of the counterparty's insolvency estate in excess of the collateral does not take into account the received collateral, there is no need to change the current value of F' (100 %).
1572. Where the collateral is taken into account the situation differs for bilaterally and indirectly centrally cleared transaction:
1573. Unless EMIR increases the recovery rate on the EAD for bilaterally cleared transaction – and EIOPA has found no evidence for this – there is no need to adjust the factor' F' for these transactions.
1574. For indirectly cleared transactions F' has to be adjusted in line with the proposed changes above.

Effect on the loss-given default

1575. The current assumed value for the recovery rate on a bilateral derivative transaction is 10 %. This reflects the recovery rate after the use of any existing collateral to satisfy claims. Based on the analysis EIOPA performed there seem to be no reasons for changes. EMIR may reduce the exposure at default. But it is not clear why it should increase the recovery rate. Actually, EMIR could result in lower recovery values for investment banks as collected collateral has to be segregated.

14.5.3. EIOPA's advice

Exposures to CCPs

1576. Where the insurer posts assets as collateral to a clearing member that are bankruptcy remote in the event that the CCP, the clearing member or one or more of the other clients of the clearing member becomes insolvent, the insurer may not consider these assets in the calculation of the counterparty default risk module.

1577. EIOPA suggests to use one of the following two approaches for indirect exposures to CCPs:

Relative consistency approach:

1578. Where the derivative transaction of an insurer meets the requirements set out in Article 305(2) CRR, the probability of default for AAA-rated exposures and the formula for the loss-given default below with $x=0.18$ should be used.

1579. Where the conditions in Article 305(3) CRR are met the probability of default for AA-rated exposures and the formula for the loss-given default below with $x=0.16$ should be used.

Alternative approach:

1580. Where the derivative transaction of an insurer meets the requirements set out in Article 305(2) CRR, the probability of default for AAA-rated exposures and the formula for the loss-given default below with $x=0.5$ should be used.

1581. Where the conditions in Article 305(3) CRR are met the probability of default for AA-rated exposures and the formula for the loss-given default below with $x=0.5$ should be used.

Calculation of the Loss-Given Default for derivative transactions (both indirectly centrally cleared and bilaterally cleared)

1582. The formula for the LGD in Article 192(3) of the Delegated Regulation should be altered to

$$\max(x(\text{Derivative} + 0.5RM_{fin}) - F'0.5Value; 0)$$

where $x=0.9$ for bilaterally cleared transactions and x as defined above for indirectly centrally cleared transaction.

1583. Where in case of insolvency of the counterparty, the determination of the insurer's proportional share of the counterparty's insolvency estate in excess of the collateral takes into account the received collateral, the factor F' should be set to x as defined above for indirectly centrally cleared transactions.

15. Simplification of the look-through approach

15.1. Call for advice

1584. EIOPA is asked to review the simplification provided for the look-through approach (Article 84(3) of the Delegated Regulation).

1585. In particular, EIOPA is asked to provide information on investments by insurers through collective investment undertakings and other investments packaged as funds and on the amount of those investments which are hedging unit linked and index-linked products, including information on cases where the simplified methodology (currently limited to 20% of the assets) does not cover the whole portfolio.

1586. Furthermore EIOPA is asked to suggest refinements to this simplification to cover all investments for which a simplified methodology would allow proportionate and risk-based calculations of the solvency capital requirement. Such refinements should in particular take account of the objective to reduce the reliance on external ratings.

15.2. Legal basis

Solvency II Directive

1587. The Solvency II Directive requires that the Solvency Capital Requirement shall be calculated so as to ensure that all quantifiable risks to which an insurance or reinsurance undertaking is exposed are taken into account, but does not contain any specific provision regarding the application of the look-through approach. The Look-through approach is provisioned in Article 84(1) of the Delegated Regulation.

Delegated Regulation

1588. Article 84(1) of the Delegated Regulation states that *"the Solvency Capital Requirement shall be calculated on the basis of each of the underlying assets of collective investment undertakings and other investments packaged as funds (look-through approach)"*.

1589. At the same time article 84(3) states that *"Where the look-through approach cannot be applied to collective investment undertakings or investments packaged as funds, the Solvency Capital Requirement may be calculated on the basis of the target underlying asset allocation of the collective investment undertaking or fund, provided such a target allocation is available to the undertaking at the level of granularity necessary for calculating all relevant sub-modules and scenarios of the standard formula, and the underlying assets are managed strictly according to this target allocation. For the purposes of that calculation, data groupings may be used, provided they are applied in a prudent manner, and that they do not apply to more than 20 % of the total value of the assets of the insurance or reinsurance undertaking."*

1590. Furthermore Article 168 requires that when a look-through approach is not possible and undertakings do not make use of the provisions in Article

84(3), they apply the stress factor of “type 2” equity risk. In particular article 168 (3) reads as follows: *Type 2 equities undertakings Article 168 Type 2 equities shall comprise equities listed in stock exchanges in countries which are not members of the EEA or the OECD, equities which are not listed, commodities and other alternative investments. They shall also comprise all assets other than those covered in the interest rate risk sub-module, the property risk submodule or the spread risk sub-module, including the assets and indirect exposures referred to in Article 84(1) and (2) where a look-through approach is not possible and the insurance or reinsurance undertaking does not make use of the provisions in Article 84(3).*

Guidelines

1591. EIOPA Guidelines on the look-through approach aim at increasing consistency and convergence of professional practice in the application of the look-through approach for all types and sizes of solo undertakings using the standard formula.

1592. As regards the simplified look through of Article 84(3) of the Delegated Regulation, they provide specific guidance on how to apply the “grouping” approach in a prudent way. Specifically Guideline 4 requires that where assets covered in the spread and interest rate risk sub-modules are grouped according to duration bands, undertakings should ensure that the durations assigned to the bands are demonstrably prudent. Furthermore it requires that where groupings across different credit quality steps are used, undertakings should ensure that the credit quality steps assigned to the groups are demonstrably prudent.

1593. Guideline 5 provides for additional guidance for the application of the “grouping” approach to single name exposures when calculating the capital requirement for market risk concentration.

15.3. Feedback statement on the main comments received to the consultation paper (EIOPA-CP-17-006)

a. Summary of the comments received

1594. Most of the stakeholders have supported the EIOPA’s set of proposals on simplifying the look through approach, especially the proposed amendment to article 84(3) of the Delegated Regulation. But some of them have expressed criticism about the proposal to link the application of the simplified approach of article 84(3) to the Article 88 of the Delegated Regulation, which refers to proportionality and simplifications, intended to be a means to ensure a consistent and prudent approach across all simplifications. They have highlighted that, in the case of the proposed look-through simplifications, there are already safeguards for prudence, namely the 20% threshold and the requirement for testing the asset allocation criterion.

1595. Some stakeholders have highlighted that the requirement of Article 84(3) to « strictly » manage the collective investment fund according to the target asset allocation or the latest reported asset allocation could lead to misinterpretation. To address this, they have proposed to replace the requirement «strict » with «consistent» in Art 84 (3) and Art 84(3)(b).

b. Assessment

1596. EIOPA believes that the proposal in the Advice, which aims at extending the scope of application of the simplified approach of Article 84 (3) of Delegated Regulation and to make it less costly and more widely applicable, needs necessarily to be complemented by an additional qualitative condition which is linked to Article 88. This set of provisions would ensure that undertakings might apply a “simplified look through” more widely, provided that the error introduced in the calculation is not material. This is in line with the general proportionality framework of the Standard Formula and avoids wrong incentives for non-applying the look-through approach when the SCR is likely to be above 49%.

1597. EIOPA does recognize the point but is more in favour of proposing a deletion of the word “strictly” from the current article, rather than using the word “consistently”, which would make the meaning more vague. In order to calculate the SCR based on the target asset allocation, assets should evidently be managed, and all underlying risks valued, according to that allocation.

1598. EIOPA will also make clear in the final Advice that the last reported allocation might be used when exposures and risk are not supposed to vary materially over a short period of time and that the undertaking is supposed to review it on a regular basis anyway, therefore ensuring that the assumed target is representative.

15.4. Feedback statement on the main comments received to the discussion paper

Appropriateness of the 20% threshold established by Article 84(3) of the Delegated Regulation

a. Summary of the comments received

1599. The simplified approach of Article 84(3) of the Delegated Regulation was considered to be an appropriate provision for avoiding prohibitive costs in the application of the Solvency II rules and in respecting the proportionality principle.

1600. As regards the appropriateness of the current level of the threshold of total assets (20%) up to which the simplified approach might be applied, many stakeholders indicated that when the asset grouping method is performed in a prudent way, leading to higher capital requirements, such method should be allowed to be used for larger parts of asset portfolio (more than 20% of total assets). In this context it was reported that consideration should be given to extending the applicability where it can be demonstrated that the simplification would not have a material impact on SCR.

1601. Some comments indeed suggested that investment assets backing unit-linked and index linked products should be excluded from the look-through approach provided that the market risk of those assets is negligible

1602. Other stakeholders suggested that the 20% threshold established by Article 84(3) of the Delegated Regulation should be reflective of risk or materiality. In particular they asked for a risk-based threshold that takes account of the contribution of the assets to the SCR calculation, in order to enable greater scope to apply a simplified look-through approach to unit and index-linked businesses.

1603. Also a more general comment about the applicability of Article 84(3) of the Delegated Regulation was expressed: stakeholders argued that the condition of having a target asset allocation, on the sole basis of which investments are performed, is often difficult to fulfil in practice.

Issue with the application of the simplified approach for investments which are backing unit-linked and index-linked products

a. Summary of the comments received

1604. Many stakeholders reiterated that the simplified approach of Article 84(3) of the Delegated Regulation should be allowed for all unit- or index-linked products without any threshold. They argued that, as far as the risk is borne by the policy holders, the investment related to unit-linked products could be entirely allowed for a simplified approach like a data grouping approach.

1605. Furthermore they raised doubts about the appropriateness of the 20% threshold in individual cases, especially for insurance undertakings with a strong focus on unit-linked products.

1606. It was also indicated that the threshold may be less appropriate in certain circumstances, such as a fund that is passively managed, or a unit-linked fund with low trading volumes and that where there is a lack of data for the application of the look-through, there is also likely a lack of data for alternative information (for example, information about the management of the underlying assets according to a target allocation);

1607. Furthermore many stakeholders indicated that the current strict wording of Article 84 of the Delegated Regulation makes the application of the look-through approach excessively burdensome and in many cases insurers are only left with the alternative of the type 2 equity sub-module which is not appropriate.

1608. It was also asked for additional guidance on the application of the look-through approach in different cases.

Specific proposals to further simplify the look-through approach for investments which are backing unit-linked and index-linked products

a. Summary of the comments received

1609. Some stakeholders suggested an even simpler approach, similar to the standard factors used for equity risk, because the target allocation of a fund does not always contain sufficient information for the calculation of the SCR, e.g. it is not always possible to construct a cash flow profile for the interest rate risk.

1610. Some other stakeholders advocated for an alignment of the threshold of Article 84(3) of the Delegated Regulation with the reporting requirements: they suggested that the same 30 % threshold for reporting requirements (detailed list of assets in QRT) is also applied as a maximum for investments in investment funds subject to the simplified approach of Article 84(3) of the Delegated Regulation.
1611. It was also reiterated that a look-through approach on assets backing unit linked and index linked contracts should be completely excluded.
1612. Some stakeholders proposed to amend Article 84(3) of the Delegated Regulation as follows:
1613. "Where no such target allocation is available, an aggregated actual allocation of the collective investment undertaking or fund can be used as data-grouping, provided it is unlikely to expect that the allocation will change substantially in the near future and provided, that the data grouping of the actual allocation is reviewed on a regular basis (at least yearly). Such a data-grouping may be based on the last published asset allocation and may for example aggregate equity positions or fixed-income securities in an appropriate manner."
1614. It was also proposed that, since the impact of unit-linked business on the SCR is negligible, the 20% threshold should not apply to unit-/index-linked products or at least be substantially increased, for instance by allowing data groupings to be applied in an "appropriate" manner instead of a "prudent" manner as Article 84(3) requires.
1615. It was also suggested to: 1) introduce a simplified SCR calculation based on factors related to risk measure of a given investment fund (e.g. for UCITS SRRI included in the Key Investor Information Document); 2) decrease the frequency of application of the look-through approach, e.g. annually.

Specific exposures for which the cost of the application of the look-through approach would be excessively burdensome

- a. Summary of the comments received

1616. Main comments received in this section were:

- in the case of bond funds collecting all the relevant information to apply the look-through approach would be unnecessarily burdensome;
- in case of "external" investment funds (managed by non-related undertakings), the information required for even a high-level estimation of SCRs is very difficult to collect;
- for equity and private equity funds, because of frequent turnover of the holdings of such investment vehicles, a look-through is burdensome. The risk of a particular equity- or private equity fund should be estimated with respect to the investment mandate;

- for unit-linked business, the application of the look-through approach, even with the given simplifications, is excessively burdensome, as the impact of unit-linked business on the SCR is negligible;
- in the case of fixed income funds, it is often difficult to apply the look-through approach as key information such as rating and duration of underlying bonds is missing. This in practice leads to the application of a "type" 2 equity charge, which is significantly overstating the risk of fixed income funds;
- if the change in asset allocation within the fund is immaterial in the context of determining the SCR (e.g. asset classification, rating, duration), then it may be appropriate to exclude these holdings when assessing compliance with the 20% limit;
- for large funds with negligible total asset value it is difficult to collect all necessary information to apply the look-through;
- for money market funds in which captives are investing, the look-through approach could be avoided.

b. Assessment

1617. EIOPA is aware of the costs and challenges associated with the application of the look-through approach, especially in view of the effort to collect all granular information at single exposure level. The same level of granularity is asked also when the "grouping approach" of Article 84(3) is applied.

1618. For this reason EIOPA considers that some refinements are necessary to extend the scope of application of the simplified approach of to Article 84(3) and to make it less costly and more widely applicable, but is not in favour of promoting "exemptions" for specific cases or a less frequent application of the requirement of Article 84(1). The look-through approach is one of the fundamental principles of Solvency II, also from a risk management perspective.

15.5. Advice

15.5.1. Previous advice

1619. Even though CEIOPS did not advise for a specific framework for the application of a "simplified" look-through approach, in *CEIOPS' Advice regarding the Calibration of Market Risk Module*, it was stated that *the same stress as for the "equity, other" category should be applied to the structured product/investment for which the look-through is not possible*.

1620. Hence CEIOPS was aware that the "full" look-through approach was not always possible and that the costs and challenges regarding data availability for its application would have made necessary the adoption of simplifications.

15.5.2. Analysis

1621. Based on the comments received, EIOPA has performed some quantitative analysis (reported below) to verify the appropriateness of the 20% threshold of Article 84(3), in order to investigate on the possibility to extend the “scope” of application of the simplified approach of Article 84(3) to larger parts of assets portfolio when it can be prudentially justifiable.

1622. Specific analyses has been performed with regard to assets covering Unit Linked/Index linked products.

Data analysis

1623. In order to review the simplification provided for the look-through approach (Article 84(3) of the Delegated Regulation), EIOPA is asked to provide information on:

- investments by insurers through collective investment undertakings and other investments packaged as funds, and;
- the amount of those investments which are hedging unit linked and index-linked products, including information on cases where the simplified methodology does not cover the whole portfolio.

1624. EIOPA has performed some analysis on specific data from annual reporting templates (as of 31/12/2016). From S.02.01.01 (Balance sheet) – column C001– - EIOPA has analysed the following aggregated data:

Investments (other than assets held for index-linked and unit-linked contracts) – R0070
Collective Investments Undertakings – R0180
Assets held for index-linked and unit-linked contracts – R0220
Total assets – R0500

1625. In S.02.01.01 investments in “Collective Investments Undertakings (CIU)” and “Assets held for index-linked and unit-linked contracts” are separated items.

1626. Below is displayed the aggregated market information (split by country) about the investments in CIUs and about investments covering unit-index linked products, both expressed in percentage of total assets.

	CIUs/Total Assets	Assets for Unit-Index Linked products/Total Assets	Assets for Unit-Index Linked products +CIUs/Total Assets
AT	10.4%	13.1%	23.5%
BE	4.2%	9.4%	13.6%
BG	4.9%	3.0%	7.9%
CY	12.4%	32.0%	44.4%
CZ	4.7%	15.1%	19.8%
DE	8.7%	4.8%	13.5%
DK	13.5%	25.9%	39.5%
EE	4.0%	34.7%	38.7%
ES	3.7%	5.2%	8.8%
FI	12.6%	44.4%	57.1%
FR	9.9%	7.5%	17.4%
GR / EL	5.6%	13.3%	18.9%
HR	6.3%	3.3%	9.7%
HU	4.7%	43.0%	47.7%
IE	1.0%	26.6%	27.7%
IT	5.6%	14.9%	20.5%
LI	0.6%	27.0%	27.6%
LT	6.4%	36.7%	43.0%
LU	3.3%	28.7%	32.0%
LV	8.7%	8.3%	17.0%
MT	4.4%	2.7%	7.1%
NL	3.5%	19.7%	23.2%
NO	20.0%	13.5%	33.5%
PL	9.5%	23.8%	33.3%
PT	4.0%	22.7%	26.7%
RO	1.7%	17.9%	19.6%
SE	11.3%	15.4%	26.7%
SI	4.5%	14.4%	18.8%
SK	3.7%	18.2%	21.9%
UK	4.1%	21.8%	25.8%
EEA	6.9%	14.7%	21.5%

Data reported have been subject to some cleaning. In addition some outliers have been removed. They should be anyway considered as preliminary and only usable for indicative conclusions because some other cleaning/processing are still on-going. Some of the country-specific figures relating to investments in CIUs reported in the table may be not fully representative as some CIUs might have been reported under other asset classes of the Solvency II balance sheet (e.g. participations).

1627. The second column shows that in some countries assets for unit-index linked products represent more than the 20% of total assets, even though at EU level that percentage is largely below 20%.

1628. The third column displays the cumulative percentage of assets for which the look-through approach might be applied. At EU level the 20% threshold of Article 84(3) seems to be appropriate from a global perspective, while it

might be low for specific cases, especially for companies highly engaged in unit-index linked products.

1629. In order to get information about Investments in "Collective Investments Undertakings" which are hedging index-linked and unit-linked contracts, EIOPA has combined the information included in S.06.02.01 (List of assets) with the information in S.06.03.01 (Collective investment undertakings - look-through approach).

1630. On an asset by asset basis, data have shown that a big portion of investments in CIUs (almost 80%) are covering unit linked and index-linked products. As the scope of the template S.06.03.01 is confined to assets for which the look-through was applied, this quantitative indication should be treated with caution as there is no indication about which of the relevant investments in CIUs were subject to "equity risk type 2".

Simplifications envisaged

1631. EIOPA considers appropriate to propose some amendments to the simplified approach of Article 84(3) to allow the usage of "grouping" of exposures also when the target asset allocation is not available at the level of granularity necessary for all relevant sub-modules and scenarios of the standard formula, provided that "grouping" is applied in a prudent manner, so permitting to determine a conservative SCR and a prudent evaluation of the risk.

1632. EIOPA is of the opinion that when it is impractical to get some necessary data at single exposure level (for instance information about the external rating for some of the underlying exposures in case of a bond fund), undertakings should be in a position to apply an average CQS, if it can be demonstrated that this is prudent. The prudent CQS might be derived from the mandate of the investment fund, which might indicate the general target quality of the underlying exposures. This approach might also avoid a wider use of the simplified approach of Article 168(3) of the Delegated Regulation which is not risk-sensitive.

1633. EIOPA believes that this approach might also mitigate the over-reliance on external ratings mentioned in the Call for Advice, as undertakings would not be forced to rely regularly on the detailed information about external ratings for all exposures.

1634. Furthermore EIOPA welcomes the idea that when the target asset allocation is proven to be insufficient to calculate the SCR, the simplified look through can be applied on the basis of the last reported asset allocation, provided that assets are (and will be) actually managed according to that allocation.

1635. As regards the quantitative threshold, the quantitative assessment reported above has shown that the 20% of Article 84(3) are still appropriate.

1636. EIOPA is rather supportive of introducing a "carve out" for assets covering Unit Linked/Index Linked products from the application of the 20%

threshold, but only for insurance products for which the significant part of the market risk is transferred to policyholders.

1637. EIOPA believes that assets which are hedging unit/index linked products for which the undertaking has not sold any significant "guarantee" or policyholder option should be still subject to the look-through approach, but should not be considered when determining whether the threshold is met or not. These insurance products might have an immaterial impact on the SCR calculations and hence the simplified approach, if applied in a prudent manner, is considered appropriate with no limitations.
1638. When assets hedge unit linked/index linked products for which the undertaking has sold "guarantees" or policyholder options there are no elements to carve them out from the application of the 20% threshold, since these assets do significantly contribute to the SCR calculation. For these assets the current 20% threshold would be still be relevant.
1639. This proposal would certainly extend the "scope" for the application of the simplified approach of Article 84(3) to a larger part of the asset portfolio.
1640. Finally EIOPA considers also appropriate to impose an additional qualitative condition for the application of a simplified look through i.e. the (qualitative or quantitative) assessment of the error introduced in the calculation of the SCR when the "full" look-through is not applied (applicable for both the simplified approach of Article 84(3) and the residual "equity risk type 2" of Article 168 (3) of the Delegated Regulation).
1641. The application of a simplified look through and in particular the application of the "equity risk type 2" might be insufficient to reflect the underlying risk in some specific cases (e.g. for exposures for which the application of the look-through would determine a stress factor higher than the 49%).
1642. In order to avoid wrong incentives for non-applying the look-through approach when the SCR is likely to be above 49%, EIOPA proposes the introduction of a new provision in the legal framework, in order to be in line with the general requirements on proportionality and simplifications of the standard formula in Article 88 of the Delegated Regulation.

15.5.3. EIOPA's advice

1643. It is proposed to "carve-out" from the 20% limit assets for unit/index linked products that do not significantly contribute to the SCR (i.e. insurance products without significant guarantees or policyholder options).
1644. Where the look-through approach cannot be applied, it is proposed that the SCR may be calculated according to the last reported asset allocation of the collective investment undertaking or fund, provided that the underlying assets are (and will be) managed according to that reported asset allocation and that exposures and risks are not to vary materially over a short period of time.
1645. Under the scope of Article 84(3) of the Delegated Regulation, it is proposed to allow the usage of "groupings" of exposures also when the target asset allocation is not available at the level of granularity necessary for all relevant sub-modules and scenarios of the standard formula, provided that "grouping" is applied in a prudent manner (permitting to determine a conservative SCR). For instance, in case it is impractical to get detailed information about the external rating for some of the underlying exposures of an investment fund, it should be possible to apply the "grouping" approach of Article 84(3) of the Delegated Regulation by assigning an average CQS to those exposures, provided that the CQS is prudent.
1646. It is proposed to impose an additional qualitative condition for the application of a simplified look-through i.e. the (qualitative or quantitative) assessment of the error introduced in the calculation of the SCR when the "full" look-through is not applied (applicable for both the simplified approach of Article 84(3) of the Delegated Regulation and the residual "equity risk type 2" of Article 168(3) of the Delegated Regulation).

15.5.4. Proposal for New Articles

1647. Proposal for amending Article 84(3) of the Delegated Regulation:

3. Where the look-through approach cannot be applied to collective investment undertakings or investments packaged as funds, the Solvency Capital Requirement may be calculated on the basis of the target underlying asset allocation **or the last reported asset allocation** of the collective investment undertaking or fund, provided such a target allocation is available to the undertaking ~~at the level of granularity necessary for calculating all relevant sub-modules and scenarios of the standard formula,~~ the underlying assets are managed according to this target allocation **or to the last reported asset allocation and that exposures and risks are not to vary materially over a short period of time.**

For the purposes of that calculation, data groupings may be used, provided they ~~are applied in a prudent manner~~ **permit to calculate all relevant sub-modules and scenarios of the standard formula in a prudent manner**, and that they do not apply to more than **20 %** of the total value of the assets of the insurance or reinsurance undertaking."

3b. ~~Notwithstanding Article 84(3), where the look-through approach cannot be applied to~~ **investments in collective investment undertakings or investments packaged as funds which back unit- and index linked obligations (for which the market risk is borne by policyholders)**, the Solvency Capital Requirement may be calculated on the basis of the target underlying asset allocation **or the last reported asset allocation** of the collective investment undertaking or fund, provided such a target allocation is available to the undertaking, the underlying assets are managed according to this target allocation **or to the last reported asset allocation and that exposures and risks are not to vary materially over a short period of time.**

For the purposes of that calculation, data groupings may be used, provided they **permit to calculate all relevant sub-modules and scenarios of the standard formula in a prudent manner.**

1648. Proposal for a new article:

In accordance with Article 88, insurance and reinsurance undertakings which make use of the simplified approaches provided for in Articles 84(3) and 168(3) of the Delegated Regulation, shall determine whether the simplified calculation is proportionate to the nature, scale and complexity of the risks by carrying out an assessment which shall include all of the following:

(a) an assessment of the nature, scale and complexity of the risks of the undertaking falling within the relevant module or sub-module;

(b) an evaluation in qualitative or quantitative terms, as appropriate, of the error introduced in the results of the simplified calculation due to any deviation between the following:

- (i) the assumptions underlying the simplified calculation in relation to the risk;*
- (ii) the results of the assessment referred to in point (a).*

A simplified calculation shall not be considered to be proportionate to the nature, scale and complexity of the risks where the error referred to in point (b) of the previous paragraph leads to a misstatement of the Solvency Capital Requirement that could influence the decision-making or the judgement of the user of the information relating to the Solvency Capital Requirement, unless the simplified calculation leads to a Solvency Capital Requirement which exceeds the Solvency Capital Requirement that results from the standard calculation.

16. Look-through approach at group level

16.1. Call for advice

1649. The European Commission call for advice requests EIOPA to review the simplification provided for the look-through approach and to assess under which conditions it may be appropriate to extend the look-through approach to investments in related undertakings.

1650. During the consultation of the draft first set of advice (EIOPA-CP-17-004), EIOPA received a comment on the application of the look-through approach at group level and a request for extending the approach.

1651. EIOPA has also been made aware of different interpretation of how look-through should be applied at group level, in particular for related collective investment undertakings and other similar type of related undertaking.

16.2. Legal basis

Solvency II Directive

1652. Article 212 on “definitions” and in particular paragraph (1)(b).

1653. Article 221 on the “inclusion of proportional share”.

1654. Article 230 on “method 1 (default method): accounting consolidation-based method”.

Delegated Regulation

1655. Article 84 on the “look-through approach”.

1656. Article 335 on “method 1: determination of consolidated data”

1657. Article 36 on “method 1: calculation of the consolidated group solvency capital requirement”

Guidelines

1658. Guidelines on group solvency: in particular Guideline 19 on the “determination of the consolidated data for the group solvency calculation” and the explanatory text 2.52 of the final report⁷⁶.

16.3. Feedback statement on the main comments received to the consultation paper (EIOPA-CP-17-006)

a. Summary of the comments received

1659. Most of stakeholders supported option b, i.e. applying look-through at group level where it has been applied at solo level. They justified their

⁷⁶ https://eiopa.europa.eu/Publications/Guidelines/Final_Report_Group_GLS.pdf

preference by explaining that the calculations would be simpler and more risk-sensitive.

b. Assessment

1660. EIOPA agrees with the stakeholders' comments. The advice has been modified accordingly.

16.4. Advice

16.4.1. Previous advice

1661. CEIOPS-DOC-52/09: "Assessment of Group Solvency"⁷⁷.

16.4.2. Analysis

1662. Currently at solo level, Article 84 of the Delegated Regulation provides the cases where, in the calculation of the Solvency Capital Requirement using the standard formula, look-through should be applied and when it should not. Article 84(4) of the Delegated Regulation provides derogation from the application of the 'look through approach' in Article 84(2) of the Delegated Regulation, meaning that indirect exposures other than CIUs, when classified as 'related undertakings under Article 212' of the Solvency II Directive, should be exempted from the 'look through approach'.

1663. Paragraph 1 provides that look-through shall always be applied at solo level for Collective Investment Undertakings ("CIUs") and other investments packaged as funds. A first discussion point is how CIUs are treated at group level.

1664. Two cases should be distinguished: the case of a CIU that is a related undertaking and the case of a CIU that is not a related undertaking (the CIU is simply an investment).

1665. The look through would apply in the case where the participating undertaking or any subsidiary in the scope of the line by line consolidation simply invests **in a CIU that is not a related undertaking** (for instance holds less than 20%), since Article 336(a) of the Delegated Regulation is applied.

1666. The look through is also applied at group level - indirectly - via the inclusion of the SCR of each related but not controlled insurance and reinsurance undertakings in the scope of the group (Articles 335(1)(d) and Article 336(b) of the Delegated Regulation).

1667. The explanatory text 2.52 of the Group Solvency Guidelines explains the treatment of **CIUs considered as related undertakings** at group level: the

⁷⁷ <https://eiopa.europa.eu/CEIOPS-Archive/Documents/Advices/CEIOPS-L2-Final-Advice-Group-solvency-assessment.pdf>

holdings in the related CIUs should be treated under Article 335(1)(f) of the Delegated Regulation, i.e. valued in accordance with Article 13 of the Delegated Regulation, and the SCR calculated under Article 336(d) of the Delegated Regulation, i.e. applying a capital charge on the asset value. That means there is no look-through at group level for a related CIUs, whatever percentage of shares the participating undertaking is holding in the related undertaking.

1668. However, some local markets still have a different approach and consider that look-through should apply at group level. The rationale relies on the “mutatis mutandis” principle (what applies at solo level should apply mutatis mutandis at group level) as well as the possibility for not considering CIUs as “related undertakings” but as simple financial investments (which are then subject to look-through).

1669. EIOPA has also analysed the treatment at group level for indirect exposures to market risk other than CIUs and investments packaged as fund. This is in particular relevant given EIOPA’s advice on extending the look-through approach at solo level for investment related undertakings.

1670. Again one should make a distinction between related and non-related undertakings.

1671. For **related undertakings** that correspond to “Indirect exposures to market risks other than CIUs and investments packaged as funds”:

- If they are considered as ancillary services undertakings, the treatment to apply is the one under Article 335(1)(a), (c) or (f) of the Delegated Regulation.
 - In the first two cases (the undertaking is considered a subsidiary) consolidation on a line by line basis would be applied and therefore look through would be applied;
 - whereas in the last case (f) look-through would not be applied.
- If they are not considered as ancillary services undertakings, the only treatment that would be applicable is that under Article 335(1)(f) of the Delegated Regulation, which means that no look-through would be applied.

1672. For **non-related undertakings**, the funds are considered investments by (re)insurance undertakings. In that case, look-through is applied, since Article 336(a) or (b) of the Delegated Regulation is applied.

Conclusion

1673. The question raised is mainly relevant for related undertakings.

1674. At the moment, look-through is applied at group level in different cases than it is at solo level for related undertakings. This could be justified by:

- the specific treatment of related undertakings at group level compared to solo level: Articles 335 and 336 of the Delegated Regulation prescribe specific rules for the treatment of related undertakings for the purpose of the group solvency calculation;
- group supervisory judgment has to be applied: in order for CIUs to be considered related undertakings, the group is expected to provide arguments which are assessed by the group supervisor;
- the complexity of the calculation at group level, which requires more data and which is a more lengthy process;
- the fact that line-by-line consolidation is maybe not appropriate for all type of non-insurance related undertakings.

1675. On the other hand, the treatment at solo level is more risk-sensitive to the underlying assets in related CIUs/funds than at group level for related undertakings. If one of the subsidiaries of a group has already collected the information necessary for applying look-through at solo level, there is no obvious constraint why the group could not use the same information for the group SCR calculation.

1676. The current approach has led to diverging approaches at European level, due to different assessments of the related characteristics of CIUs, which calls for a clarification of the Delegated Regulation that would favour enhanced convergence between national markets.

1677. Therefore EIOPA advises the European Commission to make a change in Article 336 of the Delegated Regulation so that these related undertakings are treated at group level in the same way that they are treated at solo level. This would mean that where there is look-through at solo level, there should be look-through at group level and where there is no look-through at solo level because of the simplification in Article 84(3) of the Delegated Regulation, then there is also no look-through at group level. In the latter case, the current treatment would continue to be applied.

1678. Applying look-through means that the SCR for these related undertakings will be calculated taking account of diversification benefits within each related undertaking.

1679. A subsequent question is whether diversification benefits between underlying assets in these related undertakings and other assets appearing on the consolidated balance sheet should be recognised in the group SCR calculation.

1680. Recognising full diversification benefits may be justified by the fact that related CIUs are used as a way to structure the investments of the group and of solo insurers. The risks are similar whether the assets are on the balance sheet or within related CIUs, in particular if it is controlled. This option also has some consequences in terms of own funds availability at group level (Article 330 of the Delegated Regulation). Indeed, given the current group solvency guidelines, the contribution of each solo undertaking to the group SCR depends on the calculation of SCR^{diversified}, which would probably increase

under this option. Therefore, this would increase the amount of non-available own funds that could be included in the calculation of group solvency under Article 330(5) of the Delegated Regulation.

1681. Not recognising diversification benefits may be justified to align the calculation of the SCR with the process followed for the establishment of consolidated data. Indeed, related CIUs are consolidated according to Article 335(1)(f), i.e. they are valued in accordance with Article 13 of the Delegated Regulation. Other entities falling within Article 335(1)(f) contribute to the group SCR without diversification benefits being recognised.

1682. Where these related undertakings are controlled, diversification benefits with other consolidated assets can be justified since the group integrates fully the underlying assets within its investment strategy. Where these related undertakings are not controlled, the group has no control on the underlying assets and not recognising diversification benefits with other consolidated assets would be more appropriate.

1683. In any case the treatment of CIUs not identified as related undertakings would remain unchanged: application of the look-through and recognition of diversification benefits between the underlying assets of the CIUs and the rest of the consolidated data.

16.4.3. EIOPA's advice

1684. EIOPA has analysed how the look-through approach is applied at group level for related CIUs, related undertakings that correspond to "Indirect exposures to market risks other than CIUs and investments packaged as funds" and related investment undertakings.

1685. The current approach has led to diverging approaches at European level, due to different assessments of the related characteristics of CIUs, which calls for a clarification of the Delegated Regulation that would favour enhanced convergence between national markets.

1686. Therefore EIOPA advises the European Commission to make a change in Article 336 of the Delegated Regulation so that these related undertakings are treated at group level in the same way that they are treated at solo level. This would mean that where there is look-through at solo level, there should be look-through at group level and where there is no look-through at solo level because of the simplification in Article 84(3) of the Delegated Regulation, then there is also no look-through at group level. In the latter case, the current treatment would continue to be applied.

1687. Applying look-through means that the SCR for these related undertakings will be calculated taking account of diversification benefits within each related undertaking.

1688. A subsequent question is whether diversification benefits between underlying assets in these related undertakings and other assets appearing on the consolidated balance sheet should be recognised in the group SCR calculation.

1689. Where these related undertakings are controlled, diversification benefits with other consolidated assets can be justified since the group integrates fully the underlying assets within its investment strategy. Where these related undertakings are not controlled, the group has no control on the underlying assets and not recognising diversification benefits with other consolidated assets would be more appropriate.

17. Loss-absorbing capacity of deferred taxes

17.1. Call for advice

1690. The European Commission has asked EIOPA to report on the different methods currently applied to calculate the loss-absorbing capacity of deferred taxes (LAC DT), and on the extent to which the divergent practices lead to differences in capital requirements. The European Commission states that "The calculation for reduction in capital requirements due to a deferred tax adjustment is complex, and requires a high level of supervisory judgement, resulting in possibly divergent practices in Member States."
1691. In order to answer this request for information, EIOPA has published a consultation paper (EIOPA-CP-17-004) and has sent factual information to the European Commission.
1692. EIOPA has provided evidence that National Supervisory Authorities (NSAs) have similar approaches with respect to more than 75 % of almost 100 billion euros in LAC DT across the EEA, which is the part of LAC DT where likely utilisation is being demonstrated by a net deferred tax liability (DTL) on the balance sheet. While recognising that positive position, with respect to the remaining part of LAC DT where likely utilisation is being demonstrated by likely future taxable profits, NSAs do have different approaches. Where carry-back is applicable in the tax regime NSAs also allow for its use to demonstrate likely utilisation of LAC DT, increasing the 75 % of LAC DT where supervisors have similar approaches.
1693. Regression analyses in the first consultation paper suggested that almost 40 % of the variation in LAC DT across the EEA may be explained by differences in the balance sheet of undertakings, differences in the tax regime and the size of undertakings. The fact that an undertaking is in one or another jurisdiction may explain an approximately additional 35 % of the variation in LAC DT; this difference may be due to differences in supervisory practices, but also due to differences in the tax regime and the risk characteristics of undertakings in the different jurisdictions that were not captured by the variables on these aspects in the regression analyses.
1694. EIOPA refers readers to its first response to the Call for Advice for additional background on LAC DT, its impact on the SCR of European (re)insurance undertakings, sources of differences in LAC DT and differences in supervisory practices.
1695. EIOPA recognises the positive position that NSAs have similar approaches with respect to more than 75% of LAC DT across the EEA. Of the remaining proportion where there are differences, EIOPA considers differences in LAC DT justified if they stemmed from differences in fiscal regimes, risk profiles or the length and duration of assets and liabilities. EIOPA treats the fiscal regimes as given; undertakings in jurisdictions with tax regimes with higher tax rates or more favourable carry-forward and carry-back possibilities will, all else equal, have a higher LAC DT.

1696. EIOPA has observed a wide range of judgement involved in the part of LAC DT that relies on projecting the future profits estimated after the bSCR* shock loss⁷⁸. Subjectivity in itself is not a problem as valuations for the Solvency II balance sheet and SCR calculations require expert judgement. However, typically expert judgement for the balance sheet valuations and SCR calculations result in a relatively small range of possible outcomes for similar assets and liabilities and risks. With respect to the part of LAC DT that is demonstrated by likely future taxable profits, supervisors have observed a wide range of assumptions and outcomes for similar undertakings.

1697. For this reason and according to Articles 8 and 16 of EIOPA Regulation (Regulation (EU) 1094/2010 of 24 November 2010) EIOPA strives to achieve convergence in the calculation of LAC DT under the standard formula and in particular for the projection of post stress taxable profits used to demonstrate the likely utilisation of increases in deferred taxes, and, going forward, will consider suitable good practices to ensure such convergence.

1698. After having considered stakeholders' comments EIOPA advises to amend the Solvency II Delegated Regulation to foster convergence in undertakings' and supervisory practices regarding LAC DT where differences are not justified. At the same time, EIOPA advises to only implement key principles rather than stricter prescriptions for the LAC DT calculation in order to allow for differences in LAC DT where they are justified.

1699. EIOPA's advice is based on several key principles that aim to foster supervisory convergence and to address the following three concerns:

- **Uncertainty** about future profits for utilization of notional deferred tax assets (DTA);
- **Complexity** involved in projections of these future profits;
- **Uneven playing field** because of wide range of judgement involved in the likely utilisation of notional DTA:
 - undertakings with similar solvency ratios which are exposed to similar risks may have significantly different LAC DT and SCR just because of unjustifiable differences in the assumptions made regarding the post-shock world;
 - differences in the application of the Solvency 2 regime (e.g. application of transitional measures) may also give rise to differences in LAC DT between otherwise similar undertakings;
 - differences in tax regimes do justify differences in LAC DT; this chapter is not about off-setting differences in tax regimes.

⁷⁸ The bSCR* shock loss is the SCR minus LAC DT or, put differently, the basic SCR (bSCR) plus operational risk and the Loss-Absorbing Capacity of Technical Provisions (LAC TP)

1700. Proportionality plays an important role in the key principles and their possible implementations, as to reflect different situations and different level of complexity; the level of complexity typically increases with the extent the likely utilization of LAC DT is being demonstrated by future profits.

17.2. Feedback statement on the main comments received to the consultation paper (EIOPA-CP-17-006)

1701. Stakeholders made some general comments and comments specific to the key principles.

1702. With respect to the key principles the comments mainly relate to the possible implementations of the key principles rather the key principles themselves.

General comments: no advice, only factual report on differences in LAC DT

a. Summary of the comments received

1703. Stakeholders reiterated that the European Commission did not ask EIOPA to advise on LAC DT, but only requested evidence of potential differences in supervisory approaches.

1704. Stakeholders stated that there is as yet insufficient evidence of any issues with LAC DT; undertakings have only reported LAC DT once since their Day-One reporting. They argued that unjustified differences in LAC DT and the assumptions underlying utilisation would decrease over time.

b. Assessment

1705. Whilst assessing current practices, it became clear that supervisors have divergent practices with respect to the assessing likely future profits used to demonstrate the probable utilisation of LAC DT. With this advice EIOPA aims to foster convergence in supervisory practices and thus capital requirements for similarly risky insurance and re-insurance undertakings.

1706. EIOPA does not believe that unjustified differences in the demonstration of likely future profits will disappear automatically over time and thinks additional guidance and regulation is necessary to support the removal of unjustified differences.

General comments: limitations and principle-based supervision

a. Summary of the comments received

1707. Stakeholders referred to Solvency II as a principle-based regime and argued for a principle-based view of LAC DT to enable undertakings to best reflect their specific risk profile, risk appetite and tax regime specificities.

1708. Stakeholders also provided general comments, as well as specific comments on key principles, asking EIOPA not to prescribe any hard limitation on the calculation of LAC DT. Their line of reasoning was that hard

limitations may restrict the recognition of potential loss-absorbing capacity of deferred taxes.

1709. Stakeholders opined that rather than strict limitations, supervisory dialogues should address EIOPA's concerns regarding LAC DT; this would allow supervisory concerns to be addressed whilst not limiting the potential loss-absorbing capacity of deferred taxes..

1710. Stakeholders proposed that when introducing caps on different aspects of the LAC DT calculations they should act as a means of simplifying the calculation rather than as limitations for all undertakings.

b. Assessment

1711. Solvency II is indeed a principle based framework. However, insurance and re-insurance undertakings calculate other parts of the Solvency Capital Requirements according to explicitly prescribed formulas or scenarios; there is in EIOPA's experience much less subjectivity with these other calculations than with LAC DT for which likely utilisation is being demonstrated by likely future taxable profits. EIOPA agrees that the Standard Formula should appropriately reflect differences in the balance sheets and risks between undertakings as well as differences in the applicable tax regimes.

1712. Rather than proposing fixed caps to projection parameters, EIOPA has developed criteria in line with the key principles to allow for undertaking and tax regime specificities. It believes it is appropriate and reasonable for the criteria to be applied consistently as between the pre- and post-shock environments, and for the post-shock projections to reflect both the increased uncertainty of the post-shock environment and the post-shock financial and solvency position of the undertaking.

General comments: going concern principle

a. Summary of the comments received

1713. Stakeholders pointed out that the Solvency II Directive prescribes that the Solvency Capital Requirements be calculated under the going concern assumption. This holds for all elements of the SCR calculation including LAC DT.

1714. Some stakeholders argued that the going concern principle is only applicable if an undertaking meets its capital requirements after the shock loss; for example, by restoring compliance with the capital requirements via future management actions.

1715. Other stakeholders stated that the going concern principle allows the use of future management actions; in a going concern situation the undertaking would be able to initiate such actions.

b. Assessment

1716. EIOPA agrees with the going-concern principle as a basis for the SCR calculations. This does not prevent LAC DT, being the changed value in deferred taxes after the shock loss, reflecting the impact of the shock loss. This is particularly the case where utilisation of LAC DT is being demonstrated, in part or in full, by likely future taxable profits.
1717. EIOPA distinguishes between the going concern assumption and the use of future management actions; future management actions for scenario based calculations of the basic SCR are already covered in Article 83 of the Delegated Regulation, while the going concern assumptions generally applies to the SCR calculation. EIOPA agrees with the allowance of future management actions when calculating LAC DT and advises to allow for future management actions if they comply with the requirements of Article 23 of the Delegated Regulation.
1718. With respect to the going concern assumption and future management actions EIOPA points out that measures such as recapitalization and derisking are not taken into account in other parts of the SCR calculation. Moreover, given that EIOPA does not advise to explicitly require restoring compliance with the MCR and SCR after the shock loss, such measures are not necessary to demonstrate the going concern of the undertaking after the shock loss. However, the extent of compliance with the MCR and SCR, or more generally the financial situation of the undertaking after the shock loss, should be taken into account when calculating LAC DT: the worse the financial situation after the shock loss the lower the amount of likely future taxable profits, and the less likely these become.

General comments: prudence and best-estimates

a. Summary of the comments received

1719. Stakeholders argued that assumptions used for the calculation of LAC DT should not be prudent assumptions, but best-estimate assumptions. This would be similar to other parts of the SCR calculation where after a shock or loss scenario the undertaking calculates a new best-estimate or market-consistent valuation, and not a prudent valuation.
1720. Stakeholders commented on layers of prudence when limitations on the profits from new business based on the compliance with the capital requirements were combined with deductions for uncertainty and limitations on the horizon.

b. Assessment

1721. EIOPA agrees that the calculation of LAC DT should be based on post-shock best-estimate assumptions. Given the impact of the shock loss on the financial situation of the undertaking and the increased uncertainty after such a shock loss, the assumptions for this post-shock best-estimate calculation should be less favourable than assumptions used pre-shock for the valuation and recognition of deferred tax assets in accordance with Article 15 of the Delegated Regulation.

1722. EIOPA agrees that 'layered prudence' should be avoided, but that overall the projections should adequately meet the criteria as proposed in the key principles and hence reflect increased post-shock uncertainty and the post-shock financial and solvency position of the undertaking.

General comments: accounting

a. Summary of the comments received

1723. Stakeholders commented that several proposals were not in line with the valuation and recognition principles in IAS12.

b. Assessment

1724. With respect to the references to IAS 12 EIOPA points to Article 15 of the Delegated Regulation and its references to Article 9 of the Delegated Regulation for the recognition and valuation of deferred taxes. According to Article 9(3) of the Delegated Regulation all valuation principles should be consistent with the general Solvency II valuation principles laid down in Article 75 of the Directive.

Key principle 1: Role of compliance with the MCR and SCR after shock loss

a. Summary of the comments received

1725. Most respondents agree that whilst an undertaking should not be asked to explicitly demonstrate compliance with the capital requirements after the shock loss, its financial situation should be considered if projecting likely future taxable profits.

1726. Some respondents argued that consideration of compliance with the capital requirements after the shock loss was inappropriate, either because it was not consistent with Article 207 of the Delegated Regulation or because the going concern presumption for SCR calculations itself implies recapitalization will automatically restore compliance with the capital requirements.

1727. Other respondents indicated that, while the post-shock financial position of undertakings should be considered, actions taken to restore compliance with the capital requirements should be reflected.

1728. Some respondents pointed out that the undertakings with recovery plans are able to rely on those plans to restore compliance with the capital requirements after the shock loss.

1729. Virtually all respondents disagreed with the proposed formula, or any other formula. Respondents deemed the formula too rigid and lacking in undertaking specificities, believed it was not in line with the 'probable' criterion, or overly prudent.

1730. Others indicated they could only support the formula as an optional simplification to help undertakings calculate future profits from new business.

1731. Some respondents pushed back against the statement that a post-shock breach of the SCR could lead to an increase in lapses. Respondents stated that no evidence was provided for this statement and that if the shock resulted from macroeconomic stress, the SCR breach could be a sector-wide phenomenon and hence might not trigger lapses.

b. Assessment

1732. EIOPA believes that it is reasonable to request undertakings to reflect their post-shock solvency position in their future profits projections for LAC DT utilisation purposes, without explicitly requiring them to meet the capital requirements after the shock loss.

1733. EIOPA stresses that the proposed formula for reflecting the extent of compliance with the capital requirements would be but one possible way for undertakings to reflect the impact of their post-shock solvency on the profits from new business in their LAC DT calculations. Any method by which post-shock solvency was taken into account would have to be assessed as reasonable by the supervisor.

1734. EIOPA agrees that the actual shock loss does not need to take account of potential additional lapses after the shock loss. However, EIOPA believes that all relevant uncertainties should be taken into account when calculating LAC DT. When profits from new business are being used to demonstrate likely utilisation the undertaking has to assess the potential impact of additional lapses after the shock loss resulting from a decreased solvency position.

Key principle 2: Future profits stemming from new business – projection assumptions

a. Summary of the comments received

1735. Respondents commented on the proposal that additional post-shock uncertainty should be considered when projecting new business. Some respondents indicated that no additional uncertainty needs to be included in the projection: future profits from new business projections should simply be calculated as post-shock best estimates. Another respondent indicated that if new business was projected on the basis of taxable instead of economic profits, no need for further uncertainty parameters would be needed.

1736. One respondent indicated that no profits at all should be allowed from new business, as this would create subjectivity and complexity.

1737. Mixed responses were received regarding the suggestion that economic profits could be used (EVNB), regardless of their timing. Some agreed with using economic profits, either for the sake of simplicity or because it incorporates firm-specific differences in the horizons of new business written. Others, however, argued that taxable economic profits differed from actually relevant fiscal profits.

1738. Further responses were received regarding the types of new business that could be projected and in what way. Many respondents indicated that distinctions should be made between renewals and new business written to

new policyholders. Some suggested a cap on renewals would not be appropriate; others believed renewals should only be exempt from a cap if renewals occurred frequently (non-life). One respondent, moreover, indicated, that where future premiums of existing business are currently outside the contract boundaries (e.g. unit-linked products) they should be included in full (no cut-off point) for the purpose of projecting likely future taxable profits.

b. Assessment

1739. EIOPA reiterates that future taxable profits should reflect a post-shock best estimate, as long as such calculations can properly reflect the increased uncertainty pertaining to calculations of longer-term profits in a post-shock situation. For the purpose of the Standard Formula, EIOPA deems it reasonable to apply certain deterministic measures –including horizons –to reflect that increased uncertainty.

1740. EIOPA believes allowing for economic profits (EVNB) reflects a simplification of the calculation of probable future taxable profits post-shock. However, it believes that taxable profits projections also demonstrate probable future fiscal profits in an appropriate manner for LAC DT utilisation purposes. EIOPA therefore believes undertakings should be allowed to adopt the method most suitable to them, as long as that method is applied consistently between the pre- and post-shock situations and the undertaking is able to demonstrate when the fiscal profits and losses will emerge, to the extent needed to demonstrate likely utilization in the LAC DT calculation.

1741. EIOPA agrees with respondents that differences in the types of new business (life vs. non-life, individual lines of business, renewals versus completely new contracts) should be reflected appropriately in profits from new business projections. For clarification purposes, EIOPA would like to point to paragraph 1313 of the consultation paper, which defines new business as “all premiums outside of the contract boundaries of the technical provisions in the balance sheet”.

Key principle 3: Future profits stemming from new business – projection horizon of future profits stemming from new business

a. Summary of the comments received

1742. While respondents broadly agreed that uncertainty about post-shock profits from new business should be reflected in projections, virtually all respondents rejected the proposed ways of doing this.

1743. Many respondents regarded the proposed possible caps (50% of profits from new business in the past, first 5 years’ worth of future profits) to be arbitrary and inappropriate.

1744. Most respondents argued that it should be possible to project future profits on an undertaking-specific basis. This would allow undertakings to demonstrate why projected profits are credible, for instance by basing them on past experiences with profits from new business.

1745. Others again indicated that caps should only be applied at the level of individual lines of business, and that caps for mandatory lines of business should be less restrictive than for non-mandatory products.

1746. One respondent proposed that for profits projected beyond the horizon of normal business planning, haircuts should be applied.

b. Assessment

1747. The various components used to project post-shock future profits – including horizons –should reflect the criteria as set out in the various key principles: in particular the increased post-shock uncertainty and post-shock solvency position of the undertaking. Since these criteria are partly dependent on the situation and state of individual undertakings in the post-shock situation, they are thereby by definition undertaking-specific to a certain extent.

1748. While EIOPA agrees that the ‘caps’ proposed in the implementation options may reduce potentially justified amounts of LAC DT and are merely reflect but two ways of implementing the criteria, it believes that it is reasonable to require that post-shock future profit projections should not be based on more favourable assumptions than those used for the purpose of the normal business planning, which is based on a pre-shock assumptions.

Key principle 4: Future profits stemming from new business – projection horizon of new business sales

a. Summary of the comments received

1749. Many respondents indicated that the implementation options proposed are not appropriate or are overly prudent. Others indicated that the horizons caps are not consistent with the going-concern assumption. Moreover, one respondent stated that in many jurisdictions (e.g. those which allow for longer periods or unlimited carry-forward of losses) the horizons are not realistic.

1750. Some respondents indicated that capping horizons for LAC DT calculations (either at the horizon of the business plan or at 5 years) would interfere with the horizon in the ORSA horizon (i.e. longer than 3 years) and horizons set by IFRS (10 years).

1751. In addition, one respondent stated that the strict horizons would enhance procyclicality and effectively cap LAC DT at net DTL.

1752. Respondents made a number of suggestions on how to incorporate uncertainty with respect to new business:

- Some suggested that horizons be set at an individual level through the SRP.
- Others indicated that horizons should be set at the level of line of business or types of policyholders, with less restrictive horizons applying to mandatory insurance products and renewals.

- One respondent believed the projection horizon should be linked to the weighted horizon of the Technical Provisions.
- One respondent referred to Guideline 9 on the valuation of deferred tax assets, which allows for new business projected beyond the normal business planning, as long as the increased uncertainty is accounted for.

b. Assessment

1753. EIOPA does not agree with the argument of some stakeholders that potential restrictions on future profits calculations would be procyclical: if such restrictions were to result in a higher SCR, the undertaking would be required to build up sufficient own-fund buffers in the pre-shock scenario (assuming the firm is SCR-compliant before the shock), which would strengthen its capital position in any post-shock scenario. Overly optimistic assumptions regarding LAC DT utilisation, on the other hand, could well give rise to procyclical behaviour, as a 1-in-200 shock would lead to a larger shock loss and hence a less robust post-shock capital situation than anticipated, potentially forcing the undertaking to raise capital in the aftermath of a severe shock event.

1754. EIOPA agrees that for the purpose of determining the projection horizons, attention should be given to the specific characteristics of the undertaking and the type of business it engages in. Nevertheless, the general principle that uncertainty increases with the length of the horizon holds, all else being equal. Given the increased uncertainty in a post-shock situation EIOPA believes it is reasonable that projection horizons in the post-shock scenario do not exceed those used for the purpose of the normal business planning, as these are based on no-shock assumptions, and that the projection horizon in any event should not exceed 5 years. Limiting the number of years of new business sales moreover, increases level-playing field. This measure furthermore serves as an ultimate back-stop to prevent undertakings having an incentive to artificially extend the horizon of their business planning in order to increase the amount of LAC DT that can be recognised. Given this aim, the impact of the measure is calibrated to be limited: currently for LAC DT purposes virtually no new business is currently written beyond the 5-year horizon.

Key principle 5: Future profits stemming from return on assets

a. Summary of the comments received

1755. While most respondents in general agreed that future post-shock returns were subject to uncertainty, none of the respondents expressed support for limiting returns to the relevant risk-free rate.

1756. Some respondent argued that only allowing risk-free returns would be unrealistically prudent and out of step with tax regimes, which tax actual returns and not risk-free returns.

1757. Some respondents would only support risk-free returns as a default option, while they believed it should remain possible for undertakings to use well-evidenced projections containing excess returns.

1758. A number of respondents indicated that, often in addition to excess returns, pull-to-par assumptions should be allowed. Usually the respondents refer to buy-to-hold strategies with respect to fixed income, indicating under such strategies an automatic pull-to-par will occur and in fact little or no loss arising from the increase in credit spreads will be realized.
1759. A number of respondents stated that projected (excess) returns on all assets held in the general portfolio should be considered and not only those in excess of the technical provisions. One respondent also asked how the Volatility and Matching Adjustments would be applied.
1760. Several stakeholders responded by asking whether the pre-shock or applicable post-shock interest rate term structure should be used. Three respondents agreed that using post-shock interest rate curves could provide incentives for undertakings to alter their hedging strategies, while another one argued that such incentives would be limited. Two respondents argued that it would be normal and proper for undertakings to consider LAC DT in determining their hedging strategies.

b. Assessment

1761. EIOPA believes that for Standard Formula purposes, limiting returns to returns on own funds provides an appropriate simplification. The returns on assets backing or covering technical provisions are considered to match these technical provisions to a certain extent. Moreover, returns on all assets could be translated into levered returns on own funds.
1762. Stakeholders did not state a clear preference for returns from the pre- or post-shock relevant term structure. EIOPA therefore confirms its advice to use the applicable post-shock relevant term structure as this aligns best with the financial situation after the shock loss.
1763. EIOPA finds the relevant risk-free term structure, potentially including the matching or volatility adjustment, appropriate for the returns in the LAC DT calculation.
1764. EIOPA agrees that ruling out excess returns altogether in the post-shock scenario may be excessively prudent. However, it reiterates that the increased uncertainty regarding returns should be reflected in the projections. This can be properly be reflected by the requirement that assumptions underlying the projections of return on assets are not more favourable than those used for the purpose of projecting future profits to demonstrate utilisation of Deferred Tax Assets on the balance sheet (i.e. in the pre-shock situation).

Key principle 6: Future profits stemming from return on assets in excess of technical provisions – projection horizon

a. Summary of the comments received

1765. Most respondents agreed with the notion that uncertainty in future returns should be taken into account in projections of future profits.

1766. Stakeholders rejected the notion of capping the horizon and argued for horizons tailored to reflect the potential loss absorbing capacity of deferred taxes.

1767. Most respondents indicated that linking the projection horizon to technical provisions would be more appropriate. Others suggested that the horizon should be linked to the number of years of carry-forward loss is permitted in the relevant fiscal regime, while others stated the horizon should be linked to the undertaking's long-term investment strategy.

b. Assessment

1768. EIOPA reiterates the need for the post-shock increase in uncertainty to be reflected in the projection horizon, but also agrees that room should exist to reflect appropriate undertaking- and country-specific differences. These considerations can be reflected appropriately by requiring that post-shock assumptions regarding the projection horizon should not be more favourable than those used for the purpose of projecting future profits to demonstrate utilisation of Deferred Tax Assets on the balance sheet (i.e. in the pre-shock situation).

Key principle 7: Future Management Actions (FMA)

a. Summary of comments received

1769. Most respondents agreed that FMAs should be realistic and well-evidenced.

1770. Many responses indicated that de-risking and recapitalisation, both external and within the group, are valid FMAs that should not be dismissed a priori.

1771. Many respondents argued that undertakings should have the opportunity to evidence the likelihood of being able to implement FMAs post-shock, e.g. through supervisory dialogue. Such an assessment should be based on the past success of undertakings to implement FMAs in stress situations, and differences between pre- and post-shock scenarios.

1772. Some stakeholders disagreed that Article 23 requirements should be applicable to post-shock FMAs.

b. Assessment

1773. EIOPA agrees with stakeholders that if FMAs are plausible and reasonable, they should be considered for the purposes of demonstrating likely utilisation of LAC DT.

1774. When determining whether or not FMAs are plausible within the context of LAC DT calculations, EIOPA believes that the well-established requirements in Article 23 of the Delegated Regulation are as appropriate in the post-shock scenario as in scenario based calculations of the basic SCR. These requirements are not excessively prudent for the purposes of LAC DT, given the fact that those FMAs would have to be implemented in a more challenging environment after a severe shock loss than would be relevant when considering them for the purpose of valuing pre-stress technical

provisions. Of course undertakings do have to assess the likelihood of implementing the FMAs in such a situation.

Key principle 8: Role of system of governance

a. Summary of comments received

1775. Respondents acknowledged the need for appropriate governance requirements with respect to demonstrating likely utilisation of LAC DT.

1776. A number of respondents stated that the requirements, in particular the sensitivity analysis of assumptions, would impose undue burdens on AMSB and Boards of undertakings and go against the stated aim of the SCR Review to simplify the Standard Formula.

1777. Others indicated they did not believe the requirements need necessarily fall on the Actuarial Function. Rather, other Key Functions (Audit, Risk Management) could also be tasked with LAC DT governance.

b. Assessment

1778. When projecting future taxable profits in the post-shock environment undertakings have to consider the sensitivity of their projections to changes in assumptions. Hence it should not be an excessive requirement for such a sensitivity analysis to be provided to AMSB; particularly given the materiality of LAC DT.

1779. EIOPA agrees that the undertaking should be allowed some discretion in determining how their governance requirements are organised. The natural key function appears to be the actuarial function, but the risk management function could also be involved. As to the audit function, this would not be appropriate given its specific role and the independent assessment it should carry out.

Key principle 9: Supervisory reporting and disclosure

a. Summary of comments received

1780. Respondents generally supported transparency.

1781. Many respondents indicated that the proposed reporting and disclosure requirements would be excessive. As a compromise, one stakeholder suggested only requiring disclosure in instances where LAC DT was highly material.

1782. Some respondents indicated their concerns that the information EIOPA proposed should be reported would be highly sensitive and of competitive value.

1783. Other respondents also indicated that the proposed disclosure would be highly complex, and feared it may cause confusion among the public. Hence, some respondents indicated this information should be reported in the RSR, but not included in the SCFR.

b. Assessment

1784. EIOPA is mindful that disclosure requirements should not place an excessive burden on undertakings or be liable to lead to misunderstandings among investors and policyholders. Nevertheless, an element as material as LAC DT should be thoroughly explained to supervisors and the public.

1785. Given the potentially sensitive information in the calculation of LAC DT, EIOPA advises to distinguish between disclosures to the public and to the supervisors. Undertakings should disclose to their supervisor to the full extent and should provide the public with less, but still sufficiently granular, information to assess the likelihood of the loss-absorbing capacity of their deferred taxes.

Simplified calculation of LAC DT

a. Summary of comments received

1786. Some stakeholders were not in favour of the simplified calculation as they argued that the simplified calculation was too harsh and did not allow for the recognition of sufficient LAC DT. Others favoured the simplified calculation.

1787. Stakeholders in favour of the simplified calculation argued that it should be optional, not mandatory.

b. Assessment

1788. EIOPA would like to clarify that the simplified calculation was only intended to be optional, consistent with other simplified calculations.

1789. The simplified calculation would still be relatively complex and not only allow for recognition of less LAC DT than potentially could be justified, but could also allow for unjustified utilization of LAC DT beyond the net DTL on the balance sheet. Therefore EIOPA does not advise the Commission to introduce a simplified calculation for LAC DT.

17.3. Feedback statement on the comments received during consultations EIOPA-CP-16-008 and EIOPA-CP-17-004

1790. Please refer to the final report on the consultation paper EIOPA-CP-17-004 on EIOPA's first advice to the European Commission on specific items in the Solvency II Delegated Regulation.

17.4. Legal basis

Solvency II Directive

1791. Article 103 of the Solvency II Directive on the structure of the standard formula states the following:

The Solvency Capital Requirement calculated on the basis of the standard formula shall be the sum of the following items:

- (a) *the Basic Solvency Capital Requirement, as laid down in Article 104;*
- (b) *the capital requirement for operational risk, as laid down in Article 107;*
- (c) **the adjustment for the loss-absorbing capacity of technical provisions and deferred taxes**, as laid down in Article 108.

1792. Article 108 of the Solvency II Directive on the adjustment for the loss-absorbing capacity of technical provisions and deferred taxes states the following:

The adjustment referred to in Article 103(c) for the loss-absorbing capacity of technical provisions and deferred taxes shall reflect potential compensation of unexpected losses through a simultaneous decrease in technical provisions or deferred taxes or a combination of the two.

That adjustment shall take account of the risk mitigating effect provided by future discretionary benefits of insurance contracts, to the extent insurance and reinsurance undertakings can establish that a reduction in such benefits may be used to cover unexpected losses when they arise. The risk mitigating effect provided by future discretionary benefits shall be no higher than the sum of technical provisions and deferred taxes relating to those future discretionary benefits.

For the purpose of the second paragraph, the value of future discretionary benefits under adverse circumstances shall be compared to the value of such benefits under the underlying assumptions of the best-estimate calculation.

Delegated Regulation

1793. Articles 205 and 207 in section 9 on the adjustment for the loss-absorbing capacity of technical provisions and deferred taxes in chapter V on the Solvency capital requirement standard formula of the Delegated Regulation contains the regulation on LAC DT. Article 205 contains general provisions and no requirements for LAC DT. Article 207 sets out the regulation regarding the calculation of LAC DT:

1. The adjustment for the loss-absorbing capacity of deferred taxes shall be equal to the change in the value of deferred taxes of insurance and reinsurance undertakings that would result from an instantaneous loss of an amount that is equal to the sum of the following:

(a) the Basic Solvency Capital Requirement referred to in Article 103(a) of Directive 2009/138/EC;

(b) the adjustment for the loss-absorbing capacity of technical provisions referred to in Article 206 of this Regulation;

(c) the capital requirement for operational risk referred to in Article 103(b) of Directive 2009/138/EC.

2. For the purposes of paragraph 1, deferred taxes shall be valued in accordance with Article 15. Where the loss referred to in paragraph 1 would result in the increase in deferred tax assets, insurance and reinsurance undertakings shall not utilise this increase for the purposes of the adjustment unless they are able to demonstrate that future profits will be available in accordance with Article 15(3), taking into account the magnitude of the loss referred to in paragraph 1 and its impact on the undertaking's current and future financial situation.

3. *For the purposes of paragraph 1, a decrease in deferred tax liabilities or an increase in deferred tax assets shall result in a negative adjustment for the loss-absorbing capacity of deferred taxes.*

4. *Where the calculation of the adjustment in accordance with paragraph 1 results in a positive change of deferred taxes, the adjustment shall be nil.*

5. *Where it is necessary to allocate the loss referred to in paragraph 1 to its causes in order to calculate the adjustment for the loss-absorbing capacity of deferred taxes, insurance and reinsurance undertakings shall allocate the loss to the risks that are captured by the Basic Solvency Capital Requirement and the capital requirement for operational risk. The allocation shall be consistent with the contribution of the modules and sub-modules of the standard formula to the Basic Solvency Capital Requirement. Where an insurance or reinsurance undertaking uses a partial internal model where the adjustment to the loss-absorbing capacity of technical provisions and deferred taxes are not within the scope of the model, the allocation shall be consistent with the contribution of the modules and sub-modules of the standard formula which are outside of the scope of the model to the Basic Solvency Capital Requirement.*

1794. Article 15 of the Delegated Regulation, which is referred to in Article 207 on LAC DT sets out the regulation for the valuation of deferred taxes on the Solvency II balance sheet:

1. *Insurance and reinsurance undertakings shall recognise and value deferred taxes in relation to all assets and liabilities, including technical provisions, that are recognised for solvency or tax purposes in accordance with Article 9.*

2. *Notwithstanding paragraph 1, insurance and reinsurance undertakings shall value deferred taxes, other than deferred tax assets arising from the carry-forward of unused tax credits and the carry-forward of unused tax losses, on the basis of the difference between the values ascribed to assets and liabilities recognised and valued in accordance with Article 75 of Directive 2009/138/EC and in the case of technical provisions in accordance with Articles 76 to 85 of that Directive and the values ascribed to assets and liabilities as recognised and valued for tax purposes.*

3. *Insurance and reinsurance undertaking shall only ascribe a positive value to deferred tax assets where it is probable that future taxable profit will be available against which the deferred tax asset can be utilised, taking into account any legal or regulatory requirements on the time limits relating to the carry-forward of unused tax losses or the carry-forward of unused tax credits.*

1795. Article 9 of the Delegated Regulation sets out the general requirements for the valuation of all assets and liabilities other than technical provisions:

1. *Insurance and reinsurance undertakings shall recognise assets and liabilities in conformity with the international accounting standards adopted by the Commission in accordance with Regulation (EC) No 1606/2002.*

2. *Insurance and reinsurance undertakings shall value assets and liabilities in accordance with international accounting standards adopted by the Commission pursuant to Regulation (EC) No 1606/2002 provided that those standards include valuation methods that are consistent with the valuation approach set out in Article 75 of Directive 2009/138/EC. Where those standards allow for the use of more than one valuation method, insurance and reinsurance undertakings*

shall only use valuation methods that are consistent with Article 75 of Directive 2009/138/EC.

3. Where the valuation methods included in international accounting standards adopted by the Commission in accordance with Regulation (EC) No 1606/2002 are not consistent either temporarily or permanently with the valuation approach set out in Article 75 of Directive 2009/138/EC, insurance and reinsurance undertakings shall use other valuation methods that are deemed to be consistent with Article 75 of Directive 2009/138/EC.

4. By way of derogation from paragraphs 1 and 2, and in particular by respecting the principle of proportionality laid down in paragraphs 3 and 4 of Article 29 of Directive 2009/138/EC, insurance and reinsurance undertakings may recognise and value an asset or a liability based on the valuation method it uses for preparing its annual or consolidated financial statements provided that: (a) the valuation method is consistent with Article 75 of Directive 2009/138/EC; (b) the valuation method is proportionate with respect to the nature, scale and complexity of the risks inherent in the business of the undertaking; (c) the undertaking does not value that asset or liability using international accounting standards adopted by the Commission in accordance with Regulation (EC) No 1606/2002 in its financial statements; (d) valuing assets and liabilities using international accounting standards would impose costs on the undertaking that would be disproportionate with respect to the total administrative expenses.

5. Insurance and reinsurance undertakings shall value individual assets separately.

6. Insurance and reinsurance undertakings shall value individual liabilities separately

1796. Article 9(2) of the Delegated Regulation implies that Solvency II valuation principles follow the international accounting standards adopted by the European Commission to the extent that they comply with the Solvency II valuation principles, i.e. transfer value, in Article 75 of the Solvency II Directive. The adopted accounting standard for deferred taxes is IAS12, to be used to the extent that it complies with the Solvency II valuation principles.

1797. Article 76(a)(iii) lists net deferred tax assets as tier 3 basic own fund items.

1798. Furthermore, recital 68 of the Delegated Regulation states that the calculation of the adjustment for the loss-absorbing capacity of technical provisions and deferred taxes should ensure that there is no double counting of the risk mitigating effect provided by future discretionary benefits or deferred taxes.

1799. In the Delegated Regulation all regulation regarding the, scenario-based, calculations of the SCR also applies to LAC DT. Regulation regarding the Basic SCR does not apply to LAC DT as LAC DT is not an element of the Basic Solvency Capital Requirements. Article 83(1)(b) of the Delegated Regulation states that deferred taxes remain unchanged when calculating the Basic SCR.

1800. For the purpose of this advice, EIOPA has left the regulation regarding the calculation of LAC DT for the purpose of the group SCR out of scope.

Guidelines

1801. A separate set of guidelines regarding the loss-absorbing capacity of technical provisions and deferred taxes has been published by EIOPA. Guidelines 6 to 14 in sections II and III relate to the calculation and recognition for the LAC DT adjustment.

1802. Next to these guidelines on LAC DT, the guidelines 9 to 11 regarding deferred taxes in the guidelines on the valuation and recognition of assets and liabilities other than technical provisions are also relevant.

17.5. Advice

17.5.1. Previous advice

1803. CEIOPS-DOC-46/09 on the “loss-absorbing capacity of technical provisions and deferred taxes”⁷⁹.

1804. EIOPA-BOS-17/280 on the “first set of advice to the European Commission on specific items in the Solvency II Delegated Regulation”⁸⁰.

17.5.2. Analysis

Definitions

1805. LAC DT is the phenomenon that undertakings are able to compensate part of a shock loss to their tax authority for which the impact of the loss on own funds is therefore lower than the original gross loss itself. The idea is that the economic Solvency II loss also results in fiscal losses and that these fiscal losses result in tax reductions if fiscal profits are available to utilise/offset these fiscal losses.

1806. LAC DT is, according to Article 207 of the Delegated Regulation, equal to the change in the value of deferred taxes after the shock loss. With DTA^*/DTL^* being the deferred taxes after the shock loss, LAC DT is:

$$LAC\ DT = DTA^* - DTL^* - (DTA - DTL) + carry-back^{81}$$

1807. Article 207 of the Delegated Regulation provides that deferred taxes shall be valued in accordance with Article 15 and that especially the increase in DTA after the shock loss may be used only if undertakings demonstrate that it is likely that future profits will be available against which to utilise the losses, taking into account the magnitude of the loss and in accordance with the Solvency II valuation principles. The Solvency II valuation principles for

⁷⁹ <https://eiopa.europa.eu/CEIOPS-Archive/Documents/Advices/CEIOPS-L2-Final-Advice%20SCR-Loss-absorbing-capacity-of-TP.pdf>

⁸⁰ https://eiopa.europa.eu/Publications/Reports/EIOPA-BoS-17-280_Final_report_on_First_set_of_Advice_on_SII_DR_Review.pdf

⁸¹ Carry-back is the phenomenon in Ireland, United Kingdom and the Netherlands that a loss can be used (carried back) to offset taxes paid on profits in the previous year. In this way, a fiscal loss is directly being compensated by a direct claim on the tax authority; carry-back thus does not result in a DTA, but in a tax receivable.

deferred taxes are laid down in Article 15 of the Delegated Regulation and state that DTA are only ascribed a positive value if it is probable that future taxable profits are available for its utilization.

1808. The change in the value of deferred taxes is, as a maximum, equal to the applicable tax rate times the shock loss as defined in Article 207(1) of the Delegated Regulation. The Guidelines on LAC DT refer to this change in the value of deferred taxes as notional deferred taxes, nDT and state that to the extent that its recognition depends on an assessment of future taxable profits this must be supported by credible evidence that future profits exist. This can be considered as a simplified approach of the calculation of LAC DT, but would result in the same outcome.

LAC DT = nDT (credible evidence of probable future profits) + carry-back

1809. Undertakings justify likely utilisation of DTA and DTA* in several ways:

- by demonstrating DTL that reverse at the same time (and under the same tax Authority);
- by demonstrating future fiscal profits that realise at the same time (and under the same tax Authority).

1810. If insufficient DTL or future fiscal profits are available at a certain point in time for the utilization of the DTA at that same point in time, carry-back and carry-forward possibilities in the tax regime may allow the use of DTL and future fiscal profits from other points in time for the utilization of the DTA.

1811. DTA/DTL and LAC DT contribute to Solvency figures differently: net DTA recognized in the Solvency II balance sheet increases own funds while LAC DT may reduce the SCR.

Differences in deferred taxes on the balance sheet result in differences in LAC DT

1812. While this chapter only pertains to LAC DT, it is useful to note that data analyses in the first set of advice provided evidence that undertakings with a – higher – net DTL on their Solvency II balance sheet typically have a higher LAC DT than undertakings with a – higher – net DTA. This is a consequence of the fact that the likely utilization of the post shock DTA* by net DTL on the balance sheet is relatively more certain and less complex to demonstrate than the demonstration of additional probable future profits for the post-shock DTA* in excess of those required for the DTA on the Solvency II balance sheet.

1813. An undertaking with net DTL has less eligible own funds than the same undertaking with either less net DTL or net DTA. On the other hand, the undertaking with the higher net DTL has more net DTL available to demonstrate likely utilization of the post-shock DTA* and will typically have a higher LAC DT and thus a lower SCR. Moreover, LAC DT is not capped, as is the case for the eligibility of balance sheet net DTAs.

1814. Differences in the net DTA/DTL on the Solvency II balance sheet across Europe occur for different reasons:

- differences in tax regimes;
- economic position of the undertakings⁸²;
- implications of differences because different LTG and transitional measures, or none at all, are applied when valuing technical provisions on the Solvency II balance sheet;
- differences in terms and conditions of insurance policies sold (e.g. the amount of profits to be shared with policyholders in life insurance contracts).

1815. Differences in tax regimes are the main source of differences in the net DTA/DTL on the Solvency II balance sheet (beyond their specific economic position of course). If the fiscal valuation principles were the same as the Solvency II valuation principles no deferred taxes for temporary differences would arise on the Solvency II balance sheet; the only DT that might arise would be DTA representing carry-forward of fiscal losses, to the extent permitted in the relevant tax regime.

1816. The more the valuation principles for the fiscal balance sheet differ from the Solvency II valuation principles, the larger the temporary differences and the larger the DTA and DTL on the Solvency II balance sheet.

Content of the chapter

1817. This chapter consists of key principles regarding the projection of likely future profits:

- role of compliance with the MCR and SCR after bSCR* shock loss;
- future profits stemming from new business;
- future profits from returns on assets;
- future Management Actions (FMA);
- role of the system of Governance;
- supervisory reporting and disclosure.

Financial and Solvency position after the bSCR* shock loss

I. Key principle 1: Role of compliance with the MCR and SCR after shock loss

1818. The extent of compliance with the MCR and SCR after the bSCR* shock has an effect on the likelihood of an undertaking being able to utilise nDT. For example, if an undertaking no longer complied with its MCR after the shock loss within the applicable recovery period, its supervisor would withdraw its

⁸² These are differences in the balance sheet not due to the other factors detailed in the bullet points but that come from investment choices, other assets, debt etc.

authorisation. Without such authorisation an undertaking would no longer be able to write new business as a source of future profits in the LAC DT calculation.

1819. EIOPA does not expect undertakings using the standard formula to explicitly determine the compliance with their MCR and SCR after the bSCR* shock loss. However, EIOPA does expect that all undertakings reflect the extent of compliance with their MCR and SCR in their assumptions used for their projections of future profits.

1820. If the shock loss would be close to, or an actual breach of the SCR, assumptions regarding likely future profits should reflect this. For example, if the undertaking breached its SCR after shock loss, it is probable that such a disclosure would undermine new business underwriting.

1821. Similarly, if the undertaking would be close to an MCR breach, more evidence would be needed to demonstrate that future profits would be probable.

Future profits stemming from new business

1822. Demonstration of likely utilisation of increases in deferred taxes by virtue of future profits from new business is one of the areas where similar undertakings have provided a wide range of assumptions resulting in a range of LAC DT and SCR outcomes that cannot be explained by differences in solvency position and risk-profiles.

1823. Undertakings often rely on projections for their business plans to demonstrate likely future profits from new business in their LAC DT calculations. The future profits projected to justify LAC DT should consider the impact of post-shock scenario. For example, a mass lapse undermines the capacity of undertakings to finance their overheads or other expenses, hence reducing profits or even generating losses during a future period.

1824. Business plans and their projections used to justify LAC DT vary between 'pessimistic' and 'optimistic' for undertakings with similar risk-profile and risk-appetite. These differences in LAC DT and SCR for similar undertakings appear unjustified.

II. Key principle 2: Future profits stemming from new business – projection assumptions

1825. Future profits stemming from new business should be calculated using assumptions which are consistent with those used to determine own funds in compliance with the Solvency II Delegated Regulation. When calculating LAC DT, undertakings determine a post-shock best-estimate of their nDT. However, the higher uncertainty that comes with the shock loss should result in assumptions of these projections that are more prudent than the pre-shock assumptions.

1826. When considering profits from new business it is important to distinguish between two time horizons. The first time horizon relates to the number of years' worth of new business after the shock loss that is recognised by the

projection. The second time horizon relates to the projection horizon within which profits for that given new business will, fiscally, emerge.

1827. Some undertakings use the concept of economic profits for demonstrating the likely utilization deferred tax assets, under the assumption that without economic profits no fiscal profits will occur. Question is if an economic profit becomes a fiscal profit at the right time for the utilisation of deferred tax assets. For example, new business sold in year 2 of the projection will result in a direct economic profit in year 2 equal to the Economic New Business Value (ENBV); ENBV is the day-one profit or loss of contracts sold when these are valued according to the Solvency II valuation principles for technical provisions⁸³. If this economic profit in ENBV is taxable, it will generate fiscal profits and losses in the future. These fiscal profits are available for the utilisation of the DTA* after the shock loss.

1828. There are different ways to calculate economic profits (based on market-consistent valuation principles). Assumptions are needed (e.g. on inflation, risk-free discount curve, expenses, demography ...) and these assumptions should be compliant with the Solvency II framework. These assumptions should also be consistent with assumptions made in the calculation of technical provisions.⁸⁴ For example, undertakings should not assume that after a shock loss new pension business becomes more profitable, because they assume a lower life expectancy.

1829. As indicated, taxable economic profits and losses will generate fiscal profits and losses in the future. Therefore, projections of fiscal profits may also be used to demonstrate LAC DT, under the condition that the timing of these fiscal profits and DTA*, given the applicable carry-back and carry-forward possibilities, allow for this utilisation, and that the uncertainty regarding the timing of these profits is properly reflected in the projection.

III. Key principle 3: Future profits stemming from new business – projection horizon of future profits stemming from new business

1830. Given the shock loss and the fact that these future profits are calculated for new business in a hypothetical post-shock situation, there is higher uncertainty compared to the technical provisions calculation and compared to a "normal" scenario (i.e. a pre-shock best estimate scenario). Undertakings should reflect this higher uncertainty into their calculations in a way that is compliant with guideline 9 of EIOPA Guidelines on *recognition and valuation of assets and liabilities other than technical provisions*.

1831. Undertakings should ensure that their forecast of likely new business reflects the impact of the shock loss on the amount of likely new business: the shock loss may lead to a decrease in the amount of likely new business

⁸³ EVNB may have similarities to the market consistent value of new business developed in the MCEV framework. Important differences exist because the EVNB is to be calculated with assumptions stemming from Solvency II framework, which differ to assumptions in MCEV framework (e.g. the risk-free interest rate curve).

⁸⁴ Please note that "consistency" is not to be interpreted as that "the same" assumptions should be used.

compared to that that would be projected in the pre shock environment of the business plan; the shock loss is expected to reduce the future profits stemming from new business in comparison with realised profits stemming from new business written in past recent years. Furthermore, the impact of the shocks on other assumptions of the projection should be considered as well (e.g. lapse shock may mean the undertaking has lower capacity after the shock to finance overheads and management expenses than beforehand).

1832. Where an undertaking projects new business profits in excess of its business plan horizon, it should set a finite time horizon and apply appropriate haircuts to new business profits projected beyond the horizon of the business planning so as to reflect increased uncertainty after the shock-loss.

IV. Key principle 4: Future profits stemming from new business – projection horizon of new business sales

1833. Where used to determining likely utilisation of LAC DT, the horizon over which new business sales can be projected should reflect uncertainty.

1834. The horizon over which new business sales can be projected should be limited to the length of the projection horizon used in the business plan.

1835. This reflects that profits after a severe shock are not expected to exceed the profits in the pre shock situation. On top of that LAC DT projections are reconcilable with other projections done by the undertaking and business plans are a tool used by undertakings to manage the whole of their business and play a crucial role in the strategy of undertakings. As such, it is a document approved by the AMSB.

1836. Restricting the horizon of new business sales may still leave room for an uneven playing field as similarly risky and solvent undertakings may have a different LAC DT and SCR caused by different projection horizons used in their business plans. Another concern is that, under this restriction, undertakings may lengthen the projection horizon of their business plans in order to allow more future profits from new business to be recognised in their calculation of likely utilisation of LAC DT.

1837. In order to address the above and increase convergence in the calculations of likely utilisation of post-shock net DTA, the horizon over which new business sales can be projected should never exceed 5 years, irrespective of the horizon applied in the business planning. The impact assessment shows that this should not raise issues for the market since only 10% of insurance undertakings appear to project future profits on a horizon longer than 5 years in their business plan.

Future profits from returns on assets

1838. Another source of future profits comes from assets in excess of the technical provisions on the Solvency II balance sheet. The assumed returns on these assets are raising differences between similar undertakings. A convergent set of return assumptions can help reduce unjustified differences in LAC DT and SCR for similar undertakings.

V. *Key principle 5: Future profits stemming from return on assets*

1839. The return assumptions used should take into account the shock loss for market risk and its impact on the economic environment. The extent and timing of the recovery of the financial markets is highly uncertain and future crashes are also possible; (re)insurance undertakings are expected to reflect this uncertainty in their calculations by setting prudent assumptions. EIOPA deems it inappropriate to assume higher returns after a severe shock loss given the uncertainty that comes with such a post-shock environment.
1840. Guideline 9 on the valuation of deferred tax assets in the "*Guidelines on recognition and valuation of assets and liabilities other than technical provisions*" requires that projections of taxable profits are "broadly consistent" with the assumptions underlying the projections for the valuation of technical provisions and assets on the Solvency II balance sheet.
1841. The payment of dividends (and hence the decrease in the own funds) should be adequately taken into account, considering both the practice applied during last years and the planning according to the capital and dividend policies currently in place. The projections of assets in excess of technical provisions should also be consistent with both the asset management policy and practice.
1842. When considering returns on assets, the development of the technical provisions should also be taken into account. Assumptions on return on assets also apply to returns on the assets stemming from the new business that is assumed to be sold. Also here, account should be taken of the development of the technical provisions stemming from this new business.
1843. One way of taking account of the aforementioned uncertainty is to set, for the purpose of the standard formula calculation, returns on assets in future profit projections equal to the forward rates derived from the relevant post-shock risk-free interest rate term structure derived from the interest rates risk sub-module within the market risk module.
1844. Risk-free returns on assets would address supervisory concerns regarding the uncertainty of these future profits after the shock loss. Proscribing returns above the relevant risk-free rates makes LAC DT more certain than assuming returns above the risk-free rate, with the associated risk of returns below that rate, or even negative returns.
1845. Setting returns on assets equal to the relevant risk-free rate would ensure that the calculation is fully consistent with Guideline 9 referred to above, which increases the certainty of future profits from return on assets after the shock loss in the LAC DT standard formula calculation. It implies no so-called pull-to-par and no additional returns from recovery of equity markets. In this case, pull-to-par is defined as a recovery of credit spreads to their pre-shock levels.
1846. Other methods may also be used to take account of uncertainty, e.g. projecting various scenarios with regards to future returns on assets. Such greater complexity could (as noted in paragraph 1700 above) imply a greater

supervisory scrutiny, potentially offered by an internal, or partial internal, model.

1847. Undertakings assuming returns above the forward rates implied by the interest rate term structure should provide credible evidence that it is probable that they will realize such excess returns, given the increased uncertainty in the post-shock environment.

1848. In any event, higher returns should not be assumed after the shock loss in the LAC DT calculation compared to the pre shock assumptions, as, due to increased uncertainty after the shock loss, such returns are unlikely.

VI. Key principle 6: Future profits stemming from return on assets in excess of technical provisions – projection horizon

1849. As for other sources of likely future profits, the returns on assets are uncertain. However, even when liabilities run-off, there may be remaining assets in the Solvency II balance sheet that keep generating profits. Compared to the projection of future profits from new business, the question of the projection horizon for these assets is more difficult to determine: there is no liability that helps determining when the projection should stop. The question of which are these assets also raises difficulties since it depends on the investment strategy and on the maturity of the portfolio among other things. Moreover, additional considerations and requirements about these future profits may apply, for example concerning assets management due to terms and conditions of contracts.

1850. The horizon used for the projection of future profits stemming from assets in excess of the technical provisions should be set up such that it reflects the increased uncertainty after the shock loss. This implies that assumptions regarding the projection horizon are also set in a more prudent manner than pre shock. In particular, (re)insurance undertakings should not project these profits where they cannot objectivise the future own funds of the Solvency II balance-sheet and all elements that will have an impact on future own funds.

Future management actions

1851. When demonstrating probable future profits, some undertakings have assumed a range of future management actions, including:

- Recapitalization;
- De-risking;
- Ceasing sales of unprofitable business lines;
- Changes of sales channels;
- Changes to commission structure;
- Transfer of portfolios.

VII. Key principle 7: Future Management Actions (FMA)

1852. The use of future management actions can be an additional source of uncertainty in the calculation of likely utilisation of DTA. Allowing for future management actions without limitations and safeguards bears the risk that settings and assumptions in the LAC DT calculation after the shock loss are set in such a way that LAC DT is unjustifiably maximized.
1853. Future management actions become less probable the more they depend on externalities. Undertakings should weigh this reliance on externalities and the related increased uncertainty when assessing the likelihood of future management actions for the purpose of their LAC DT calculations.
1854. Article 23 of the Delegated Regulation provides requirements on future management actions that relate to the valuation of technical provisions. These requirements should also apply to future management actions integrated into the calculation of LAC DT. In particular an assessment of the results of the future management actions against experience should be included in the FMA plan. The future management actions in the calculation of LAC DT should be part of the existing FMA plan and meet all requirements set out in Article 23 of the Delegated Regulation.
1855. In general, the management actions that are also relevant in a pre-stress situation, such as changing a sales channel to increase profitability or changes to commission structure are difficult to accept for the sole purpose of LAC DT calculation: why would the undertaking wait the shock-loss to perform such profitable management actions? The FMA should be compared with the experience as per Article 23(2) of the Delegated Regulation.

Role of system of Governance in LAC DT calculation

1856. As explained above, the LAC DT calculation requires demonstration of likely utilisation which introduces uncertainty and complexity where this depends on a projection of the post-shock situation.
1857. The projections and calculations done to identify likely future taxable profits have similarity with those that are made for the calculation of technical provisions. Solvency II however places fewer governance requirements on this calculation than on the calculation of technical provisions, which increases the risk of unrealistic or inappropriate assumptions being used, inappropriate validation of the results, an inappropriate audit trail being kept, appropriate key functions not being involved and the AMSB not taking ultimate responsibility for the projections.

VIII. Key principle 8: Role of system of governance

AMSB and Key functions

1858. As part of the risk management policy and possibly of the ORSA exercise the calculation of LAC DT should be approved by the AMSB. Since the projection of future profits are linked to the business planning of the undertaking and its whole strategy, AMSB approval should play a role in the demonstration of the credibility of the assumptions and calculations.

1859. Key functions should play a role in the validation of the assumptions and calculations.

Capital management

1860. Regarding capital management and consistently with Article 297(1) of the Delegated Regulation, undertakings are expected to define their targets both in respect of the solvency ratio (own funds compared to capital requirements) and in respect of the quality of own funds (e.g. maximum percentage of own funds relying on items of the lowest quality, among them, the net deferred tax assets). For the sake of completion and according to the principle of substance over form, the reliance of own funds on items of lowest quality should consider to which extent the capital needs are covered with net deferred tax assets, both those included as assets in the balance sheet and those accounted to offset losses under a stressed scenario via LAC DT in the SCR.

1861. It is relevant to bear in mind that the justification of the deferred tax assets (pre-stress) and notional deferred tax assets (post-stress) may rely on future profits. In such case, it is likely that the assessment of future profits will be materially sensitive to the assumptions applied in the projections. Therefore it seems appropriate to carry out sensitivity analysis in order to assess which changes in the aforementioned assumptions may endanger the capacity of the undertaking to keep the quality of its own funds below the limits targeted in order to avoid an overreliance of the capital needs on deferred tax assets and notional deferred tax assets.

ORSA

1862. Article 45 of the Solvency II Directive provides that, as part of its risk-management system, every undertaking shall conduct its own risk and solvency assessment.

1863. In particular, paragraph (1)(b) provides that this assessment shall include an assessment of the compliance, on a continuous basis, with the capital requirements.

1864. Given the materiality of LAC DT and its specificities, it can be appropriate for the projections performed for the calculation of likely utilisation of LAC DT and the whole of the calculation to be included in the undertaking's ORSA. The ORSA-report could include a specific section on the calculation of LAC DT and an assessment of its assumptions. Moreover, it could be appropriate to develop a sensitivity analysis to changes in the main assumptions used to estimate or justify both deferred tax assets in the pre-stress situation and LAC DT generated post-shock, including changes in future profits.

1865. The system of governance regarding the LAC DT calculation should require an approval of the methods used and outcome by AMSB and by involving key functions, in particular the Actuarial Function.

1866. The capital management policy should consider which part of the own funds correspond to both deferred tax assets in the pre-stress situation and LAC DT generated post-shock. The capital management policy should also

target appropriate limits to the part of the eligible own funds and SCR that is based on the two aforementioned elements.

1867. The risk management policy should include the assumptions and calculations done for the purpose of LAC DT:

- The sources used to justify LAC DT and their effect (e.g. amount justified with DTL pre-stress, amount justified with DTL post-stress, amount justified with future profits).
- A sensitivity analysis to changes in the main assumptions used to estimate or justify both deferred tax assets in the pre-stress and post-stress situation, including changes in future profits.
- Comparisons of the projections against experience where relevant should be performed.
- the ORSA supervisory report includes a specific section on the calculation of LAC DT and an assessment of its assumptions.

Supervisory Reporting and Public disclosure regarding LAC DT calculation

IX. Key principle 9: Supervisory reporting and disclosure

1868. Consistently with the Solvency II framework, it is appropriate to enhance the information for supervisors and public disclosure of the LAC DT calculation and justification of its likely utilisation.

1869. LAC DT is a material factor in determining and understanding the solvency position of most undertakings and should be publically disclosed in a manner consistent with other material components of the solvency position.

1870. Furthermore, without an adequate public disclosure investors and customers will lack essential data for a well-informed decision. In particular it will be unlikely to have a comparable overview of market participants and to what extent the level playing field is preserved.

1871. Ensuring enhanced information provision should be achieved by strengthening both the supervisory reporting and the public disclosure of the deferred tax assets in the pre-stress balance sheet and the LAC DT calculation. For instance undertakings should be asked to include in the RSR, if not covered by the ORSA Report, and in the SFCR, under section of Risk profile and/or Capital management, at least the following information:

- The part of the own funds generated by deferred tax assets, both in the pre-stress and post-shock situations.
- The calculation of the notional deferred tax assets.
- The limits targeted in the capital management to the part of the solvency position that is based on the two aforementioned elements.

- The sources used to justify likely utilisation of LAC DT, with a justification of the effect of each source (e.g. amount justified with DTL pre-stress, amount justified with DTL post-stress, amount justified with future profits).
- Where future profits are used to demonstrate likely utilisation of either deferred tax assets in the pre-stress situation or LAC DT generated post-shock,
 - the numbers of years over which new business sales are projected,
 - the time horizon over which profits emerging from that new business are projected,
 - the profits assumed for new business and its comparison with the average profit during the last three years,
 - the rate of return used for future investments supporting technical provisions and the rate of return of other assets,
 - the number of years over which returns of assets in excess of the technical provisions have been projected to demonstrate likely utilisation.
- A summary of the sensitivity analysis carried out regarding the assumptions used to demonstrate likely utilisation of both deferred tax assets in the pre-stress situation and LAC DT. The sensitivity analysis will assess the impact of changes in the assumptions on the solvency position of the undertaking,
- Any other information on both pre-stress deferred tax assets and LAC DT that could influence the decision-making or judgement of third parties.

17.5.3. EIOPA's advice

1872. EIOPA has provided evidence that National Supervisory Authorities have similar approaches with respect to more than 75 % of almost 100 billion euros in LAC DT across the EEA, which is the part of LAC DT where likely utilisation is being demonstrated by a net deferred tax liability (DTL) on the balance sheet. With respect to the remaining part of LAC DT where likely utilisation is being demonstrated by future profits, NSAs do have different approaches. Where carry-back is applicable in the tax regime NSAs also allow for its use to demonstrate likely utilisation of LAC DT, increasing the 75 % of LAC DT where supervisors have similar approaches.

1873. EIOPA recognises the positive position that NSAs have similar approaches with respect to more than 75% of LAC DT across the EEA. Of the remaining proportion where there are differences, EIOPA would consider differences in LAC DT justified if they stemmed from differences in fiscal regimes or risk profiles or the length and duration of assets and liabilities. EIOPA treats the fiscal regimes as given; undertakings in jurisdictions with tax regimes with higher tax rates or more favourable carry-forward and carry-back possibilities will, all else equal, have a higher LAC DT.

1874. EIOPA has observed a wide range of judgement involved in the part of LAC DT that relies on projecting the future profits estimated after the bSCR* shock loss⁸⁵. Subjectivity in itself is not a problem as valuations for the Solvency II balance sheet and SCR calculations require expert judgement. However, typically expert judgement for the balance sheet valuations and SCR calculations result in a relatively small range of possible outcomes for similar assets and liabilities and risks. With respect to the part of LAC DT that is demonstrated by future profits, supervisors have observed a wide range of assumptions and outcomes for similar undertakings.

1875. For this reason and according to Article 8 of EIOPA Regulation (Regulation (EU) 1094/2010 of 24 November 2010) EIOPA strives to achieve convergence in the calculation of LAC DT under the standard formula and in particular for the projection of post stress taxable profits used to demonstrate the likely utilisation of increases in deferred taxes, and, going forward, will consider suitable good practices to ensure such convergence. However, convergence in the undertakings' and supervisory approaches cannot be achieved without amendments to the current regulation on LAC DT.

1876. EIOPA considers several key principles to foster supervisory convergence and to address three concerns:

- **Uncertainty** about future profits for utilization of notional deferred tax assets (DTA)
- **Complexity** involved in projections of these future profits

Uneven playing field because of wide range of judgement involved in the likely utilisation of notional DTA

1877. These key principles are about:

- I. The financial and solvency position of the undertaking – role of compliance with the MCR and SCR after shock loss
- II. Future profits stemming from new business – projection assumptions
- III. Future profits stemming from new business – projection horizon of future profits stemming from new business
- IV. Future profits stemming from new business – projection horizon of new business sales
- V. Future profits stemming from return on assets
- VI. Future profits stemming from return on assets in excess of technical provisions – projection horizon
- VII. Future Management Actions
- VIII. Role of system of governance
- IX. Supervisory reporting and disclosure

1878. Regarding key principles 1 to 6 on the demonstration of likely utilization of post-shock DTAs, EIOPA advises to implement the key principles by setting additional criteria for the calculation of deferred taxes after the shock loss. For that purpose EIOPA advises amendments to Article 207 of the Delegated Regulation on LAC DT.

1879. Paragraph 1 of Article 207 of the Delegated Regulation prescribes that LAC DT equals the change in deferred taxes after the shock loss; the amendments and clarifications proposed relate to the change in the value of deferred taxes. The advice is to add to Article 207 requirements for the assumptions underlying the determination of the notional deferred taxes after the shock loss that are eligible for the LAC DT.

1880. These requirements clarify that when calculating LAC DT undertakings should take account of their financial and solvency position after the shock loss and of the increased uncertainty regarding the projection of future profits following the shock loss. When projecting future profits following the shock loss, undertakings should not apply assumptions that are more favourable than the assumptions applied to the valuation of deferred taxes

on the Solvency II balance sheet in accordance with Article 15 of the Delegated Regulation.

1881. On compliance with MCR and SCR, the Delegated Regulation already specifies that the "*magnitude of the loss (...) and its impact on the undertaking's current and future financial situation*" should be taken into account. EIOPA does not advise additional explicit requirement to meet the MCR and SCR after the shock loss, but the extent of compliance should be reflected in the amount of profits available for the likely utilization of the notional deferred taxes (see second indent of proposed paragraph 2a). With respect to profits from returns, the extent of compliance with the capital requirements is automatically enforced without any further adjustments to the returns as the shock loss implies a decrease in the assets in excess of the shocked technical provisions; this automatically decreases profits from returns and EIOPA would deem another adjustment to reflect the extent of compliance with the capital requirements as double-counting. With respect to profits from new business, undertakings may need to adjust their assumptions to reflect the extent of compliance with the capital requirements after the shock loss.
1882. Given the increased uncertainty after the shock loss EIOPA deems it appropriate to set post-shock assumptions on returns on assets equal to the forward rates derived from the relevant interest rate term structure. However, it should be recognised that in certain circumstances, higher returns are justifiable. Therefore EIOPA advises to allow for returns in excess of the risk-free rates where an undertaking is able to provide credible evidence that it is likely it will realize such excess returns after the shock loss.
1883. These higher returns should however be limited and the stipulation that post-shock loss assumptions cannot be more favourable than the ones applied to the valuation of pre-shock loss DTAs implements this principle. This ensures that no reversion of any part of the shock may be assumed, which implies, inter alia, no pull-to-par and no shock reversion. The expected return on equity (as well as other) investments does not exceed the return assumed for these equities when valuing deferred taxes on the balance sheet. The same applies to fixed income investments; the yield assumed after the shock loss does not exceed the yield assumed for the valuation of the deferred taxes on the balance sheet. For all investments, the return assumptions apply to the shocked values.
1884. The horizons used for the valuation of the notional deferred taxes after the shock loss should not be longer than the corresponding horizons used for the balance sheet valuation of deferred taxes. With respect to new business, EIOPA advises to also link the projection of new business with the business plan, in order to ensure consistency in the various projections performed by the (re)insurance undertaking:
- First, the total amount of new business sales in the LAC DT projection should not exceed that of the business plan.

- Second, the projection horizon of new business sales should also be limited to that of the business plan. In order to avoid providing an incentive for (re)insurance undertakings to lengthen their business plan, the horizon of projection of new business sales should, in any case, be limited to 5 years. The setting of such limit is necessarily based on expert judgment, however the impact assessment shows that it will not have strong consequences for undertakings: only 10% of the business plans exceed 5 years.
- Third, where the profits stemming from the new business are projected over a longer horizon than that of the business plan, undertakings should reflect the increased uncertainty. EIOPA advises that haircuts are applied to these profits from new business. The longer the projection, the greater the haircuts.

1885. EIOPA advises to implement key principle 7 concerning future management actions by referring to Article 23 of the Delegated Regulation. This aligns the requirements of the calculation of LAC DT with the requirements for scenario based calculations as provided in Article 83 of the Delegated Regulation.

1886. EIOPA advises to implement key principle 8 concerning the governance requirements pertaining to LAC DT by amending Article 260 on Risk management areas and Article 272 on the Actuarial Function. Including governance requirements within the risk management policy ensures appropriate involvement of the AMSB during the approval of the policy. The actuarial function, or the risk management function if more appropriate, should formally be required to assess and validate the underlying assumptions applied to future profit projections, both for the valuation of deferred tax assets on the balance sheet (Article 15) and for the purpose of LAC DT (Article 207).

1887. EIOPA proposes to implement key principle 9 concerning the public disclosure and supervisory reporting requirements pertaining to LAC DT by amending Article 297 on the SFCR and Article 311 on the RSR. In both undertakings should provide evidence of the reliance of their eligible own funds and solvency capital requirements on future profits. In the RSR undertakings should additionally provide sufficient evidence on the credibility of the assumptions used for demonstrating net DTA on the balance sheet and LAC DT as reduction of the SCR. These amendments require undertakings to clearly explain how they calculate their deferred tax assets and LAC DT, in particular the underlying assumptions applied in these calculations and in the demonstration that it is likely they can be utilised in the future.

17.5.4. Proposal for new Articles

1888. In order to implement EIOPA's advice, the following amendments to the Delegated Regulation are proposed.

1889. Article 207 of the Delegated Regulation.

1. The adjustment for the loss-absorbing capacity of deferred taxes shall be equal to the change in the value of deferred taxes of insurance and reinsurance undertakings that would result from an instantaneous loss of an amount that is equal to the sum of the following:

(a) the Basic Solvency Capital Requirement referred to in Article 103(a) of Directive 2009/138/EC;

(b) the adjustment for the loss-absorbing capacity of technical provisions referred to in Article 206 of this Regulation;

(c) the capital requirement for operational risk referred to in Article 103(b) of Directive 2009/138/EC.

2. For the purposes of paragraph 1, deferred taxes shall be valued in accordance with **paragraphs 1 and 2** of Article 15, **without prejudice to paragraphs 2a to 2c.**

2a. Where the loss referred to in paragraph 1 would result in an increase in deferred tax assets, undertakings shall not utilise this increase for the purposes of the adjustment unless they are able to demonstrate **it is probable** that future taxable profits **will be available against which this increase can be utilised, taking into account:**

- any legal or regulatory requirements on the time limits relating to the carry-forward of unused tax losses or the carry-forward of unused tax credits;

- the magnitude of the loss referred to in paragraph 1 and its impact on the undertaking's current and future financial situation, as well as the impact of the loss referred to in paragraph 1 on insurance product pricing, market profitability, insurance demand, reinsurance coverage and other macroeconomic variables; and

- the increased uncertainty in future profits following the loss referred to in paragraph 1, as well as the increasing degree of uncertainty relating to future taxable profits following the loss referred to in paragraph 1, as the projection horizon becomes longer.

2b. Without prejudice to paragraph 2a, for the purpose of demonstrating probable future taxable profits referred to in paragraph 2a, undertakings shall not apply assumptions that are more favourable than those used for the valuation of deferred taxes in accordance with Article 15 and the demonstration of likely utilisation of deferred tax assets in accordance with Article 15(3).

2c. Without prejudice to paragraphs 2a and 2b, when demonstrating probable future taxable profits, undertakings shall:

- set rates of returns on their investments following the loss referred to in paragraph 1 equal to the implicit returns of the relevant forward risk-free rate term structure obtained after the loss referred to in paragraph 1; or

- use higher returns where they are able to provide credible evidence of likely returns in excess of the implicit returns of the relevant forward risk-free rate

term structure obtained after the loss referred to in paragraph 1. In any case, they shall not use a rate of return that exceeds that used for the purpose of the valuation and utilization of deferred tax assets in accordance with Article 15, as provided in paragraph 2b

- not assume new business sales in excess of those projected for the purpose of their business plan;
- not project new business sales beyond the horizon of their business plan and, in any case, not beyond a maximum of five years;

Where, without prejudice to the third indent of this paragraph, undertakings set a projection horizon for profits from new business that is longer than the horizon of their business planning, they shall determine a finite projection horizon and apply appropriate haircuts to these profits from new business projected beyond the horizon of their business planning. Such haircuts shall increase the further into the future the profits are projected.

2d. Where undertakings assume the implementation of future management actions following the loss referred to in paragraph 1, such actions shall be subject to provisions laid down in Article 23.

1890. Article 260 – Risk management areas

1.

(...)

h. Loss-absorbing capacity of deferred taxes:

(i) actions to be taken by undertakings to ensure that the selection of methods and assumptions to justify the amount and recoverability of the loss-absorbing capacity of deferred taxes are included in the risk management policy;

(ii) involvement of the relevant key functions in the selection and assessment of methods and assumptions;

(iii) risks the undertaking is or could be exposed to, taking into account potential future changes in its risk profile due to the undertaking's business strategy or the economic and financial environment, including operational risks and potential changes in its loss-absorbing capacity of deferred taxes. This assessment shall include the overall reliance of the solvency and financial condition on deferred taxes and its consistency with the risk management policy.

1891. Article 272 – Actuarial Function

7a. Assess and validate the underlying assumptions applied for the projection of future profits for the purpose of Article 15 and Article 207.

The administrative, management or supervisory body may delegate this task to the risk management function.

1892. Article 297 – Capital management (SFCR)

1.

(...)

fa. A description of the potential amount of deferred tax assets and the extent to which this has been recognised. For those deferred tax assets which have been recognised, a description of the amounts being recognised as likely to be utilised by reference to likely future taxable profits and by reference to the reversion of deferred tax liabilities at the same tax authority.

Where these deferred tax assets exceed the amount of deferred tax liabilities:

- a comment that this net DTA is available T3 own funds in accordance with Article 76 (a)(iii); and
- a description of how much of this is eligible own funds, applying the eligibility limits of Article 82.
- Where material, a description of the underlying assumptions used for the projection of likely future taxable profits for the purpose of Article 15.

2.

(...)

fa. The amount with which the SCR has been adjusted for the loss-absorbing capacity of deferred taxes, and a description of the deferred tax liabilities, carry-back and probable future taxable profits used to demonstrate likely utilisation.

Where material, a description of the underlying assumptions used for the projection of likely future taxable profits for the purpose of Article 207.

1893. Article 311 – Capital management (RSR)

1.

(...)

d.

Information regarding deferred taxes that shall at least contain:

- A description of the potential amount of deferred tax assets and the extent to which this has been recognised. For those deferred tax assets which have been recognised, a description of the amounts being recognised as likely to be utilised by reference to likely future taxable profits and by reference to the reversion of deferred tax liabilities at the same tax authority;
- a detailed description of the underlying assumptions used for the projection of likely future taxable profits for the purpose of Article 15; and
- an analysis of the sensitivity of the value of these net deferred tax assets to changes in these underlying assumptions.

2.

(...)

d. For the future profits projected for the purpose of the loss-absorbance capacity of deferred taxes in accordance with Article 207:

- a description, and the relevant amount of each of the components used to demonstrate a positive value of the increase in deferred tax assets;

- a detailed description of the underlying assumptions used for the purpose of Article 207; and
- an analysis of the sensitivity of the value of the adjustment to changes in these underlying assumptions.

18. Risk margin

18.1. Call for advice

1894. According to Article 77(5) of the Solvency II Directive, the risk margin shall be calculated by determining the cost of providing an amount of eligible own funds equal to the SCR necessary to support the insurance and reinsurance obligations over the lifetime thereof. The risk margin is such as to ensure that the value of the technical provisions is equivalent to the amount that (re)insurance undertakings would be expected to require in order to take over and meet the (re)insurance obligations.

1895. As part of the SCR review EIOPA is asked to:

- Provide information on the relative size of the risk margin in insurers' balance sheet.
- Assess if the methods and assumptions applied in the calculation of the risk margin continue to be appropriate, in view of a changed market environment. In particular, EIOPA is asked to review the Cost-of-Capital rate (CoC rate).

18.2. Legal basis

Solvency II Directive

1896. Recital 56:

The assumptions made about the reference undertaking assumed to take over and meet the underlying insurance and reinsurance obligations should be harmonised throughout the Community. In particular, the assumptions made about the reference undertaking that determine whether or not, and if so to what extent, diversification effects should be taken into account in the calculation of the risk margin should be analysed as part of the impact assessment of implementing measures and should then be harmonised at Community level.

1897. Article 77 – Calculation of technical provisions

(1) The value of technical provisions shall be equal to the sum of a best estimate and a risk margin as set out in paragraphs 2 and 3.

[...]

(3) The risk margin shall be such as to ensure that the value of the technical provisions is equivalent to the amount that insurance and reinsurance undertakings would be expected to require in order to take over and meet the insurance and reinsurance obligations.

[...]

(5) Where insurance and reinsurance undertakings value the best estimate and the risk margin separately, the risk margin shall be calculated by determining the cost of providing an amount of eligible own funds equal to

the Solvency Capital Requirement necessary to support the insurance and reinsurance obligations over the lifetime thereof.

The rate used in the determination of the cost of providing that amount of eligible own funds (Cost-of-Capital rate) shall be the same for all insurance and reinsurance undertakings and shall be reviewed periodically.

The Cost-of-Capital rate used shall be equal to the additional rate, above the relevant risk-free interest rate, that an insurance or reinsurance undertaking would incur holding an amount of eligible own funds, as set out in Section 3, equal to the Solvency Capital Requirement necessary to support insurance and reinsurance obligations over the lifetime of those obligations.

1898. Article 86 – Delegated Regulation and Regulatory and Implementing technical standards

1. The Commission shall adopt delegated acts in accordance with Article 301a laying down the following:

...

(d) the methods and assumptions to be used in the calculation of the risk margin including the determination of the amount of eligible own funds necessary to support the insurance and reinsurance obligations and the calibration of the cost-of-capital rate, as referred to in Article 77(5);

Delegated Regulation

1899. The calculation of the risk margin is described in Subsection 4 of the Delegated Regulation, Articles 37 to 39. In particular, Article 39 provides the following:

The Cost-of-Capital rate referred to in Article 77(5) of Directive 2009/138/EC shall be assumed to be equal to 6 %.

18.3. Feedback statement on the main comments received to the consultation paper (EIOPA-CP-17-006)

General comments

a. Summary of the comments received

1900. The stakeholders expressed their discontent regarding the level and the current formula of the risk margin. Therefore, many changes were proposed by stakeholders, including, allowing the use of MA and VA measures in the calculation, allowing risk diversification at group level, introducing a time scaling factor, capping the size of the risk margin.

b. Assessment

1901. Most of the issues raised by stakeholders have already been raised in the previous consultation. Some of them have been analysed, and EIOPA's analysis on those can be found in the consultation paper. Furthermore, most of the proposals are not within the scope of the current review which focuses on the cost of capital parameter rather than on the risk margin's formula. Those concerns might be tackled by EIOPA at a later stage, for example in

the full review of Solvency II that the Commission is required to undertake after five years of implementation.

Scope of the assessment and level of the cost of capital

a. Summary of the comments received

1902. Stakeholders expressed general disappointment that no other areas than the cost of capital were considered. Respondents believe a wider range of approaches to the risk margin should be considered and pointed to examples of concepts equivalent to the risk margin in IFRS17 financial reporting and developments under ICS.

1903. Some stakeholders considered that 6% is too high and it does not reflect the economic reality of risk transfer prices in current environment. Those stakeholders suggested that 3% would be more appropriate.

b. Assessment

1904. The focus on the cost of capital was partly implied by the call for advice from the Commission. Moreover, EIOPA responds to some proposals on the design of the risk margin in the consultation paper. Other components of the risk margin calculation might be analysed at a later stage.

1905. Some of the approaches proposed and concepts, including the ICS, were already analysed by EIOPA. Furthermore, the current works under ICS are still at an early stage of development and are not yet finalised and could not be taken as a comparison.

1906. The level of 6% results from in-depth analyses by CEIOPS and then by EIOPA.

Macroeconomic impacts and impacts on insurer behaviour

a. Summary of the comments received

1907. Some respondents highlighted that current allegedly excessive level of the risk margin incentivises longevity risk reinsurance outside of EU. If longevity risk is being managed outside the EU, it could lead to an increase in the interconnectedness of the financial system.

1908. Especially, stakeholders considered that in low interest rate environments, the risk margin increases to an unjustifiably high level which disproportionately affects firms which have long-term maturity insurance products.

1909. Some stakeholders believe that the risk margin will lead to pro-cyclical investment behaviour.

b. Assessment

1910. EIOPA understands that significant amounts of longevity reinsurance have been undertaken by specific life insurance undertakings but believes that, in

general, the level of the risk margin appropriately reflects the price of risks based on the EIOPA assessment of the cost of capital.

1911. A high risk margin when rates are low is a natural consequence of the risk margin formula. EIOPA analysed the link between the level of interest rate and the cost of capital. It does believe that there is no clear empirical or academic evidence of such a link. The rest of the risk margin formula is out of scope of the current review.
1912. In the review of the cost of capital, EIOPA took a careful attention to avoid undue volatility and pro-cyclical effects by choosing appropriate role for averages and length of time. Moreover the impact on insurer behaviour is out of scope of the current review.

Calculation and derivation of 6%

a. Summary of the comments received

1913. Some stakeholders argued that the zero debt assumption for deriving the cost of capital was not appropriate and provided data relying on a small sample of insurers. Stakeholders pointed out the fact that EIOPA weighted debt on own funds rather than on SCR, the latter being considered as more appropriate by them.
1914. Regarding the ERP derivation, stakeholders challenged the choice of an historical method. According to them, such methodology is volatile and contains upward bias. Stakeholders claimed that the ERP should be lower than the figure provided by EIOPA.
1915. On the beta derivation, stakeholders highlighted that the use of a levered beta was not appropriate and that the beta should be calibrated on global market data. They also considered that the effect of market risks should be removed from beta.

b. Assessment

1916. As stated in the consultation paper, EIOPA considers that the funding split of the base capital has not significantly changed since QIS 4 when it was found that the debt funding cannot represent more than 6/8% of the capital base. Please also refer to the new figures provided in the advice. The data provided by Stakeholders is not considered as representative of the market. Using debt as a percentage of the SCR rather than own funds would not reflect the capital structure of typical insurers.
1917. With regard to the estimation of the ERP, historical and forward-looking methods were analysed. In view of the advantages and disadvantages of both methods, EIOPA suggests to use historic return models to derive ERP. These models ensure methodological consistency with the initial calibration of the CoC rate, stronger stability over time and are less dependent on assumptions.
1918. Regarding the beta calculation, the use of levered beta is in line with the CEIOPS methodology. Although the market risk is not included in the

reference undertaking, it doesn't mean that in the purpose of estimating the cost of capital, the market risk should be removed from the beta. All financial investors are exposed to market risk, thus it should be a component of the beta. Using an unlevered beta is not in line with the assumption that the reference undertaking covers its SCR at 100%; please refer to updated advice. Furthermore, since the CoC rate will be primarily applied in the European market, a calibration on European data is preferable.

18.4. Feedback statement on the main comments received to the discussion paper

Level of the cost of capital

Stakeholders proposal	Assessment
The CoC rate should be fixed at the level that corresponds to current market conditions.	The proposal does not ensure that the risk margin is sufficient where liabilities run off over a longer time period that includes market conditions different from current conditions. A CoC rate that reflects current credit spreads, for instance, would have procyclical effects. Technical provisions would increase when credit spreads are widening forcing insurers to derisk their asset portfolios thereby contributing to further spread widening. A CoC rate that reflects current interest rates is discussed separately below.
The CoC rate should be fixed and based on market prices for underwriting reinsurance (2-3 %) or on MCEV approaches (4.5 %).	Market prices for underwriting reinsurance risks corresponding to those in the risk margin are typically not directly observable, and the approach under MCEV does not seem to be in line with the transfer value approach of Solvency II. A methodology followed for the initial calibration of the CoC rate – using a weighted average cost of capital model, (assessing the expected cost of equity with a shareholder return model) and proceeding with adjustments to reflect the long term

	objectives seems more appropriate.
The CoC rate should be fixed and based on the long-term average of EUR/USD investment grade spread levels of 2-3 % since it corresponds to the level of the VaR at 99.5 %.	The CoC rate should reflect the cost for raising sufficient own funds for the reference undertaking. The current CoC rate reflects the average composition of equity and debt at the time of original calibration across European insurance undertakings. Since then the debt-funding has not significantly increased. The debt CoC for insurance undertakings may be different from the debt CoC of other undertakings. The universe of investment grade instruments will contain senior debt which does not count as regulatory capital under SII. It therefore may not be appropriate to reflect yields on senior debt instruments when deriving the CoC.
The CoC rate should be fixed to avoid unintended pro-cyclicality and for reasons of simplicity. EIOPA should periodically review the CoC rate and keep it constant between these reviews.	The Solvency II Directive provides that the CoC rate should be reviewed periodically. CEIOPS advice on the risk margin suggested a method for such revision. It is EIOPA's objective to document the proposed approach.
The CoC rate should not be fixed but change gradually depending on a long-term average, as for the UFR.	As part of the refresh of the cost of capital methodology the appropriate role for averages and length of time period will be considered to avoid undue volatility and procyclical effects.

Sensitivity of the cost of capital to interest rates

Stakeholders proposal	Assessment
The CoC rate should be allowed to vary per currency. Some stakeholders propose that it could be the sum of a fixed credit risk component and a floating interest rate risk element: $\text{CoC} = [X\% * \text{risk free rate}] + [Y\% \text{ fixed addition}]$ Stakeholders argue that this proposal would reduce the volatility of the risk margin.	The Solvency II Directive provides that the CoC rate shall be the same for all insurance undertakings. A differentiation of the CoC rate by currency may not be in line with the Directive. There is no clear economic justification of the proposal. Its main objective seems to be to reduce the volatility of the risk margin. The proposed approach may reduce the volatility of the risk margin for long-term business, but may increase it for short-term business, unless the rate was to vary by term. See also the assessment below this table.
Some stakeholders propose to adjust the formula as set out above, where the CoC rate is allowed to vary according to a weighted average of risk-free interest rates for different currencies.	The proposal aims to lower the volatility of the risk margin, but will not achieve that in case interest rates of different currencies move in different directions.

1919. The empirical and academic evidence to support a theoretical link between the risk-free rate and the equity risk premium is mixed. The economics and finance profession has investigated the use of macroeconomic variables to forecast the cost of capital, including risk-free interest rates, but has yet to reach a consensus.^{86 87}

1920. Over the very long term prior to 2000, there was a mostly positive relationship between the returns demanded by equity investors and those

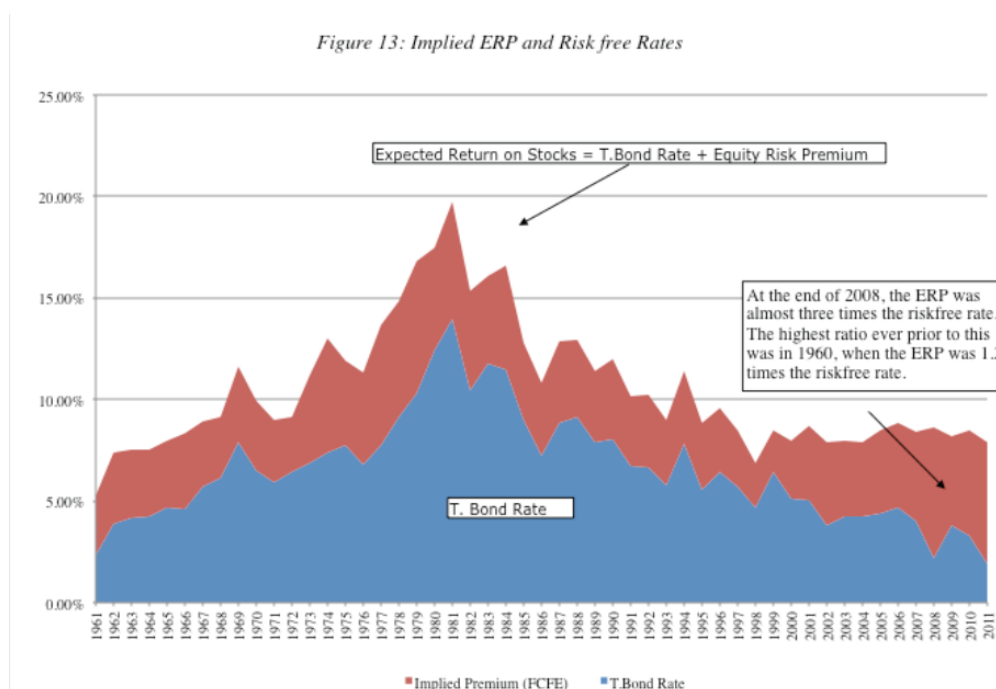
⁸⁶ Neely, Rapach and Tu (2012) Forecasting the Equity Risk Premium: the Role of Technical Indicators

⁸⁷ Duarte and Rosa (2015) The Equity Risk Premium: A Review of Models

demanded by investors in government bonds.⁸⁸ Using data from the 1960s onwards, Damodaran (2012) also found a positive relationship between the equity risk premium and the risk-free rate (see Chart below).⁸⁹ That might suggest that the risk premium does tend to decline as risk free interest rates fall, and vice versa.

1921. However, in the early part of this century, the relationship between equity returns and risk-free bond yields appeared to turn negative. Various explanations have been put forward, including investors being less concerned about inflation and more concerned about low economic growth, and post-crisis there has been an increased demand for risk-free assets.⁹⁰ The change in this relationship has also been reflected in the relationship with the equity risk premium. Damodaran's (2016) most recent estimates of the relationship between the equity risk premium and the risk-free rate has found only no statistically significant relationship.⁹¹

The relationship between the equity risk premium and yields on long-term risk free bonds



Source: Damodaran (2012)

⁸⁸ Campbell, Sunderam and Viceira (2016) Inflation Bets or Deflation Hedges? The Changing Risks of Nominal Bonds. Roberts-Sklar (2016) 250 years of the bond-equity correlation, Bank of England Bitesize

⁸⁹ Damodaran (2012) Equity Risk Premium (ERP): Determinants, Estimation and Implications – The 2012 Edition. See also Cappiello and Guene (2005) Measuring Market and Inflation Risk Premia in France and in Germany, ECB Working Paper, for evidence of the effects of inflation on equities and long-term government bonds.

⁹⁰ Roberts-Sklar (2016) 250 years of the bond-equity correlation

⁹¹ Damodaran (2016) Equity Risk Premium (ERP): Determinants, Estimation and Implications – The 2016 Edition. The coefficient in the regression of the equity risk premium on long-term interest rates remains positive, but is not statistically significant.

Calculation of the risk margin

Stakeholders proposal	Assessment
The reference undertaking should be allowed to use the VA and MA.	Changes to the scope of application of the long-term guarantee measures should be assessed in the ongoing review of the long-term guarantee measures and measures on equity risk. Measures that require supervisory approval on a case-by-case basis should not be assumed to be granted for all undertakings.
Allowing for more diversification in the reference undertaking: between the life and non-life business for composite insurance undertakings and between the other business that the reference undertaking could have on its own.	The current calculation already allows for diversification across lines of business. The assumption is however that the life and non-life business are taken over separately by two different undertakings and the reference undertaking is empty before receiving the business of the original undertaking. This approach appears still to be more realistic than assuming that the portfolio is transferred to a composite undertaking. That is in particular the case for composite undertakings subject to grandfathering in accordance with Article 73(5) of the Solvency II Directive.
Allowing for hedgeability of longevity risk.	The current assumptions for the reference undertaking allow taking account of the risk-mitigation technique that are in place in the original undertaking. That assumption still appears to be appropriate. It is not clear why the reference undertaking should apply more (or less) risk-mitigation than the original undertaking. If the approach would be changed and the assumption on additional risk mitigation would be included in the transfer scenario, then the cost of hedging would need to be

	reflected in the risk margin.
In order to simplify the RM calculation, use a percentage of the best estimate or of the SCR or a different CoC rate per line of business.	The simplifications of using a percentage of the best estimate or of the SCR provide a bad approximation for lines of business where the duration of liabilities differs across undertakings. There are simplifications available that take into account the duration information and are equally easy to calculate. The distinction per line of business may allow adjusting the CoC rate for long term business, but it would be more complex to calculate and the RM may less benefit from diversification effects.
Use a time scaling factor to reduce SCR projected.	The materiality of the risk diversification over time is not clear nor how this effect can be quantified reliably. The diversification effect appears to be business-specific, existing mainly where risks may result in policyholders leaving the portfolio (e.g. for lapse risk or mortality risk).
Include market risk in the reference undertaking.	It would be more realistic to assume that the reference undertaking is exposed to market risk. It would however increase the complexity of the risk margin calculation.
Cap the risk margin at 100 % of the SCR.	There is no conceptual reason that would justify capping the risk margin. For liabilities with long durations a risk margin that exceeds the SCR can be appropriate.
Allow the risk margin to change in the scenario-based calculations of the SCR standard formula.	It would be more realistic to assume that the risk margin can change in the stress scenarios. It would however increase the complexity of the risk margin calculation, in particular because the risk margin itself depends on the future SCR of the insurance

	portfolio.
The calculation of the group risk margin should allow for intra group transactions.	The group risk margin is calculated as the sum of the risk margin for the participating undertaking and the proportional shares of related undertakings. Consequently the risk margin allows for intra-group transactions reflected in the risk margin of those solo undertakings.

1922. The focus of EIOPA's work is currently to provide an advice on revising the CoC rate as a fixed amount. The starting point for the development of the methodology is the earlier advice from CEIOPS on the RM.

18.5. Advice

18.5.1. Previous advice

1923. CEIOPS provided advice on the risk margin for the level 2 implementing measures for Solvency II "Technical Provisions – Article 86(d) – Calculation of the Risk Margin" (CEIOPS-DOC-36/09)⁹² On the derivation of the CoC rate the advice included in particular the following:

The Cost-of-Capital rate has to be a long-term average rate, reflecting both periods of stability and periods of stress. Otherwise, the rate would vary from year to year, and would be higher in times of economic uncertainty.

A rate of at least 6 per cent is assessed to be an adequate placeholder for the Cost-of-Capital rate in the current context of the Solvency II regulation. In order to reach this conclusion it may be argued along the following lines:

- *Shareholder return models provide the initial input.*
- *Some objective criteria may cause upward and downward adjustments of the initial input.*
- *A final calibration of the Cost-of-Capital rate, in order to obtain risk margins consistent with observable prices in the marketplace, may be necessary.*

Shareholder return models

A rate of at least 6 per cent is assessed to be an adequate placeholder for the Cost-of-Capital rate in the current context of the Solvency II regulation

⁹² See <https://eiopa.europa.eu/CEIOPS-Archive/Documents/Advices/CEIOPS-L2-Final-Advice-on-TP-Risk-Margin.pdf>

As the most commonly used models in the market seem to be the Capital Asset Pricing Model (CAPM) and versions of the Fama-French multi Factor Model (FFmF), CEIOPS' analysis has been confined to the results given for these models... CEIOPS finds it ... appropriate to base the assessment of the Cost-of-Capital rate on CRO Forum's results for the CAPM and the FF2F method for European insurance undertakings.

Table 2. *Equity Risk Premiums as assessed in the CRO Forum's report.*⁴⁴

	CAPM		FF2F	
	European market	Global market	European market	Global market
Life	10.0 pct	5.1 pct	11.8 pct	9.4 pct
Non-life	7.4 pct	4.2 pct	12.5 pct	9.6 pct

Taking into account only the results from the shareholder return models a cost-of-capital rate of 7.5% - 10% seems to be adequate.

Objective adjustments

In order to account for the fact that a key source of return that exists for going concerns (the so called franchise value related to expected profit from new business) may not be demanded by capital providers in a transfer context, a downward adjustment is needed. No reliable quantitative results are available concerning the size of this adjustment.

Additional costs may stem from:

- *Frictional costs of carrying capital. These are ... costs related to managers' incentives, information asymmetries, and so on. Again, these costs are very difficult, if not impossible, to quantify.*
- *Initial costs of raising capital. These are fees for underwriting, listing and regulation, which in most jurisdictions are not negligible.*
- *Corporate income taxes on the risk margin in some tax jurisdictions. This is the case if the risk margin is considered as taxable profit at inception and not as taxable income only over the time of its release from the risk margin.*

It is unlikely that the downward adjustment outweighs the upward adjustments by a large margin. A reasonable range for the cost-of-capital rate taking into account these necessary adjustments could be 6% to 8%.

18.5.2. Analysis

Size of the risk margin

1924. Based on the reporting of insurance and reinsurance undertakings to their national supervisory authorities EIOPA has analysed the size of the risk margin at the end of the first, second and third quarter of 2016. The size of the risk margin was compared to the best estimate, the own funds and the

SCR. The comparison was performed for all undertakings and separately for life insurance undertakings, non-life insurance undertakings and undertakings pursuing both life and non-life activities.

1925. At European level the risk margins amounted to EUR 161 billion at the end of 2016. The following table sets out the relative size of the risk margin for the end of the first three quarters of 2016 at European level:

	Q1 2016	Q2 2016	Q3 2016
Ratio of risk margin and best estimate	2%	2%	2%
Ratio of risk margin and amount of own funds	12%	12%	13%
Ratio of risk margin and SCR	26%	26%	26%

1926. For the calculation of the risk margin, it is necessary to calculate future SCR for each point in time over the lifetime of (re)insurance obligations. The longer the obligations, the longer the projection of the SCR. That is why, for long-term business such as annuities, the risk margin is generally higher than for short-term business and more sensitive to changes in long-end maturities of the risk-free interest rate term structure. This however holds only in the case where long-term business generates significant underwriting risk.

1927. More detailed results can be found in "*40. Annex to chapter 18 – Relative size of the risk margin*".

General approach to the review of the CoC rate

1928. The initial calibration of the CoC rate was carried out by CEIOPS in 2009, resulting in a recommendation to fix the CoC rate within the range of 6%-8%. On the basis of CEIOPS' recommendation the Commission included a CoC rate of 6% in the Delegated Regulation.

1929. In order to assess the CEIOPS method and possible alternative methods EIOPA developed a list of criteria to assess and compare the methods. The criteria are set out in the following table.

Criteria	Prerequisite for methodology
Reflects economic reality	Solvency II is a market consistent regime, and so all elements of the regime should reflect the economic reality. Note that this does not mean the model would need to rely <i>only</i> on current market data or observations.
Captures all relevant costs (e.g. dividends and share buy-backs)	Methods that only use dividends can be criticised for not including other forms of compensation, e.g. buy-backs. Buy-backs are more important in US than Europe, but are still a part of compensation.
Underlying assumptions are realistic and reliable	The methods are based on assumptions, for example on current and future shareholder remuneration or on how the country of the undertaking influences the equity risk premium of the undertaking. These assumptions should be realistic and reliable in order to ensure an appropriate derivation of the equity risk premium.
'Through the cycle calibration'	As per the original CEIOPS advice, the method should result in a long-term average result, at least with regard to changes in credit risk. Otherwise, the rate would vary from year to year, and would be higher in times of economic uncertainty. This may have procyclical effects with regard to the investment behaviour of insurance and reinsurance undertakings.
Results should not be too volatile	A volatile CoC rate would cause the own funds of insurance and reinsurance undertakings to be also volatile. Where this volatility does not reflect fundamental economic changes it should be avoided. ⁹³
Transparent	The methodology should be clearly specified so that stakeholders can understand how the COC rate is derived. Transparency enables firms to model and predict potential future results of the methodology.
Replicable in the future	The methodology should be capable of being replicated by EIOPA on a regular basis, without being onerous. This will in particular ensure that the CoC rates derived by EIOPA are consistent over time.
Simplicity	Where it does not introduce material error the methodology should be simple. This will contribute to the transparency and replicability of the methodology.

⁹³ The risk margin being calculated as a percentage of the sum of discounted future SCR may change according to economic conditions even if the CoC is stable

1930. The requirement of a calibration 'through the cycle' was already applied in the initial calibration of the CoC rate. EIOPA explicitly recommended that the CoC rate should be a long-term average rate, reflecting both periods of stability and periods of stress.

1931. The CEIOPS method and the other methods analysed have the following theoretical setting in common:

Basic formula for the Cost of Capital

$$\text{CoC} = (\text{Cost of equity}) * (\text{Weight of equity}) + (\text{Cost of debt}) * (\text{Weight of debt})$$

Cost of equity

1932. The cost of equity is a commonly investigated element in the field of economics. The estimation of the cost of equity is usually based on the capital asset pricing model (CAPM). That model is based on the assumption that the only risk priced by rational investors is systematic risk, because this risk cannot be eliminated by diversification. Accordingly, the expected return of a security is equal to the rate on a risk-free security (r_f) plus a risk premium multiplied by the asset's systematic risk (beta - β):

$$\text{Cost of equity} = r_f + \beta * ERP$$

1933. The *Equity Risk Premium (ERP)* is the difference between the return on the market and the risk-free rate. It represents the extra return that investors demand above a risk-free rate to invest in an equity class.

1934. The factor beta is the measure of the non-diversifiable risk from owning a particular stock, and it is derived from a regression analysis of how a change in the market index affects the returns on the individual stock. It is given by:

$$\beta = \frac{\text{Cov}(r_m, r)}{\text{Var}(r_m)}$$

where r_m is the return of the market and r is the return of the individual stock. The beta is meant to reflect that a given sector company stocks may constantly perform differently to that wider market. A beta of 1 indicates that the stock price moves with the market.

Cost of Debt

1935. The cost of debt reflects the default risk that lenders perceive from an investment.

1936. CEIOPS analysis showed, based on the QIS4 results, that debt funding cannot constitute more than 6 – 8% of the capital base, and thus assigned 0% to the weight of debt by way of simplification. The situation has not significantly changed since QIS4: at end 2016, subordinated debt represents 7% of the capital base. The weight of debt is therefore still assumed to be nil.

1937. Consequently, the amount to determine is the following:

$$CoC - r_f = Cost\ of\ Equity - r_f = \beta * ERP$$

1938. The Cost of Capital is therefore driven by the cost of equity, i.e. by the ERP and the beta from the insurance sector.

1939. Further adjustments to the product of ERP and beta may be necessary in order to allow for economic aspects not taken into account in that calculation.

1940. The following analysis is structured in three parts that correspond to three steps of the CoC calculation:

- Equity risk premium
- Beta factor
- Further adjustments

Sensitivity of the cost of equity to interest rates

1941. The empirical and academic evidence to support a theoretical link between the risk-free rate and the equity risk premium is mixed. The economics and finance profession has investigated the use of macroeconomic variables to forecast the cost of capital, including risk-free interest rates, but has yet to reach a consensus.^{94 95}

1942. Over the very long term prior to 2000, there was a mostly positive relationship between the returns demanded by equity investors and those demanded by investors in government bonds.⁹⁶ Using data from the 1960s onwards, Damodaran (2012) also found a positive relationship between the equity risk premium and the risk-free rate (see Chart below).⁹⁷ That might suggest that the risk premium does tend to decline as risk free interest rates fall, and vice versa.

1943. However, in the early part of this century, the relationship between equity returns and risk-free bond yields appeared to turn negative. Various explanations have been put forward, including investors being less concerned about inflation and more concerned about low economic growth, and post-crisis there has been an increased demand for risk-free assets.⁹⁸ The change in this relationship has also been reflected in the relationship with the equity risk premium. Damodaran's (2016) most recent estimates of the relationship

⁹⁴ Neely, Rapach and Tu (2012) Forecasting the Equity Risk Premium: the Role of Technical Indicators

⁹⁵ Duarte and Rosa (2015) The Equity Risk Premium: A Review of Models

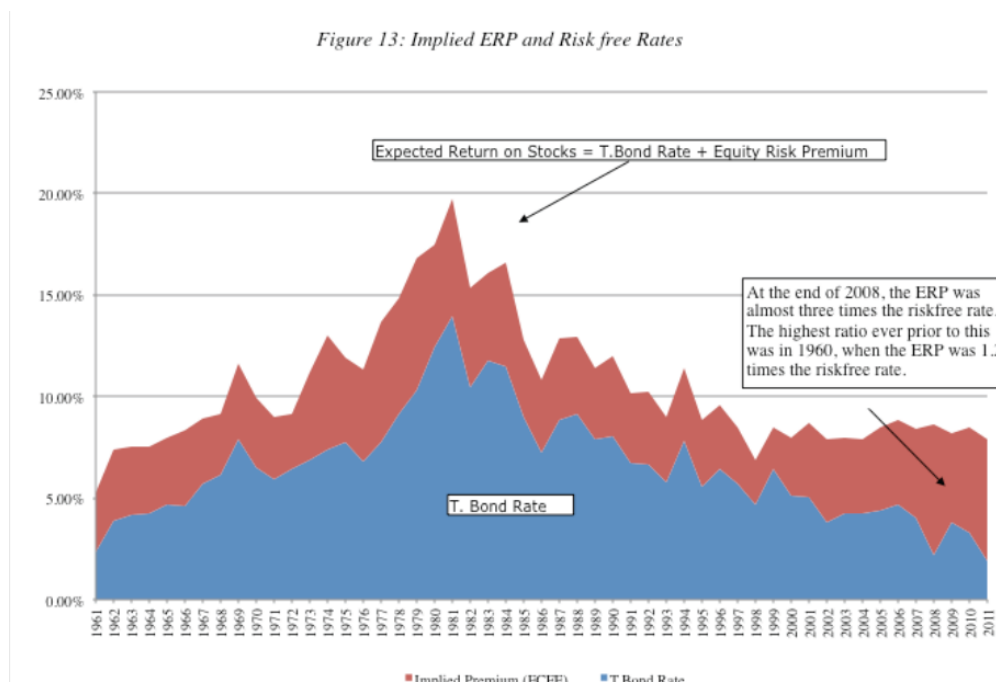
⁹⁶ Campbell, Sunderam and Viceira (2016) Inflation Bets or Deflation Hedges? The Changing Risks of Nominal Bonds. Roberts-Sklar (2016) 250 years of the bond-equity correlation, Bank of England Bitesize

⁹⁷ Damodaran (2012) Equity Risk Premium (ERP): Determinants, Estimation and Implications – The 2012 Edition. See also Cappiello and Guene (2005) Measuring Market and Inflation Risk Premia in France and in Germany, ECB Working Paper, for evidence of the effects of inflation on equities and long-term government bonds.

⁹⁸ Roberts-Sklar (2016) 250 years of the bond-equity correlation

between the equity risk premium and the risk-free rate has found only no statistically significant relationship.⁹⁹

The relationship between the equity risk premium and yields on long-term risk free bonds



Source: Damodaran (2012)

1944. Given the absence of a statistically significant relationship, the fact that interest rates decreased since 2011 is not considered a convincing argument on its own to decrease the cost of capital.

Equity risk premium

Initial derivation of the equity risk premium

1945. CEIOPS advice was based on a derivation of the equity risk premium from historical returns. The premium was derived from the return of US stocks over 30-day T-bill rates for the period from July 1926 to December 2006. The resulting equity risk premium was 7.81%.¹⁰⁰

Models to calculate the equity risk premium

1946. Estimating ERPs on the basis of historical returns was the commonly used approach at the time of CEIOPS' advice. Since then further methods have been developed to estimate the ERP. The development of these new

⁹⁹ Damodaran (2016) Equity Risk Premium (ERP): Determinants, Estimation and Implications – The 2016 Edition. The coefficient in the regression of the equity risk premium on long-term interest rates remains positive, but is not statistically significant.

¹⁰⁰ CEIOPS advice was based on calculations performed by the Chief Risk Officer Forum, see "Market Value of Liabilities for Insurance Firms", page 56 (<https://www.thecroforum.org/wp-content/uploads/2012/10/croforummvlpaperjuly2008.pdf>)

methods does not mean that academics have dismissed the use of historical returns. Apart from that also variants of estimating ERPs on the basis of historical returns have emerged.

1947. Five types of approach to estimating the equity risk premium were considered¹⁰¹

- Historic return models
- Dividend discount models
- Cross section approaches, explaining differences in the ERP between firms
- Time-series approaches, based on economic and financial variables
- Surveys of firms.

1948. The basic idea behind each of the approaches is to measure the compensation investors expect and use this to infer a discount rate, which is comprised of the equity risk premium and the risk free interest rate. In general, approaches use past equity returns as a measure of expected compensation, or measures of expected future cash flows.

1949. In what follows we focus on two of these five approaches – *historic return models* and *dividend discount models*. This is because EIOPA is interested in the ERP across the sector, ruling out a *cross section approach*. *Time-series approaches* are an area of live academic debate, where a consensus has yet to emerge. *Surveys of firms* would rely on collecting data from firms. Although surveys may prove a useful validation exercise, we do not see a survey as being able to be used as a sufficiently robust calibration tool.

Historical return model

1950. CEIOPS advice was based on a time series of US stocks since 1926. Since the CoC rate will be primarily applied in the European insurance market a calibration on European stocks appears preferable. The disadvantage of that approach is that for European stock markets the history of consistent data is shorter than for the US stock market. The use of a shorter time series would result in an estimate of the ERP that is less stable. On the other hand, the inclusion of the World War II period and the following economic recovery in the US time series may be considered questionable, because that economic situation is not comparable with today.

1951. The analysis that CEIOPS advice was based on also includes a long-term estimate of the ERP on European data for the period from January 1975 to December 2006 of 9.24%.¹⁰² This time series can be extended with data from

¹⁰¹ Duarte and Rosa (2015) The Equity Risk Premium: A review of models, FRBNY staff report 714

¹⁰² See Chief Risk Officer Forum (2008) "Market Value of Liabilities for Insurance Firms", page 56 (<https://www.thecroforum.org/wp-content/uploads/2012/10/croforummvlpaperjuly2008.pdf>).

January 2007 to December 2016. The data used for that extension were returns of the Eurostoxx 600 over the 1-year euro risk-free interest rates of Solvency II. After the extension the average ERP of the time series is 8.09%.

1952. For comparison also the result of extending the time series of US stocks since 1926 was calculated. The extension is based on S&P 500 stock returns and 1-year US dollar risk-free interest rates. The outcome is an ERP of 7.54%. The comparison is relevant because the beta factor derived for the S&P 500 Index is in the same range as the ones derived for the European indices (see next section on the beta factors).

1953. In order to validate the aforementioned results an approach of A. Damodaran was followed to derive the European ERP.¹⁰³ The calculation consists of four different steps: determining the market premium of the S&P 500, assessing the country risk using Moody's ratings, converting the country risk measure into an additional country risk premium for equity and estimating the ERP for the country. This give the following results for the EU countries:

¹⁰³ See Aswath Damodaran (2016) "The Cost of Capital: The Swiss Army Knife of Finance", (<http://people.stern.nyu.edu/adamodar/pdfiles/papers/costofcapital.pdf>). The equity risk premium used for the S&P 500 is based on data from 1966 to 2015 and derived in relation to US T-Bills, see table 1 on page 11.

Country	Total ERP (%)	Country risk premium (%)	GDP (M\$)
Austria	6	0	376 950
Belgium	6,9	0,9	455 086
Bulgaria	8,84	2,84	50 199
Croatia	9,72	3,72	48 732
Czech Republic	7,05	1,05	185 156
Denmark	6	0	301 308
Estonia	7,05	1,05	22 459
Finland	6	0	232 351
France	6,74	0,74	2 418 836
Germany	6	0	3 363 447
Hungary	9,72	3,72	121 715
Ireland	8,38	2,38	283 703
Italy	8,84	2,84	1 821 497
Latvia	7,79	1,79	27 003
Lithuania	7,79	1,79	41 400
Luxembourg	6	0	56 800
Malta	7,79	1,79	9 746
Netherlands	6	0	750 284
Poland	7,26	1,26	477 066
Portugal	9,72	3,72	199 113
Romania	9,28	3,28	177 954
Slovakia	7,26	1,26	87 264
Slovenia	9,28	3,28	42 775
Spain	8,84	2,84	1 192 901
Sweden	6	0	495 694
UK	6,59	0,59	2 861 091
Average	7,02	-	-

1954. The weighted average of the country ERPs with GDP weights¹⁰⁴ is 7.02%.

Dividend discount model

1955. The equity risk premium represents the additional compensation required by investors to hold risky assets. For the purposes of determining an estimate of the CoC that the reference entity would require we are concerned with investors' required future returns. Historical ERP can be determined by examining the difference between returns on equity investments and risk-free returns over a particular time period. On the assumption that the past is a good guide to the future, and that over a suitably long time period unexpected returns average zero, then historical ERP can be used as an estimate of the expected future ERP. Forward-looking methods (primarily

¹⁰⁴ World Bank 2015

dividend discount models) on the other hand use data based on current economic conditions (for example equity prices and compensation to shareholders) and assumptions on future economic development (eg growth) to infer the ERP.

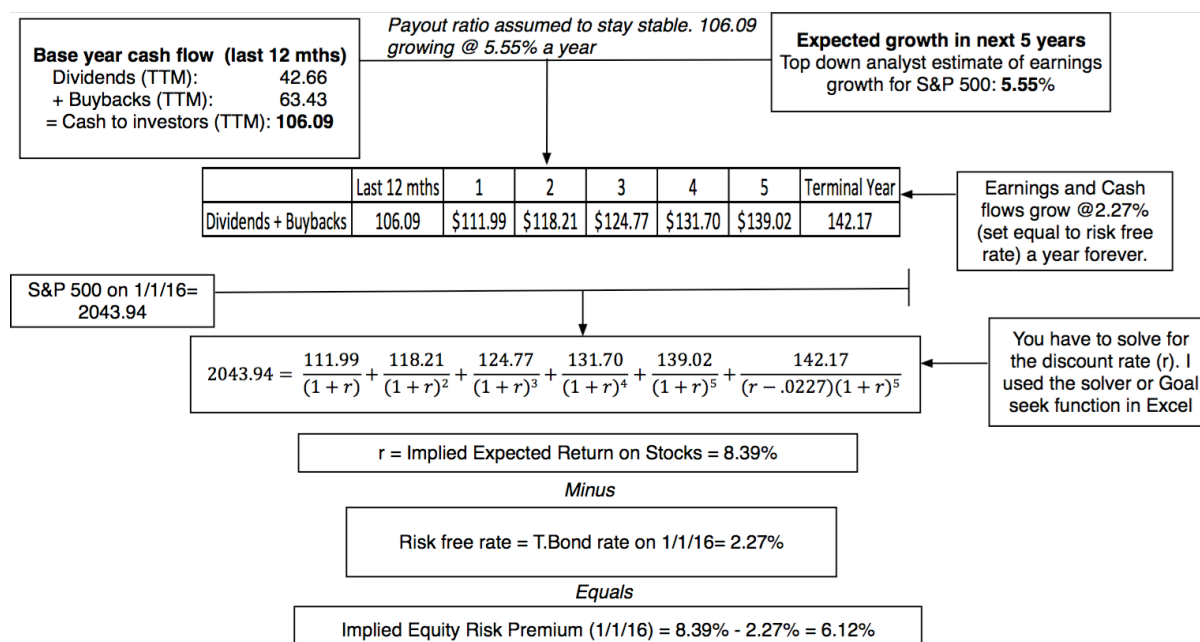
1956. The Damodaran method is one example of a dividend discount model. It is an extension of the simpler 'Gordon Growth model' in which the ERP is determined using current dividend yields and risk-free rates and an assumption that future dividends will grow at a constant rate in perpetuity.

1957. The Damodaran method enhances this method in two ways:

- First, it makes a forward projection of compensation, by applying a constant dividend growth assumption for 5 years and a long-run assumption for the remaining years.
- Second it is assumed that shareholders are remunerated not only by dividends but also share buy-backs.

1958. The Damodaran method projects future compensation, and derives the ERP from the discount rate that gives these future cash flows a present value equal to the current share price. The computation of the ERP using the Damodaran method is set out in the figure below. For further information on the Damodaran method see 'Damodaran, The Cost of Capital: The Swiss Army Knife of Finance, 2016 ('The Damodaran paper')'.¹⁰⁵

How Damodaran determines the implied ERP for S&P 500 – January 2016 (extracted from 'The Damodaran paper')



¹⁰⁵ <http://people.stern.nyu.edu/adamodar/pdfiles/papers/costofcapital.pdf>

1959. The key assumptions and features of the model are as follows:

- **Data:** We have used Eurostoxx 600 data on the basis that this data is readily available, and is representative of listed European firms.
- **Dividend growth for the first five years of the projection:** An assumption of 5.5% has been used in line with Professor Damodaran's assumption, which is based on consensus estimates. The average dividend growth rate of the Eurostoxx 600 over the last five years was c5% (and c0% over the last 10 years).
- **Growth after the first five years:** The assumption that compensation grows at the risk free rate after the first 5 years of the projection is another feature of the Damodaran model. This is on the basis that the growth rate assumed for the first five years will not continue indefinitely and long-term growth will be equal to the growth of the wider economy¹⁰⁶.
- **Risk-free rate:** We have used the 10-year rate for the Euro Area (OECD data) of 0.93% as per the Damodaran methodology¹⁰⁷.
- **Proportion of total compensation due to share buy-backs:** We have included share buy-backs, which represented c30% of shareholders' total remuneration over the last 10 years.¹⁰⁸ This represents an uplift factor of 143% to dividends to arrive at total compensation ($1/(1-0.3)$). This uplift factor has been applied to actual dividends used to determine projected future compensation.

1960. The results are shown in the chart below. Both point-in-time and smoothed results have been shown. See below for further details.

¹⁰⁶ See pages 64-65 of <http://people.stern.nyu.edu/adamodar/pdfiles/papers/ERP2012.pdf>

¹⁰⁷ It is also widely used by practitioners, e.g. CFA Institute (2009) Equity

¹⁰⁸ See ECB (2007) Monthly Bulletin, Share Buybacks in the Euro Area and Pictet (2015) Share Buybacks: A powerful driver that looks set to gain even more momentum.

Damodaran ERP estimates based on Eurostoxx 600



1961. The results show that the ERP derived using the Damodaran method is in the same range for most of the points in time. However, during the financial crisis the ERP strongly increased. This may be due to a faster adjustment in share prices, due to weaker economic growth, than in companies' dividend policy. In practice firms are often reluctant to reduce dividends and share prices subsequently recovered post crisis. The chart also shows results on a smoothed basis by averaging the point-in-time results over a 10-year period. The smoothed estimate is about 6%.

1962. The results show the following sensitivities to the changes in the input parameters:

- An increase in the compensation growth assumption in the first 5 years of 100bps (from 5.5% to 6.5%) results in a c20bps increase in the derived ERP.
- Assuming that compensation growth in the first 5 years of the projection is equal to the risk-free rate (i.e. lower than 5.5%) would reduce the derived ERP by 120bps.
- Increasing the period for which we assume 5.5% growth in total compensation from five years to ten years – a departure from the Damodaran method - increases the derived ERP by c80bps¹⁰⁹.
- Using the 10yr rate from the EIOPA curve as the risk free rate increases the derived ERP by c10 basis points. Using the 1yr rate from the EIOPA curve as the risk free rate increases the derived ERP by c30 basis points.

¹⁰⁹ This, in effect, assumes that the largest 600 companies in Europe grow at 5.5% annually for the next 10 years.

- A 5 percentage point increase in the uplift factor applied to dividends to allow for share buybacks (e.g. from 143% to 148%) results in an increase in the derived ERP of c25bps.
- A reduction in the risk free rate of 50bps results in an increase in the derived ERP of c20bps. Note that in the Damodaran model the same rate is used to project future compensation and as the risk free rate deducted from the implied expected equity return to determine the ERP. This results in an offsetting effect; in isolation, decreases to the rate used in projecting compensation reduce the ERP whereas decreases to the rate used to deduct from the expected equity return increase the ERP.

1963. There are several different dividend discount models that tend to provide different results. Research by Norges Bank Investment Management gives an indication of the variation in dividend discount estimates of ERP (see table below).¹¹⁰ For Europe the ERPs estimated by the models analysed range from 2.3% to 8.7%. Bloomberg provides an estimate of the ERP for the Eurostoxx 600 that is currently about 10%.

¹¹⁰ Norges Bank Investment Management (2016): "The equity Premium – Discussion Note", (<https://www.nbim.no/contentassets/2b92009ffa9440f98eec8f32a0996ca2/discussion-note-1-16---equity-risk-premium.pdf>)

Implied ERPs from dividend discount models

	Gordon	Fed	Expected Fed	Shiller	SOP Const	SOP Mean-Rev	SOP Low growth	Multi-stage DDM (GDP, 15 year)	Multi-stage DDM (EPS, 15 year)	Multi-stage DDM (GDP, 5 year)	Ave all models
Australia	5.4	4.7	4.4	4.9	9.9	7.9	4.2	5.1	5.1	4.7	5.6
Austria	2.0	7.4	8.3	11.6	7.9	9.4	2.1	6.5	6.3	7.3	6.9
Belgium	3.1	5.8	5.7	5.5	8.7	8.4	4.5	6.0	5.9	5.8	5.9
Canada	3.3	4.5	6.1	5.6	11.2	8.6	3.8	8.6	8.4	7.2	6.8
Denmark	1.7	3.1	4.0	1.9	14.4	13.1	1.7	5.4	5.4	4.6	5.5
France	3.3	5.3	7.2	7.0	9.5	9.6	4.6	8.3	8.3	7.7	7.1
Germany	3.0	5.5	6.8	5.5	10.1	9.6	3.1	7.5	7.5	7.1	6.6
Hong Kong	3.3	9.4	7.2	6.9	6.9	5.2	4.1	8.6	8.1	7.8	6.8
Italy	3.5	2.8	5.7	9.3	9.1	10.4	3.5	11.9	11.9	8.4	7.6
Japan	2.1	5.7	5.9	3.2	6.1	4.0	2.0	7.6	7.5	6.7	5.1
Netherlands	2.3	5.3	6.7	6.0	6.0	8.6	3.7	7.9	7.8	7.3	6.2
Norway	4.5	7.8	6.9	9.7	19.4	16.8	4.8	6.5	6.1	6.6	8.9
Singapore	4.6	7.3	7.3	7.9	11.2	7.7	4.0	8.5	7.3	7.8	7.4
Spain	5.2	7.2	8.0	10.2	15.0	14.0	6.6	10.6	10.4	9.2	9.6
Sweden	4.1	6.6	7.2	6.2	20.2	17.9	5.5	7.9	7.9	7.5	9.1
Switzerland	3.3	6.2	6.4	5.2	13.8	11.2	4.7	7.3	7.4	6.8	7.2
UK	4.4	6.6	6.7	8.8	8.0	6.2	5.5	7.1	7.0	6.9	6.7
US	2.3	4.8	5.7	4.3	8.1	7.1	2.9	6.9	6.8	6.3	5.5
America	2.9	5.9	5.8	4.1	7.1	5.0	2.7	7.0	6.9	6.3	5.4
Asia	3.6	5.9	6.7	7.1	10.6	9.5	4.7	7.2	7.0	6.5	6.9
Europe	2.3	4.8	5.7	4.3	8.2	7.1	3.0	7.7	7.7	7.2	5.8
World	2.7	5.2	6.0	5.0	8.7	7.4	3.4	7.2	7.1	6.5	5.9

Source: Factset, IMF, OECD, Bloomberg, USDA Macroeconomic data; Norges Bank Investment Management

1964. The table below summarizes the pros and cons to develop a new methodology for estimating the ERP based either on dividend discount models or on historical return methods

Historical return models	
Pros	Cons
Less volatile than dividend discount models	Could misstate the ERP as the past data that it is derived from includes periods of particularly high returns and very low returns (crashes) that were not anticipated by investors at the time.
Provides an estimate through the cycle	Outcome of the models depended on the time period chosen.
Arguably consistent with beta calculation which is based on historical returns.	
These methods seem more objective and reliable as they rely on observed data rather than on strong assumptions	
Ensures methodological consistency with the initial calibration of the CoC rate where also a historical return model was used.	
Dividend discount models	
Pros	Cons
Aims to take into account differences between past and future levels of the ERP.	Dividend discount models rely on strong assumptions about the future economic development, like dividend growth or the rate of future share buy-back. Our ability to correctly project these figures, in particular in the mid and long term, is poor. The model results are dependent on these assumptions.
Takes account of new academic work	Using a dividend discount model for estimating the ERP would arguably be inconsistent with the methodology to derive the beta which relies on historical returns.
Based on current economic conditions.	Change of method compared to the initial calibration. Compared to the initial calibration the ERP may change because of the change of method. That change would not reflect a change in the economic situation but a regulatory decision. It would produce artificial volatility in the insurer's technical provisions and own funds.

1965. In view of the advantages and disadvantages of both models it is suggested to use historic return models to derive the Equity Risk Premium. In particular, these models ensure methodological consistency with the initial calibration of the CoC rate, stronger stability of the CoC rate over time and depend less on assumptions.

Beta factor

1966. CEIOPS advice was based on a derivation of the beta factor that compared the performance of US stocks with European insurance stocks over a period of nine years. The calculation provided separate beta factors of 1.28 for life insurance and 0.94 for non-life insurance.¹¹¹

1967. For the revision of the beta factor the returns of European insurance undertakings are compared with the returns of the European stock market because the beta factors will be applied to an ERP for the European stock market. Furthermore it is not useful to derive separate beta factors for life and non-life undertakings because the Solvency II Directive stipulates that the same CoC rate is applied for all undertakings. It is therefore more appropriate to directly derive a beta for an average undertaking.

1968. The derivation of the revised beta factors is based on the following specifications:

- a. The beta factor is derived on the basis of a weighted average of the betas for the 66 listed EEA insurance and reinsurance companies and groups.¹¹² Please refer to "41. *Annex to chapter 18 – EEA (re)insurance undertakings used to derive beta factor*" for the list of companies used.
- b. The beta is regressed against the Eurostoxx 600¹¹³ as it is the most representative index of the European market. For comparison also betas with regard to the most relevant local index for each firm¹¹⁴ and for the European market returns index of K. French¹¹⁵ were calculated.
- c. The data cover the period 2006 to 2016.
- d. Correlations are derived from weekly periods as it allow for a larger set of data and therefore provides more stable results. For the European market returns index of K. French monthly periods were used because weekly data were not available.

¹¹¹ Chief Risk Officer Forum (2008) "Market Value of Liabilities for Insurance Firms", page 58 (<https://www.thecroforum.org/wp-content/uploads/2012/10/croforummvlpaperjuly2008.pdf>)

¹¹² The weights are based on market capitalisation.

¹¹³ Source: Bloomberg

¹¹⁴ Source: Bloomberg

¹¹⁵ Source: <http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/>

- e. Levered beta is used as was it done in the derivation for the initial beta factor (i.e. the capital structure of insurance companies, reflecting equity and debt, was taken into account).¹¹⁶
- f. Betas are averaged over a period of 10 years to ensure the stability of the outcome.
- g. Data from companies is aggregated using a weighted average in order to reflect different company sizes and to arrive at an estimate that is sufficient to transfer half of the insurance liabilities in the market. It was not considered appropriate to take the simple average of company betas, which results in a beta in the range 0.9-1, and would provide a lower level of protection.

1969. Some stakeholders suggested using an unlevered beta: they argued that the assumption that the weight of debt funding is nil should also be reflected in the derivation of beta. On the basis of the end 2016 annual reporting for 43 of the groups used in the derivation of beta an analysis of the weight of debt was made.

1970. For these groups, the total amount of subordinated debt, the consolidated SCR and the consolidated eligible own funds were analysed.¹¹⁷ The total amounts are:

- EUR 781.6bn of eligible own funds
- EUR 183.6bn of subordinated liabilities
- EUR 222.5bn of SCR

1971. The assumption for the reference undertaking is that it has no excess capital (Article 77(5) of the Solvency II Directive). Therefore,

- on the one hand equity should be reduced to reach a 100% SCR coverage ratio;
- on the other hand stakeholders argued to increase equity by replacing debt with equity.

1972. If debt is subtracted from the eligible own funds, the SCR coverage ratio of these groups is 269%. The calculation suggested by stakeholders would increase the excess equity over SCR from EUR 375.5bn to EUR 559.1bn while the assumption about the reference undertaking is that it has no excess capital. Deleveraging would therefore not bring the calculation closer to the description of the reference undertaking but further way.

¹¹⁶ A. Damodaran derives an unlevered beta of 0.9, see http://people.stern.nyu.edu/adamodar/New_Home_Page/data.html. See 'Levered and Unlevered Betas by Industry' under 'current data' and 'archived data' links

¹¹⁷ Consolidated data were used to avoid including other sectoral entities in the calculation.

1973. In view of the above, levered betas were used.

1974. The following table sets out the result of the beta calculations for all classes of firm (life and non-life):

Index	Beta
Eurostoxx 600	1.25
Local indices	1.19
K. French European market returns index	1.12

1975. In view of these results a beta factor of 1.20 is suggested to be used in the calculation of the CAPM.

Further adjustments

1976. In the initial derivation of the CoC rate CEIOPS applied further adjustments to allow for economic aspects not reflected in the CAPM estimation of the CoC. EIOPA mentioned in particular the franchise value related to expected profit from new business, frictional costs of carrying capital, the initial costs of raising capital and corporate income taxes on the risk margin in some tax jurisdictions. EIOPA did not quantify the impact of the different aspects separately. Instead, on the basis of expert judgement one adjustment for the combination of all aspects was made. The relative size of the adjustment was -20%.

1977. As for the initial estimation of the CoC rate it seems hardly possible to quantify the impact of the aspects that the further adjustment reflects. As there are no indication that their impact has changed since the initial calibration it is advisable to keep the relative adjustment that CEIOPS applied and reduce the result of the CAPM calculation by 20% to determine the CoC rate.

CoC rate

1978. Combining the three steps produces a CoC rate of 6.7% to 7.8% where the ERP is derived from a historical return model.

	ERP	Beta factor	Further adjustment	CoC rate
Historical return model based on European stocks	8.09%	1.20	0.80	7.8%
Historical return model based on US stocks and country factors	7.02%	1.20	0.80	6.7%

18.5.3. EIOPA's advice

1979. The focus of EIOPA's work at this stage has been to provide an advice on revising the CoC rate as a fixed amount. EIOPA advises that the review of other aspects of the risk margin should be done as part of the review of Solvency II that the Commission is required to undertake after five years of implementation.

1980. EIOPA reviewed the CoC rate by following the same approach that CEIOPS applied in its technical advice on the risk margin of 2009, in particular:

- The Cost of Capital is equal to the cost of equity.
- The cost of equity is calculated with the capital asset pricing model (CAPM), which includes:
 - An Equity Risk Premium, which represents the extra return that investors demand above a risk-free rate to invest in an equity class.
 - A Beta factor, which reflects the insurance sector stocks performance compared to that of the wider market.
- The outcome is adjusted to allow for economic aspects not reflected in the CAPM estimation of the CoC.

1981. With regard to the estimation of the Equity Risk Premium historical return models and dividend discount models were analysed. In view of the advantages and disadvantages of both models EIOPA suggests to use historic return models to derive the Equity Risk Premium. In particular, these models ensure methodological consistency with the initial calibration of the CoC rate, stronger stability of the CoC rate over time and depend less on assumptions.

1982. In view of the results of the CoC calculations in the range from 6.7% to 7.8% EIOPA recommends that the currently applicable CoC rate of 6% should not be changed.

19. Comparison of own funds in insurance and banking sectors

19.1. Call for advice

1983. The European Commission states that "Certain own funds items are shared by the insurance and banking frameworks (e.g. certain debt instruments). However, feedback received through the Call for Evidence highlighted that certain features (e.g. contractual clauses) do not receive the same treatment in both frameworks.

EIOPA is asked to:

- For those eligible items which are comparable between the banking framework and Delegated Regulation (EU) 2015/35, assess differences in their classification.
- For each of these differences, assess if they are justified by differences in the business model of the two sectors, by diverging elements in the determination of own funds requirements, or on other grounds."

19.2. Legal basis

1984. In this section EIOPA sets out the relevant Solvency II regulation that relates to own funds together with the relevant banking rules in Commission Delegated Regulations (CDR) Capital Requirements Regulation (CRR) (Regulation (EU) 575/2013)¹¹⁸ and Commission Delegated Regulation (EU) 241/2014¹¹⁹ for Own Funds requirements for institutions (CDR).

19.2.1. Solvency II Directive

Article 75 (1)

Member States shall ensure that, unless otherwise stated, insurance and reinsurance undertakings value assets and liabilities as follows:

- (a) assets shall be valued at the amount for which they could be exchanged between knowledgeable willing parties in an arm's length transaction;*
- (b) liabilities shall be valued at the amount for which they could be transferred, or settled, between knowledgeable willing parties in an arm's length transaction.*

When valuing liabilities under point (b), no adjustment to take account of the own credit standing of the insurance or reinsurance undertaking shall be made.

¹¹⁸ Regulation (EU) No 575/2013 of the European Parliament and of the Council of 26 June 2013 on prudential requirements for credit institutions and investment firms and amending Regulation (EU) No 648/2012. OJ L 176.

¹¹⁹ Commission Delegated Regulation (EU) No 241/2014 of 7 January 2014 supplementing Regulation (EU) No 575/2013 of the European Parliament and of the Council with regard to regulatory technical standards for Own Funds requirements for institutions. OJ L 74.

Article 138 (3) and (4)

(3) The supervisory authority shall require the insurance or reinsurance undertaking concerned to take the necessary measures to achieve, within six months from the observation of non-compliance with the Solvency Capital Requirement, the re-establishment of the level of eligible own funds covering the Solvency Capital Requirement or the reduction of its risk profile to ensure compliance with the Solvency Capital Requirement.

The supervisory authority may, if appropriate, extend that period by three months.

(4) In the event of exceptional adverse situations affecting insurance and reinsurance undertakings representing a significant share of the market or of the affected lines of business, as declared by EIOPA, and where appropriate after consulting the ESRB, the supervisory authority may extend, for affected undertakings, the period set out in the second subparagraph of paragraph 3 by a maximum period of seven years, taking into account all relevant factors including the average duration of the technical provisions.

[...]

[...]

The insurance or reinsurance undertaking concerned shall, every three months, submit a progress report to its supervisory authority setting out the measures taken and the progress made to re-establish the level of eligible own funds covering the Solvency Capital Requirement or to reduce the risk profile to ensure compliance with the Solvency Capital Requirement.

The extension referred to in the first subparagraph shall be withdrawn where that progress report shows that there was no significant progress in achieving the re-establishment of the level of eligible own funds covering the Solvency Capital Requirement or the reduction of the risk profile to ensure compliance with the Solvency Capital Requirement between the date of the observation of non-compliance of the Solvency Capital Requirement and the date of the submission of the progress report

19.2.2. Solvency II Delegated Regulation**Article 9**

1. Insurance and reinsurance undertakings shall recognise assets and liabilities in conformity with the international accounting standards adopted by the Commission in accordance with Regulation (EC) No 1606/2002.

2. Insurance and reinsurance undertakings shall value assets and liabilities in accordance with international accounting standards adopted by the Commission

pursuant to Regulation (EC) No 1606/2002 provided that those standards include valuation methods that are consistent with the valuation approach set out in Article 75 of Directive 2009/138/EC. Where those standards allow for the use of more than one valuation method, insurance and reinsurance undertakings shall only use valuation methods that are consistent with Article 75 of Directive 2009/138/EC.

3. Where the valuation methods included in international accounting standards adopted by the Commission in accordance with Regulation (EC) No 1606/2002 are not consistent either temporarily or permanently with the valuation approach set out in Article 75 of Directive 2009/138/EC, insurance and reinsurance undertakings shall use other valuation methods that are deemed to be consistent with Article 75 of Directive 2009/138/EC.

4. By way of derogation from paragraphs 1 and 2, and in particular by respecting the principle of proportionality laid down in paragraphs 3 and 4 of Article 29 of Directive 2009/138/EC, insurance and reinsurance undertakings may recognise and value an asset or a liability based on the valuation method it uses for preparing its annual or consolidated financial statements provided that:

(a) the valuation method is consistent with Article 75 of Directive 2009/138/EC;

(b) the valuation method is proportionate with respect to the nature, scale and complexity of the risks inherent in the business of the undertaking;

c) the undertaking does not value that asset or liability using international accounting standards adopted by the Commission in accordance with Regulation (EC) No 1606/2002 in its financial statements;

(d) valuing assets and liabilities using international accounting standards would impose costs on the undertaking that would be disproportionate with respect to the total administrative expenses.

5. Insurance and reinsurance undertakings shall value individual assets separately.

6. Insurance and reinsurance undertakings shall value individual liabilities separately.

Article 69

The following basic own-fund items shall be deemed to substantially possess the characteristics set out in Article 93 (1)(a) and (b) of Directive 2009/138/EC, taking into consideration the features set out in Article 93 (2) of that Directive, and shall be classified as Tier 1, where those items display all of the features set out in Article 71: (a) the part of excess of assets over liabilities, valued in accordance with Article 75 and Section 2 of Chapter VI of Directive 2009/138/EC, comprising the following items: (i) paid-in ordinary share capital and the related share premium account; (ii) paid-in initial funds, members' contributions or the equivalent basic own-fund item for mutual and mutual-type undertakings; (iii) paid-in subordinated mutual member accounts; (iv) surplus funds that are not considered as insurance and reinsurance liabilities in accordance with Article 91 (2) of Directive 2009/138/EC; (v) paid-in preference

shares and the related share premium account; (vi) a reconciliation reserve; (b) paid-in subordinated liabilities valued in accordance with Article 75 of Directive 2009/138/EC.

Article 71

1.(e)(iii) a principal loss absorbency mechanism that achieves an equivalent outcome to the principal loss absorbency mechanisms set out in points (i) or (ii) [...]

1 (f)(ii) in the case of items referred to in points (a)(iii) and (v) and point (b) of Article 69, the item is undated; the first contractual opportunity to repay or redeem the basic own-fund item does not occur before 5 years from the date of issuance;

5. For the purposes of paragraph (1)(e)(i), the nominal or principal amount of the basic own-fund item shall be written down in such a way that all of the following are reduced: (a) the claim of the holder of that item in the event of winding-up proceedings; (b) the amount required to be paid on repayment or redemption of that item; (c) the distributions paid on that item. [...]

8. The trigger event referred to in paragraph (1)(e) shall be significant non-compliance with the Solvency Capital Requirement. For the purposes of this paragraph, non-compliance with the Solvency Capital Requirement shall be considered significant where any of the following conditions is met: (a) the amount of own-fund items eligible to cover the Solvency Capital Requirement is equal to or less than the 75 % of the Solvency Capital Requirement; (b) the amount of own-fund items eligible to cover the Minimum Capital Requirement is equal to or less than Minimum Capital Requirement; (c) compliance with the Solvency Capital Requirement is not re-established within a period of three months of the date when non-compliance with the Solvency Capital Requirement was first observed. Insurance and reinsurance undertakings may specify, in the provisions governing the instrument, one or more trigger events in addition to the events referred to in points (a) to (c).

Article 76

The following basic own-fund items shall be deemed to possess the characteristics set out in Article 93 (1)(b) of Directive 2009/138/EC, taking into consideration the features set out in Article 93 (2) of that Directive, and shall be classified as Tier 3 where the following items display all of the features set out in Article 77:

[...]

(a)(iii) an amount equal to the value of net deferred tax assets.

19.2.3. Guidelines

1985. Introduction to EIOPA Guidelines on classification of own funds.

1.33 In order that any principal loss absorbency mechanism can achieve its purpose at the point of the trigger, the terms of the contractual arrangement should be clearly defined and legally certain, and capable of being applied without delay.

19.2.4. Relevant CDR requirements

Article 29 (3)

Submission of application by the institution to carry out redemptions, reductions and repurchases for the purposes of Article 77 and Article 78 of Regulation (EU) No 575/2013 and appropriate bases of limitation of redemption for the purposes of paragraph 3 of Article 78 of Regulation (EU) No 575/2013

.[.].

3. In the case of a repurchase of Common Equity Tier 1 instruments, Additional Tier 1 instruments or Tier 2 instruments for market making purposes, competent authorities may give their permission in accordance with the criteria set out in Article 78 of Regulation (EU) No 575/2013 in advance to actions listed in Article 77 of that Regulation for a certain predetermined amount.

19.2.5. Relevant CRR requirements

Article 54

Write down or conversion of Additional Tier 1 instruments

.[.].

(3) The amount of Additional Tier 1 instruments recognised in Additional Tier 1 items is limited to the minimum amount of Common Equity Tier 1 items that would be generated if the principal amount of the Additional Tier 1 instruments were fully written down or converted into Common Equity Tier 1 instruments.

Article 77

Conditions for reducing own funds

An institution shall require the prior permission of the competent authority to do either or both of the following:

.[.].

(b) effect the call, redemption, repayment or repurchase of Additional Tier 1 instruments or Tier 2 instruments as applicable, prior to the date of their contractual maturity.

Article 78

1. *The competent authority shall grant permission for an institution to reduce, repurchase, call or redeem Common Equity Tier 1, Additional Tier 1 or Tier 2 instruments where either of the following conditions is met:*

(a) earlier than or at the same time as the action referred to in Article 77, the institution replaces the instruments referred to in Article 77 with own funds instruments of equal or higher quality at terms that are sustainable for the income capacity of the institution;

(b) the institution has demonstrated to the satisfaction of the competent authority that the own funds of the institution would, following the action in question, exceed the requirements laid down in Article 92 (1) of this Regulation and the combined buffer requirement as defined in point (6) of Article 128 of Directive 2013/36/EU by a margin that the competent authority may consider necessary on the basis of Article 104 (3) of Directive 2013/36/EU.

2. *When assessing under point (a) of paragraph 1 the sustainability of the replacement instruments for the income capacity of the institution, competent authorities shall consider the extent to which those replacement capital instruments would be more costly for the institution than those they would replace.*

3. *Where an institution takes an action referred to in point (a) of Article 77 and the refusal of redemption of Common Equity Tier 1 instruments referred to in Article 27 is prohibited by applicable national law, the competent authority may waive the conditions laid down in paragraph 1 of this article provided that the competent authority requires the institution to limit the redemption of such instruments on an appropriate basis.*

4. *The competent authorities may permit institutions to redeem Additional Tier 1 or Tier 2 instruments before five years of the date of issue only where the conditions laid down in paragraph 1 and point (a) or (b) of this paragraph are met:*

(a) there is a change in the regulatory classification of those instruments that would be likely to result in their exclusion from own funds or reclassification as a lower quality form of own funds, and both the following conditions are met:

(i) the competent authority considers such a change to be sufficiently certain;

(ii) the institution demonstrates to the satisfaction of the competent authorities that the regulatory reclassification of those instruments was not reasonably foreseeable at the time of their issuance;

(b) there is a change in the applicable tax treatment of those instruments which the institution demonstrates to the satisfaction of the competent authorities is material and was not reasonably foreseeable at the time of their issuance.

19.2.6. Relevant EBA Questions and answers

1986. EBA Q&A 2013-290

Question:

Can you please confirm if Article 78 (4) is meant to apply only to the redemption of T2 securities within 5 years of issuance (as specified in the terms and conditions of the instrument), or if it also prohibits the use of liability management exercises to repurchase (and cancellation) T2 notes at market levels within 5 years of the issuance.

Answer:

Article 63(j) of Regulation (EU) No 575/2013 (CRR) permits that Tier 2 instruments may be reduced/repaid, repurchased, called or redeemed early only where prior supervisory permission has been granted in accordance with Articles 77 and 78 and not before five years after the date of issuance. Article 78 (4) of the CRR conditionally permits redemption of AT1 and Tier 2 instruments before five years from date of issuance where a significant/material tax or regulatory change is deemed by the competent authorities to have occurred. The CRR provides no other basis on which fully eligible Tier 2 instruments may be called, redeemed, repurchased or repaid/reduced before five years after the date of issuance or raising.

Instruments grandfathered under Article 484 of the CRR can be called, redeemed, repurchased or repaid/reduced before five years after the date of issuance.

Fully eligible instruments may be exchanged against fully eligible instruments of a higher quality, in exceptional circumstances, and subject to the approval of the competent authority in accordance with Article 77.

19.3. The main differences identified by the discussion paper

1987. Most of the responses received to EIOPA's discussion paper (EIOPA-CP-16-008) related to differences between Additional Tier 1 (AT1) in the banking regime and items listed in Article 69 (a)(iii), (v) and (b) of the Solvency II Delegated Regulation (rT1), as regards the features they are required to have, and the impact that triggering a principal loss absorption mechanism (PLAM) has on total capital or own funds under the banking regime and Solvency II. In particular respondents drew attention to two topics related to perceived differences between AT1 and rT1:

- Operation of the PLAM; and
- Tax effect of rT1 which writes down on trigger - respondents from some Member States noted that under their national fiscal regimes the write down of an rT1 instrument in accordance with Article 71(1)(e)(i) of the Delegated Regulation would create a taxable profit. This in turn could result in a tax liability arising and own funds falling.

1988. Respondents also drew attention to one difference that applied more broadly to all basic own funds items of whatever tier - the treatment of repayment or redemption in the first five years. Specifically, several respondents commented that the Delegated Regulation differs from the banking regime in that it does not permit undertakings to undertake a tax or regulatory call (i.e. first contractual opportunity to redeem) within the first five years after issuance, unless that call is funded out of the proceeds of a new issuance of the same or higher quality.

19.4. Feedback statement on main comments received on consultation paper CP-17-006

Operation of the PLAM

PLAM and the quality of capital

1989. Five respondents argued that PLAM should only trigger at the point of gone concern. They argued that the PLAM of European bank AT1 is generally only triggered in a gone concern situation, and that rT1 triggers should be amended in a similar manner. Four respondents argued that PLAM does not provide quality of capital because it does not improve the SCR coverage ratio.

1990. EIOPA does not agree that the features of rT1 capital should be amended to only provide gone concern capital. The face value of an rT1 instrument (i.e. the principal amount, the amount recognised as tier 1 capital) only absorbs losses by writing down or converting. Tier 1 capital is expected to be available to fully absorb losses on a going concern basis. That being the case, any instrument which did not trigger in going concern would not be of an appropriate quality of capital to be treated as Tier 1 capital.

1991. In terms of the comment that PLAM is unlikely to improve the SCR coverage ratio, it is important to mention that quality of capital is driven by the ability to absorb losses and protect policyholders and other beneficiaries. Since the principal value absorbs losses only when the PLAM is triggered, PLAM demonstrably delivers quality of capital regardless of whether the SCR coverage metrics change as a result of that triggering.

Partial write-down or conversion

1992. All respondents who commented on it were supportive of the EIOPA proposal to permit partial write-down on 3 month breach of SCR. Several argued that partial conversion should also be permitted, although one questioned whether this could be applied in the legal jurisdiction of all member states.

1993. Several respondents asked that EIOPA explicitly stated what should happen if, when the breach is recalculated, no deterioration is observed.

1994. Several respondents also questioned whether the phrase "as a minimum" was redundant in EIOPA's draft partial write-down Article.

1995. On balance EIOPA agrees that it is appropriate to apply the partial write-down proposals mutatis mutandis to rT1 which converts on trigger.

1996. EIOPA thinks that it can make clear its intentions by expanding the example in the CP:

*If the SCR cover was 90% at the original trigger date, and on recalculation remains at 90% **or improves to 95%** then no further write down is required at that time; if it drops to 80% a further write down reflecting the 10% deterioration of the solvency position is needed.*

1997. It is important that the phrase “as a minimum” is included in the drafting, to make the provision permissive rather than directive. Without this, any current or future rT1 instruments which wrote down (or converted) faster than the minimum rate, would cease to be Solvency II compliant. The phrase thus ensures that all existing rT1 instruments which write-down or convert in full on trigger continue to be compliant, and that (should they choose) it will be possible for undertakings to issue future rT1 which write down or convert in full on trigger or to specify additional triggers over and above the mandatory ones¹²⁰.

Potential loss of own funds on PLAM trigger

1998. Of those who commented on the matter, all respondents were supportive of EIOPA’s proposal to introduce an exceptional waiver of the write-down of rT1 if this created a tax liability which caused deterioration in the capital position of an undertaking.

1999. Four respondents argued that the adverse capital effect might also be triggered on conversion or another PLAM with an equivalent outcome.

2000. Four respondents also argued that where undertakings are recognising carried forward taxable losses from previous years as deferred tax assets (DTA) on their balance sheets then any taxable profit arising from the PLAM may not create a tax liability (so the tax waiver would not apply), but the undertaking might still suffer a loss of own funds as a result of the brought forward loss being set against the tax arising from the PLAM.

2001. EIOPA agrees that an adverse capital effect might also be triggered on conversion or another PLAM with an equivalent outcome, and has amended its advice accordingly.

2002. EIOPA agrees that the issue described concerning carry forward losses may occur; it is precisely because the carried forward losses are available to be realised against taxable profits that the DTA is recognised on the Solvency II balance sheet.

2003. However, it does not follow that taxable profits arising from the PLAM will necessarily lead to any fall in carry forward losses for several reasons:

¹²⁰ EIOPA is aware of at least one rT1 instrument in issuance which has triggers in addition to the mandatory ones

- Since breach of the SCR is most likely to occur through loss of uT1, it is plausible that the undertaking will be making tax losses at the point the SCR is breached. If these are greater than the tax profits created by the PLAM then no loss of DTA will result.
- The DTA may arise from a tax other than that which arises on PLAM, with no right of set-off. Again, PLAM will not result in loss of DTA in this case even if the undertaking makes a taxable profit.
- If the undertaking has been making losses for some time, it is plausible that it has not been able to demonstrate sufficient future taxable profits to recognise all the losses incurred. In this case the loss of DTA will allow the recognition of some losses that were previously not recognised. That being the case the DTA recognised on the balance sheet, and thus own funds, may not change at all as a result of the PLAM;
- Similarly, the firm may not have been able to recognise all potential LAC DT; the loss of DTA will “release” probably future taxable profits that had been used to support recognition of the DTA on the balance sheet. This future taxable profit may well allow greater recognition of LAC DT and so mitigate the effect on own funds.

2004. For all these reasons EIOPA believes that even for undertakings which are recognising carry forward taxable losses on their balance sheet, DTA loss may well cause little or no drop in the SCR coverage ratio. It believes that the limited benefits that extending the tax waiver might deliver to the relatively small group of undertakings who are carrying forward taxable losses is outweighed by the additional risk to market certainty and consistent application between member states. It therefore does not propose to widen the waiver proposal.

Redemption in the first five years

2005. Respondents requested that the EIOPA proposal be expanded to permit regulatory calls in the first five years when own funds instruments were relegated to a lower tier of capital as a result of changes to the regulatory regime.

1. This was EIOPA's intention, and is expressly referenced in Article 78(4) of the CRR. EIOPA has expanded the wording in its proposed articles to make this clear.

Trigger inversion

2006. Four respondents pointed out that a breach of the Group SCR minimum could trigger the PLAM (or in the case of tier 2 or tier 3 capital - trigger coupon or redemption deferral) at a point where the group SCR had not yet breached. They asserted that trigger inversion is an unintended consequence of the regime, on the assumption that this could not have been intended in a logically consistent system with a regulatory ladder of intervention. They therefore suggested that breach of Group SCR minimum should not be a mandatory PLAM trigger.

2007. EIOPA disagrees with this assertion. The fact that the solo MCR could be breached before the solo SCR is expressly recognised within the Solvency II regime, see for example Article 71 (9) of the Delegated Regulation. It is therefore a demonstrable fact that it is not an unintended consequence of the regime that trigger inversion could occur.

2008. The group SCR floor is an important part of the group capital regime. To remove this as a mandatory trigger for rT1, or to lower the quality of capital that is required to cover that requirement by changing the eligibility requirements pertaining to it, would materially weaken the group regime.

19.5. Analysis

19.5.1. Operation of the PLAM

2009. Several stakeholders have pointed out that triggering an rT1 instrument does not normally restore compliance with the SCR, and therefore questioned the value of the PLAM.

2010. Neither triggering AT1 nor rT1 results in an increase in the quantity of regulatory capital. In both cases the mechanism results in an increase in the highest quality of capital (Common Equity Tier 1(CET1) and unrestricted Tier 1 respectively) but does not change the total amount. The prudential purpose of the PLAM under both the banking regime and Solvency II is it improves the quality of own funds at the trigger point. The trigger specified for banks is calculated by reference to the amount of this highest quality of capital that a bank has. So, the increase in the amount of CET1 after the trigger event can cure the CET1 breach.

2011. In contrast the trigger specified in Solvency II is calculated with reference to total capital. This being the case, a write down or conversion of rT1 cannot restore compliance (except in the rare situation where both the 20% rT1 limit and the 50% Tier 2 limit are impacting the total amount of eligible capital). This is a technical fact, which results from differences in the way that the insurance and banking regimes articulate the mandatory trigger event.

2012. The primary objective of triggering a capital instrument is not to cure breaches of regulatory capital, nor does the fact that rT1 does not cure a breach imply a deficiency in the requirements of Article 71 of the Delegated Regulation. The value to the financial stability of the undertaking of the PLAM in the case of both AT1 and rT1 is that it provides more of the highest quality of own funds under stress, whilst not changing total own funds available. This mechanism, to improve the quality of own funds, is the main feature that differentiates rT1 instruments from Tier 2 ones.

2013. EIOPA has observed different practices and implementation within Member States regarding the operation of the PLAM based on the current requirement in the Solvency II Delegated Regulation, in particular the requirement in Article 71 (1)(e) that the “nominal or principal amount of the basis own-fund item is written-down”. In view of this, although it was not part of the request for advice from the European Commission, EIOPA

recommends that even if it is decided not to align the PLAM with the banking regime, changes should be made to the Delegated Regulation to further specify the operation of the PLAM.

2014. In particular, EIOPA believes that it would be beneficial to redraft Article 71(1)(e) of the Delegated Regulation to clarify how and when partial write down is permitted, and the minimum write down required in such cases.

19.5.2. When and how partial write down should be permissible

2015. As stated above, only in rare cases can partial write down of rT1 instruments upon the occurrence of a mandatory trigger event result in SCR compliance being restored. In situations other than these, different approaches have been taken by Member States regarding the implementation of Article 71 (1)(e)(i), (5) and (8) of the Delegated Regulation and the extent to which a partial write down is permissible if a mandatory trigger is breached.

2016. EIOPA believes that it is reasonable to allow partial write down when that is sufficient to restore compliance with the SCR.

2017. EIOPA also believes that partial write down should be possible in those cases where own funds have fallen a limited amount below the SCR. However EIOPA believes that any rT1 instrument should be written down fully at least at the point at which SCR coverage falls to 75% or the MCR is breached. Furthermore, if partial write down is permitted between SCR breach and 75% SCR coverage, then EIOPA believes it is desirable to avoid a cliff edge effect at the point of 75% SCR coverage.

19.5.3. Further write down – recalculation of the SCR

2018. In order for rT1 to “absorb losses at least once there is non-compliance with the SCR” periodical consideration of the need for further write down is necessary if it has breached the 3 month SCR trigger and then continues to make losses, but does not reach the 75% SCR trigger.

2019. Article 138 (3) of the Solvency II Directive requires an undertaking to re-establish compliance with the SCR within 6 months, with the possibility of a 3 months extension being granted by the supervisory authority. So, if an undertaking breached its SCR and gradually drifted downwards, without breaching 75% of SCR then there may be a number of months of increasing losses that do not result in write down if no recalculation is made.

2020. In addition, if EIOPA has declared an exceptional adverse situation in accordance with Article 138 (4) of the Solvency II Directive then that recovery period can be extended for up to seven years, and the undertaking has to report its solvency position at least quarterly. So, without periodic recalculation of the write down an undertaking could in theory breach SCR for three months by a very small amount, calculate a small write down and then face a slow loss over years – during which it is likely it would be reporting its SCR coverage to its supervisors monthly or quarterly – without another trigger being reached.

2021. EIOPA expects that any undertaking in breach of its SCR may well be calculating its solvency position at least monthly for its own governance purposes, and may be reporting this to their supervisory authority. However, EIOPA believes that it would be disproportionate to require undertakings to consider the need for further write down, to reflect any further deterioration in solvency coverage, on a monthly basis. On balance EIOPA considers that its policyholder protection objectives will be achieved so long as undertakings are required to undertake any further write down, at least every three months. The subsequent three month periods should refer back to the date that the trigger event in Article 71(8)(c) of the Delegated Regulation occurred and not when the partial write-down actually took place (if different). This would mean a recalculation, as needed, 6 months and then 9 months etc. following the date that the SCR breach was first observed.

19.5.4. How should write down subsequent to the initial write down be calculated?

2022. Separate from the question of the frequency of write down following an initial trigger, is the question of how any such subsequent write downs should be calculated. EIOPA identified two means by which further write down could be calculated:

- Option a: When the extent of the breach is recalculated at the 6 month breach point, if the undertaking is still in SCR breach then the instrument writes down in full.
- Option b: When the extent of the breach is recalculated, any further deterioration of the solvency ratio results in a further write down (e.g. if the SCR cover was 90% at the original trigger date, and on recalculation remains at 90% or improves to 95%, no further write down is required; if it drops to 80% a further write down reflecting the 10% deterioration of the solvency position is needed).

2023. The first option could be seen as justifiable since the default approach is that SCR compliance should have been restored within 6 months, and has the advantage of being a simple approach that avoids the potential for multiple recalculations.

2024. However, on balance, EIOPA believes that option (b) is more proportionate and intuitive and best reflects the aim of the PLAM which is to mitigate losses. This further write down would be limited to the extent of the deterioration of the SCR position, but should be calculated on the basis of the principal or nominal amount at original issuance.

19.5.5. Partial conversion

2025. EIOPA considers that the partial write down provisions should also apply mutatis mutandis to rT1 instruments which convert in accordance with Article 71 (1)(e)(ii) of the Delegated Regulation. That is, to permit partial conversion where the 3 month SCR breach trigger has been breached, but not the 75% SCR trigger nor the MCR trigger. As with partial write down, solvency coverage should be reconsidered every three months until SCR compliance is

restored, and if a further deterioration has occurred this should result in a further partial conversion.

19.5.6. Transitional arrangements

2026. Because existing Solvency II compliant rT1 instruments will continue to be compliant if the proposed changes to the Delegated Regulation are made, EIOPA does not consider that transitionals are necessary as a result of these proposals.

19.5.7. Potential loss of own funds on PLAM trigger

2027. The fiscal regime of some Member States is such that write down of an rT1 instrument in accordance with Article 71(1)(e)(i) of the Delegated Regulation, conversion in accordance with Article 71(1)(e)(ii) of the Delegated Regulation or another PLAM with an equivalent outcome, as permitted by Article 71(1)(e)(iii) could all create a taxable profit. This in turn would result in a tax liability arising and own funds falling.

2028. This tax effect can also occur in the banking regime and depends on the specific fiscal regime of the member state concerned. In some Member States, the write down of both AT1 and rT1 can create a tax liability if the bank or insurance undertaking is making taxable profits at the point of trigger. In others this is not the case. To date, AT1 instruments have usually triggered at a point where the bank has not been making taxable profits, so that the write down has not normally created a tax liability.

2029. Whilst EIOPA has no robust statistical analysis to confirm or rebut this assumption, it is plausible that rT1 may trigger at a higher level than AT1, when an undertaking is more likely to be still generating taxable profits. Therefore this may be more problematical for insurance undertakings than banks.

2030. CRR Article 54 (3) requires that:

“The amount of Additional Tier 1 instruments recognised in Additional Tier 1 items is limited to the minimum amount of Common Equity Tier 1 items that would be generated if the principal amount of the Additional Tier 1 instruments were fully written down”.

2031. Thus the maximum possible tax consequences on write down or conversion should be deducted from the principal amount when considering how much AT1 to recognise in respect of any particular instrument. That being so, the concern of Solvency II basic own funds being lost on trigger, as a result of tax becoming due, could be fully addressed by aligning the banking and insurance regimes.

2032. If the Solvency II regime were to be aligned fully with that of CRR Article 54 this would mean limiting the amount of rT1 recognised as basic own funds to the minimum amount of unrestricted tier 1 capital that would be generated if the principal amount of the instrument were fully written down or converted.

2033. EIOPA has not identified a difference in the business models of the two sectors nor diverging elements in the determination of own funds requirements. From a prudential perspective, in order for the basic own funds to reflect the loss absorbing characteristics of the instrument, it can be seen as reasonable for the principal value to be adjusted to reflect the amount of tax that would be expected to be paid on trigger; it is not available to provide policy holder protection since it would be paid to the tax authorities on trigger.
2034. However, EIOPA recognises that whilst the theoretical maximum tax consequences could be calculated, and deducted from the principal to obtain the amount of own funds to be recognised, the likelihood of this tax actually being payable on trigger is expected to be low. Therefore mandatory deduction of the maximum possible tax that could become due on trigger of the PLAM would seem to be unduly stringent. EIOPA therefore considered the possibility for regulatory authorities to be able to waive the requirement for a write down at the point of trigger if a tax liability was likely to arise.
2035. When considering this approach, EIOPA was concerned that if the PLAM were regularly waived because of the tax effects this would lead both to the degradation of the quality of protection afforded to policyholders by rT1 and potentially to a distortion in the pricing of such instruments in the capital market. EIOPA also considered that the question of the extent to which tax will be payable on PLAM trigger will be case specific and may not be known until end of the tax period in which the instrument was triggered; potentially only at or after the tax year end, which might be some time after the instrument is triggered.
2036. To mitigate these risks EIOPA believes that any waiver a supervisory authority decides to grant should be on an exceptional basis and subject to strict criteria, including the involvement of the undertaking's statutory auditors. EIOPA is also of the opinion that, due to their seriousness, the waiver should not be available if either of the mandatory triggers in Article 71(8)(a) or (b) of the Delegated Regulation are breached, that is, only PLAM that results from breach of the 3 month SCR triggers may be considered for waiver.
2037. One approach considered was whether the waiver should be granted on a temporary basis only, to be confirmed or not once the tax position of the undertaking is known. However the practical complexity of applying this approach was judged to outweigh the positive benefits that might arise from dissuading overly optimistic projections at the point of trigger. This also avoids additional uncertainty to holders of rT1 instruments.
2038. As discussed above, EIOPA also considered the case of an undertaking which remains in SCR breach after a further 3 month period. Consistent with the recommendation above that a further PLAM should be triggered if there is deterioration in the SCR coverage ratio, it is proposed that the undertaking would need to apply for a further waiver in this case. The subsequent waiver would only address the PLAM triggered by the deterioration of the SCR coverage ratio and would not revisit the decision to grant the first waiver.

19.5.8. Timeline for application for tax waiver

2039. Whilst the respondents who commented on the consultation paper, suggested that EIOPA should not set a fixed timeline for approval of the PLAM waiver, EIOPA is of the view that without clarity this will introduce inappropriate market uncertainty and be damaging to the development of a market in Solvency II compliant rT1 instruments.
2040. In terms of the timeline, if the waiver request was submitted after the SCR had been in breach for 3 months (e.g. within 1 or 2 months of the mandatory trigger) there may not be a decision on the waiver before the SCR has been breached for 6 months.¹²¹ Uncertainty regarding whether a PLAM will trigger is likely to be highly detrimental to any market in rT1 instruments and so should be minimised. Starting the waiver process after the 3 month SCR breach is therefore not considered to be appropriate, even though it means undertakings will need to sign-off projections before the 3 month trigger has been reached. It can also be noted that Article 54(5)(c) of CRR states that the write-down or conversion of an AT1 instrument should be without delay or at the latest within one month.
2041. EIOPA therefore proposes that an undertaking should begin preparation of the necessary projections as soon as it identifies that the SCR has been breached, and enters into discussion with its auditors at the same time. The undertaking should then be in a position to submit the audited projections to its supervisory authority at the same time as it submits the recovery plan required by Article 138(2) of the Solvency II Directive.
2042. Once the supervisory authority has received the application and audited projections it should make its decision and be in a position to convey this to the undertaking as soon as possible, preferably before the 3 month SCR breach time point is reached. This would allow the undertaking to inform the market whether a tax waiver has been granted at the same time it notifies it that the 3 month SCR breach trigger has occurred.

19.5.9. Early redemptions, tax calls and regulatory calls

2043. The Solvency II regime allows undertakings to redeem any rT1 or Tier 2 capital instrument in the first five years for any reason, so long as they do so out of the proceeds of a new issuance of the same or higher quality. The banking regime treatment of such capital redemptions differs in several respects.
2044. Article 78 of the CRR text permits banks to call instruments which have been subject to a tax or regulatory event (including situations where capital has been reclassified into a different tier), without replacing those instruments with new capital. However, this is subject to supervisory approval and only permitted if a sufficient capital buffer is retained after the redemption. EBA Q&A 2013 290 further states that redemptions are only

¹²¹ The SCR should normally have been restored within 6 months (see previous section).

permitted out of the proceeds of new issuance of higher quality, in exceptional circumstances.

2045. The Commission has made a proposal (23 November 2016) to amend the CRR in certain respects, including permitting redemption out of the proceeds of new issuance of the same quality of capital. It is possible that there will not be a decision on this proposal before any amendments to the Solvency II regulations arising from this review are put in place. Thus, there is the possibility that if Solvency II is aligned with current CRR provisions, the two regimes may move apart again at a future date.

2046. Article 29 (3) of the Commission Delegated Regulation (CDR) 241/2014 also permits banks, subject to supervisory approval, to undertake limited repurchases without new issuance, up to the lower of 10% of the relevant AT1 or Tier 2 issuance or 3% of total amount of AT1 or Tier 2, as part of market-making activity. Since EIOPA does not expect that market making should ever be performed by insurance entities it has not considered this further.

2047. This being the case, should the Commission choose to align Solvency II with the current CRR text it would need to make two changes:

- a. Permitting, subject to supervisory approval, material and unforeseen tax and regulatory calls on rT1 or Tier 2 instruments under Solvency II in the first five years, without requiring that this is out of the proceeds of a new issuance of the same or higher quality if a sufficient capital buffer is retained; and

- b. Remove the wider ability under Solvency II for undertakings to repay or redeem rT1 or Tier 2 instruments in the first five years after issuance with replacement of equal quality capital and instead only allow this in exceptional circumstances with replacement with higher quality capital.

2048. Allowing capital to be reduced by permitting tax and regulatory calls without replacement means that the amount of policyholder protection which it can provide is arguably reduced to a certain extent. However, the regulatory safeguards in the banking regime including the requirement that undertakings must have a sufficient capital buffer, should significantly mitigate any resulting prudential risk. In view of this, whilst Solvency II can be seen as currently somewhat more prudent than CRR in this regard, this is considered to be a marginal difference and EIOPA sees no prudential concern from aligning the regimes.

2049. CRR is more restrictive than Solvency II as regards redemption in the first five years out of the proceeds of another issuance. Withdrawing the ability for insurance undertakings to repay or redeem rT1 or Tier 2 instruments in the first five years out of the proceeds of an issuance of the same quality, places a restriction on capital management. EIOPA considers that there may be commercial reasons for undertaking such capital management and limiting this does not offer any obvious prudential advantage. EIOPA also notes the Commission proposal to amend CRR to

allow for replacement with capital of equal quality. It is therefore not recommend that Solvency II is amended in this respect.

19.6. EIOPA's advice

Operation of the Principal Loss absorbency mechanism

2050. EIOPA recommends that partial write down should be permissible where the mandatory trigger of 3 months SCR breach has been reached, but only so long as the 75% SCR breach and MCR breach triggers have not also been triggered.

2051. EIOPA further recommends that, as a minimum, rT1 is written down on a straight line basis in such a way that at 75% SCR breach the instrument is written down in full. RT1 should be written down in full immediately if the MCR is breached.

2052. Undertakings should recalculate their SCR coverage every three months until compliance with the SCR is restored, and apply a further write down upon any further worsening of the SCR coverage ratio after each subsequent 3 month period.

2053. This approach should be applied mutatis mutandis to rT1 instruments which convert on trigger.

Potential loss of own funds on PLAM trigger

2054. EIOPA recommends not to align with the banking regime and instead to continue to allow for full recognition of the principal amount of rT1 instruments on issuance. Additionally, EIOPA recommends to provide supervisory authorities with the ability to consider whether to give an exceptional waiver from the requirement to write down or convert, on a case specific basis, if:

- a) the undertaking requests such a waiver and provides projections to the end of its tax year, based on reasonable assumptions, which demonstrate there is a high likelihood that the tax effects of write down or conversion could significantly weaken the solvency position of an undertaking; and
- b) the undertaking's statutory auditors confirm in writing that the assumptions used in that projection are reasonable; and
- c) neither the 75% SCR mandatory trigger nor MCR have been breached.

Early redemptions, tax calls and regulatory calls

2055. EIOPA recommends changes to bring Solvency II closer to alignment with CRR, in particular regarding tax and regulatory calls. In doing so EIOPA notes that this would be in line with the November 2016 draft of CRR II.

19.7. Proposal for new articles

2056. Operation of the Principal Loss absorbency mechanism: Article 71 of the Delegated Regulation should be amended as follows:

A second sub paragraph is added to Article 71(5):

For the purposes of paragraph 1(e)(i) the provisions governing the write-down shall comply with the following:

(a) when the trigger event listed in point (c) of paragraph 8 occurs, and write down can re-establish compliance with the Solvency Capital Requirement then partial write down to restore compliance is sufficient.

(b) in all other cases:

(i) when the trigger event listed in point (c) of paragraph 8 occurs, the nominal or principal amount of the basic own-fund item as determined at original issuance is written down at least on a linear basis in a manner which ensures that full write down occurs at or before 75% coverage of the Solvency Capital Requirement is reached;

(ii) when either of the trigger events specified in points (a) or (b) of paragraph 8 are met, the nominal or principal amount of the basic own-fund item is written down in full.

(c) where partial write down has been carried out in accordance with point (b)(i) of this paragraph a further write-down shall be applied in the following cases:

(i) when either of the trigger events specified in points (a) and (b) of paragraph 8 are subsequently met, the nominal or principal amount of the basic own-fund item is written down in full

(ii) if, after a period of three months starting from the date of the trigger event listed in point (c) of paragraph 8, the trigger events specified in points (a) and (b) of paragraph 8 have not been met but the Solvency Capital Requirement coverage ratio has deteriorated further, then the nominal or principal amount of the basic own-fund item as determined at original issuance should be written down further in accordance with point (b)(i) of this paragraph to reflect that additional deterioration. This shall apply to each subsequent deterioration of the Solvency Capital Requirement coverage ratio after each subsequent three month period until the insurance or reinsurance undertaking re-establishes compliance with the Solvency Capital Requirement.

A second sub paragraph is added to Article 71(6):

For the purpose of point (e)(ii) of paragraph 1, the second subparagraph of paragraph 5 shall apply mutatis mutandis.

2057. Potential loss of own funds on PLAM trigger

The following paragraph is added to Article 71

Notwithstanding point (e), the basis own-fund item, in the case of items referred to points (a)(iii) and (v) and point (b) of Article 69 may allow for the principal loss absorbency mechanism to not be triggered at the trigger event specified in point (c) of paragraph 8, where all of the following conditions are met:

- (i) neither of the trigger events specified in points (a) and (b) of paragraph 8 have been met;*
- (ii) the supervisory authority has exceptionally waived the triggering of the principal loss absorbency mechanism based on projections provided by the insurance or reinsurance undertaking at the same time as it submits the recovery plan required by Article 138(2) of Directive 2009/138/EC which demonstrate that the triggering of the principal loss absorbency mechanism is very likely to lead to a tax liability that will have a significant adverse effect on its Solvency Capital Requirement coverage, a certification by the insurance or reinsurance undertaking's statutory auditors that all of the assumptions used in the projections are realistic.*

2058. Early redemptions, tax calls and regulatory calls

The following paragraph is added to Article 71:

Notwithstanding point (ii) of paragraph (1)(f), the basic own-fund item referred to in points (a)(iii) and (iv) and point (b) of Article 69 may allow for repayment or redemption before 5 years of the date of issue when all of the following conditions are met:

- (i) the insurance or reinsurance undertaking's Solvency Capital Requirement is, after the repayment or redemption, exceeded by an appropriate margin taking into account the solvency position of the undertaking including the undertaking's medium-term capital management plan:*
- (ii) one of the following conditions are met:*
 - (a) there is a change in the regulatory classification of the own-fund item which would be likely to result in its exclusion from own funds or reclassification as a lower tier of own funds, and both of the following conditions are met:*
 - (i) the supervisory authority considers such a change to be sufficiently certain;*

(ii) the undertaking demonstrates to the satisfaction of the supervisory authority that the regulatory reclassification of the own-fund item was not reasonably foreseeable at the time of their issuance;

(b) there is a change in the applicable tax treatment of the own-fund item which the undertaking demonstrates to the satisfaction of the supervisory authority is material and was not reasonably foreseeable at the time of the item's issuance.

The following paragraph is added to Article 73:

Notwithstanding paragraph (1)(c), the basic own-fund item may allow for repayment or redemption before 5 years of the date of issue when all of the following conditions are met:

(i) the insurance or reinsurance undertaking's Solvency Capital Requirement is, after the repayment or redemption, exceeded by an appropriate margin taking into account the solvency position of the undertaking including the undertaking's medium-term capital management plan:

(ii) one of the following conditions are met:

(a) there is a change in the regulatory classification of the own-fund item which would be likely to result in its exclusion from own funds or reclassification as a lower tier of own funds, and both of the following conditions are met:

(i) the supervisory authority considers such a change to be sufficiently certain;

(ii) the undertaking demonstrates to the satisfaction of the supervisory authority that the regulatory reclassification of the own-fund item was not reasonably foreseeable at the time of their issuance;

(b) there is a change in the applicable tax treatment of the own-fund item which the undertaking demonstrates to the satisfaction of the supervisory authority is material and was not reasonably foreseeable at the time of the item's issuance.

The following paragraph is added to Article 77:

Notwithstanding paragraph (1)(c) the basic own-fund item may allow for repayment or redemption before maturity when all of the following conditions are met:

(i) the insurance or reinsurance undertaking's Solvency Capital Requirement is, after the repayment or redemption, exceeded by an appropriate margin taking into account the solvency position of the undertaking including the undertaking's medium-term capital management plan:

(ii) one of the following conditions are met:

(a) there is a change in the regulatory classification of the own-fund item which would be likely to result in its exclusion from own funds or reclassification as a lower tier of own funds, and both of the following conditions are met:

(i) the supervisory authority considers such a change to be sufficiently certain;

(ii) the undertaking demonstrates to the satisfaction of the supervisory authority that the regulatory reclassification of the own-fund item was not reasonably foreseeable at the time of their issuance;

(b) there is a change in the applicable tax treatment of the own-fund item which the undertaking demonstrates to the satisfaction of the supervisory authority is material and was not reasonably foreseeable at the time of the item's issuance.

20. Capital instruments only eligible as tier 1 up to 20% of total tier 1

20.1. Call for advice

The list of own-fund items, deemed to fulfil the tier 1 eligibility criteria, which contains for each own-fund item a precise description of the features which determine its classification (under the empowerments in Articles 97 (1) and 99 (a) of Directive 2009/138/EC).

The list of own funds items deemed to fulfil the tier 1 eligibility criteria contains paid-in subordinated mutual member accounts, paid-in preference shares and the related share premium account, and paid-in subordinated liabilities¹²². These items are subject to a quantitative limit of 20%.

EIOPA is asked to assess whether, if this quantitative limit were removed, the detailed eligibility criteria applicable to these items would need to be modified, in order to ensure that the criteria set out in Article 94 (1) continue to be fulfilled.”

20.2. Legal basis

Solvency II Directive

Recital 16

(16) The main objective of insurance and reinsurance regulation and supervision is the adequate protection of policy holders and beneficiaries. The term beneficiary is intended to cover any natural or legal person who is entitled to a right under an insurance contract. Financial stability and fair and stable markets are other objectives of insurance and reinsurance regulation and supervision which should also be taken into account but should not undermine the main objective.

Article 97:

The Commission shall adopt implementing measures laying down the following:

- (a) a list of own-fund items, including those referred to in Article 96, deemed to fulfil the criteria, set out in Article 94, which contains for each own-fund item a precise description of the features which determined its classification;*
- (b) [...]*

Article 99:

The Commission shall adopt implementing measures laying down:

- (a) the quantitative limits referred to in Article 98 (1) and (2);*
 - (b) [...]*
-

¹²² For the purposes of this paper these items are referred to as “restricted tier 1”, or “rT1”.

Delegated Regulation

Article 82:

1. *As far as compliance with the Solvency Capital Requirement is concerned, the eligible amounts of Tier 2 and Tier 3 items shall be subject to all of the following quantitative limits:*
 - a. *the eligible amount of Tier 1 items shall be at least one half of the Solvency Capital Requirement;*
 - b. *the eligible amount of Tier 3 items shall be less than 15 % of the Solvency Capital Requirement;*
 - c. *the sum of the eligible amounts of Tier 2 and Tier 3 items shall not exceed 50 % of the Solvency Capital Requirement.*
2. *As far as compliance with the Minimum Capital Requirements is concerned, the eligible amounts of Tier 2 items shall be subject to all of the following quantitative limits:*
 - a. *the eligible amount of Tier 1 items shall be at least 80 % of the Minimum Capital Requirement;*
 - b. *the eligible amounts of Tier 2 items shall not exceed 20 % of the Minimum Capital Requirement.*
3. *Within the limit referred to in point (a) of paragraph 1 and point (a) of paragraph 2, the sum of the following basic own-fund items shall make up less than 20 % of the total amount of Tier 1 items:*
 - a. *items referred to in point (a)(iii) of Article 69;*
 - b. *(b) items referred to in point (a)(v) of Article 69; (c) items referred to in point (b) of Article 69; (d) items that are included in Tier 1 basic own funds under the transitional arrangement set out in Article 308b (9) of Directive 2009/138/EC.*

20.3. Feedback statement on the main comments received to the consultation paper

Proposals to strengthen the quality of restricted Tier 1 instruments

2059. Most stakeholders expressed support for the retention of the 20% limit. The majority of stakeholders hold the view that to strengthen the quality of hybrid T1 instruments would not protect the quality of Tier 1 own funds, should the limit be removed. Further, most stakeholders considered that the options for strengthening the criteria that EIOPA had considered, such as an increase in the call date or in the trigger point for the principal loss absorbency mechanism, would impede investment in exchange for negligible return in quality.

2060. Bearing in mind that the majority of respondents preferred to keep the 20% limit and did not support the consequential actions that would have

partially mitigated the resulting fall in the quality of Tier 1 capital, EIOPA has included Option 1 (retain the 20% limit) in its final advice.

Arguments to remove the 20% limit

2061. One stakeholder preferred the deletion of the 20% quantitative limit and one preferred its disapplication to “paid in subordinated mutual members accounts”. The first of these argued that the limit creates complexity. The second stated that “paid in subordinated mutual members accounts” are a significant balance sheet item for some mutuals, and argued that they are available to absorb losses such that they should be eligible as Tier 1 own funds without a limit.

2062. EIOPA does not agree that the arguments provided justify the removal of the 20% limit. EIOPA considers any additional complexity arising from the limit to be minimal and not to be significant in comparison to the prudential benefits to policy holders. EIOPA also still considers that the 20% limit is appropriate in the context of subordinated mutual member accounts.

20.4. Feedback statement on the main comments received to the discussion paper

a. Summary of the comments received

2063. Most respondents were not in favour of removing the 20% limit, given the amendment to the features required of rT1 which would then be necessary to mitigate the resulting fall in the quality of Tier 1 own funds. A third of respondents positively opposed such a change.

2064. Various, respondents commented that removing the 20% limit would provide a large ex-post subsidy to undertakings which have a lot of legacy instruments which had transitioned into rT1. Indeed, these are currently being recognised as Tier 2 own funds as a result of the 20% limit.

2065. Respondents were unanimous on the point that improving the quality of rT1 capital by raising the mandatory triggers in Article 71(8) of the Delegated Regulation to a point above SCR breach would increase the cost of such instruments. But, several respondents also pointed out that setting a trigger above the point at which there is a mandatory dividend cancellation could lead to undesirable reversals of creditor subordination.

2066. All respondents that commented on the issue thought that improving the quality of rT1 capital by making the first contractual opportunity to redeem (or call date) more distant would increase the price of the instruments. However, some respondents also stated that the first call date is irrelevant to the economic substance of rT1, given its perpetual nature and the need for supervisory approval before any redemption.

2067. One respondent commented that if the limit were removed, and the features required for rT1 instruments to be Tier 1 compliant strengthened, then it would be important to introduce transitional arrangements for instruments already issued which comply with the current requirements.

b. Assessment

2068. EIOPA agreed with the view that it is preferable to retain the 20% limit and that its removal would provide a large ex-post subsidy to undertakings, which had a lot of legacy instruments which had transitioned into rT1, and which are currently recognised as Tier 2 own funds as a result of the limit. EIOPA was of the view that if the 20% limit were removed, it would be inappropriate to take no action to mitigate the resulting effect of lowering the quality of Tier 1 capital.
2069. EIOPA accepted the argument that raising the mandatory trigger point to a point before mandatory dividend cancellation had occurred risks introducing perverse incentives into the rT1 market. This possibility was, therefore, not considered further.
2070. EIOPA saw an inconsistency between the argument made that extending the first call date would cause rT1 instruments to be more expensive, with the view that the perpetual nature of Tier 1, plus the need for supervisory permission to redeem, are sufficient to provide permanence. Since supervisory permission to redeem is required for all three tiers of own funds, EIOPA did not believe that this is relevant to assessing whether rT1 items have sufficient quality to be recognised as the highest quality of own funds. Market data indicates that investors tend to price instruments to their first call date, treating this as the effective duration of the instrument. That being the case, if a supervisor did not allow the instrument to be redeemed on call, investor expectations would not be fulfilled and it is unlikely that the relevant undertaking would be able to raise further capital for some time. Extending the period to the first call date would therefore change investor expectations, and improve the permanence of rT1 own funds, bringing the expectations of the duration of rT1 instruments closer to that of equity, which is the highest quality form of capital.
2071. The instruments which are recognised as rT1 under the transitional arrangements are identified in Article 308b of the Solvency II Directive. The Directive requirements are not within the scope of the Commission's call for advice. So, if the Commission were to remove the 20% limit for rT1 instruments, it is expected that all instruments subject to the transitional provisions in the Solvency II Directive would be recognised as Tier 1 own funds.

20.5. Advice

20.5.1. Previous advice

2072. CEIOPS' Advice for Level 2 Implementing Measures on Solvency II: Own funds - Article 97 and 99 - classification and eligibility gave the following advice to the European Commission in 2009:

3.33. A number of CEIOPS Members are of the view that only ordinary share capital or the equivalent capital of mutual and mutual-type undertakings should be allowed in Tier 1, as far as capital instruments are concerned.

3.34. These Members do not consider other capital instruments to be of sufficient quality for classification in Tier 1. At the same time, these Members acknowledge that there may be merit in providing the possibility of classifying such other instruments in Tier 1 in exceptional circumstances, subject to those instruments meeting the necessary characteristics for eligibility as Tier 1 own funds

3.38. CEIOPS cannot [...] support any regime in which hybrid instruments could represent all or the most significant part of Tier 1. Any inclusion of high quality hybrids should therefore be restricted i.e. they should account for no more than 20% of Tier 1.

20.5.2. Analysis

Analysis: Retention of the 20% limit

2073. Article 93 of the Solvency II Directive sets out the characteristics which are used to classify own funds into tiers. Those characteristics are no different now than they were when CEIOPS gave its previous advice regarding the quality of rT1 instruments.

2074. That being the case, EIOPA is still of the view that it cannot support any regime in which hybrid instruments¹²³ could represent all or the most significant part of Tier 1. It therefore reconfirms the view that any inclusion of high quality hybrids should be restricted. If the 20% limit is removed undertakings would be able to comply with the requirement for at least 50% of the SCR to be presented by Tier 1 own funds by holding more hybrid capital and equity-like capital than at present. This would weaken the ability of Solvency II to deliver protection to policy holders and beneficiaries at the 1 in 200 level of risk.

2075. EIOPA analysed the data it receives from the 2016 annual reporting of undertakings. It received data pertaining to 2707 undertakings, out of which 204 have recognised rT1 capital. Of those 204, only 30 entities (i.e. 1.1%) had rT1 above the 20% total tier 1 limit (and therefore relegate some rT1 to Tier 2). Of those only eight (0.029%) have more than 30% of total Tier 1 (before relegation). In four extreme cases undertakings have rT1 (before relegation) of over 50% of total Tier 1. This being the case, the limit is not considered to be a material impediment to the industry. If the 20% limit were removed, EIOPA does not believe that recognising higher levels of hybrid debt as Tier 1 capital would be consistent with requirements of Article 93 of the Solvency II Directive.

2076. In response to EIOPA's consultation paper, the majority of stakeholders expressed their support for the retention of the 20% limit. EIOPA's draft advice within CP-17-006 provided 2 options: Option 1: to retain the 20%

¹²³ Hybrid instruments are instruments which have a mixture of both debt and equity characteristics. Whilst rT1 instrument will be hybrid instruments it does not follow that all hybrid instruments have the Article 71 features required of rT1 own funds.

limit and Option 2: to strengthen the quality of hybrid T1 instruments, if Option 1 was not accepted. Most stakeholders expressed a strong preference for Option 1. The majority of stakeholders hold the view that Option 2 (Strengthen the quality of hybrid T1 instruments) would not protect the quality of Tier 1 own funds, should the limit be removed.

Analysis: Strengthening of the features required of rT1 instruments

2077. There is no way to strengthen the quality of rT1 which would exactly mitigate the effect on Tier 1 own funds of removing the 20% limit, and thereby deliver the same quality of own funds as before any change. However, the impact could be partly mitigated by:

- a. improving the permanence of rT1 instruments; and
- b. improving the loss absorbency which they provide on trigger; and
- c. strengthening the mandatory trigger points at which they provide loss absorbency.

2078. In their responses to the consultation paper, stakeholders provided opposing views in respect of the possible options to strengthen the features of rT1 instruments, if the 20% limit was to be removed.

Permanency

2079. Two options are considered to be logical possibilities to improve permanence:

- a. increase the first call date to 10 years; or
- b. require that rT1 has no call dates so that all Tier 1 own fund items have the same permanence features.

2080. In the first case a consequential change would be needed to amend the start and end dates of the subsequent period where repayment or redemption may only be allowed if the SCR is exceeded by an appropriate margin.

2081. In their responses to the CP, most stakeholders argued that extending the call date of rT1 instruments would not improve permanence as it is already implicit within the instrument itself. The majority of stakeholders rejected the option of disallowing call dates completely within rT1 as a disincentive to investment. Finally, respondents rejected the assertion that increasing the permanence of rT1 instruments, made those instruments equal to equities, due to the inherent differences in features between debt and equity financial instruments. EIOPA is of the view that a longer call date enhances the permanence of the instrument, thus improving the overall quality of an undertaking's own funds, while also noting the inherent differences between debt and equity instruments.

Improved loss absorbency

2082. The loss absorbency of rT1 instruments which write down could be improved by requiring full write down immediately in the event of any of the mandatory triggers occurring. Whilst not in favour of this option, stakeholders did not provide specific reasons as to why they did not support this.

Stronger mandatory triggers

2083. The extent to which rT1 instruments absorb losses could be strengthened by changing the mandatory triggers to:

- a. SCR breach for two month¹²⁴; or
- b. 80% SCR trigger; or
- c. MCR breach.

2084. Most stakeholders stated that strengthening the loss absorbency of these instruments by changing the mandatory triggers would reduce market access for issuers. Stakeholders noted that as the SCR includes a substantial buffer, to activate a trigger at MCR breach or to increase the SCR breach trigger, would increase the likelihood of a breach, and under some circumstances create a trigger inversion. EIOPA does not accept these arguments as undermining to the potentiality of increasing the trigger point. It is accepted that a trigger inversion could occur, but this is not an unintended consequence of the Solvency II regime.

Transitional Measures

2085. It should be noted that if it were decided to remove the 20% limit and strengthen the features required of hybrid instruments, a transitional measure is considered to be necessary for existing instruments that would no longer be eligible as Tier 1 own funds. In this case, consistent with paragraph 9 and 10 of Article 308b of the Solvency II Directive, a 10 year transitional period is considered to be a reasonable period to allow for the orderly repayment or redemption or exchange or conversion of such instruments.

Analysis: Removal from Article 71 of the Delegated Regulation of those features pertaining to hybrid instruments

2086. One way of preserving the quality of Tier 1 own funds if the 20% limit were removed would be to withdraw the ability for hybrid instruments to be recognised as Tier 1 capital.

¹²⁴ If the Commission chooses this option, there may be consequential amendments necessary to other EIOPA recommendations such as the frequency with which recalculation of partial write down is recalculated. See section on Operation of the PLAM.

2087. However, removing these criteria may have a large impact on mutual undertakings, since they may be limited by their mutual nature in their ability to issue equity-like Tier 1 own fund instruments. The majority of stakeholders agreed with this assessment.

2088. This being the case, EIOPA does not recommend this option.

20.5.3. EIOPA's advice

2089. EIOPA advises the Commission to retain the 20% limit in order to protect the prudential quality of Tier 1 own funds necessary to deliver the adequate protection of policy holders and beneficiaries. EIOPA is of the view that it cannot support any regime in which hybrid instruments could represent all or the most significant part of Tier 1. If the 20% were removed, EIOPA believes that there are no changes to the features of hybrid instruments that would fully mitigate the resulting loss in capital quality.

21. Article 209(3): Allowed adjustments

21.1. Introduction

2090. In its first set of advice to the Commission EIOPA suggested that weekly adjustments to risk-mitigation techniques (RMT) should be allowed, provided they are “exposure adjustments”. The advice stated that EIOPA would provide further clarifications in the second set of advice.

2091. The discussion below focuses on the aspects of “similarity” (see first sentence of Article 209(3)). Obviously, to qualify RMT have to meet all relevant requirements in Article 209(3) as well as the other parts of Section 10 of the Delegated Regulation.

21.2. Advice

21.2.1. Analysis

Introduction

2092. Article 209 (3) of the Delegated Regulation allows under certain conditions the full recognition of RMT where contracts with maturity of less than 12 months are used provided that certain conditions are met.

2093. In particular, there is the requirement that the replacements has to be similar. But it seems that this requirement has been interpreted in different ways (in some cases perhaps even very literally that it is sufficient to use the same type of instrument).

2094. With the relaxation in terms of the adjustment frequency proposed by EIOPA, it becomes even more important to ensure that the adjustments result in prudentially sound outcomes.

2095. Looking at the requirement for the SCR in Article 101(3) Solvency II adjustments should qualify in case the risk-mitigating effect is not materially overestimated, if the current portfolio of hedging instruments and/or the underlying exposure is subject to changes over the coming 12 months.

2096. The risk-mitigating effect is reflected in the SCR calculation by calculating the capital requirement taking into account the hedge instruments currently in place.

2097. Consequently, a sufficient condition for hedging strategies to be allowed should be that there is reasonable certainty that the resulting risk is not higher than reflected in the standard formula calculation.

2098. In order gain a deeper insight into the possible situations that can occur in the following a number of examples for adjustments to financial risk mitigation are developed.

Examples

Case 1:

2099. These cases cover the situation where the exposure change solely due to changes in the value of the hedged instrument.

2100. An insurer buys at the beginning of the year 100 stocks for 100 each and enters into 80 short futures with forward price 100 and a maturity of less than one year with the intention to renew them at maturity.

2101. Case 1.1: The stock price rises to 110 and the insurer rolls over the existing contracts as well as entering into 10 new contracts, which cover the rest of the year.

2102. Case 1.2: The stock price decreases to 90 and the insurer rolls over only 78 contracts, which cover the rest of the year.

2103. Case 1.3: The stock price rises to 110 and the insurer rolls over 70 contracts, which cover the rest of the year.

2104. Case 1.4: The stock price does not change but the insurer rolls over all contracts and enters into 10 new one, which cover the rest of the year, due to a changed assessment of risks.

2105. In case 1.1 the overall loss in case the stock drops to 61 at the end of the year is $100 \cdot (100 - 61) - 80 \cdot (100 - 61) - 10 \cdot (110 - 61) = 290$ instead of the $100 \cdot (100 - 61) - 80 \cdot (100 - 61) = 780$ that are reflected in the SCR calculation.

2106. In case 1.2 the overall loss is now $100 \cdot (100 - 61) - 78 \cdot (100 - 61) - 2 \cdot (100 - 90) = 20 \cdot 39 + 2 \cdot (100 - 39 + 10) = 838$ which is higher than the 780 reflected in the SCR calculation.

2107. Case 1.3 is similar to case 1.2. The rationale for the insurer may be that with the higher current stock price a drop to 61 has become less likely. The loss in case of a drop to 61 would be $100 \cdot (100 - 39) - 70 \cdot (100 - 39) + 10 \cdot (110 - 100) = 1.270$.

2108. Case 1.4 is very similar to case 1.1.

Case 2:

2109. These cases cover the situation where the exposure change solely due to a reduction in the number of the hedged instruments. One could also say that the hedge ratio changes.

2110. An insurer buys at the beginning of the year 100 stocks for 100 each and enters into 80 short futures with forward price 100 and a maturity of less than one year with the intention to renew them after they mature. The stock price does not change until the futures are rolled-over.

2111. Case 2.1: The insurer sells 20 stocks and keeps all futures.

2112. Case 2.2: The insurer sells 20 stocks and keeps only 60 futures.

2113. Case 2.3: The insurer sells 20 stocks and keeps only 50 futures.
2114. In case 2.1 the loss cannot be higher than the $100 \cdot (100 - 39) - 80 \cdot (100 - 39)$ which are used in the standard formula.
2115. With Case 2.2 there is an overall loss of $80 \cdot (100 - 39) - 60 \cdot (100 - 39) = 780$ if the stock drops to 61 at the end of the year. This is equal to the loss that is reflected in the standard formula if no changes were made.
2116. In case 2.3 the loss is $80 \cdot (100 - 39) - 50 \cdot (100 - 39) = 1.170$ which exceeds the loss that is reflected in the standard formula.

Case 3:

2117. These cases cover the situation where the exposures change solely due to an increase in the number of instruments.
2118. An insurer buys at the beginning of the year 100 stocks for 100 each and enters into 80 short futures with forward price 100 and a maturity of less than one year. The stock price does not change until the future is renewed.
2119. Case 3.1: The insurer buys 50 additional shares and enters into no additional futures.
2120. Case 3.2: The insurer buys 50 additional shares and enters into 50 additional futures.
2121. As the SCR does not reflect the future sale or purchase of shares both cases seem not problematic in terms of a higher loss than reflected in the standard formula. If meaningful purchases of equities were planned in the future this would have to be covered when assessing the adequacy of the standard formula/ORSA.
2122. The challenge is that there is the necessity to "freeze" the initial exposure and to define clearly the borderline between initial exposures and later additions. This might be relatively simple for a hedge on the level of an equity portfolio but less simple in case of, for example, a company level (i.e. that takes into account assets and liabilities) hedge against interest rate risks. Currency risk will also probably be hedged on an aggregate level.

Case 4

2123. An insurer has a portfolio on different stocks and a short future on a stock index. With the current portfolio there is no material basis risk.
2124. The insurer changes the portfolio composition over the year with the overall market value fluctuating.
2125. Changes in the value of the portfolio and the corresponding adjustments have been covered in the previous cases. A crucial requirement for a recognition as risk mitigation would be that there is no material basis risk introduced by changing the composition of the portfolio.

Case 5

2126. An insurer buys at the beginning of the year 100 stocks for 100 each and enters into 80 short futures with forward price 100 and a maturity of 3 months. After three months, the insurer changes to one-month contracts until the end of the year.

2127. The possible loss after 12 months does not depend on the behaviour of stock prices during the next year and is not materially different from what is reflected in the SCR calculation.

Preliminary conclusions

2128. Not all adjustments that seem acceptable in terms of the objective stated above reflect a change in the exposure.¹²⁵ One example is the increase in the "hedge ratio" due to a perceived higher risk without a movement of the stock (see case 1.4). Another example would be switching from monthly to three-monthly futures contracts. Therefore the term "exposure adjustment" seems not to fit in all cases.

2129. Based on the considerations above adjustments seem unproblematic where the risk is not material that the loss on the initially defined exposure in case the shocks implied by the standard formula have materialised after one year are significantly higher than what is reflected in the standard formula.

2130. In order to check this condition the insurer would have to define the exposure covered by the risk-mitigation technique, the current portfolio of instruments/contracts that constitute the RMT and the rules for adjustments during the following 12 months.

2131. How complex it is to demonstrate that this condition is met, would depend on the complexity of the hedging. If for example the "hedge ratio" is increased in response to higher stock prices to "lock in" gains then no deeper quantitative analysis seems necessary. This is also the case if equity futures are rolled over periodically. In contrast, the case 1.2 can be simply ruled out, because there are possible paths for the movement of the stock over the next 12 months where the loss at the end of the year is higher than reflected in the SCR calculation.

2132. The above condition can be seen as one possible interpretation of the "similarity" requirement as set out in Article 209 (3) of the Delegated Regulation.

The case of currency hedges

Introduction

2133. The examples so far considered only equities and assumed that only the equity risk-submodule is relevant.

¹²⁵ Unless one considers that the change in the perception of the risk involved in the position is a change in the exposure.

2134. In principle the condition described above are transferable to the case where the hedge covers several sub-modules of the market risk module by determining shocks for the individual sub-modules.
2135. But the fact that the standard formula does not consider combined shocks could result in undesirable outcomes if this was the only way for adjustments to qualify.
2136. The design of the standard formula means that currency risk is sometimes underestimated. Consider the example that the currency risk for assets and liabilities in a foreign currency is perfectly hedged with offsetting one-year futures (i.e. the net exposure to the currency at the time of the calculation is zero and there would be no need to check compliance with Article 209(3) DA).
2137. In this case the currency risk charge in the standard formula is zero. But there is of course currency risk as shocks to the value of assets and liabilities create an unhedged currency exposure.
2138. Adjustments in the currency hedge to reflect changes in the value of the hedged assets and liabilities in the foreign currency are sensible from a risk management perspective.
2139. But the sufficient condition above compares the risk reflected in the standard formula with the actual risk when intra-year adjustments are made. Also with regular adjustments there is significant currency risk in case there is a combined movement in the exchange rate and the value of the hedged assets and liabilities in the foreign currency.
2140. While there are different possible methods to determine the shocks for the sub-modules, the consequence could be that the currency hedges do not meet the condition above.

Should such currency hedges qualify?

2141. As mentioned above the design of the standard formula means that for the specific case described the currency risk is underestimated. One possible viewpoint could therefore be that currency hedges, where the hedge is adjusted to the changes in the value of the hedged exposure in foreign currency, should qualify.
2142. On the other hand, there would be the counterintuitive effect that the frequent adjustment to the current value of the asset -which makes sense from a risk perspective - does not qualify while a 12-month future - which might actually results in higher risk - would. There is of course the safeguard of the ORSA.
2143. It could also be seen as quite restrictive and setting the wrong incentives if there was no recognition of the currency hedge at all while the currency risk is actually substantially reduced. Finally, there are mechanisms (ORSA) to avoid that the risk is underestimated in the calculation of the capital requirement with the standard formula.

2144. As a consequence, a currency hedge where the future/forward position is adjusted to maintain full protection against currency fluctuations should qualify provided the risk of deviations between the risk-mitigation reflected in the standard formula and the actual risk mitigation is part of the ORSA.
2145. The discussion above shows that not only adjustments that meet the condition described in the section "Preliminary conclusions" should qualify.
2146. One could say that the adjustment in the currency hedge described above result in "similar arrangements" in that at the times of the adjustments there is always a full hedge of the current FX exposure.

Conclusions

2147. The reflection of intra-year adjustments in the standard formula framework - which is based for good reasons on instantaneous shocks - creates some challenges.
2148. The rules have to allow for sufficient flexibility. At the same time there have to be adequate safeguards.
2149. Based on the analysis above there seems to be no need to introduce the new concept of an exposure adjustment in the legislation. The current requirement for similarity seems to be sufficient to "sort out" inadequate arrangements.
2150. But with the new possibility of weekly adjustments it becomes more important to avoid too "creative" readings. It should therefore be specified that similarity means not simply the use of the same type of instruments.
2151. Where this should be necessary, EIOPA could provide guidance on the interpretation of the term.
2152. Given the mentioned dichotomy, possible deviations between the risk mitigating effect reflected in the standard formula and the actual risk mitigation should be part of the ORSA.
2153. Finally, with the allowed higher frequency the issue of "dynamic hedging" becomes more relevant. Recital 72 of the Delegated Regulation already rules out dynamic hedging. But based on the feedback from stakeholders there is a large degree of uncertainty what the term means.
2154. One has to be careful as many of the examples described above are hedges and they are "dynamic" (in that they are not static).
2155. While this will not cover all relevant cases it should be stated that risk mitigation techniques which create an option-like return by increasing or reducing the position in the underlying security or futures, options, or forward contract with the intent to simulate the delta change in the value of an option position are not considered as similar arrangements.

21.2.2. EIOPA's advice

2156. There is no need to introduce the new concept of an exposure adjustment in the legislation. The current requirement for similarity seems to be sufficient to "sort out" inadequate arrangements.
2157. Similarity should not simply mean the use of the same type of instruments.
2158. Possible deviations between the risk mitigating effect reflected in the standard formula and the actual risk mitigation and compliance with the requirement on basis risk set out in Article 210 of the Delegated Regulation should be part of the ORSA.
2159. Some risk-mitigation techniques create an option-like return by increasing or reducing the position in the underlying security or futures, options, or forward contract with the intent to simulate the delta change in the value of an option position. They should not be considered as similar arrangements.
2160. Any adjustment should not introduce material basis risk.

22. USP for lapse risk

22.1. Call for advice

The framework for undertaking specific parameters provides for standardised methods to replace a defined set of parameters in the standard formula, where sufficient data is available to calculate calibrations tailored to its liabilities. This framework should be provided wherever possible in the underwriting risk module.

EIOPA is asked to:

- *Assess standardised methods to replace additional parameters in the underwriting risk modules and assess any criteria with respect to the completeness, accuracy and appropriateness of the data used that must be met before supervisory approval is given.*

22.2. Legal basis

Solvency II Directive

2161. Article 104(7) of the Solvency II Directive specifies that subject to approval by the supervisory authorities, insurance and reinsurance undertakings may, within the design of the standard formula, replace a subset of its parameters by parameters specific to the undertaking concerned when calculating the life, non-life and health underwriting risk modules. Such parameters shall be calibrated on the basis of the internal data of the undertaking concerned, or of data which is directly relevant for the operations of that undertaking using standardised methods. When granting supervisory approval, supervisory authorities shall verify the completeness, accuracy and appropriateness of the data used.

Delegated Regulation

2162. Article 218 of the Delegated Regulation defines the subset of standard parameters that may be replaced by undertaking-specific parameters. Article 219 concretises the data criteria for the use of undertaking-specific parameters. Article 220 specifies the standardised methods to be used to calculate the undertaking-specific parameters. For the calculation of the undertaking-specific parameters, undertakings can select a method from a number of standardised methods prescribed in Annex XVII of the Delegated Regulation.

Guidelines

2163. EIOPA Guidelines on undertaking specific parameters (EIOPA-BoS-14/178) provide further specification on the data quality criteria that should be taken into account during the process of calculating undertaking-specific parameters and group-specific parameters. The role of the actuarial function is mentioned as very important in the assessment of the quality of data used in the calculation of undertaking-specific parameters. The Guidelines also aim at harmonising the supervisory approval process for the group-specific parameters.

ITS

2164. Commission implementing regulation (EU) 2015/498 of 24 March 2015 specifies the supervisory approval procedure to use undertaking-specific parameters.

22.3. Analysis

22.3.1. Follow-up of the first set of advice

2165. EIOPA has answered the call for advice from the Commission on USP in its first set of advice, sent on 30 October 2017.

2166. In its advice, EIOPA has stated that it "will further consider the methodologies proposed by stakeholders for USP on lapse risk and provide its final advice by February 2018."

2167. This section of the second set of advice provides the analysis on the stakeholders' proposal.

22.3.2. Legal requirement

2168. The parameters in the scope of the USP proposals are those defined in Article 142 of the Delegated Regulation.

1. *The capital requirement for lapse risk is the largest of*
 - a) *the capital requirement for the risk of a permanent increase in lapse rates;*
 - b) *the capital requirement for the risk of a permanent decrease in lapse rates*
 - c) *the capital requirement for mass lapse risk*
2. *The capital requirement for the risk of a permanent increase in lapse rates should be equal to the loss in basic own funds of insurance and reinsurance undertakings that would result from an instantaneous permanent increase of 50 % in the option exercise rates of the relevant options set out in paragraphs 4 and 5. Nevertheless, the increased option exercise rates shall not exceed 100 % and the increase in option exercise rates shall only apply to those relevant options for which the exercise of the option would result in an increase of technical provisions without the risk margin.*
3. *The capital requirement for the risk of a permanent decrease in lapse rates should be equal to the loss in basic own funds of insurance and reinsurance undertakings that would result from an instantaneous permanent decrease of 50 % in the option exercise rates of the relevant options set out in paragraphs 4 and 5. Nevertheless, the decrease in option exercise rates shall not exceed 100 % and the decrease in option exercise rates shall only apply to those relevant options for which the exercise of the option would result in an increase of technical provisions without the risk margin.*
4. *The relevant options for the purposes of paragraphs 2 and 3 shall be the following:*

- a) *all legal or contractual policyholder rights to fully or partly terminate, surrender, decrease, restrict or suspend insurance cover or permit the insurance policy to lapse*
- b) *all legal or contractual policyholder rights to fully or partly establish, renew, increase, extend or resume the insurance or reinsurance cover.*

22.3.3. Stakeholders' proposal

2169. Stakeholders proposed a methodology to estimate the stress factors for a permanent increase and decrease in lapse rates, but not for the mass lapse stress.

2170. The following paragraphs described the input data, the method-specific data requirements and the method specification.

Input data:

2171. Data consist of:

- number of lapses; and
- number of total policies in force.

2172. Data should be per reporting year and potentially differentiated by line of business.

Method specific data requirement:

- The data is available for at least 10 reporting periods.
- The data is representative for the lapse risk of the undertaking for the following business year.
- The data is adjusted for any mass lapse event to the extent that the risk of those events is reflected in the mass lapse risk submodule
- The data is adjusted for any significant trend (drift) in lapse rates.
- The data fits the following assumption:
 - The lapse ratios (the ratio of a lapse rate in year t and the lapse rate in $t-1$) follow a lognormal distribution.

Method specification:

2173. Let l_t denote the crude lapse rate in the reporting year t . The crude lapse rate is determined as the ratio of the number of lapses and the number of total policies in force.

2174. Compute the annual lapse ratios

$$\Delta l_t = \frac{l_t}{l_{t-1}}$$

2175. Fit the lognormal distribution to the lapse ratio time series. Estimate the parameters μ and σ of the lognormal distribution by the method of moment estimator. That is, denote

$$\theta = \frac{1}{n} \sum_{i=1}^n \Delta l_i$$

$$\eta = \frac{1}{n} \sum_{i=1}^n \Delta l_i^2$$

2176. Then the parameters μ and σ are given by

$$\mu = 2 \ln(\theta) - \frac{1}{2} \ln(\eta)$$

$$\sigma = \sqrt{\ln(\eta) - 2 \ln(\theta)}$$

2177. Derive the 0.5 % and 99.5 % quantile of the lognormal distribution of the fitted annual lapse ratio distribution. Let $VaR_{0.005}(\Delta l_t)$ and $VaR_{0.995}(\Delta l_t)$ denote the corresponding quantiles of this distribution.

2178. The downward and upward shock are then determined as

$$lapse_{down} = \frac{VaR_{0.005}(\Delta l_t) - \theta}{\theta}$$

$$lapse_{up} = \frac{VaR_{0.995}(\Delta l_t) - \theta}{\theta}$$

2179. The symmetric permanent increase and decrease is given by the larger of the two shocks, that is

$$lapse_{symmetric} = \max(lapse_{down}, lapse_{up})$$

22.3.4. Assessment of the proposal

2180. EIOPA has assessed the proposal for USP lapse risk against the following criteria:

- Data quality: availability of data and granularity of data
- Completeness and accuracy of the proposal
 - Data requirements
 - Method-specific requirements
- Consistency with the initial calibration and underlying assumptions of the lapse risk module
- Risk sensitivity
- Adjustments of USP guidelines

Data quality

2181. Stakeholders describe that lapse is closely monitored in life and health insurance business. A sufficiently long time series of lapse rates should be available for many undertakings. The data is usually also available at a further level of granularity, e.g. differentiated by line of business and duration of the policies.

2182. The description of the data quality by the stakeholder is different than CEIOPS observation: "As lapse rates are not frequently used for reserving under Solvency I, the empirical basis for a calibration of the permanent shocks upward and downward is poor for most markets". However, it seems

realistic that a sufficient number of undertakings should have at least annual crude life lapse ratio data for a certain time period available now that Solvency II has entered into force.

2183. One question about data granularity is if undertakings have lapse ratio data also available at a higher frequency (e.g. monthly lapse data). This could play a role for the methodological specifications since the use of monthly data would increase the number of data points used for the calibration of the distribution of lapse ratios.
2184. The essential data quality question is whether undertakings have more granular data than just crude lapse rates. Specifically the question is whether undertakings have data available on the different policyholder options described in Article 142(4) and 142(5) of the Delegated Regulation, such as partial terminations, renewals, increases, decreases of the reinsurance cover etc. Should it be the case, data used for USP lapse risk calibration would be consistent with the lapse risk specification in Article 142 of the Delegated Regulation.
2185. However, stakeholders also stated that there is probably a lack of data on different policyholder options.
2186. The calibration of the lapse risk module is mainly based on two studies, which also only relied on crude lapse rate data. The approximation performed at EU level is not necessarily relevant and sufficiently risk-sensitive at undertaking level.

Completeness and accuracy of the proposal

2187. The methodological requirements and the methodology itself are precisely described such that the corresponding lapse stresses could be readily estimated. To be consistent with the lapse risk module calibration, it appears more sensible to only apply a USP on the entire portfolio and not to apply USP on a specific life line of business level. Moreover, it is deemed appropriate to require a minimum data history of at least 10 reporting years in order to have a minimum number of data points to fit a distribution for the lapse ratios.
2188. The data-specific requirements are not fully complete since they do not include a potential adjustment for reinsurance contracts. A part of the lapse risk might be reinsured and a data requirement about reinsurance should be added.
2189. The data-specification includes the important requirement to adjust the data for any mass lapse event. This is important in order to avoid double counting since mass lapse risk is a separate stress. However, stakeholders did not provide any detailed suggestions or criteria on how this adjustment should be performed in practice. See also the discussion about guidelines below.

Consistency with the initial calibration and underlying assumptions

2190. The general underlying assumption of the lapse risk module is that *“the lapse risk module should capture the adverse changes in the value of*

*insurance liabilities, resulting from changes in the level or volatility of the rates of policy lapses, terminations, renewals, and surrenders*¹²⁶.

2191. More specifically, the explicit and implicit assumptions in the lapse risk module are particularly, that

- the increase and decrease of lapse rates is a symmetrical stress;
- a permanent stress is considered for the increase and decrease of lapse rates;
- the stress is not line of business specific and is not differentiated by maturity of the contracts.

2192. The USP methodology proposed by stakeholders is mainly based on the UK study from 2003, but also refers to the Polish study. It uses the same underlying baseline assumptions than the UK study. It considers only crude lapse rate data and it is based on an annual lapse ratio time series. Furthermore, it assumes a lognormal distribution for the lapse ratio. The corresponding quantiles are derived from the 0.5%, 99.5 % distribution of that distribution. Accordingly, the proposed USP methodology replicates the methodology applied for the initial calibration.

2193. Given that the USP methodology is consistent with the underlying main calibration study, it also suffers from the same shortcomings. Firstly, the calibration derives an annual lapse stress factor for the increase and decrease of lapse rates instead of a permanent increase. However, this is not huge concern from a regulatory point of view since the annual stress factors are more conservative than the permanent stress factors, a point that was also mentioned in the Polish study referred to in the underlying assumption document. It could also be considered whether annual lapse rate changes would result in a sufficient number of data points to accurately fit the lapse ratio distribution or whether sub-annual lapse rate data would be more appropriate since these would allow for a significantly higher number of data points. This also largely depends on data availability within (re)insurance undertakings. In terms of risk-sensitivity, the variation of sub-annual changes in lapse rates may be lower than the variation of annual changes in lapse rates, which would imply that the corresponding scaled annual stress factors could be underestimated. A deeper analysis would be needed to formally conclude on that point.

2194. Secondly, the input data used for the calibration does not contain information beyond crude lapse rates, e.g. information on partial terminations, renewals etc. Accordingly, neither the initial calibration nor the USP methodology can fully capture the level and volatility of rates of terminations, renewals and surrenders.

2195. Thirdly, both the initial calibration and the USP methodology derive stress factors directly from a lapse ratio distribution instead of considering the change in liabilities or Solvency II own funds distribution. This

¹²⁶ See https://eiopa.europa.eu/Publications/Standards/EIOPA-14-322_Underlying_Assumptions.pdf

simplification has however been applied several times for the standard formula calibration.

2196. Fourthly, stakeholders propose to use the lognormal distribution to fit the data available and derive the quantiles. There is no certainty that a lognormal distribution would appropriately capture changes in lapse rates: a more heavy-tailed distribution may be more sensible. In the Polish study referred to in the underlying assumptions document, the empirical distribution of the annual changes in lapse rates was used. In the UK study the lognormal distribution was used as it appeared to capture the shape of the distribution of lapse ratios relatively well. However, the Polish study also provided with higher lapse stresses than the UK study, showing that other distributions may be more appropriate. In any case, following the stakeholders' proposal, (re)insurance undertakings would have to validate the distribution assumption in their USP applications.
2197. **In summary, the four points above show that the question at stake is whether the approximations and simplifications taken for the calibration of the parameters in the standard formula are appropriate to be taken at the level of a single (re)insurance undertaking.**

Adjustments of USP guidelines

2198. As stated in the method-specific data requirements the essential potential data adjustment that needs to be performed by undertakings is to adjust lapse ratios for any potential mass lapse event. This is conceptually comparable to the adjustment of catastrophe losses in the non-life premium and reserve risk module.
2199. After investigating the relevant guideline 4 of the USP guidelines one can note that the wording of guideline 4 can be readily used with just a reference to mass lapse risk. Accordingly, this data adjustment would not require a major change of the USP guidelines itself. It would however be useful to amend the explanatory text to a potential new/adjusted USP guideline for mass lapse.
2200. Moreover, a potential trend adjustment in the case of a significant trend in the lapse ratios would already be covered by guideline 3 of the USP guidelines.

22.3.5. EIOPA's advice

2201. Stakeholders proposed a methodology for undertaking specific parameters for lapse risk that is similar to the one used to calibrate the standard formula. This methodology has been assessed and the following conclusions can be drawn.
2202. On the scope: stakeholders proposed a method for USPs for computing the SCR only for the risk of a permanent increase and of a permanent decrease in lapse rates. As stated in Article 142(1) of the Delegated Regulation the SCR for lapse risk shall be the largest of the two capital requirements mentioned above and of the SCR for mass lapse risk. By introducing USPs only for the risk of a permanent increase and for the risk of a permanent decrease in lapse rates, it runs the risk of having little impact on the overall SCR for lapse risk where the SCR for mass lapse risk is the largest of the three capital requirements.
2203. On data used to calibrate the stress factors: the proposed methodology relied on data corresponding to crude lapse rates. According to Article 142 of the Delegated Regulation, risks stemming from partial terminations or renewals should also be taken into account. Therefore there is a risk that some of the underlying risk factors are not taken into account.
2204. On the appropriateness of the method: the method proposed relies on the lognormal distribution. The stress factors in the standard formula rely partly on a lognormal distribution assumption and were partly derive on a study that used the empirical distribution. There is no guarantee that this distribution assumption would be appropriate at undertaking level.
2205. The drivers of the life lapse risk are diverse and complex, for example they depend on the policy specificities (e.g. the guaranteed rate) and on the external environment (e.g. fiscal environment). Fitting all policyholder options (partial terminations, renewals...) within a standard method based on a lognormal distribution assumption appears to embed significant expert judgment and runs the risk to underestimate the stress factors.
2206. EIOPA does not advise the Commission to reflect the methodology proposed in the Delegated Regulation. If, overall, the proposal replicates the calibration of the standard formula, it is not considered to reflect the risk profile of the undertaking better than the standard formula.
2207. The expert judgment embedded in the proposed methodology would imply detailed documentation and reviews which also do not appear proportionate to a USP methodology.

23. Recognition of adverse development covers

23.1. Call for advice

Solvency II is a risk-based framework, which in particular takes account of the effect of certain risk mitigation techniques.

EIOPA is asked to:

- Provide information on recent market developments as regards risk mitigation techniques, in particular embedded derivatives and longevity risk transfer.*
- Assess if the framework for the recognition of risk mitigation techniques appropriately covers these recent market developments.*
- Where necessary, suggest updates to this framework.*

23.2. Analysis

23.2.1. Follow-up of the first set of advice

2208. During the elaboration of its advice, EIOPA engaged with stakeholders on several occasions. In one of their responses to the discussion paper on the review of specific items in the Solvency II Delegated Regulation¹²⁷, stakeholders proposed to recognise Adverse Development Cover ("ADC") treaties in the standard formula calculation for premium and reserves risk.

2209. Stakeholders claim that ADCs effectively address companies' reserve risk mitigation needs while maintaining non-life claims reserves on their balance sheets for liquidity and diversification reasons.

2210. Stakeholders proposed to amend Article 117 of the Delegated Regulation with a specific formula to take account of the risk-mitigating effect of ADC.

2211. In its first set of advice, EIOPA stated that it "will be conducting further analyses on adverse development covers, which are a specific type of non-proportional reinsurance. EIOPA will take a position on whether or not these covers should be recognised in the standard formula and, if yes, how, in its final advice to the Commission, by February 2018."

2212. This section of the second set of advice provides the analysis on the stakeholders' proposal and summarises the various exchanges that took place.

23.2.2. Definitions

2213. Stakeholders define **aggregate covers** as a reinsurance treaty that applies to the annual aggregated loss, e.g. the change in basic own funds which is the consequence of a number of losses over the year in a particular

¹²⁷ https://eiopa.europa.eu/Publications/Consultations/EIOPA-CP-16-008_Discussion_Paper_on_SII_DR_SCR_Review.pdf

or in multiple segments as defined under the cover. Examples for aggregate covers are Stop Loss and Adverse Development Covers. Prospective and retrospective aggregate covers are usually distinguished:

- **Stop Loss Covers** are an example of prospective covers since they provide coverage for catastrophe and premium risks.
- **Adverse Development Covers** are a form of retrospective reinsurance in which the insurer cedes the claims development risk associated with policies from past underwriting periods. They cover the risk that the existing claims reserves are deficient (i.e. reserve risk) for a defined portfolio or segment.

23.2.3. First stakeholders' proposal

2214. Stakeholders proposed to amend Article 117 of the Delegated Regulation with the following modification of the volume measure to recognise specifically the ADC:

$$NP_{res} = (A - (B - C) \times D) / A$$

where

A: Impact on the BOF of reserve risk scenario as defined under the SF
 = Nominal best estimate net reserves x Standard deviation for non-life gross reserve risk of the segment x 3

B: ADC recovery under reserve risk scenario = The lower of the following:

1. Nominal best estimate net reserves covered by the reinsurance structure x (1 + 3 · $\sigma_{(res,s)}$) – Reinsurance structure attachment point
2. Reinsurance structure cover size

C: Additional reinsurance premium or the equivalent thereof

D: Cession to the reinsurance undertaking in %

2215. EIOPA's response was that the standard deviations for reserve risk have been calibrated net of reinsurance, which means that they were calibrated taking into account the average effect of reinsurance transfers across Europe. One would therefore expect that the ADC were already taken into account, should their effect be reflected in the Reported But Not Settled ("RBNS") and Incurred But Not Reported ("IBNR") provisions and the claims paid.

2216. Apart from the concerns that there could double counting, as expressed above, the NP factor has consequences on the meaning of the aggregated non-life risk capital charge among all line of business. Hence, applying this adjustment factor to the standard deviation means modifying the underlying distribution of claims development results on the covered line of business.

2217. Let us consider the following example: an undertaking underwrites business in two lines of business, general third party liability ("GTPL") and fire and other damages where the best estimates for claims provisions are respectively 4,000 and 2,000. This would give a SCR for reserve risk of 1,581. Using the Euler method, one can draw an equivalent scenario where the loss in basic own funds comes from 1,228 in GTPL and 353 in fire and other damages.

2218. Let us imagine the undertaking has the following ADC cover on the GTPL line of business :

"Out-of-the-money" ADC: 360 xs 2,300

Net BE reserves covered by ADC	2,000
Net BE reserves not covered by ADC	2,000
Line of business	GTPL
Standard deviation before ADC	11 %
ADC attachment	2,300
ADC exit	2,660
Up-front premium RoL	15 %
Additonal premium RoL	10 %
Reinsurance undertaking share	80 %

2219. If one applies this cover to the equivalent scenario, this would give losses of 353 on Fire and other damages (which is not covered by ADC and thus not affected) and 1,005 on GTPL (300 from the retention on the Net BE covered by the ADC, 63 coming from the non-ceded 20 % of the deviation of the reserves, plus the additional premium of 29 that is to be paid, i.e. a sum of 392 on the Net BE covered by ADC and 614 on the Net BE not covered by ADC), where it was supposed that the loss on GTPL was equally distributed between both covered and non-covered perimeters. Thus, the equivalent scenario taking into account ADC results in a 1,358 loss in basic own funds.

2220. Now we compare this result to the reserve risk calculated with the NP reserves factor to take into account the ADC as proposed by stakeholders. Following the methodology prescribed, this NP factor would reduce the standard deviation on GTPL to 8.8 %. Then one should calculate the standard formula reserve risk with this modified standard deviation, keeping the volume of 4000 and 2000 on GTPL and Fire and other damages (whose standard deviation has not been affected). This results in a 1,343 loss in basic own fund, which is inferior to our equivalent scenario.

2221. This example shows that the treatment of ADC is quite complex and that the resulting SCR may underestimate the actual risks. It will depend on the attachment point of the ADC, the percentage of reserves that it covers and the diversification/business mix of the undertaking. Therefore the first way stakeholders suggested to take account of ADC does not appear appropriate for standard formula users.

23.2.4. Second stakeholders' proposal

2222. Stakeholders recognised the difficulties identified in the feedback statement of the discussion paper by EIOPA as regards adverse development

covers. Stakeholders still requested that the standard formula is modified to include such covers: the solution proposed to include them via USP would be too burdensome and the cases of underestimation would be compensated by the more numerous cases of overestimation.

2223. Some stakeholders suggested specifying the characteristics of ADC as to ensure that the risk is not underestimated (specifying an attachment point and an exit level in function of the best estimate for claims provision).

2224. This second proposal was also based on an equivalent scenario where the ADC can be applied in a manner which is closer to the functioning of the treaty. This scenario was indeed built in a similar way as EIOPA did.

2225. The refinements consisted in putting some limits to the characteristics of the treaties that can be covered by the proposed methodology. Those limits concern the attachment point and the exit level:

- the attachment point shall not exceed 1.05 times Best Estimate reserves;
- the exit level shall not exceed Best Estimate reserves times (1 + 3 x reserving risk factor).

2226. The proposal for the limitations on the characteristics was supported by a sensibility study produced by the stakeholders. Below is the result of the study:

		ADC attachment								
		2,000	2,050	2,100	2,150	2,200	2,250	2,300	2,350	2,400
ADC exit	2,400	1.9%	1.6%	1.3%	1.0%	0.8%	0.5%	0.3%	0.2%	0.0%
	2,450	2.2%	1.9%	1.6%	1.3%	1.0%	0.8%	0.5%	0.3%	0.2%
	2,500	2.6%	2.2%	1.9%	1.6%	1.3%	1.0%	0.8%	0.5%	0.3%
	2,550	3.1%	2.6%	2.2%	1.9%	1.6%	1.3%	1.0%	0.8%	0.5%
	2,600	3.6%	3.1%	2.6%	2.2%	1.9%	1.6%	1.3%	1.0%	0.8%
	2,660	0.8%	0.4%	0.0%	-0.3%	-0.6%	-0.9%	-1.1%	-1.4%	-1.6%

Outcome based on case 1

2227. When delta is positive (i.e. cell is green) the proposed methodology is more prudent than the losses suffered in the equivalent scenario on top of which the same ADC is applied. When delta is negative (i.e. cell is red) the proposed methodology under-estimates the risks. The proposed limitations¹²⁸ were fixed in order to stay in the green zone: attachment point below 2100 and exit below 2660.

2228. These figures were indeed obtained with the following example:

¹²⁸ Below 1.05 x BE for the attachment point and (1+3sigma) x BE for the exit point

LoB	Reserve risk factor before ADC	Net BE reserves covered by ADC	Net BE reserves not covered by ADC	ADC attachment	ADC exit
Fire	10,0%	0	2 000	0	0
GTPL	11,0%	2 000	2 000	2 100	2 660

Case 1

2229. In order to investigate further the topic, EIOPA developed a wider spread of cases and compared the behaviour of the proposed methodology with the equivalent scenario. This analysis allows assessing whether the limitations proposed by the stakeholders on the attachment point and on the exit point are verified or not.

2230. Modifying the example by increasing the volume not covered by the ADC in the line of business partially covered as follow:

LoB	Reserve risk factor before ADC	Net BE reserves covered by ADC	Net BE reserves not covered by ADC	ADC attachment	ADC exit
Fire	10,0%	0	2 000	0	0
GTPL	11,0%	2 000	6 000	2 100	2 660

Case 2

2231. One gets the following table :

		ADC attachment								
ADC exit		2 000	2 050	2 100	2 150	2 200	2 250	2 300	2 350	2 400
	2 400	0,3%	0,2%	0,2%	0,2%	0,1%	0,1%	0,1%	0,0%	0,0%
	2 450	0,3%	0,3%	0,2%	0,2%	0,2%	0,1%	0,1%	0,1%	0,0%
	2 500	0,3%	0,3%	0,3%	0,2%	0,2%	0,2%	0,1%	0,1%	0,1%
	2 550	0,4%	0,3%	0,3%	0,3%	0,2%	0,2%	0,2%	0,1%	0,1%
	2 600	0,4%	0,4%	0,3%	0,3%	0,3%	0,2%	0,2%	0,2%	0,1%
	2 660	0,0%	0,0%	-0,1%	-0,1%	-0,1%	-0,2%	-0,2%	-0,2%	-0,3%

Outcome based on case 2

2232. It shows that even with treaties that respect the limitations proposed by stakeholders, there can be cases of under-estimation (see for example ADC attachment 2050 with ADC exit 2660).

2233. Similar underestimation occurs when increasing only the volume of the line of business which is not covered by the ADC treaty, for example:

LoB	Reserve risk factor before ADC	Net BE reserves covered by ADC	Net BE reserves not covered by ADC	ADC attachment	ADC exit
Fire	10,0%	0	4 000	0	0
GTPL	11,0%	2 000	2 000	2 100	2 660

Case 3

2234. Indeed:

ADC exit	ADC attachment									
		2 000	2 050	2 100	2 150	2 200	2 250	2 300	2 350	2 400
2 400		3,6%	3,1%	2,5%	2,0%	1,6%	1,1%	0,7%	0,4%	0,0%
2 450		4,3%	3,6%	3,1%	2,5%	2,0%	1,6%	1,1%	0,7%	0,4%
2 500		4,9%	4,3%	3,6%	3,1%	2,5%	2,0%	1,6%	1,1%	0,7%
2 550		4,9%	4,2%	3,6%	3,0%	2,4%	1,9%	1,4%	1,0%	0,5%
2 600		3,1%	2,4%	1,7%	1,2%	0,6%	0,1%	-0,3%	-0,8%	-1,2%
2 660		0,9%	0,2%	-0,4%	-1,0%	-1,5%	-2,0%	-2,4%	-2,8%	-3,2%

Outcome based on case 3

2235. Under-estimation is bigger in that case.

2236. It can also be tested to increase the number of lines of business not covered by ADC:

LoB	Reserve risk factor before ADC	Net BE reserves covered by ADC	Net BE reserves not covered by ADC	ADC attachment	ADC exit
MTPL	9,0%	0	3 000	0	0
MOD	8,0%	0	2 000	0	0
Fire	10,0%	0	3 000	0	0
GTPL	11,0%	2 000	2 000	2 100	2 660

Case 4

2237. In that case under-estimation increases:

ADC exit	ADC attachment									
		2 000	2 050	2 100	2 150	2 200	2 250	2 300	2 350	2 400
2 400		2,6%	2,2%	1,8%	1,5%	1,2%	0,8%	0,5%	0,3%	0,0%
2 450		3,0%	2,6%	2,2%	1,8%	1,5%	1,2%	0,8%	0,5%	0,3%
2 500		3,4%	3,0%	2,6%	2,2%	1,8%	1,5%	1,2%	0,8%	0,5%
2 550		3,5%	3,1%	2,7%	2,2%	1,9%	1,5%	1,2%	0,8%	0,5%
2 600		2,1%	1,6%	1,2%	0,8%	0,5%	0,1%	-0,2%	-0,5%	-0,8%
2 660		0,4%	-0,1%	-0,5%	-0,8%	-1,2%	-1,5%	-1,9%	-2,2%	-2,4%

Outcome based on case 4

2238. Although differences are small (-0.5% was the minimum for the first three columns where the limitations proposed by stakeholders are supposed to avoid underestimation), in the end, it seems that even with the proposed

refinements there are cases of underestimation and that the bigger the part of the portfolio not covered by the ADC, the more the risks are potentially underestimated. The latter is particularly a problem because by definition of ADC, it covers policies from past underwriting periods, i.e. in kind of run-off, which means that the part of the portfolio covered by ADC is meant to decrease as time passes by. Potential under-estimation would then necessarily increase through time.

2239. To illustrate that, one can reduce the volume covered by ADC. For example on the basis of case 1, if the volume covered by ADC is reduced in such a way:

LoB	Reserve risk factor before ADC	Net BE reserves covered by ADC	Net BE reserves not covered by ADC	ADC attachment	ADC exit
Fire	10,0%	0	2 000	0	0
GTPL	11,0%	1650	2 000	2 100	2 660

Case 5

2240. Then the outcome is:

ADC exit		ADC attachment								
		2 000	2 050	2 100	2 150	2 200	2 250	2 300	2 350	2 400
	2 400	-1,8%	-2,0%	-2,1%	-2,3%	0,0%	0,0%	0,0%	0,0%	0,0%
	2 450	-1,8%	-2,0%	-2,1%	-2,3%	0,0%	0,0%	0,0%	0,0%	0,0%
	2 500	-1,8%	-2,0%	-2,2%	-2,3%	0,0%	0,0%	0,0%	0,0%	0,0%
	2 550	-1,8%	-2,0%	-2,2%	-2,3%	0,0%	0,0%	0,0%	0,0%	0,0%
	2 600	-1,8%	-2,0%	-2,2%	-2,4%	0,0%	0,0%	0,0%	0,0%	0,0%
	2 660	-1,9%	-2,1%	-2,2%	-2,7%	0,0%	0,0%	0,0%	0,0%	0,0%

Outcome based on case 5

2241. As the volume of reserves decrease, it is getting further away from the attachment and exit points so the limitations are not complied with anymore. The under-estimations increase: -2.7% is reached in the last table.

2242. Even if it was decided to recognise ADC with the limitations as proposed by stakeholders, i.e. by adding a constraint on the volume of reserves that should be covered by ADC such that cases of under-estimation are restricted to a small amount (as in cases 2, 3 and 4), there is still an additional risk of underestimation. This additional risk corresponds to the situation where the Best Estimate for reserves covered decreases over time, which will happen by definition. When the reserves decrease, as illustrated by case 5, the under-estimation is almost certain. So far, the maximum underestimation that was obtained by simulation was -2.7%.

2243. The only case identified for which the proposed methodology would work is the case where 100% of the portfolio is in one line of business and fully covered by the ADC. In that case, the proposed methodology appears to work fine to take into account the effect of the ADC.

2244. EIOPA believes it would not be appropriate to recognise ADC only in the case of mono-liner insurance undertakings:

- It creates an uneven playing field between mono-liner insurers and other insurers;
- There would be a volatility issue in the case where an adverse development cover is in place and the mono-liner insurer decides to start writing business in another line of business: if the ADC is not recognised anymore, this would create volatility in the SCR; it also disincentives diversification between risks;
- It would be applied in a limited number of cases only.

2245. EIOPA shared its assessment with stakeholders to collect feedback and potential solutions.

23.2.5. Third stakeholders' proposal

2246. Stakeholders agreed with the analysis and cases of underestimation presented above.

2247. To address this risk of underestimation that would arise along the life of the ADC, stakeholders proposed another refinement of the methodology. This refinement consists in modifying the way the parameter B is calculated in the formula to calculate "NPRES":

$$[NPRES = (A - (B - C) \times D) / A]$$

2248. Until now B was the reserve risk after application of cover before cession rate. It would now be the lower of the latter and the following calculation:

2249. (Nominal outstanding best estimate net reserves covered by the reinsurance structure + Paid net reserves covered by the reinsurance structure since inception of the reinsurance structure + Nominal outstanding best estimate net reserves covered by the reinsurance structure $\times 3 \times$ Standard deviation for non-life gross reserve risk of the segment) – Change in ultimate reserves covered by ADC (i.e., ADC recoveries) – Reinsurance structure attachment point

2250. The idea is to take into account the pay-outs of the contract so that the overall effect of the reinsurance cover remains stable over time.

2251. Based on case 5, this would take into account the 350 pay-outs already received according to the best estimate scenario:

LoB	Reserve risk factor before ADC	Net BE reserves covered by ADC	Net paid reserves initially covered by ADC	Net BE reserves not covered by ADC	ADC attachment	ADC exit
Fire	10,0%	0		2 000	0	0
GTPL	11,0%	1650	350	2 000	2 100	2 660

Case 5

2252. The results are the following:

ADC exit		ADC attachment								
		2.000	2.050	2.100	2.150	2.200	2.250	2.300	2.350	2.400
	2.400	2.4%	2.0%	1.6%	1.3%	1.0%	0.7%	0.4%	0.2%	0.0%
	2.450	2.9%	2.4%	2.0%	1.6%	1.3%	1.0%	0.7%	0.4%	0.2%
	2.500	3.4%	2.9%	2.4%	2.0%	1.6%	1.3%	1.0%	0.7%	0.4%
	2.550	0.6%	0.2%	-0.2%	-0.6%	-0.9%	-1.2%	-1.4%	-1.7%	-1.9%
	2.600	0.6%	0.1%	-0.3%	-0.6%	-0.9%	-1.2%	-1.5%	-1.7%	-1.9%
	2.660	0.6%	0.1%	-0.3%	-0.7%	-1.0%	-1.3%	-1.5%	-1.7%	-1.9%

Outcome based on case 5 and new proposal

2253. EIOPA first notes that in order for the formula to work correctly, the complexity needs to be increased.

2254. Second, it is possible to imagine a case 6 where one year after the inception, the best estimate of reserves covered is composed of 1600 net BE reserves covered by ADC and 300 already paid claims. The "best estimate" is then equal to 1900. From the initial 2000 it represents a deviation of 5% which is deemed reasonable (11% standard deviation is considered in the standard formula for GTPL).

LoB	Reserve risk factor before ADC	Net BE reserves covered by ADC	Net paid reserves initially covered by ADC	Net BE reserves not covered by ADC	ADC attachment	ADC exit
Fire	10,0%	0		2 000	0	0
GTPL	11,0%	1600	300	2 000	2 100	2 660

Case 6

2255. We obtain the following results:

ADC exit		ADC attachment								
		2 000	2 050	2 100	2 150	2 200	2 250	2 300	2 350	2 400
	2 400	1.4%	1.0%	0.7%	0.3%	0.0%	-0.2%	-0.4%	-0.7%	0.0%
	2 450	-0.3%	-0.6%	-1.0%	-1.2%	-1.5%	-1.7%	-1.9%	-2.1%	-1.2%
	2 500	-0.3%	-0.7%	-1.0%	-1.3%	-1.5%	-1.7%	-1.9%	-2.1%	-0.9%
	2 550	-0.4%	-0.7%	-1.0%	-1.3%	-1.5%	-1.8%	-2.0%	-2.1%	-0.7%
	2 600	-0.4%	-0.7%	-1.1%	-1.3%	-1.6%	-1.8%	-2.0%	-2.2%	-0.4%
	2 660	-0.5%	-0.8%	-1.1%	-1.4%	-1.6%	-1.8%	-2.0%	-2.2%	-0.1%

Outcome based on case 6

2256. Case 6 can also be combined with case 3 where the volume of reserves in the line of business which is not covered by the ADC treaty increases (from

2000 to 2500, i.e. 25 % of deviation which is below 3*10%, 10% being the volatility of the Fire line of business):

LoB	Reserve risk factor before ADC	Net BE reserves covered by ADC	Net paid reserves initially covered by ADC	Net BE reserves not covered by ADC	ADC attachment	ADC exit
Fire	10,0%	0		2 500	0	0
GTPL	11,0%	1600	300	2 000	2 100	2 660

Case 7

2257. Then under-estimation increases, since the outcome is:

ADC exit	ADC attachment									
		2 000	2 050	2 100	2 150	2 200	2 250	2 300	2 350	2 400
	2 400	1,1%	0,6%	0,2%	-0,2%	-0,6%	-0,9%	-1,2%	-1,4%	0,0%
	2 450	-0,4%	-0,9%	-1,3%	-1,6%	-1,9%	-2,2%	-2,5%	-2,7%	-1,0%
	2 500	-0,5%	-0,9%	-1,3%	-1,7%	-2,0%	-2,3%	-2,5%	-2,8%	-0,8%
	2 550	-0,5%	-1,0%	-1,3%	-1,7%	-2,0%	-2,3%	-2,6%	-2,8%	-0,6%
	2 600	-0,6%	-1,0%	-1,4%	-1,7%	-2,0%	-2,3%	-2,6%	-2,8%	-0,4%
	2 660	-0,6%	-1,1%	-1,4%	-1,8%	-2,1%	-2,4%	-2,6%	-2,8%	-0,1%
	2 720	-0,6%	-1,1%	-1,4%	-1,8%	-2,1%	-2,4%	-2,6%	-2,8%	-0,1%

Outcome based on case 7

2258. This demonstrates that even with the complex amendments of the stakeholders, the methodology is not prudent.

23.2.6. Relevance of ADC in the insurance market

2259. In addition to the technical analysis of the proposed formula, EIOPA also requested information on the relevance of ADC in the insurance market.

2260. Stakeholders recognised that ADC are not widely used by insurance undertakings. Examples of ADC transactions usually involve (re)insurance undertakings of a significant size, often under internal models. Stakeholders argue that this would be due to the limited recognition of ADC in the standard formula. EIOPA notes that there could be many reasons why ADC are not more widely used, including the price of such covers, the degree of protection that the rest of the reinsurance programme already offers or simply because insurance undertakings do not assess retrospective risk as a major risk for their specific portfolio and risk profile.

2261. Stakeholders provided a list of the most recent transactions for the European market based on the materiality of the risk transfer. The transactions below usually cover several hundred of million euros of reserves. Over the past 10 years, 7 of these types of transactions took place:

- **AXA UK, Part VII transfer**, 2017, transferred reserves: GBP 600m¹²⁹
- **CIS (Co-op Insurance)**, 2016¹³⁰
- **Aviva, LPT¹³¹/ADC**, 2015, Limit GBP 1,750m¹³²
- **Liverpool Victoria, LPT/ADC**, 2015, premium paid GBP 242m, reinsurance of 20% of booked reserves¹³³
- **Catlin, ADC**, 2014¹³⁴
- **RSA, ADC**, 2013, cover size GBP 550m, underlying portfolio: GBP 9,000m¹³⁵
- **Swiss Re, ADC**, 2008, premium: CHF 2bn, limit: CHF 5bn¹³⁶

2262. Stakeholders did not send further evidence of ADC being much more widely used.

23.2.7. EIOPA's advice

Reinsurance in the standard formula

2263. The standard formula is criticized by stakeholders for not sufficiently recognizing non-proportional reinsurance covering non-life risks.

2264. The non-life underwriting risk module is composed of several sub-modules. Non-proportional reinsurance is usually relevant for the premium and reserve risk sub-module and the catastrophe risk sub-module.

2265. The reinsurance programme of (re)insurance undertakings usually covers all of these types of non-life underwriting risks. Non-proportional reinsurance treaties usually cover (re)insurance undertakings against losses due to an extreme event or due to an increased number and/or amount of claims. These extreme events correspond, per nature, to catastrophe risks.

2266. The capital requirements for catastrophe risk sub-module are calculated on the basis of scenarios, which allow recognition of non-proportional reinsurance where it qualifies as a risk-mitigation technique. The EIOPA Guidelines on application of outwards reinsurance arrangements specifies how to apply such outwards reinsurance arrangements.

2267. The capital requirements for premium and reserve risk-submodule are calculated on the basis of a factor-based approach. The capital requirements

¹²⁹ <http://www.axa.co.uk/newsroom/media-releases/2017/axa-insurance-begins-transfer-historical-liability-book-riverstone/>

¹³⁰ <http://www.co-opinsurance.co.uk/assets/pdfs/insurance/investorrelations/co-op-insurance-general-insurance-services-sfcr-2016.pdf>

¹³¹ LPT stands for "Loss Portfolio Transfers"

¹³² <http://www.aviva.com/investor-relations/institutional-investors/regulatory-returns/>

¹³³ <https://www.lv.com/assets/non-product/pdfs/about-us/report-accounts/annual-report-2016/lv-ar-2016-whole-report.pdf>

¹³⁴ http://xl.transactionannouncement.com/wp-content/uploads/2015/04/Catlin2014AnnualReport_B-4.pdf

¹³⁵ https://www.rsagroup.com/media/1046/rsa_full_year_results_2013_investor_presentation_final.pdf

¹³⁶ http://media.swissre.com/documents/2008_ar_analysts_slides.pdf

are calculated on the basis of standard deviations applied to volume measures.

2268. The standard deviation for reserve risk has been calibrated on a net of reinsurance basis. That means it includes already the average effect of reinsurance, including non-proportional reinsurance, on reserve risk at the time of the calibration. Regular updates of the calibration should ensure that the average effect continues to be appropriately captured.

2269. The standard deviation for premium risk has been calibrated on a gross of reinsurance basis. Article 117 of the Delegated Regulation provides that the standard deviations for premium risk are to be multiplied by an adjustment factor for non-proportional reinsurance of 80% for the most relevant segments.

2270. The adjustment factor and both of the standard deviations can be replaced by undertaking-specific parameters, which take account of the specific reinsurance programme of the undertaking.

2271. The standard deviations are multiplied by volume measures for premium and reserve risks. The volume measure for premium risk corresponds to premiums net of reinsurance. The volume measure for reserve risk corresponds to the best estimate of the provisions for claims outstanding after deduction of the amount recoverables from reinsurance contracts.

2272. If, despite the recognition of non-proportional reinsurance in the standard formula as described above, an undertaking has entered into a specific reinsurance programme due to the specific nature of its risk profile, then the internal model framework allows for recognition of these specificities.

Adverse development covers

2273. Stakeholders have made a proposal to recognise specific type of non-proportional reinsurance via a formula to be applied in the premium and reserve risk sub-module.

2274. EIOPA has engaged on an intense dialogue with stakeholders on their proposal. EIOPA's analysis showed that the proposal would allow for cases of underestimation of the real risk. Several amendments were discussed with stakeholders but none could address this deficiency.

2275. The only case where the proposal of stakeholders would work is the case of mono-liner insurers. EIOPA believes that it would not be appropriate to recognize these covers only in that specific case, since it would create a difference of treatment with multi-liner insurers.

2276. EIOPA does not advise recognizing adverse development covers on the basis of the stakeholders' proposal.

24. Impact assessment

24.1. Procedural issues and consultation of interested parties

2277. In July 2016 and February 2017 the European Commission has requested EIOPA to provide technical advice on the review of specific items in the Delegated Regulation. In particular, the European Commission seeks EIOPA's technical advice regarding the review of the methods, assumptions and standard parameters used when calculating the Solvency Capital Requirement (hereinafter, SCR) with the standard formula.

2278. According to the European Commission's request, EIOPA should justify its advice by identifying, where relevant, a range of technical options and by undertaking evidence-based assessment of the costs and benefits of each. Where administrative burdens and compliance costs on the side of the industry could be significant, EIOPA should where possible quantify these costs.

2279. The analysis of costs and benefits is undertaken according to an Impact Assessment methodology.

2280. The European Commission has requested EIOPA to provide sufficient factual data backing the analyses gathered during its assessment. The request highlights the importance of the presentation of the advice produced by EIOPA making maximum use of the data gathered and enabling all stakeholders to understand the overall impact of the options presented by EIOPA.

2281. The European Commission's request takes into account the input from stakeholders to the Call for evidence on the EU regulatory framework for financial services, launched in September 2015. Comments received on the Solvency II requirements contributed to identify the areas to be reviewed.

2282. Between December 2016 and March 2017, EIOPA published a discussion paper in order to get stakeholders' views on the scope of the review and to collect relevant evidence. Comments received during that first public consultation have been taken into account in the development of the draft technical advice.

2283. EIOPA provided its technical advice to the Commission following a staggered approach according to the availability of evidence needed to support its proposals, in particular, evidence from annual regular supervisory reporting of (re)insurance undertakings.

2284. A first set of advice that EIOPA has submitted to the Commission in October 2017 contains items for which the analysis of annual reporting data of undertakings was less relevant. In particular it contains the following: simplified calculations, reducing reliance on external credit ratings, treatment of guarantees and exposures to regional governments and local authorities, risk-mitigation techniques, look-through approach for investment related vehicles and undertaking specific parameters.

2285. This impact assessment refers to a second set of advice that EIOPA will submit to the Commission by February 2018. It contains the following items: premium and reserve risks, mortality and longevity risks, catastrophe risks, interest rate risk, market risk concentration, currency risk at group level, unrated bonds and loans, unlisted equity, counterparty default risk, treatment of exposure to CCPs and changes resulting from EMIR, simplification of the look-through approach, look-through approach at group level, loss-absorbing capacity of deferred taxes, risk margin and own funds.
2286. The impact assessment also provides with an overview of the impact, where the impact of both set of advices has been considered together.
2287. As it was done for the first set of advice, the draft technical advice and its impact assessment were subject to public consultation between 6 November 2017 and 5 January 2018. Stakeholders' responses to the public consultation have been duly analysed and serve as a valuable input for the revision of the draft technical advice and its impact assessment. Additionally, the opinion from the Insurance and Reinsurance Stakeholder Group, provided in Article 37 of EIOPA Regulation, has been considered.

24.2. Problem definition

2288. Article 111(3) of the Solvency II Directive provides that 'by 31 December 2020, the Commission shall make an assessment of the appropriateness of the methods, assumptions and standard parameters used when calculating the Solvency Capital Requirement standard formula'. The outcome of this assessment shall be presented to the European Parliament and to the Council, proposing amendments of the Directive or of the implementing measures.
2289. Recital 150 of the Delegated Regulation defined a new timeline for the review of the SCR standard formula, which should be done by the European Commission before December 2018.
2290. In preparation of such review the European Commission requested EIOPA's technical advice in three areas where the current requirements can be improved or need to be amended:
- proportionate and simplified application of the SCR standard formula requirements;
 - removal of technical inconsistencies, i.e. recalibration of certain parameters and other technical issues; and
 - removal of unjustified constraints to financing, in the context of Capital Market Union.
2291. When analysing the impact from proposed policies, the impact assessment methodology foresees that a baseline scenario is applied as the basis for comparing policy options. This helps to identify the incremental impact of each policy option considered. The aim of the baseline scenario is to explain how the current situation would evolve without additional regulatory intervention.

2292. For the analysis of the potential related costs and benefits of the proposed technical advice, EIOPA has applied as a baseline scenario the effect from the application of the Solvency II Directive requirements, the Delegated Regulation and the relevant implementing measures as they currently stand.

2293. In particular the baseline will include:

- Articles 100 to 111 of the Solvency II Directive;
- Articles 83 to 221 of the Delegated Regulation;
- the following implementing technical standards (ITS):
 - ITS with regard to the supervisory approval procedure to use undertaking-specific parameters (Commission Implementing Regulation (EU) 2015/498 of 24 March 2015);
 - ITS with regard to the lists of regional governments and local authorities, exposures to whom are to be treated as exposures to the central government (Commission Implementing Regulation (EU) 2015/2011 of 11 November 2015);
 - ITS with regard to the adjusted factors to calculate the capital requirement for currency risk for currencies pegged to the euro (Commission Implementing Regulation (EU) 2015/2017 of 11 November 2015);
- the following EIOPA's guidelines:
 - Guidelines on application of outwards reinsurance;
 - Guidelines on basis risk;
 - Guidelines on health catastrophe risk sub-module;
 - Guidelines on look-through approach;
 - Guidelines on the application of life underwriting risk module;
 - Guidelines on the loss-absorbing capacity of technical provisions and deferred taxes;
 - Guidelines on the treatment of market and counterparty risk exposures in the standard formula;
 - Guidelines on undertaking-specific parameters; and
 - Guidelines on group solvency.

24.3. Objective pursued

2294. The specific objectives of the review can be summarised as follows:

- simplify where possible and ensure the proportionate application of the SCR standard formula, in particular for small undertakings;
- ensure the methods, assumptions and parameters to be used in the SCR standard formula remain appropriate and compliant with the Solvency II Directive;
- reduce the risk of overreliance on rating agencies;
- increase consistency across sectorial rules to the extent possible; and
- avoid pro-cyclicality.

2295. In order to reach the mentioned objectives the following set of more detailed operational objectives has been considered:

- provide new simplified calculations for more modules of the SCR standard formula, in addition to the existing simplifications;
- simplify the design of some modules (counterparty default and catastrophe risk modules);
- update the parameters for underwriting risks taking into account the recent experience;
- assess if inconsistencies with banking framework on common topics (guarantees, RGLA, own funds) should be removed;
- adjust the requirements where necessary taking into account recent market development; and
- extend the use of alternative credit assessments.

2296. The mentioned objectives for the review are connected to the general objectives of the Solvency II framework (deepen the integration of the EU insurance market, enhance the protection of policyholders and beneficiaries and promote better regulation) and in particular they are connected to:

- the establishment of risk-sensitive harmonised solvency standards;
- the introduction of proportionate requirements for small undertakings; and
- the promotion of compatibility of prudential supervision of insurance and banking.

2297. The objectives of the review are also consistent with the following objectives of EIOPA, as reflected in the Regulation of the Authority¹³⁷:

¹³⁷ See Article 1.6 of EIOPA Regulation

- ensure a sound, effective and consistent level of regulation and supervision;
- ensure the taking of risks related to (re)insurance activities is appropriately regulated and supervised; and
- consumer protection.

24.4. Holistic impact assessment

2298. The call for advice of the Commission and the scope of the review of specific items in the Delegated Regulation covered a wide range of topics. For each of these topics, a specific impact assessment has been carried out in accordance with EIOPA regulation and with the request of the Commission: costs and benefits have been analysed for policyholders, the industry and supervisors, taking account of the specific and operational objectives described above.

2299. This section intends to provide with an overview of these more detailed individual impact assessments and with an estimation of the impact where all those changes are considered together.

2300. There are however several difficulties in estimating all proposed changes together:

- Some proposals relate to simplifying the standard formula or to reduce reliance on external ratings or to increase consistency across sectorial rules. While these proposals can provide a material relief to solo undertakings and groups in terms of burden and costs, they do not directly affect the solvency ratio. Hence it is in particular difficult to compare them with other proposals.
- Some proposals have an impact on certain types of business but not on other. For instance, it is meaningless to compare the changes in the solvency ratio due to the recalibration of the standard parameter for premium and reserve risks (related to non-life insurance business) with the changes due to the recalibration of stresses for mortality and longevity risks (related to life insurance business).
- Some proposals have an impact on groups only. Again, comparing these proposals with those at solo level provides with little added-value.
- Quantitative information is not always available.

2301. The following table provides an overview of the impact of the proposals on all topics for the industry, assessed against the key criteria of simplicity and risk-sensitivity of the standard formula and the foreseeable changes of the level of SCR ratio. Further comments are provided where appropriate on proportionality, comparison with the banking rules and reducing reliance on external ratings.

	Net impacts for industry +/++ (benefit/ high benefit) = (neutral) -/-- (cost/ high cost)			Other relevant impacts and comments
	Simplicity <i>Increase +</i> <i>Decrease -</i>	Risk sensitivity <i>Increase +</i> <i>Decrease -</i>	Level of SCR ratio <i>Increase +</i> <i>Decrease -</i>	
Simplified calculations	+	=	=	- On lapse and mortality risks - Two new simplified calculations reduce the reliance on external ratings and reduce costs of undertakings having several ECAI
Exposures guaranteed	-	+	+	- Simplicity is reduced on a limited scope: type 2 mortgage loans treated in the counterparty default risk module - Alignment with banking regulation is another benefit
Exposures to RGLA	=	=	+/-	- Alignment with banking regulation is another benefit - Reliance on external ratings is reduced for the RGLA not listed in the Commission Implementing Regulation (EU) 2015/2011 thanks to the intermediate treatment
Risk-mitigation techniques	=	+	+	- The application of the provisions in Article 211(3) becomes easier - More rolling hedges can qualify
Undertaking specific parameters	=	+	+/-	- Proportionality is another benefit - Further recognition of non-proportional reinsurance techniques is another benefit

	Net impacts for industry +/++ (benefit/ high benefit) = (neutral) -/-- (cost/ high cost)			Other relevant impacts and comments
	Simplicity <i>Increase +</i> <i>Decrease -</i>	Risk sensitivity <i>Increase +</i> <i>Decrease -</i>	Level of SCR ratio <i>Increase +</i> <i>Decrease -</i>	
Look-through approach	+	+	+/-	• Simplicity is increased with the proposal for new simplifications • Risk-sensitivity is increased because look-through is proposed to be applied to investment related undertakings. This leads to increase or decrease of the level of SCR depending on the case • Convergence of practices for look-through at group level is another benefit • The new simplifications also reduce the reliance on external ratings
Recalibration of standard parameters of premium and reserve risks	=	+	+/-	• Risk sensitivity is increased thanks to the updated calibration • The impact on the level of SCR depends on the line of business considered
Volume measure for premium risk	+/-	+	=	• The proposal now distinguishes 1-year contracts from multi-year contracts, which increases complexity • On the other hand, the underlying assumptions and the model will be easier to understand, which increases simplicity

	Net impacts for industry +/++ (benefit/ high benefit) = (neutral) -/-- (cost/ high cost)			Other relevant impacts and comments
	Simplicity <i>Increase +</i> <i>Decrease -</i>	Risk sensitivity <i>Increase +</i> <i>Decrease -</i>	Level of SCR ratio <i>Increase +</i> <i>Decrease -</i>	
Recalibration of mortality and longevity risks	=	=	=	- An assessment of the appropriateness of the calibration has been performed. As an additional benefit, there is further clarity on the underlying assumptions and data used (documentation) - A cost-benefit analysis of increasing granularity is also provided
Health catastrophe risk	+	+	=	The removal of a less realistic scenario improves both simplicity and risk sensitivity
Man-made catastrophe risk	+/-	+	=/-	- For fire risk the main benefit is the added simplicity; the impact on level of SCR is neutral - For marine risk there is an increase on the risk-sensitivity and on the level of SCR where there is an exposure - The calculation on a net basis increases the complexity but only to a limited extent

	Net impacts for industry +/++ (benefit/ high benefit) = (neutral) -/-- (cost/ high cost)			Other relevant impacts and comments
	Simplicity <i>Increase +</i> <i>Decrease -</i>	Risk sensitivity <i>Increase +</i> <i>Decrease -</i>	Level of SCR ratio <i>Increase +</i> <i>Decrease -</i>	
Natural catastrophe risk	+	+	+/-	- On simplicity, the simplified calculation increases the simplicity and the proposal to take account of specific contractual limits decreases the simplicity. However the latter is identified to very specific cases and is optional, hence overall simplicity is increased. - The impact on level of SCR depends on the country factor considered
Interest rate risk	=	++	--	- The proposal is to correct the level of capital since the current calibration resulted in underestimates. Taking account of a risk that was, until now, quantitatively ignored in the standard formula is leading to an increase of capital requirements. - The impact is proposed to be mitigated via a gradual implementation of the approach
Market concentration risk	=	+	+	- The proposed treatment for "mixed" exposures allows for a more risk sensitive treatment of exposures to insurer. - The calculation is marginally less simple.

	Net impacts for industry +/++ (benefit/ high benefit) = (neutral) -/-- (cost/ high cost)			Other relevant impacts and comments
	Simplicity <i>Increase +</i> <i>Decrease -</i>	Risk sensitivity <i>Increase +</i> <i>Decrease -</i>	Level of SCR ratio <i>Increase +</i> <i>Decrease -</i>	
Currency risk at group level	-	+	+/=	The level of SCR is expected to decrease only in those cases where the current standard formula was not sufficiently risk-sensitive (material exposure to different currency)
Unrated debt	=	+	+	The insurer can decide whether it wants to use the suggested approaches or not. Only in this case the calculation of the capital requirement becomes more demanding and complex.
Unlisted equity	=	+	+	The insurer can decide whether it wants to use the suggested approach or not. Only in this case the calculation of the capital requirement becomes more demanding and complex.
Strategic equity investment	=	=	=	Factual description only
Simplification of counterparty default risk	+	=	=	In addition, factual information on the size of the module and on the risks was provided
Treatment of exposures to CCPs and changes	=	+	+	The proposed treatment reflects the effects of central clearing and the exchange of variation margin.

	Net impacts for industry +/++ (benefit/ high benefit) = (neutral) -/-- (cost/ high cost)			Other relevant impacts and comments
	Simplicity <i>Increase +</i> <i>Decrease -</i>	Risk sensitivity <i>Increase +</i> <i>Decrease -</i>	Level of SCR ratio <i>Increase +</i> <i>Decrease -</i>	
resulting from EMIR				- The simplicity of the calculation is unchanged. - The relevance will increase with the higher usage of CCPs in the future.
Loss-absorbing capacity of deferred taxes (LAC DT)	=	+	-	- Convergence of practices and level-playing field are additional benefits - The approach allows for different levels of complexity, hence proportionality is an additional benefit
Risk margin	=	=	=	- Only the cost-of-capital rate has been reviewed - Other elements of the risk margin should be reviewed at a later stage
Comparison of own funds in insurance and banking sectors	+	=	=	- Simplicity is a benefit because of the clarification on the principal loss absorbency mechanism - Alignment with the banking framework on early redemptions, tax calls and regulatory calls is another benefit

	Net impacts for industry +/++ (benefit/ high benefit) = (neutral) -/-- (cost/ high cost)			Other relevant impacts and comments
	Simplicity <i>Increase +</i> <i>Decrease -</i>	Risk sensitivity Increase + Decrease -	Level of SCR ratio Increase + Decrease -	
Capital instruments only eligible as tier 1 up to 20% of total tier1	=	=	=	The current approach is seen as a good trade-off between simplicity and market practices, hence proportionality is a benefit

2302. One of the objectives of the review was to simplify the standard formula. Considering the implementation costs the industry already incurred, EIOPA has, in most cases, advised for optional simplifications. This also allows greater flexibility in the regime and ensures a proportionate application of the requirements.
2303. On risk sensitivity, no proposal is reducing the risk-sensitivity of the standard formula.
2304. On the impact on the level of SCR ratio, one should distinguish non-life from life undertakings to make an analysis.
2305. On the non-life side, there is no material change in the SCR ratios. The proposals on non-life underwriting (premium and reserve risks and catastrophe risks) balance each other. LAC DT may have an effect but for non-life undertakings, where usually business plans are shorter and where the investments play a smaller role, the proposals will not lead to a significant decrease of the SCR ratio.
2306. On the life side, the impact of LAC DT is expected to be a bit more material than for non-life. On the other hand, various items such as look-through, treatment of guarantees and of RGLA or risk-mitigation techniques should balance the changes in most cases.
2307. For life undertakings, the proposal which has a significant impact on the SCR ratio is the interest rate risk proposal. The proposal is to correct the level of capital since the current calibration resulted in underestimates. Taking account of a risk that was, until now, quantitatively ignored in the standard formula is leading to an increase of capital requirements. In order to mitigate the timing of the impact, a gradual implementation of the proposal is proposed.

24.5. Recalibration of standard parameters of premium and reserve risks

24.5.1. Policy options

2308. The capital requirement for the non-life premium and reserve risk sub-module is calculated using specific standard parameters defined in the regulation for each line of business. Based on the experience gained since the standards were defined, EIOPA has assessed the appropriateness of the standard parameters for the lines of business: assistance, credit and suretyship, legal expenses, medical expense and workers' compensation.
2309. For this purpose, the same methodology that was initially used to calibrate the standard parameters was used again.

24.5.2. Analysis of impact

2310. The recalibration is aimed to improve the risk sensitivity and therefore to provide benefits for policyholders, industry and supervisors likewise, avoiding the underestimation or overestimation of the capital requirement.

2311. In order to analyse the impact of the new standard parameters, EIOPA used the annual QRTs to assess the quantitative impact. By using the volume measures reported in S.26.05.01, one can replicate the calculations of the SCR for premium and reserve risks.

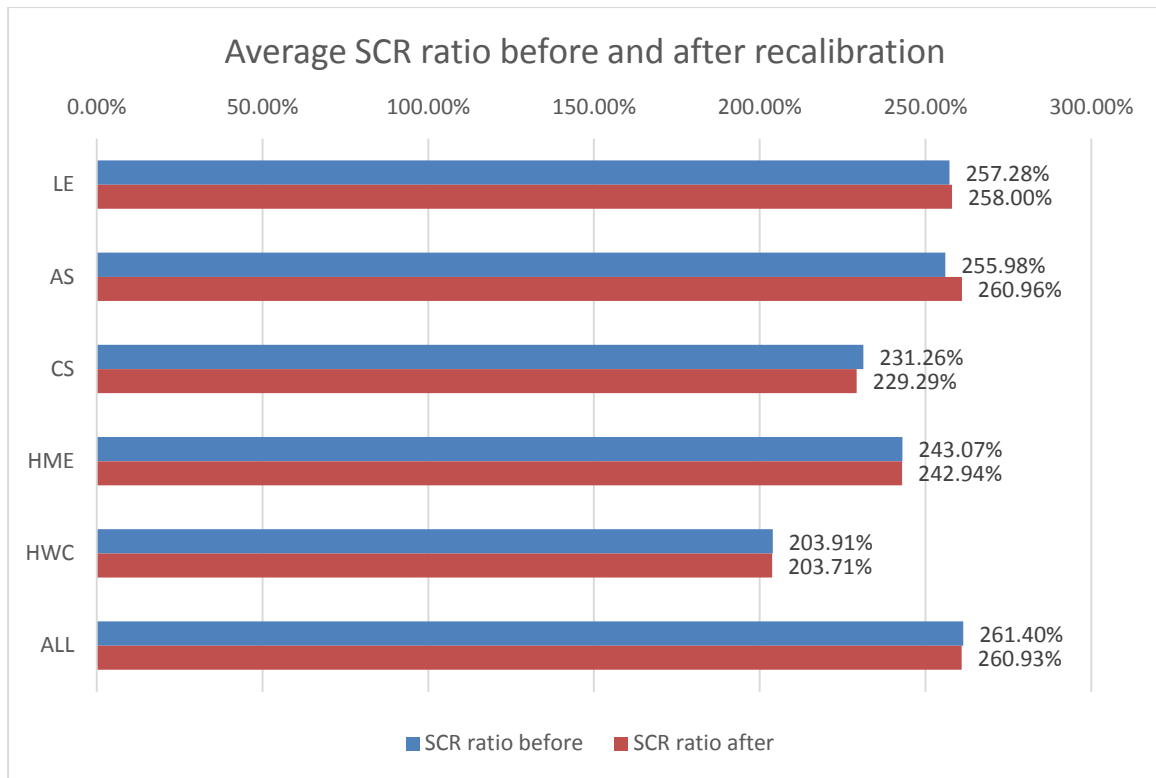
2312. The table below shows the number of undertakings that have business in any of the lines of business for which a change of the parameters is suggested and therefore, could be affected by the proposed change.

Lines of business	Number of undertakings
Legal expenses (LE)	553
Assistance (AS)	524
Credit and suretyship (CS)	456
Health-medical expenses (HME)	977
Health Work compensation (HWC)	187
Total	1,873

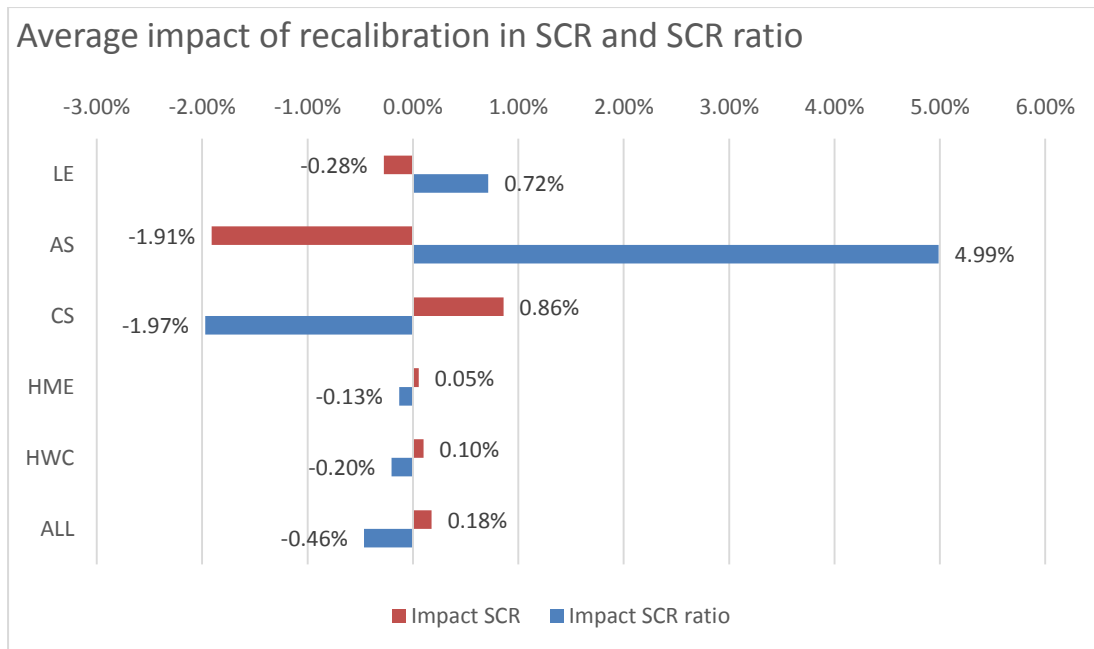
2313. The impact assessment consisted in:

- First re-performing the calculation of the non-life underwriting premium and reserve risks sub-module to validate the results provided by insurance undertakings in the annual QRTs;
- Second excluding the undertakings for which the SCR reported was not confirmed by the validation: this led to the exclusion of around one third of the undertakings in each line of business, for a total of 1,163 undertakings used;
- Third to compute the SCR with the new parameters.

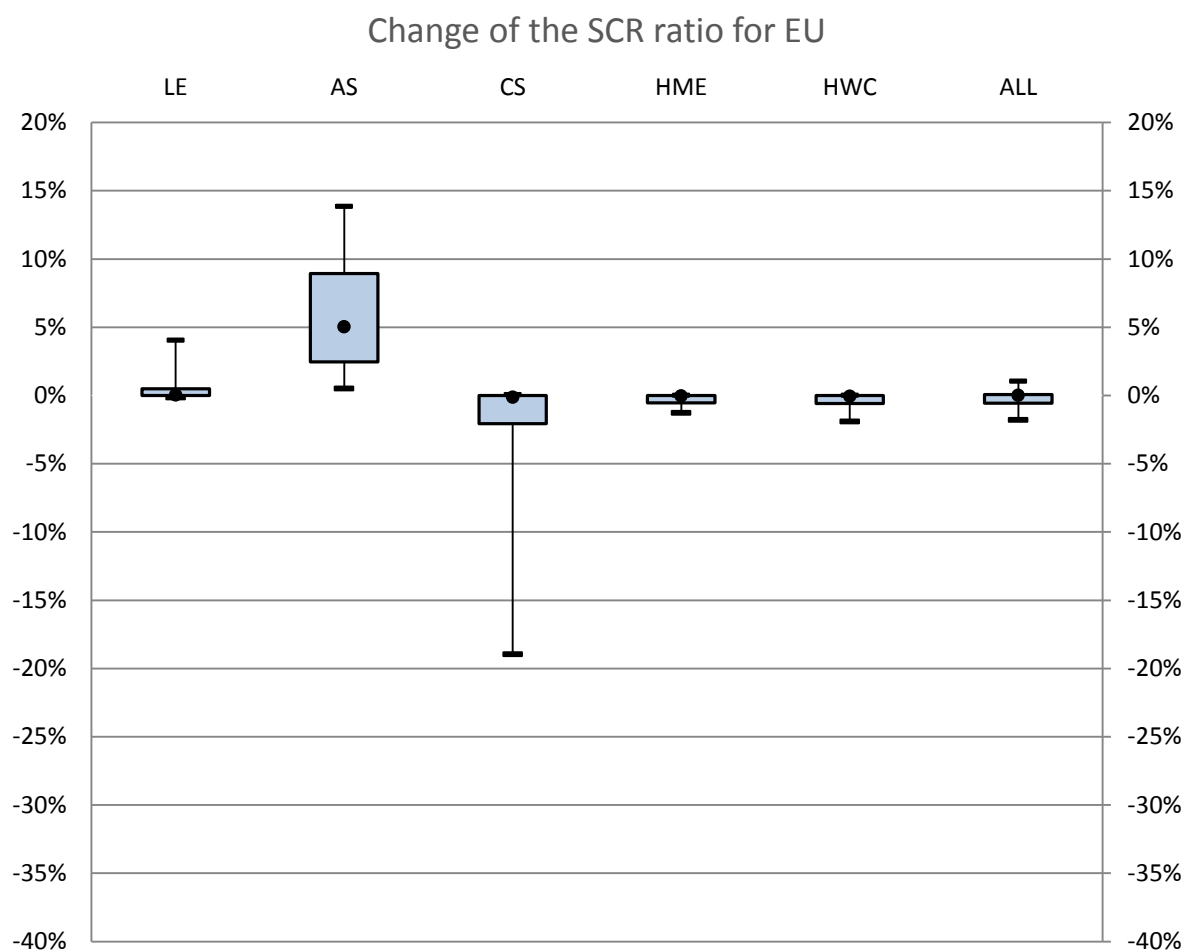
2314. The following graph shows the comparison between the current SCR ratio for undertakings carrying out business in each of the affected lines of business and the SCR ratio resulting from the change of the parameters for that line of business. SCR ratios have been calculated as weighted averages at EU level.



2315. The following graph shows the average impact of the proposed recalibration on the overall SCR and the subsequent impact on the SCR ratio (i.e. difference between the SCR ratio after and before, as presented in the previous graph). The higher impact is observed for assistance (increase) and credit and suretyship (decrease) while the lowest impact corresponds to medical expense. An average decrease of the SCR and subsequent increase of the SCR ratio is observed for legal expenses and assistance. An average increase of the SCR and subsequent decrease of the SCR ratio is observed for credit and suretyship as well as for medical expenses and worker compensation.



2316. The box-plots bellow illustrate how the impact of the recalibration compared to the baseline is distributed across undertakings, by showing the median, interquartile range and 10th and 90th percentile of observed impacts in percentage points. The blue boxes represent the 25% and the 75% quantiles and the dots represent the medians. Per lines of business the widest distribution observed is for credit and suretyship, followed by assistance and legal expenses; while for both health lines of business the distributions are much narrower.



2317. There is no undertaking, solvency ratio of which drops below 100% because of the proposed change of parameters.

2318. Given that the impact is most material on the line of business credit and suretyship, a table providing the impact per country in euro is also provided:

Country	Sum of SCR before change	Sum of SCR after change	Sum of eligible own funds
AT	3,123,020,642	3,131,240,961	9,382,563,034
BE	1,472,685,623	1,474,596,684	3,245,498,114
BG	444,287,031	444,705,328	876,659,992
CY	75,557,602	75,558,813	138,590,098
DE	14,565,029,730	14,648,296,803	44,552,382,387
DK	6,978,634	7,287,389	13,800,373
EE	54,756,499	54,847,353	90,817,326
ES	4,278,046,452	4,392,286,294	8,541,898,540
FI	1,008,785,033	1,011,133,259	2,663,560,497
FR	5,974,191,577	6,053,965,944	15,498,698,677
GB	9,513,756,567	9,605,561,830	12,807,481,763
GR	456,896,197	454,715,599	751,093,306
HR	332,445,720	335,732,996	858,987,213
HU	237,821,093	238,193,218	549,635,292
IE	1,471,990,733	1,479,305,083	2,491,461,845
IT	3,229,874,088	3,244,619,439	5,279,817,135
LT	78,218,058	78,584,654	133,594,618
LU	815,626,100	859,832,720	2,101,289,627
LV	54,069,892	54,686,191	75,167,394
MT	137,027,831	137,009,164	529,346,570
NL	684,510,025	678,745,261	1,095,607,906
NO	9,193,401	9,904,343	25,714,106
PL	3,240,903,308	3,257,971,991	7,524,498,144
PT	1,961,593,843	1,964,850,554	2,699,417,938
RO	323,718,330	324,901,653	493,734,576
SE	1,522,063,957	1,529,963,474	4,885,765,150
SI	299,278,960	302,329,522	773,985,937
SK	276,826,944	276,723,683	611,519,194

24.6. Volume measure for premium risk

24.6.1. Policy options

2319. The capital requirement for premium and reserve risks is calculated on the basis of a volume measure for premium and reserve risk and of standard deviations. EIOPA has been asked to assess for continuous appropriateness the definition of the volume measure for premium risk.

2320. The current definition takes account of the premiums to be earned for contracts where the initial recognition date falls in the following 12 months but excluding the premiums to be earned during the 12 months after the initial recognition date. Excluding these premiums means that there is a gap in the premiums taken into account in the volume measure.

2321. During the development of the advice on volume measure for premium risk, EIOPA has considered different options for amending the standard formula.

- Option 1: no change.
- Option 2: filling the gap and taking account of the premiums to be earned for contracts where the initial recognition date falls in the following 12 months but excluding the premiums to be earned during the following 12 months. Since it would lead to more premiums than today, the effect would be mitigated by the introduction of an adjustment factor.

24.6.2. Analysis of impact

Option 1: no change

2322. On the side of benefits, following observations can be made:

- Policyholders – none.
- Industry – this approach is arguably less volatile for 1-year contracts and therefore the anticipation of capital requirements is easier to manage.
- Supervisors – none.

2323. On the side of costs, following observations can be made:

- Policyholders – there is a difference between policyholders that subscribe multi-year contracts and those that subscribe 1-year contracts: there is a jump in the capital requirements. However most of the contracts are 1-year contracts.
- Industry – the current approach with the gap has led to misunderstanding and some (wrongly) believed this was a mistake.
- Supervisors – none.

Option 2: filling in the gap

2324. On the side of benefits, following observations can be made:

- Policyholders – policyholders that subscribe multi-year contracts are treated on a similar basis as those that subscribe 1-year contracts.
- Industry – this approach is easier to understand technically speaking: permanent costs are reflected throughout the life of the contract and not only 12 months after the initial recognition date.
- Supervisors – this approach is easier to understand technically speaking and therefore easier to supervise.

2325. On the side of costs, following observations can be made:

- Policyholders – this approach arguably provides for a more volatile volume measure for 1-year contract, which may be compensated by the industry by raising premiums.
- Industry – this approach seems to provide for a more volatile volume measure for 1-year contract which may be more difficult to manage.
- Supervisors – none.

2326. In addition to the cost-benefit analysis above, EIOPA has also conducted sensitivity testing on the volume measure the duly consider any change in the definition. The following graphs show the sensitivity of the SCR ratio to changes in the volume measure for premium and reserve risk (PR): +/- 1% and +/-10%.

2327. The baseline solvency ratio for non-life undertakings is of c.a. 250%.

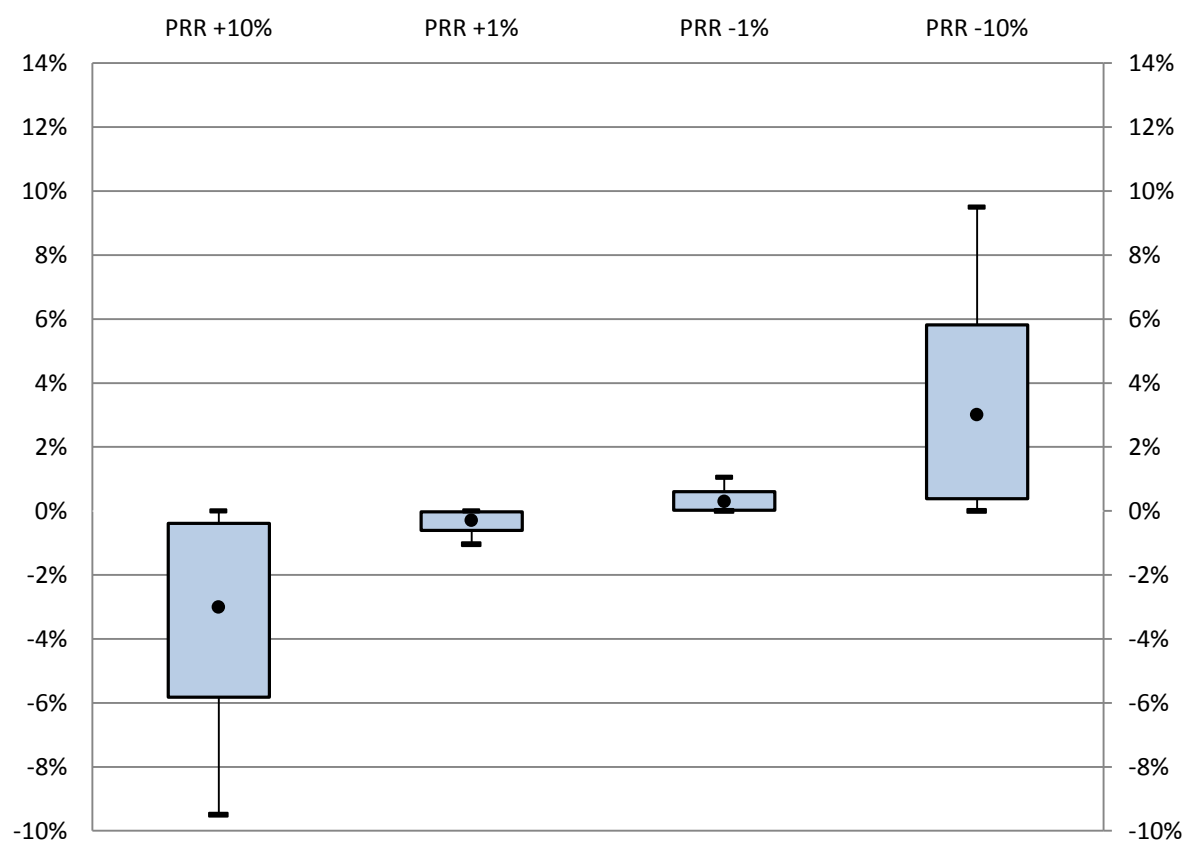
- A change of +/-1% in the volume measure leads to a weighted average change of +/-0.4% in the solvency ratio.
- A change of +/-10% in the volume measure leads to a weighted average change of +/-4% in the solvency ratio.

2328. For health insurance undertakings, the changes are smaller. The baseline solvency ratio is of c.a. 240%.

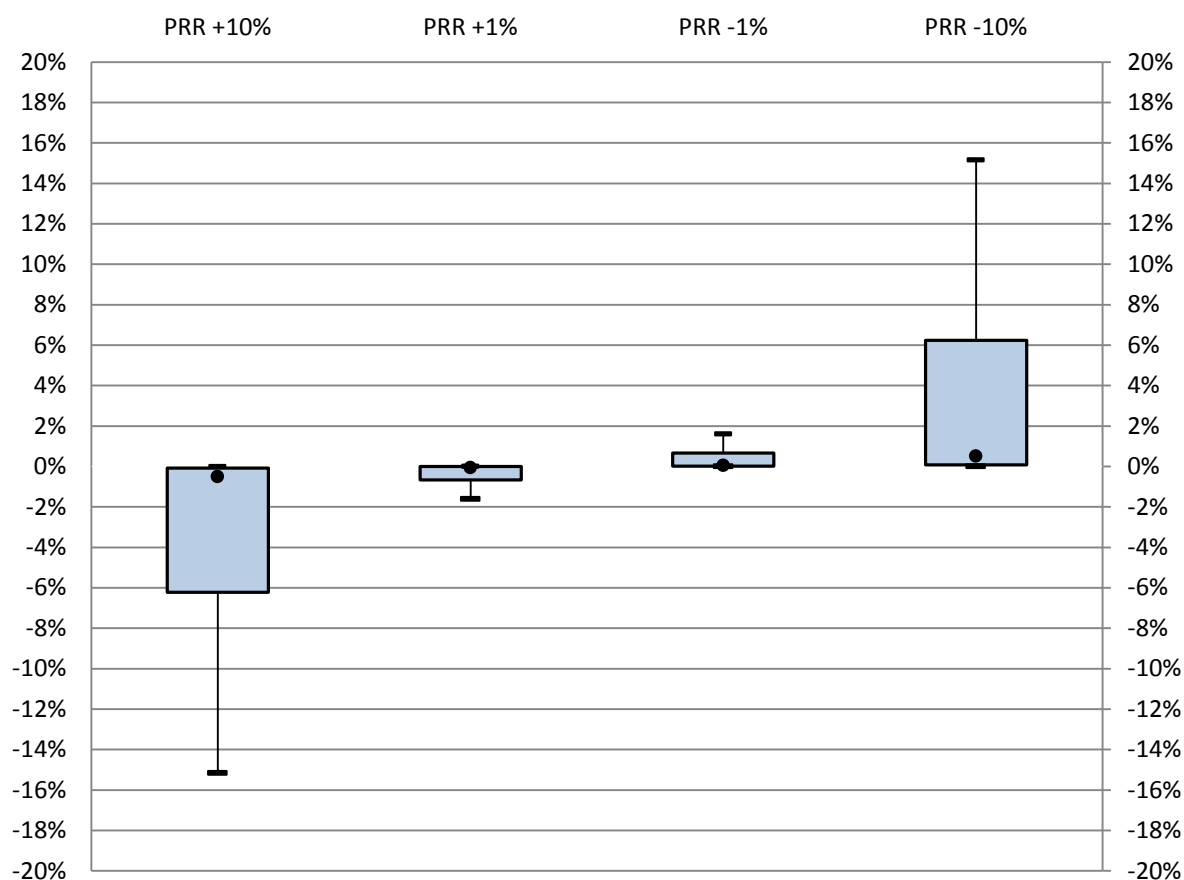
- A change of +/-1% in the volume measure leads to a weighted average change of +/-0.1% in the solvency ratio.
- A change of +/-10% in the volume measure leads to a weighted average change of +/-1% in the solvency ratio.

2329. The box-plots bellow illustrate the distribution of sensitivity of the SCR ratio to changes in the volume measure for premium and reserve risk, by showing the median, interquartile range and 10th and 90th percentile of observed changes in percentage points.

Change of the SCR ratio for EU volume changes : non-life



Change of the SCR ratio for EU volume changes: health



2330. The information above shows that a change in the definition of the volume measure can have a material impact on the solvency of some insurance undertakings (for example for health, the change in the solvency ratio of the 75th percentile is around 6 percentage points). This call for changing the situation only where there are strong technical arguments that it is not appropriate. In particular, it appears inappropriate to introduce volatility in the volume measure where the impact is that significant.

24.6.3. Comparison of options

2331. In light of the cost-benefit analysis and of the potential impact of the options, EIOPA decided to:

- Keep the current approach (option 1) for 1-year contracts;
- Adopt the new approach (option 2) for multi-year contracts.

2332. The current approach provides with stability for 1-year contract and reflects appropriately the fact that FP_{future} is exposed to some risks only. Therefore it would not be appropriate to change for 1-year contracts.

2333. However, it appears not robust technically and for multi-year contracts, option 2 appears simpler to understand and more appropriate.

2334. The following table provides the estimated impact per Member State and per line of business. The impact has been estimated on the basis of an information request, which did not distinguish 1-year and multi-year contracts. The distinction has been made using the weight of $FP_{existing}$ as described in the advice. The impact is provided only where there are at least 3 undertakings that constitute the sample: less than that, it would not be representative of the market changes. The impact is assessed on the volume measure for those multi-year contracts.

Member State	Line Of Business	Number Of Records	Simple Average Of Volume Measure Relative Change
AT	Assistance	4	-9%
AT	Credit and suretyship	3	-9%
AT	Fire and other property damage	18	-8%
AT	Income protection insurance and proportional reinsurance	18	-7%
AT	Legal expenses	17	-7%
AT	Marine, aviation, transport (MAT)	8	-13%
AT	Miscellaneous	7	-6%
AT	Motor, other classes	3	-18%
AT	Third-party liability	18	-9%
DE	Credit and suretyship	5	-7%
DE	Fire and other property damage	20	-6%
DE	Income protection insurance and proportional reinsurance	16	-8%
DE	Legal expenses	5	-8%
DE	Medical expenses insurance and proportional reinsurance	4	-5%
DE	Miscellaneous	6	-8%
DE	Third-party liability	15	-7%
FR	Assistance	4	1%
FR	Fire and other property damage	4	-7%
FR	Income protection insurance and proportional reinsurance	4	-12%
FR	Medical expenses insurance and proportional reinsurance	4	-17%
FR	Motor, other classes	5	-5%
FR	Third-party liability	3	-3%
IE	Credit and suretyship	6	-13%
IE	Fire and other property damage	4	-8%
IE	Miscellaneous	4	-8%
IE	Third-party liability	4	-7%
IT	Credit and suretyship	6	-2%
IT	Fire and other property damage	5	2%
IT	Income protection insurance and proportional reinsurance	4	1%
IT	Legal expenses	3	14%
IT	Medical expenses insurance and proportional reinsurance	7	6%
IT	Miscellaneous	6	-2%
LV	Credit and suretyship	3	-14%
PL	Credit and suretyship	8	-7%
PL	Fire and other property damage	5	-1%
PL	Income protection insurance and proportional reinsurance	5	-1%

PL	Legal expenses	4	-5%
PL	Miscellaneous	6	-3%
SI	Credit and suretyship	4	-7%
UK	Credit and suretyship	4	-11%

24.7. Recalibration of mortality and longevity risks

24.7.1. Policy options

2335. The capital requirements for longevity and mortality risks are calculated by (re)insurers by stressing the mortality rates of the best estimate.

2336. EIOPA has assessed the granularity with which the stresses are defined and has considered different options for amending the standard formula.

- Option 1: no change, i.e. define one stress for all ages.
- Option 2: define stresses per age group.

24.7.2. Analysis of impact

Option 1: no change, i.e. one stress for all ages

2337. On the side of benefits, following observations can be made:

- Policyholders – the approach is easily implementable by the industry, which ultimately reduces the cost for policyholders. Risks are mutualized between younger ages and older ages, which reduces cost for portfolio of younger ages.
- Industry – the approach is easily implementable, whichever granularity with which best estimate are calculated. It reflects the fact that (re)insurers have diversified portfolio with diversified risks.
- Supervisors – the approach is easy to supervise.

2338. On the side of costs, following observations can be made:

- Policyholders – the stress is overestimated for ages above 60 years old, which could increase costs for this population.
- Industry – the stress is underestimated for ages below 60 years, which could adversely affect the (re)insurer.
- Supervisors – the stress is underestimated for ages below 60 years, therefore supervisors need to assess the average age of the insurer portfolio.

Option 2: define stresses per age group

2339. On the side of benefits, following observations can be made:

- Policyholders – the stress would better match the risk, hence older population would pay less and younger population would be protected by an appropriate capital requirement.
- Industry – this could relieve capital held by industry on portfolios of older population.
- Supervisors – capital requirements are more appropriate for specific age distribution of insurers.

2340. On the side of costs, following observations can be made:

- Policyholders –none.
- Industry – the calculation would be more complex than with option 1.
- Supervisors – it is more difficult to supervise.

24.7.3. Comparison of options

2341. EIOPA recommends **option 1 (one stress for all ages)** having taken into account one of the key objectives of this review to simplify the standard formula.

24.8. Health catastrophe risks

2342. With the aim of simplifying the health catastrophe risk sub-module, EIOPA has considered different policy options to simplify each of its components:

- capital requirement of the mass accident risk sub-module;
- capital requirement of the accident concentration risk sub-module; and
- capital requirement of the pandemic risk sub-module.

24.8.1. Mass accident risk simplification

24.8.1.1. Policy options

2343. For the calculation of the capital requirements of the mass accident risk sub-module and the accident concentration risk sub-module 5 types of events need to be considered:

- death caused by an accident;
- permanent disability caused by an accident;
- disability that lasts 10 years caused by an accident;
- disability that lasts 12 months caused by an accident; and
- medical treatment caused by an accident.

2344. With the aim of simplifying this module, and in particular the problems associated with the “disability that lasts 10 years”, the following options have been considered:

- Option 1 – no change;
- Option 2 – delete the “disability that lasts 10 years” scenario, not modifying the rest of scenarios
- Option 3 - delete the “disability that lasts 10 years” scenario, modifying the rest of scenarios.

24.8.1.2. Analysis of impacts

Option 1 – no change

2345. On the side of benefits, it is possible to detect the following effects:

- Policyholders – none.
- Industry – consistency with previous calculations.
- Supervisors - consistency with previous calculations.

2346. On the side of costs, it is possible to detect the following effects:

- Policyholders –none.
- Industry – difficulty to apply the current module.
- Supervisors – difficulty to apply the current module.

Option 2 – delete the “disability that lasts 10 years” scenario, not modifying the rest of scenarios

2347. On the side of benefits, it is possible to detect the following effects:

- Policyholders – None.
- Industry – Relative consistency with previous calculations, simplicity.
- Supervisors - Relative consistency with previous calculations, simplicity.

2348. On the side of costs, it is possible to detect the following effects:

- Policyholders – Some risk exposures would not be covered which could lead to lower protection.
- Industry – None.
- Supervisors – Wrong risk assessment.

Option 3 – delete the “disability that lasts 10 years” scenario, modifying the rest of scenarios

2349. On the side of benefits, it is possible to detect the following effects:

- Policyholders – Appropriate protection.
- Industry – Simplification.
- Supervisors - Simplifications.

2350. On the side of costs, it is possible to detect the following effects:

- Policyholders – None.
- Industry – Change in the module design.
- Supervisors – Change in the module design.

24.8.1.3. Comparison of options

2351. From the options detailed, only the latter two (delete the “disability that lasts 10 years” scenario) would lead to significant simplification, hence being in line with the objective to simplify the standard formula.

2352. However, only one of those two options would lead to an appropriate risk assessment, this is Option 3. Consequently, **option 3 (delete the “disability that lasts 10 years” scenario, modifying the rest of scenarios)** is the preferred option, since it ensures that the key objective that methods, assumptions and parameters to be used in the SCR standard formula remain appropriate.

2353. In this respect, only 2 hypotheses have an incidence on the cost of the disability scenarios:

- the difference between retirement age and the mean age of insureds;
- the mean annual cost of total disability.

2354. The following table summarizes the impact of the new proposal on the mass-accident risk sub-module and on the concentration risk sub-module, in various configurations. A positive impact means that the new proposal is more conservative ($[CAT\ WS - CTF] / CTF$), resulting in a higher capital requirement.

2355. It appears clearly that the new calibration is broadly in line with previous one, though more simple (4 scenarios instead of 5) and with no longer use of the unrealistic 10 year disability scenario.

2356. It also appears that generally speaking, the new proposal is a bit more conservative than previous one only when permanent disability is expensive (young insureds, high annual disability costs).

Mean age (Retirement = 62 years)	Mean annual disability cost	Impact (with death = EUR 100k)	Impact (with death = EUR 150k)
35	7 000	2.8 %	2.2 %
35	10 000	3.4 %	2.7 %
35	12 000	3.7 %	3.0 %
40	7 000	-1.2 %	-1.0 %
40	10 000	-1.5 %	-1.2 %
40	12 000	-1.6 %	-1.3 %
45	7 000	-5.5 %	-4.2 %
45	10 000	-6.8 %	-5.4 %
45	12 000	-7.4 %	-6.0 %

Table 1: Impact of new calibration compared to CTF calibration

2357. The differences are less important when payments in case of accidental death are bigger, because the weight of disability in the Health CAT is lower. Medical expenses are generally not material and thus do not materially change the impacts.

24.8.2. Accident concentration risk simplification

24.8.2.1. Policy options

2358. For the calculation of the capital requirement of the accident concentration risk sub-module undertakings are required to identify their largest accident risk concentration in each country, which is based on the largest number of persons working in the same building in relation to which the (re)insurance undertaking has a workers' compensation (re)insurance obligation or an group income protection (re)insurance obligation.

2359. With the aim of simplifying this module, and in particular addressing undertakings' main difficulty in analysing whether policyholders are located in the same building or not, the following options have been considered:

- Option 1 – No change;
- Option 2 – Allow undertakings to take the largest policy (i.e. that covers the highest number of people), but assuming then that all policyholders are working in the same building;
- Option 3 - Perform the calculation on an event that hits the headquarters of the undertaking.

24.8.2.2. Analysis of impacts

Option 1 – no change

2360. On the side of benefits, it is possible to detect the following effects:

- Policyholders – assuming that undertakings are able to identify whether policyholders are located in the same building, this option is most risk sensitive, and therefore policyholders' protection is appropriate.
- Industry – assuming that undertakings are able to identify whether policyholders are located in the same building, this option is most risk sensitive.
- Supervisors – assuming that undertakings are able to identify whether policyholders are located in the same building, this option is most risk sensitive.

2361. On the side of costs, it is possible to detect the following effects:

- Policyholders – none.
- Industry – difficulty to perform the calculations is not reduced.
- Supervisors – none.

Option 2 – Allow undertakings to use the largest policy

2362. On the side of benefits, it is possible to detect the following effects:

- Policyholders – none.
- Industry – simplicity.
- Supervisors - relative simplicity.

2363. On the side of costs, it is possible to detect the following effects:

- Policyholders –none.
- Industry – Potential wrong results and higher capital requirement, if for instance the largest policy is a large group of people (e.g. hundreds of thousands) but the number of people working in the same building is much lower.
- Supervisors – Wrong risk assessment. Unreasonable results, since it cannot be assumed that group insurance policies follow geographical patterns.

Option 3 – Perform the calculation on an event that hits the headquarters of the undertaking

2364. On the side of benefits, it is possible to detect the following effects:

- Policyholders – None.
- Industry – Simplification.
- Supervisors - Simplifications.

2365. On the side of costs, it is possible to detect the following effects:

- Policyholders – Potential lower protection due to the option being less risk-sensitive (could lead to higher or lower capital requirements depending on the undertaking risk profile).
- Industry – Potential wrong results and higher or lower capital requirements since it is less risk-sensitive.
- Supervisors – Potential unrealistic risk assessment due to the decrease in the risk-sensitiveness.

24.8.2.3. Comparison of options

2366. Against the background of the aforementioned results, EIOPA concluded that no generic simplification should be proposed: it was not possible to achieve the objective of simplifying the standard formula because it would have been too much in contradiction with the objective to have appropriate methods and assumptions. Consequently, the preferred option is **Option 1 (no change)**.

24.8.3. Pandemic risk simplification

24.8.3.1. Policy options

2367. The calculation of the capital requirement of the pandemic risk sub-module is based on the estimation per country of medical expenses to be covered by (re)insurance undertakings in case of a pandemic.

2368. With the aim of simplifying this module (in particular the estimation of costs, which vary from member state to member state), the following options have been considered:

- Option 1 – keep the current design.
- Option 2 – A simplification to allow for grouping the countries where the exposure is assessed as not proportionate.
- Option 3 - A second possibility could be to provide maximal unit claim costs per scenario and country. This would allow undertakings for which the risk is not proportionate to take these maximal costs.

24.8.3.2. Analysis of impacts

Option 1 – no change

2369. On the side of benefits, it is possible to detect the following effects:

- Policyholders – none.
- Industry – consistency with previous calculations.
- Supervisors - consistency with previous calculations.

2370. On the side of costs, it is possible to detect the following effects:

- Policyholders – none.
- Industry – difficulty to apply the current module.
- Supervisors – difficulty to apply the current module.

Option 2 – grouping the countries where the exposure is assessed as not proportionate

2371. On the side of benefits, it is possible to detect the following effects:

- Policyholders – None.
- Industry – Simplicity.
- Supervisors - Simplicity.

2372. On the side of costs, it is possible to detect the following effects:

- Policyholders – Potential risk underestimation which could lead to lower protection.
- Industry – None.
- Supervisors – Potentials wrong risk assessment.

Option 3 – provide maximal unit claim costs per scenario and country

2373. On the side of benefits, it is possible to detect the following effects:

- Policyholders – Appropriate protection.
- Industry – Simplification.
- Supervisors – Potential right fit with local idiosyncratic features, cost structures and chargeabilities of the national health care system in each Member State.

2374. On the side of costs, it is possible to detect the following effects:

- Policyholders – None.
- Industry – Change in the module design.
- Supervisors – Change in the module design.

24.8.3.3. Comparison of options

2375. From the options detailed, only one of the options would simplify the fact that the benefits payable in all countries and in all scenarios are sometimes difficult to estimate, while accounting idiosyncratic features, cost structures and chargeabilities of the national health care system in each Member State.

2376. Consequently the preferred option is Option 3 (provide maximal unit claim costs per scenario and country). Given the disparities of these maximal unit claim per country, EIOPA recommends these unit claims to be determined by NSAs.

24.9. Man-made catastrophe risks

2377. The man-made catastrophe risk sub-module consists of all of the following sub-modules: (a) the motor vehicle liability risk sub-module; (b) the marine risk sub-module; (c) the aviation risk sub-module; (d) the fire risk sub-module; (e) the liability risk sub-module; (f) the credit and suretyship risk sub-module.

2378. With the aim of simplifying the man-made catastrophe risk sub-module and ensure its continued appropriateness, EIOPA has considered different policy options to simplify the fire risk sub-module, the marine risk sub-module and the aviation risk sub-module.

24.9.1. Fire risk simplification

24.9.1.1. Policy options

2379. For the calculation of the capital requirement of the fire risk sub-module undertakings are required to identify their largest fire risk concentration, which is based on the set of buildings located within a radius of 200 meters with the largest sum insured covering damage due to fire or explosion, including as a result of terrorist attacks.

2380. EIOPA believes that the existing methodology is the optimal approach and recommends that this remains the default calculation.

2381. However, it is also recognised that there are a number of issues with the current methodology which mean that it is costly or burdensome to implement for all undertakings. Therefore, the following options have been considered:

- Option 1 – No change: Retain existing volume.
- Option 2 – Using the largest exposure measure (i.e. building with the largest sum insured) with an adjustment for conflagration
- Option 3 - Using a factor based approach (same as the simplification of QIS 5: multiplying volumes by risk factors) and not the current scenario-based approach

- Option 4 - Alter the formula to reflect market share, building density and reconstruction costs
- Option 5 - Limit the scope of the identification to the largest concentration of risk within a 200m radius circle to, at a minimum, the top five exposures per risk type (industrial, commercial, residential).

24.9.1.2. Analysis of impacts

Option 1 – no change

2382. On the side of benefits, it is possible to detect the following effects:

- Policyholders – none.
- Industry – consistency with previous calculations.
- Supervisors - consistency with previous calculations.

2383. On the side of costs, it is possible to detect the following effects:

- Policyholders –none.
- Industry – burdensome and costly particularly for small undertakings. This option is neither a simplification nor an alternative calculation.
- Supervisors – This option is neither a simplification nor an alternative calculation.

Option 2 – Using the largest exposure measure with an adjustment for conflagration

2384. On the side of benefits, it is possible to detect the following effects:

- Policyholders – None.
- Industry – Simplicity.
- Supervisors - Simplicity.

2385. On the side of costs, it is possible to detect the following effects:

- Policyholders – this option is less risk-sensitive and could lead to lower capital requirements hence lower policyholders' protection.
- Industry – loss of risk sensitivity which could lead to lower capital requirements: the proposal does not capture the risks to which undertakings are exposed to.
- Supervisors – Substantial loss of risk sensitivity and practical limitations with the proposal, including the calibration of the conflagration adjustment factors and the potential use of postal codes.

Option 3 – Using the simplification of QIS 5 (factor based approach)

2386. On the side of benefits, it is possible to detect the following effects:

- Policyholders – Appropriate protection on average.
- Industry – Simplification with minimal costs.
- Supervisors - Simplifications.

2387. On the side of costs, it is possible to detect the following effects:

- Policyholders – None on average, but could be cases where the capital requirements are lower due to a lower risk-sensitivity.
- Industry – Loss of risk sensitivity to the real drivers of the risk.
- Supervisors – Loss of risk sensitivity.

Option 4 – Alter the formula to reflect market share, building density and reconstruction costs

2388. On the side of benefits, it is possible to detect the following effects:

- Policyholders – none.
- Industry – Reduced calculation burden as requirement to identify concentration risk is removed.
- Supervisors - Reduced calculation burden as requirement to identify concentration risk is removed.

2389. On the side of costs, it is possible to detect the following effects:

- Policyholders –possible lower protection due lower capital requirements since risk-sensitivity is decreased. Increase of data requirements which costs could be passed on to policyholders via an increase in prices.
- Industry – loss of risk sensitivity. Loss of simplicity through increased data requirements
- Supervisors – loss of risk sensitivity. Increased complexity.

Option 5 – Limit the scope of the identification to the largest concentration of risk within a 200m radius circle to, at a minimum, the top five exposures per risk type (industrial, commercial, residential)

2390. On the side of benefits, it is possible to detect the following effects:

- Policyholders – Adequate risk assessment.
- Industry – Simplicity. Reduced calculation burden to identify largest concentration of risks for undertakings that are manually assessing

their exposures. Current level of risk sensitivity will be maintained in majority of cases.

- Supervisors - Simplicity.

2391. On the side of costs, it is possible to detect the following effects:

- Policyholders – loss of risk sensitivity in certain specific cases.
- Industry – loss of risk sensitivity in certain specific cases.
- Supervisors – loss of risk sensitivity in certain specific cases.

24.9.1.3. Comparison of options

2392. Regarding fire risk, the “no change” option is neither a simplification nor an alternative calculation.

2393. However, EIOPA agreed with the conclusions from the previous CAT taskforce and believes this remains the optimal approach.

2394. It is also recognised that there are a number of issues with the current methodology which means that it is costly or burdensome to implement for all undertakings.

2395. EIOPA believes it is important for undertakings to understand their exposures and risks. Likewise, improved data recording and management should be incentivised. EIOPA therefore recommends that **option 5**, limit the scope of the identification to the largest concentration of risk within a 200m radius circle around, at a minimum, the top five exposures per risk type (industrial, commercial, residential) be adopted as a simplification: it will be in line with the objective to simplify the standard formula and still provides with sufficient risk-sensitivity, ensuring that methods, assumptions and parameters are appropriate.

24.9.2. Marine risk submodule

24.9.2.1. Policy options

2396. The marine risk sub-module consists of the capital requirements for the risk of a tanker collision and for the risk of a platform explosion. Therefore the catastrophe risk is not considered for undertakings providing cover for other vessels than ‘tankers’ or ‘platforms’ or for other types of events than ‘collision’ or ‘explosion’. In view of that , the following options have been considered:

- Option 1 – no change;
- Option 2 – modify the scenarios, replacing the “tanker” scenario with “vessel”.

24.9.2.2. Analysis of impacts

Option 1 – no change

2397. On the side of benefits, it is possible to detect the following effects:

- Policyholders – none.
- Industry – consistency with previous calculations.
- Supervisors - consistency with previous calculations.

2398. On the side of costs, it is possible to detect the following effects:

- Policyholders – this option is not risk sensitive to the risk of losses due to other vessels than tankers or platforms, which could lead to lower protection.
- Industry – not risk sensitive.
- Supervisors – not risk sensitive.

Option 2 – modify the scenarios, replacing the “tanker” scenario with “vessel”

2399. On the side of benefits, it is possible to detect the following effects:

- Policyholders – Better protection.
- Industry – Relative consistency with previous calculations, simplicity.
- Supervisors - Relative consistency with previous calculations, simplicity.

2400. On the side of costs, it is possible to detect the following effects:

- Policyholders – None.
- Industry – higher capital requirements, however this will reflect the risks hence benefits in terms of risk management should outweigh the cost.
- Supervisors – None.

24.9.2.3. Comparison of options

2401. From the options detailed, only the second would lead to an improvement of the module, ensuring the objective of appropriate methods, assumptions and parameters. Therefore the preferred option is **option 2 (modify the scenarios, replacing the “tanker” scenario with “vessel”)**.

24.9.3. Identification of largest man-made catastrophe exposures on gross vs. net of reinsurance basis risk sub-module

24.9.3.1. Policy options

2402. EIOPA has analysed whether the identification of the largest risk exposure within the Marine, Fire and Aviation ("MFA") submodules should be altered to be carried out on a net of reinsurance basis.

2403. The following options have been considered:

- Option 1 – no change; the identification is carried out gross of reinsurance,
- Option 2 – alter the submodule to net of reinsurance basis

24.9.3.2. Analysis of impacts

Option 1 – no change

2404. On the side of benefits, it is possible to detect the following effects:

- Policyholders – none.
- Industry – consistency with previous calculations.
- Supervisors - consistency with previous calculations.

2405. On the side of costs, it is possible to detect the following effects:

- Policyholders – lower risk sensitivity which could lead to lower protection due to lower capital requirements.
- Industry – lower risk sensitivity and potential distortion since the biggest loss could arise from a different exposure than the one used to determine the capital requirements.
- Supervisors – lower risk sensitivity and potential distortion since the biggest loss could arise from a different exposure than the one used to determine the capital requirements.

Option 2 – largest exposures net of reinsurance basis

2406. On the side of benefits, it is possible to detect the following effects:

- Policyholders – higher risk sensitivity which leads to better policyholders' protection.
- Industry – increased risk-sensitivity of the calculation that takes account of specific reinsurance programme.
- Supervisors – increased risk sensitivity and removal of a potential distortion that needed to be analysed "outside" of the standard formula.

2407. On the side of costs, it is possible to detect the following effects:

- Policyholders –none.
- Industry – none.
- Supervisors – none.

24.9.3.3. Comparison of options

2408. EIOPA proposes **Option 2 (largest exposure net of reinsurance)**, to remove the distortion within the SCR calculation in the majority of cases: this complies best with the objective of appropriate methods, assumptions and parameters.

24.10. Natural catastrophe risks

24.10.1. Natural Catastrophe risks simplification

24.10.1.1. Policy options

2409. The non-life catastrophe risk sub-module is one of the most complex sub-modules in the SCR standard formula, mainly due to the high granularity of the technical specifications and calculations. The non-life catastrophe risk sub-module consists altogether of 13 sub-modules, 5 of which form the natural catastrophe risk sub-module. Three of the natural catastrophe sub-modules are further defined by means of two different scenarios.

2410. With the aim of simplifying this module, the following options have been considered:

- Option 1 – Use of less granular risk zones than the ones currently used, but more granular than the current regions (typically defined on country level).
- Option 2 – Use of risk factor for the region without consideration of risk zones for the (non-allocated part of the) undertaking's exposure.
- Option 3 - Use of risk factor for the region without consideration of risk zones and applying prudency factor for the (non-allocated part of the) undertaking's exposure.
- Option 4 - Allocation of the (non-allocated part of the) undertaking's exposure in the region the average of the industry within the region.
- Option 5 - Allocation of non-allocated part of the undertaking's exposure to the CRESTA zone with the highest risk weight in the region
- Option 6 - Allocation o of the non-allocated part of the undertaking's exposure in the region on country level to the average of the undertaking within the region.

24.10.1.2. Analysis of impacts

Option 1 – Use of less granular risk zones

2411. On the side of benefits, it is possible to detect the following effects:

- Policyholders –none.
- Industry – would make the standard formula simpler, and retain adequate capital requirements on average.
- Supervisors – would make the standard formula simpler, and retain adequate capital requirements on average.

2412. On the side of costs, it is possible to detect the following effects:

- Policyholders – lower risk sensitivity which could lead to lower protection due to lower capital requirements.
- Industry – lower risk sensitivity. It is not sure whether the simplification is actually helpful for a lot of undertakings. It would introduce another zoning mechanism that is no industry standard.
- Supervisors –lower risk sensitivity.

Option 2 – Use of risk factor for the region

2413. On the side of benefits, it is possible to detect the following effects:

- Policyholders – None.
- Industry – Simplicity.
- Supervisors - Simplicity.

2414. On the side of costs, it is possible to detect the following effects:

- Policyholders – significant loss of risk sensitivity, which could lead to inappropriate capital requirements and lower policyholders' protection .
- Industry – significant loss of risk sensitivity.
- Supervisors – significant loss of risk sensitivity.

Option 3 – Use of risk factor for the region and applying prudency factor

2415. On the side of benefits, it is possible to detect the following effects:

- Policyholders – None.
- Industry – Simplicity.
- Supervisors - Simplicity.

2416. On the side of costs, it is possible to detect the following effects:

- Policyholders –loss of risk sensitivity, which could lead to inappropriate capital requirements and lower policyholders’ protection.
- Industry – Loss of risk sensitivity.
- Supervisors – Loss of risk sensitivity.

Option 4 – Allocation to industry exposure

2417. On the side of benefits, it is possible to detect the following effects:

- Policyholders – None.
- Industry – less information from the undertakings.
- Supervisors - None.

2418. On the side of costs, it is possible to detect the following effects:

- Policyholders – substantial loss of risk sensitivity which could lead to lower protection.
- Industry – substantial loss of risk sensitivity, need for substantial reporting.
- Supervisors - substantial loss of risk sensitivity.

Option 5 – Allocation of remaining exposure to highest risk weight

2419. On the side of benefits, it is possible to detect the following effects:

- Policyholders – None.
- Industry – less information from the undertakings.
- Supervisors - None.

2420. On the side of costs, it is possible to detect the following effects:

- Policyholders – substantial loss of risk sensitivity which could lead to lower protection.
- Industry – substantial loss of risk sensitivity, need for substantial reporting.
- Supervisors - substantial loss of risk sensitivity.

Option 6 – Allocation of remaining exposure to already allocated exposure

2421. On the side of benefits, it is possible to detect the following effects:

- Policyholders – None.
- Industry – less information from the undertakings.

- Supervisors - None.

2422. On the side of costs, it is possible to detect the following effects:

- Policyholders – potential underestimation of risk which could lead to lower protection.
- Industry – none.
- Supervisors - difficult to supervise.

24.10.1.3. Comparison of options

2423. The final assessment of the options is the following:

- Ad 1) this option is too complex for calibration and use as an optional simplification.
- Ad 2) There is a material loss of risk sensitivity when following this option. There would be a need to introduce a level of additional prudence in this case, which option 2) does not include.
- Ad 3) this option can be considered appropriate, with the open question concerning the appropriate calibration of the prudency factor. The same or similar results can be obtained when following option 5 which appears to be a bit more intuitive, especially when only parts of the exposure for a peril/ region are considered in the simplified approach.
- Ad 4) there is no advantage of this approach in comparison to option 2). As this approach has the additional drawback of the need to publish industry exposure as part of the regulation, option 2 is the preferred approach in comparison to option 4).
- Ad 5) the approach is considered reasonable.
- Ad 6) Together with option 5)/ 3) this option is identified as one of the potential simplifications. It would however require to have a minimum percentage threshold for the already allocated part (or in turn max % of unallocated contracts) of the portfolio in order to prevent arbitrage, which raises difficulties. For this approach to reflect the risk that the undertaking is exposed to, the unallocated part of the exposure needs to be similar to the allocated one. There are different kinds of circumstances that can generate such case:
 - Nature peril profile: if the peril is relatively homogeneous within the region(s) where the undertakings conducts business, then deep asymmetries in the risk embedded in allocated and unallocated exposures are not expectable.
 - Operational reasons: for instance, insurance contracts with inception more remotely in the past, under inferior geocoding standards, not (fully) upgraded in successive renewals, may contain less detailed information impairing allocation, while not necessarily corresponding to differentiated (more severe) risk exposures.

2424. Considering the pros and cons outlined above, **option 5 (Allocation of remaining exposure to highest risk weight)** is the preferred option in view of balancing the objectives of simplifying the standard formula and ensuring appropriate methods, assumptions and parameters.

24.10.2. Natural Catastrophe risks recalibration

24.10.2.1. Policy options

2425. The recalibration is aimed to improve the risk sensitivity and therefore to provide benefits for policyholders, industry and supervisors likewise, avoiding the underestimation or overestimation of the capital requirements.

2426. Analysis of the feedback received from national supervisors and insurance associations during the first phase of the project showed a case for recalibration of the following scenarios:

Country	Risks	Country factors to be recalibrated?	Zone relativities/ aggregation matrices to be recalibrated?
Czech Republic	Hail	Not currently in DR	Not currently in DR
Finland	Windstorm	Not currently in DR	Not currently in DR
Greece	Earthquake	Yes	Yes
Slovenia	Windstorm	Not currently in DR	Not currently in DR
	Hail	Not currently in DR	Not currently in DR
Sweden	Windstorm	Yes	Yes - specific zones highlighted
Hungary	Flood	Yes	Yes – specific zones highlighted
	Windstorm	Not currently in DR	Not currently in DR
Slovakia	Earthquake	Yes	Yes
Spain	Windstorm	Yes	-
Germany	Windstorm	Yes	Not priority
	Flood	Yes	Not priority
Italy	Earthquake	Yes	-

2427. However, to capture better the impact of spatially large perils to adjacent scenarios, all scenarios per peril that are currently contained in the Delegated Regulation were re-assessed, in order to explicitly pay attention of pairs/groups of countries that are likely to be hit simultaneously by windstorm or flood (“holistic recalibration approach”).

2428. EIOPA conducted the holistic approach for windstorm and flood only. Reasons for this are that earthquake and especially hail do in most cases either not have a spatially widespread impact that would give rise to significant changes at country level, or the particular set of just recalibrated

EQ and HL scenarios and the associated magnitude of the changes made to these does not point to material inconsistencies with adjacent scenarios.

2429. Against this background, the following scenarios/parameters were recalibrated:

- d. WS scenarios, country factors: AT, BE, CZ, CH, DK, FR, IE, LU, NL, NO, PL, UK;
- e. FL scenarios, country factors: AT, BE, BG, CZ, CH, DK, FR, IT, PL, RO, SK, SI, UK
- f. Re-assessment/re-calibration of the cross-country aggregation matrix for WS and FL

2430. Using the annual QRTs, it is possible to derive an approximate impact of the changes in parameters in Windstorm, Flood and Earthquake, for those markets where a scenario exists already.

24.10.2.2. Analysis of impacts

2431. EIOPA has analysed the impact of a change in the following country factors:

- Windstorm risk: AT, CH, CZ, DE, ES, IE, LU and SE;
- Flood risk: CH, FR, HU, IT, RO, SK and UK;
- Earthquake risk: EL, IT and SK.

2432. The annual QRTs provide with the results of intermediary calculations at country level. There is not sufficient information to perform an impact assessment at zonal level, i.e. at the level where undertakings performed calculations.

2433. Because of this limitation, assumptions and approximations are needed.

2434. The first important assumption is that the change in country factor affects linearly the calculation.

2435. The second important assumption relates to the effect of reinsurance. Natural catastrophe events create significant claims against which insurance undertakings seek to protect themselves by entering into reinsurance arrangement contracts. Because of the nature of the events, typically non-proportional reinsurance covers are used. These covers are expected to be adjusted after the introduction of new country factors, and 3 different assumptions could be taken:

- The insurance undertaking does not modify its reinsurance programme, hence the capital requirements for natural catastrophe risk increase;

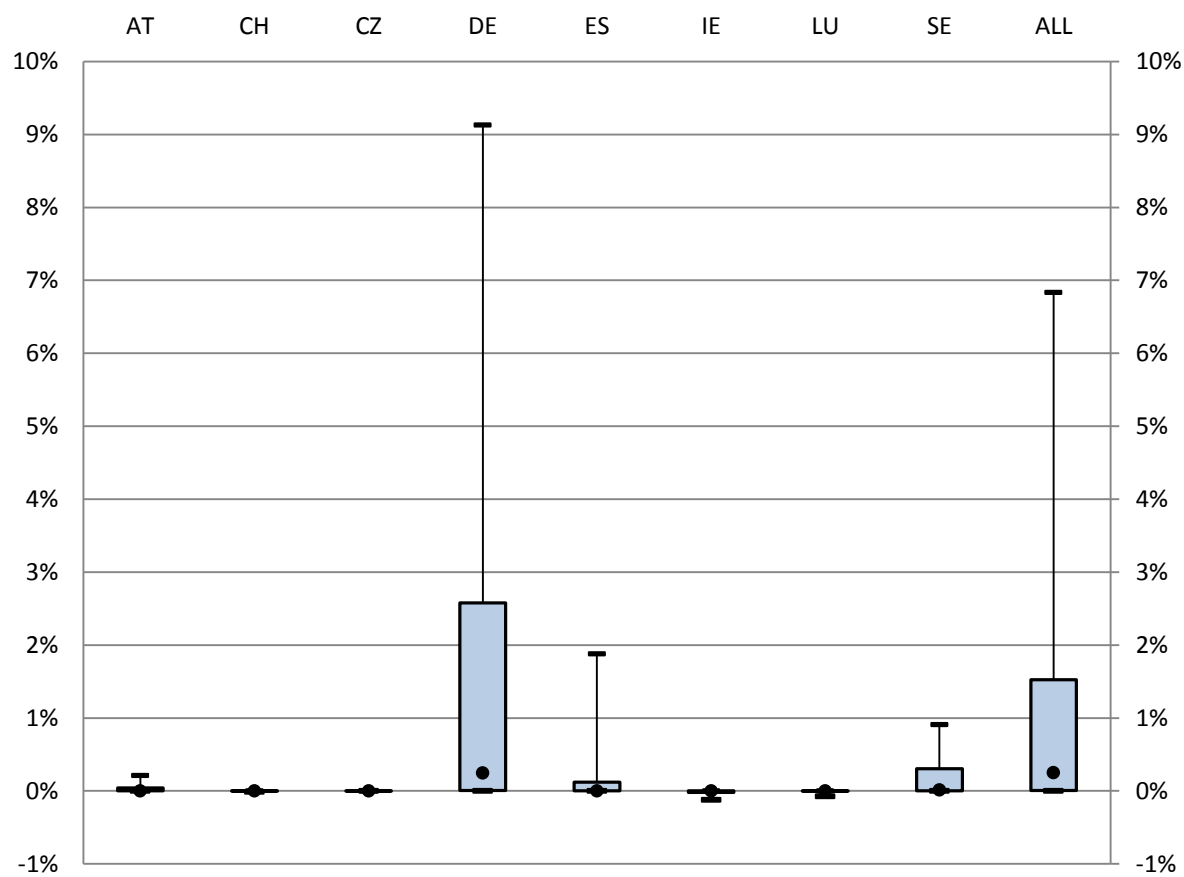
- The insurance undertaking modifies its reinsurance programme so that the capital requirements for natural catastrophe risk are unchanged;
- The insurance undertaking modifies its reinsurance programme so that the capital requirements for natural catastrophe risk increase but not to the full extent;

2436. In its impact assessment, EIOPA has considered the third option: the first option seems unrealistic given that the updated country factors measure the risk in a more appropriate way. The second option is likely, but it would imply that the capital requirements for counterparty default risk increase in an extent that is difficult to foresee.

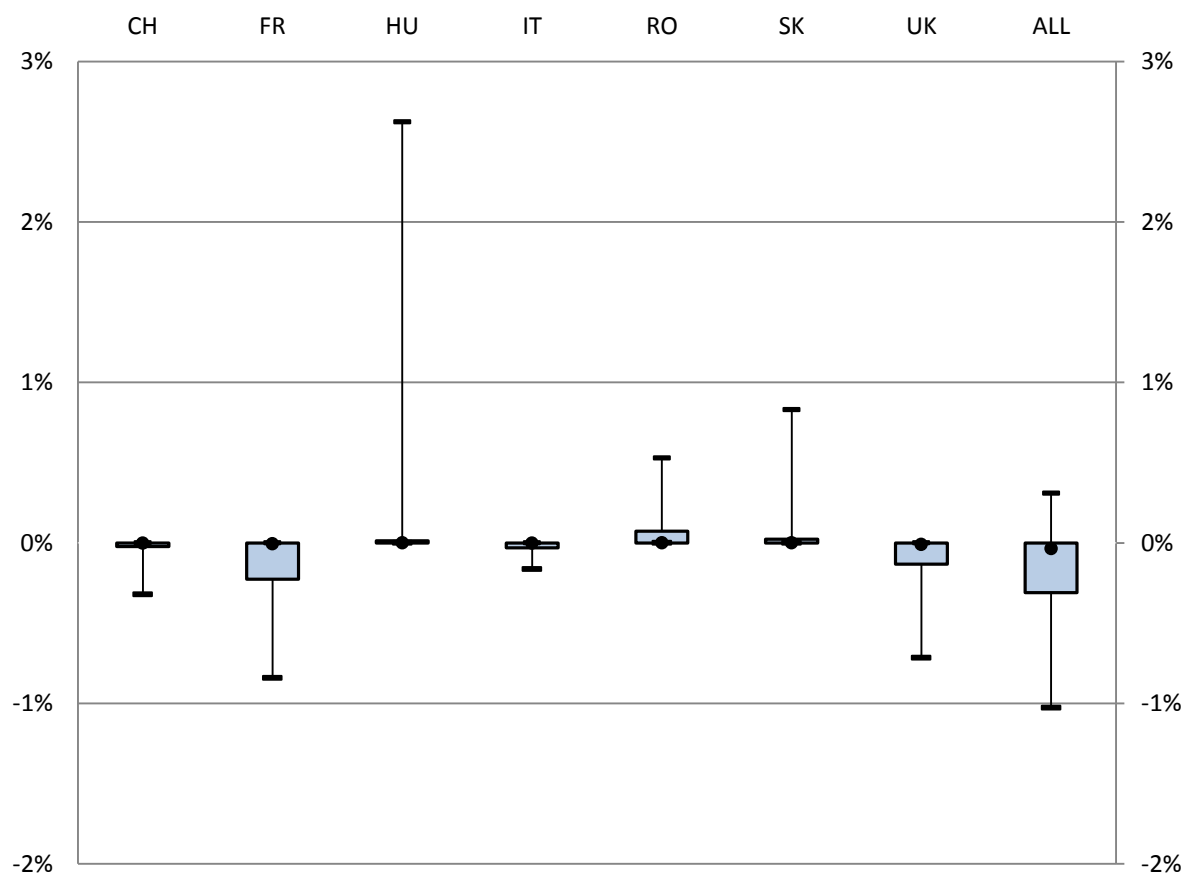
2437. For the third option, an additional assumption needs to be made on the extent with which the new reinsurance programme will mitigate the risk of loss in basic own funds. For practicability reasons, EIOPA has assumed that the effect of reinsurance would increase linearly. Although this assumption is not the most realistic at undertaking level, for assessing the impact on the whole market EIOPA finds it to be more reasonable. Moreover, given the data quality available, it would have been difficult to proceed with another assumption.

2438. The box-plots below illustrate how the impact of the recalibration compared to the baseline is distributed across undertakings, by showing the median, interquartile range and 10th and 90th percentile of observed impacts in percentage points. The blue boxes represent the 25% and the 75% quantiles and the dots represent the medians. The change that has the biggest effect is the reduction of the German country factor for Windstorm risk. However, even for this factor, the average change in the solvency ratio is of 2 percentage points (from 273% to 275%).

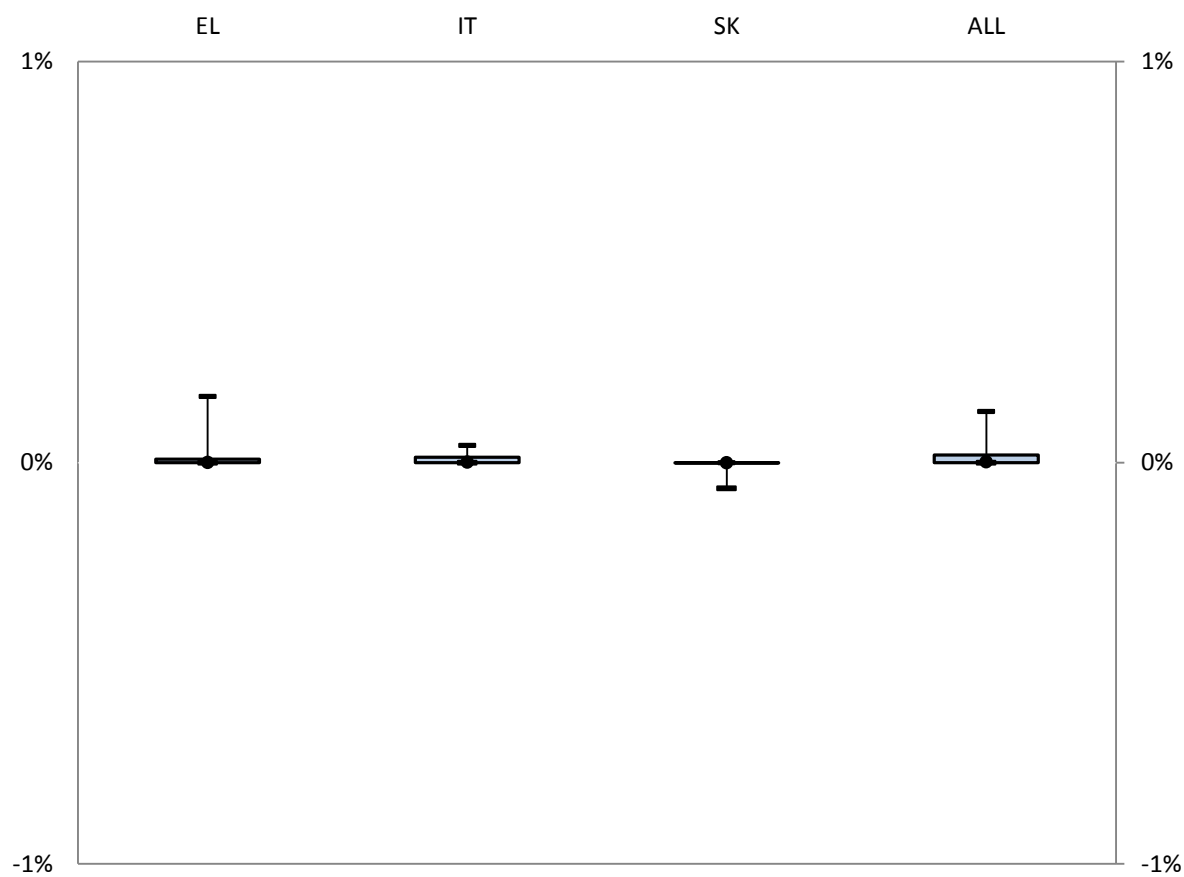
Windstorm risk



Flood risk



Earthquake risk



24.11. Interest rate risk

24.11.1. Policy options

2439. During the development of the advice on interest rate risk module, EIOPA has identified two main policy options which have been considered and debated:

- Option 1: No change.
- Option 2: Changing the method in the interest rate risk module to particularly better reflect lower and negative interest rates.

24.11.2. Analysis of impacts

Option 1 – No change

2440. On the side of benefits, it is possible to detect the following effects:

- Policyholders – None.
- Industry – Undertakings would need to hold less regulatory capital for their interest rate risk. The lower capital requirement in the low yield could act countercyclical if rates do not decrease further and may partly counterbalance the other problems undertakings suffer from in the low yield environment.
- Supervisors – None.

2441. On the side of costs, it is possible to detect the following effects:

- Policyholders – They are less protected if undertakings underestimate their important risks and do not set sufficient capital aside to cover those risks.
- Industry – The undertakings would need to justify more the potential deviations from their risk profile within the ORSA. The risk of interest rates decreasing is not covered by appropriate capital requirements.
- Supervisors – They are more concerned about the likely underestimation of the interest rate risk in the low yield environment and the fact that the SCR does not sufficiently capture the real risk of the undertakings.

Option 2 – changing the method to reflect low and negative interest rates

2442. On the side of benefits, it is possible to detect the following effects:

- Policyholders – a more risk-sensitive methodology for interest rate risk in the low yield environment promotes good risk management, which benefits policyholders.

- Industry – From a risk-management point of view, the adjusted methodology will provide more risk-sensitive results in the low yield environment and thus better capture the undertakings risk-profile. From a complexity point of view, the methodology remains relatively simple and transparent, such that the modified methodology will not create an extra burden for undertakings with regard to complexity.
- Supervisors – they are more certain that the SCR for the interest rate risk is not underestimated in the low and medium yield environment.
- Financial stability – resilience against further decreases of interest rates of the whole industry and of the financial institutions at large is improved.

2443. On the side of costs, it is possible to detect the following effects:

- Policyholders – None.
- Industry – The main cost is the probably increasing capital requirement undertakings need to hold for their interest rate risks.
- Supervisors – None. The understanding and particularly the supervision of the interest rate risk module does not become more complex.

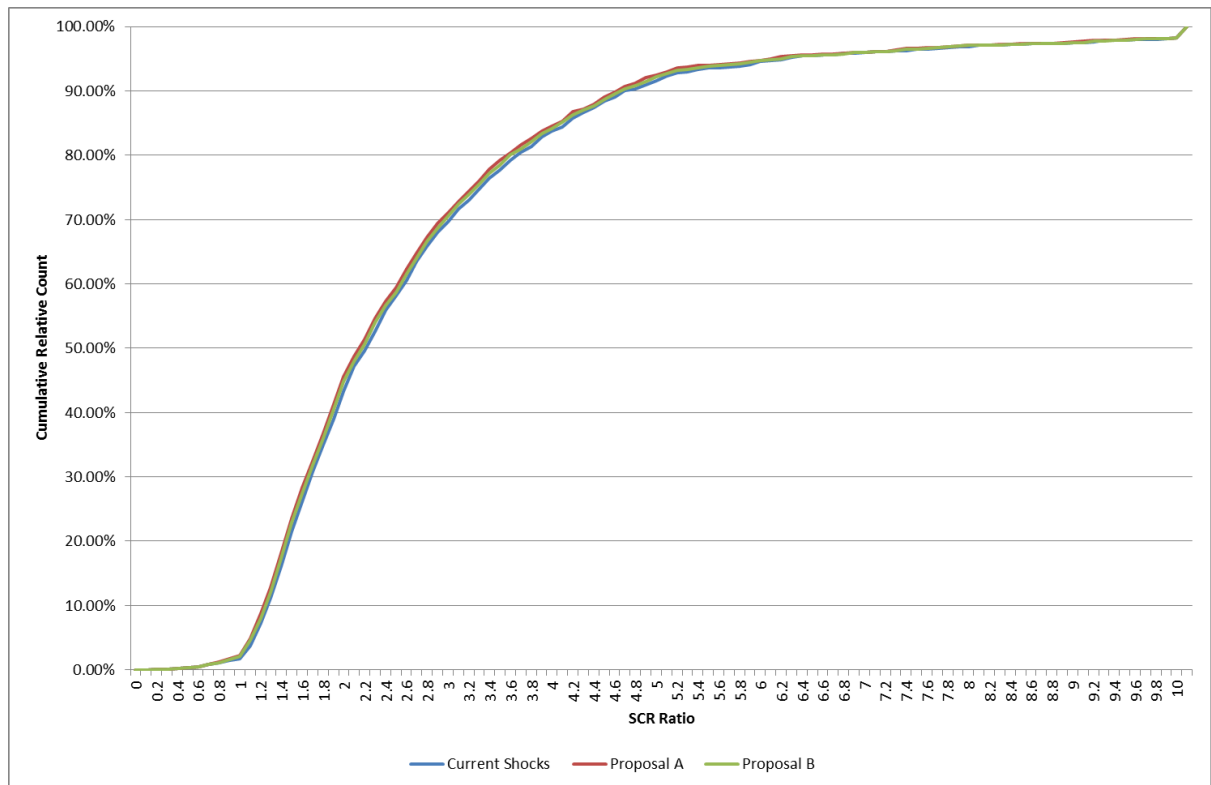
24.11.3. Comparison of options

2444. Given the above cost-benefit analysis, Option 2 (changing the method to reflect low and negative interest rates) is the preferred option: it complies with the objective to ensure the methods, assumptions and parameters remain appropriate.

2445. EIOPA has performed a quantitative impact assessment of two different ways to implement option 2, that are referred to as “proposal A” (absolute stresses of 2% and static floor to interest rates) and as “proposal B” (combined approach). A two-step impact assessment approach was followed:

2446. In a first step, EIOPA has used the annual QRT data to make an impact assessment that has some limitations. Indeed, liabilities’ cash-flows are provided, but it is not possible to assess the impact in case the liabilities cash-flows depend on interest rates. Moreover, assets cash-flows are not provided. On the asset side, approximations can be made using the duration (cf. Article 103 of the Delegated Regulation). The impact assessment is relevant for these undertakings where the liability cash-flows do not depend on interest rates: the scope is limited to non-life undertakings.

2447. The scope of this impact assessment is 1455 insurance undertakings. 25 undertakings have been excluded from the analysis because of poor data quality. The graph below shows the effect of implementing proposal A and B on the SCR ratio, as cumulative distribution function:



2448. Overall the impact on the SCR ratio of non-life undertakings is of a few percentage points: -5 for proposal B and -8 for proposal A. Under proposal A, 4 undertakings would breach their SCR; under proposal B, 2 undertakings would breach their SCR.

2449. To complement this initial impact assessment, EIOPA has launched an information request on these undertakings where liabilities cash-flows depend on interest rates (i.e. profit participation business).

2450. EIOPA received information from 275 undertakings. These undertakings were selected using the following criteria:

- They are sensitive to interest rate changes (i.e. their cash-flows are sensitive).
- They represent at least 50% of the best estimates of standard formula users that are sensitive to interest rates changes.

2451. For several countries, a much higher percentage of representativeness was achieved: in 13 countries, the sample represents more than two third of the total best estimate of these undertakings. In 9 countries, the sample represents more than 80%. In one country, all life insurance undertakings participated. Therefore the sample is considered sufficiently representative of the likely impact on the market.

2452. In order to assess the impact of the proposed shifted approach, a linear approximation appeared as the most natural choice for several reasons:

- first, it is simple: with the standard formula SCR ratio and the shifted approach SCR ratio there are two points that would be below and above the impact of the gradual implementations; and
- second, a linear approximation is not a bad approximation where rates are negative: most of the policy options are already “at the money” and therefore a further decrease does not significantly change the behaviour.

2453. The impact also depends on the average duration of liabilities and assets. Across Europe, different durations and durations mismatched are observed for life products, but most of them are in-between 10 and 20 years. EIOPA has estimated the final impact on the basis of the 10y maturity.

2454. The table below summarises the average impact per country and at EU level. It distinguishes those currencies in a low-yield environment from the ones in a higher yield environment (PLN, HUF, RON). The averages have been calculated as a simple average of the solvency ratios (not weighted). The decrease in the solvency ratios is expressed in percentage points: e.g. assume a solvency ratio of 220%; a decrease of 20 percentage points means that the solvency ratio decreases to 200%. The countries have been anonymised in the following table:

Country	Solvency ratio	Average decrease with proposal A	Average decrease with proposal B	Average decrease with shifted approach
<i>Low-yield environment currencies (EUR, BGN, CZK, DKK, CHF, NOK, SEK, GBP)</i>				
Average	216%	-33	-22	-14
A	171%	-12	-10	-6
B	275%	-5	-3	-2
C	200%	-29	-16	-10
D	229%	-28	-19	-12
E	175%	-17	-12	-8
F	226%	-50	-35	-23
G	204%	-34	-22	-14
H	206%	-49	-31	-20
I	159%	-21	-13	-9
J	212%	-73	-41	-27
K	186%	-5	-7	-5
L	186%	-59	-42	-27
M	398%	-168	-115	-75
N	157%	-19	-11	-7
O	159%	-5	-3	-2
P	168%	-32	-19	-12
Q	228%	-5	-4	-2
R	335%	-46	-30	-20
S	168%	-15	-9	-6
T	240%	-7	-4	-3
U	213%	-14	-9	-6
V	238%	-60	-52	-34
W	232%	-21	-15	-8
X	209%	-6	-4	-2
<i>Higher-yield environment currencies (RON, PLN, HUF)</i>				
Average	271%	-7	-7	-7
Y	284%	-6	-6	-6
Z	271%	-8	-8	-8
AA	257%	-7	-7	-7

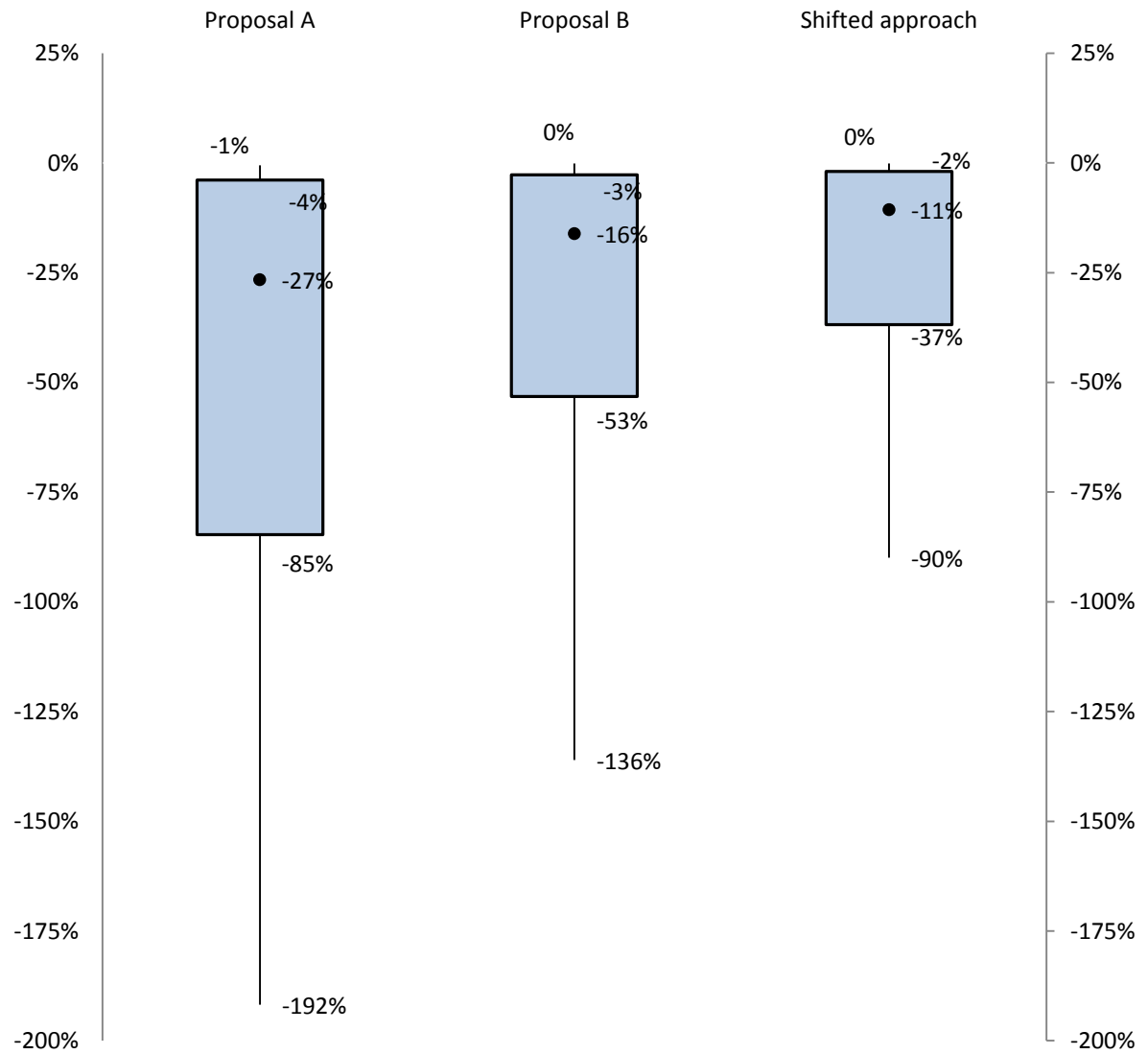
2455. The impact varies significantly per country because of the different businesses and types of products. However, in most countries the impact is quite material.

2456. In terms of number of undertakings breaching their SCR:

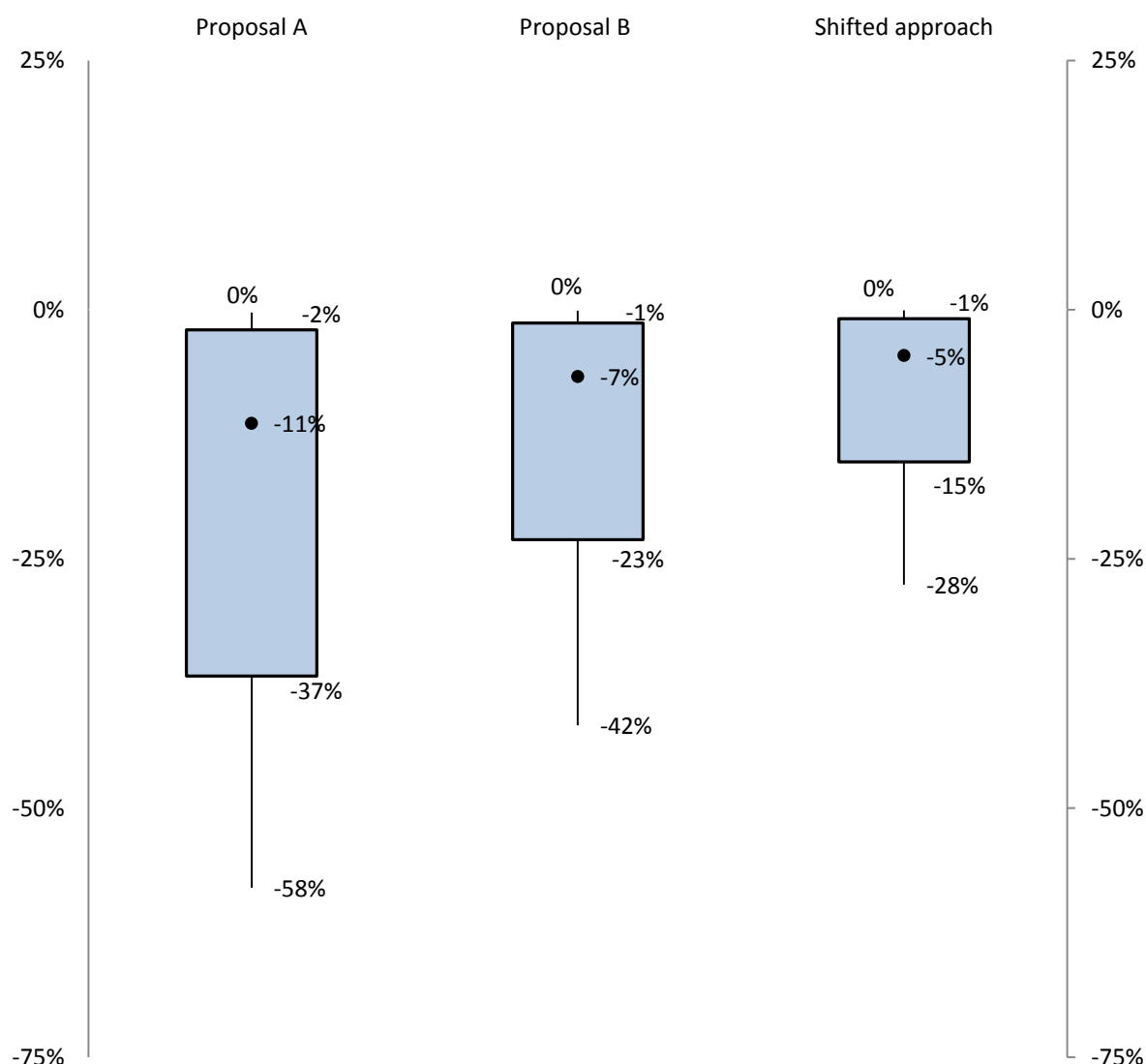
- 15 undertakings of the sample breach their SCR with proposal A: that is 5% of the undertakings of the sample;
- 8 undertakings of the sample breach their SCR with proposal B: that is 3% of the undertakings of the sample.
- 4 undertakings of the sample breach their SCR with the shifted approach: that is 2% of the undertakings of the sample. The average solvency ratio of these undertakings breaching the SCR is 109% with the current standard formula and 94% with the shifted approach. In euro, there is a **total breach of EUR 75m** (i.e. with additional EUR 75m for all these undertakings together, they would not breach their SCR anymore). Given that the sample represents at least 50% of the best estimate of these undertakings sensitive to interest rate, the total breach for all life undertakings can be estimated to be of around that EUR 150m.

2457. The two following box plots provide with the impact on different percentiles: the black point represents the median, the blue box the 25th and 75th percentiles and the black line the 10th and 90th percentiles:

Change of the SCR ratio in percentage points



Relative change of the SCR ratio



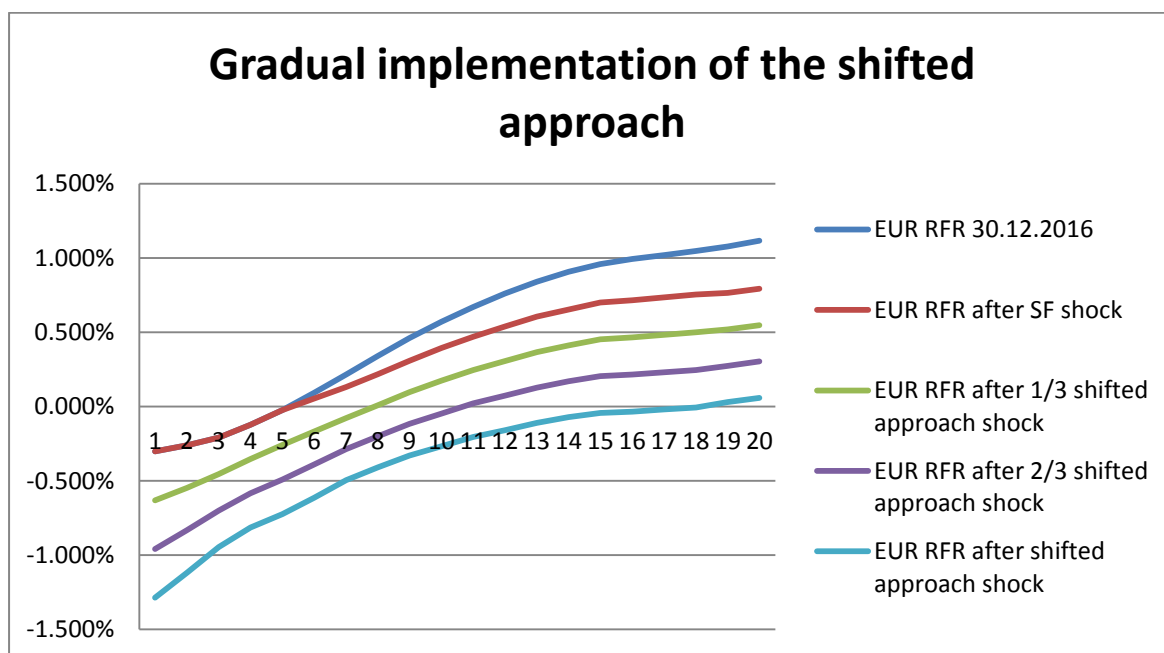
Impact of the gradual implementation of the shifted approach

2458. Given the material impact described above, EIOPA has advised that the shifted approach be gradually implemented in the Delegated Regulation over the next 3 years. The impact of such gradual implementation has also been analysed.

2459. Given that the impact is amortized into the future, it is not possible to anticipate all factors that will change over the next 3 years and affect the solvency of (re)insurance undertakings. Not least of them being (re)insurance undertakings anticipating the effect of the shifted approach on their solvency ratio and seek to reinforce their solvency position where necessary. Further than that, should interest rates continue to increase it would have a double positive effect on the solvency ratios: an increase in eligible own funds due to a decrease of insurance liabilities and a change in the impact of the shifted approach. Other than that, the effect of the various transitional measures, the change in the volatility and matching adjustments would have an impact as well.

2460. Therefore and in order to base its analysis on factual data, EIOPA has considered the impact of the gradual implementation at the same date of calculation for each of the 3 years.

2461. In most cases and given the current rate environment and types of products, the relevant scenario for the interest rate risk is the downward shock. The gradual implementation proposed provides with the following curves:



2462. The impact of each step of the gradual transition is estimated on the basis of the SCR ratio obtained with the current standard formula and of the SCR ratio obtained with the “full” shifted approach.

2463. A linear approximation of the impact appeared as the most natural choice for several reasons:

- first, it is simple: with the standard formula SCR ratio and the shifted approach SCR ratio there are two points that would be below and above the impact of the gradual implementations; and
- second, a linear approximation is not a bad approximation where rates are negative: most of the policy options are already “at the money” and therefore a further decrease does not significantly change the behaviour;

2464. The impact is expected to be most material from the 2nd to the 3rd year. This is because for the first year, where the decrease is less material, different buffers such as specific reserves or unrealised gains could be used to compensate for the lower amount of distributed profits. After a certain step, this compensation is not sufficient.

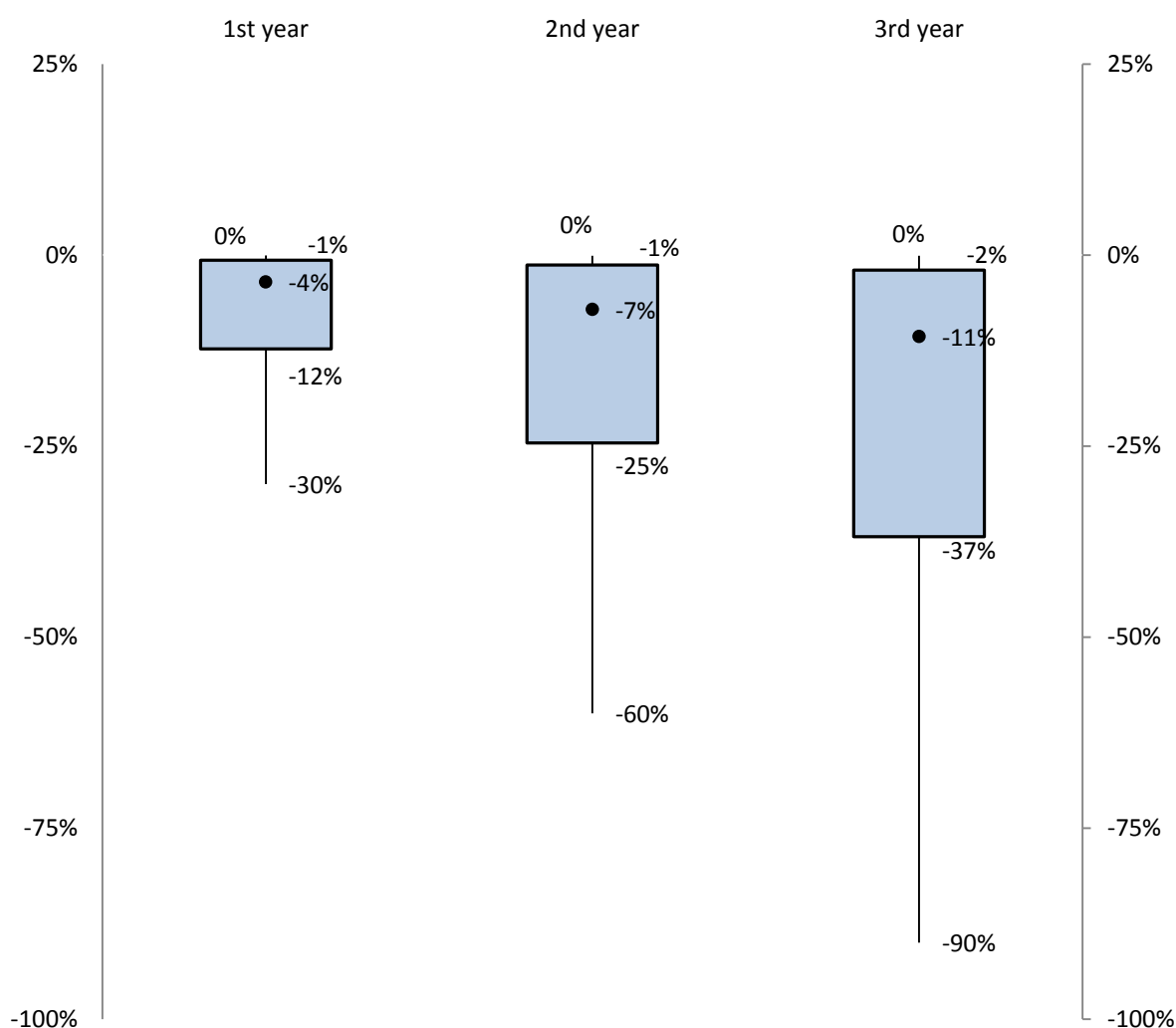
2465. Finally, the impact also depends on the average duration of liabilities and assets. Across Europe, different durations are observed for life products, but most of them are in-between 10 and 20 years.

2466. EIOPA has chosen to assess the impact mainly on the basis of the decrease observed for maturity 10 year. The change in the 10y interest rate in absolute percentage has been used to linearly interpolate the change in the SCR ratio. Other maturities have also been tested, without changing materially the conclusion.

Number of undertakings breaching its SCR per year

	1st year	2nd year	3rd year
10y maturity assessment	2 undertakings (1% of sample)	3 (1% of sample)	4 (2% of sample)
15y maturity assessment	2 undertakings (1% of sample)	3 (1% of sample)	4 (2% of sample)
20y maturity assessment	2 undertakings (1% of sample)	3 (1% of sample)	4 (2% of sample)

Decrease of SCR ratio in percentage points based on 10y maturity assessment



2467. To validate its approximation of the impact, a further analysis based on cash-flows available in the annual QRT was conducted. This analysis used, as a basis, the cash-flows available in a significant life insurance market where undertakings would be materially affected by the introduction of the shifted approach.

2468. The process followed was the following:

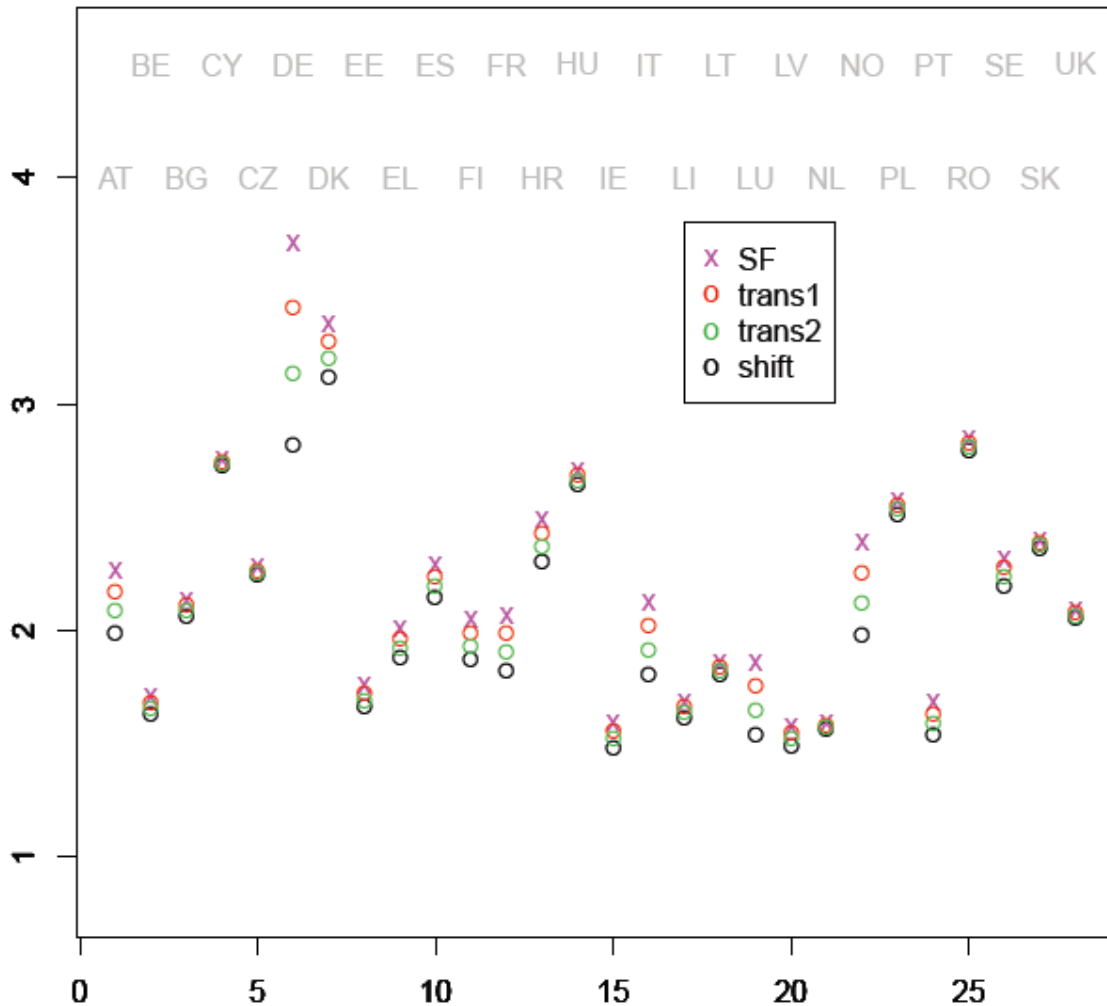
- Define the coverage ratio as $CR_k := (1 - \alpha_k)CR_{SF} + \alpha_k CR_B$, where CR_{SF} and CR_B are the SCR ratios under the standard formula and under the proposal B, respectively; k stands for the other curves, in particular the curves obtained over the gradual implementation.
- To calibrate Alpha, the cash flows of template S.13.01.01.01 were used and the present values using the different curves mentioned above was computed:

$$\alpha_k := \frac{PV_k - PV_B}{PV_{SF} - PV_B},$$

$$\text{where } PV_X := \sum_{\substack{n \in \{1, \dots, 30, 36, 46, 56\} \\ \text{all life insurers}}} \frac{R00nn0(C0010 + C0020 - C0030 - C0040)}{(1 + i_n^{(k)})^n}$$

- For each undertaking in the whole sample, Alpha was applied to the boundaries CR_SF and CR_B.
- A simple average of the SCR ratios was performed per country.

2469. This calculation smooths away the maturity-dependency of the impact estimation, and shows that the two intermediate coverage ratios are somewhat linear, even when calibrating on present values. The graph below provides with the (simple) average solvency ratio over the sample along the gradual implementation. On x-axis are countries.



24.12. Market risk concentration

24.12.1. Policy options

2470. The capital requirement for market risk concentration shall be calculated on the basis of single name exposures. Each single name exposure shall be assigned a risk factor depending on the weighted average credit quality step of the exposure.

2471. However, the risk factor for single name exposures to a (re)insurance undertaking for which a credit assessment by a nominated ECAI is not available and where the undertaking meets its Minimum Capital Requirement shall be determined based on its solvency ratio. The risk factor to be applied would range between 12%-73%; the higher the solvency ratio, the lower the risk factor (and the resulting capital requirement for market risk concentration).

2472. This provision is not applicable where exposures to a solo insurance undertaking are part of a larger single name exposure. In this case the risk factor has to be determined in accordance with the general rule for exposures for which a credit assessment by a nominated ECAI is not available; therefore the risk factor would be 73% irrespective of the solvency ratio.

2473. This situation would for example arise if a solo insurance undertaking was part of a group and there were exposures to other members of the group (e.g. other solo insurance undertakings).

2474. This means that the same exposures to a solo insurance undertaking may be assigned different risk factors depending on whether they are part of a larger single name exposure or not.

2475. In order to avoid such a situation, EIOPA has analysed the possible introduction of a different treatment for single name exposures which consist not exclusively of exposures to a single solo insurance or reinsurance undertaking.

2476. In this respect the following policy options have been considered:

- Option 1 – No change: in this option exposures to a solo insurance undertaking which are part of a larger single name exposure are treated as described above.
- Option 2 – Change: The contribution of exposures to a solo insurance undertaking which are part of a larger single name exposure to the risk factor is determined based on the solvency ratio of the solo insurer. EIOPA considered two approaches how this could be implemented ("Reverse mapping" and "Average risk factor"). Both can be calibrated so that the results are (nearly) identical. In consequence the impacts on policyholders, industry and supervisors do not differ materially. But as there is no need to change Article 185 the former approach seems preferable.

24.12.2. Analysis of impacts

Option 1 - No change

2477. On the side of benefits, it is possible to detect the following effects:

- Policyholders – in case the calculation based on solvency ratios underestimated the risks, the current rules would avoid an insufficient level of regulatory capital requirements. This would reduce the risk that the insurance undertaking cannot meet its obligations towards the policyholder.
- Industry – in case the calculation based on solvency ratios underestimated the risks, the current rules would avoid an insufficient level of regulatory capital requirements. This would reduce the risk of the loss of the “franchise value” in case of a default, the need to raise additional capital under stressed conditions or reputational damage.
- Supervisors – in case the calculation based on solvency ratios underestimated the risks, the current rules would avoid an insufficient level of regulatory capital requirements. This would reduce the risk of solvency problems for insurers and the risk of losses for policyholders.

2478. On the side of costs, it is possible to detect the following effects:

- Policyholders – in case the calculation based on solvency ratios reflected the risks better than the current treatment, the regulatory capital requirements could overestimate the risks. This could result in higher premiums or in reduced benefits: The regulatory capital could be higher than necessary or the insurer might enter into less efficient transactions (e.g. to avoid “mixed” exposures).
- Industry – in case the calculation based on solvency ratios reflected the risks better than the current treatment, the regulatory capital requirements could overestimate the risks. This could result in lower returns on capital: The regulatory capital that the insurer has to hold might be higher than necessary or the profits might be lowered by less efficient transactions.
- Supervisors – in case the calculation based on solvency ratios reflected the risks better than the current treatment, the regulatory capital requirements could overestimate the risks. This could result in higher premiums than necessary and less choice for policyholders. Another consequence could be that insurance undertakings are less profitable thus making it more difficult for them to absorb losses.

Option 2 - Change

2479. On the side of benefits, it is possible to detect the following effects:

- Policyholders – in case the calculation based on solvency ratios reflected the risks better than the current treatment, an overestimation of the regulatory capital requirements with the costs for policyholders described for option 1 would be avoided.
- Industry – in case the calculation based on solvency ratios reflected the risks better than the current treatment, an overestimation of the regulatory capital requirements with the costs for industry described for option 1 would be avoided.
- Supervisors – in case the mapping of solvency ratios reflected the risks better than the current treatment, an overestimation of the regulatory capital requirements with the costs for supervisors described for option 1 would be avoided.

2480. On the side of costs, it is possible to detect the following effects:

- Policyholders – in case the mapping of solvency ratios underestimated the risks, this would result in an insufficient level of regulatory capital with the consequences for policyholders described for option 1.
- Industry – in case the mapping of solvency ratios underestimated the risks, this would result in an insufficient level of regulatory capital with the consequences for industry described for option 1. The mapping does not result in a meaningful increase in the complexity of the calculations.
- Supervisors – in case the mapping of solvency ratios underestimated the risks, this would result in an insufficient level of regulatory capital with the consequences for supervisors described for option 1.

24.12.3. Comparison of options

2481. While there are some limitations (there is for example no requirement that the insurer identifies all single name exposures that were used in the calculation of the market risk concentration risk charge), based on reporting data the possible impact of the proposed treatment for “mixed” single name exposures is apparently quite limited.

2482. It seems that on an aggregate level significantly less than 1 % of assets could be potentially affected. In addition, in 80 % of the cases evaluated that were affected the weighted average credit quality step was reduced by one step.

2483. Based on the cost-benefit analysis, EIOPA's preferred option is option 2 (Change). This avoids the different treatment of exposures to insurers in single name exposures.

24.13. Currency risk at group level

24.13.1. Policy options

2484. The capital requirement for currency risk is calculated for each foreign currency based on a stress to the value of foreign currency against local currency. At group level that calculation may penalize holding own funds to cover a related undertaking's Solvency Capital requirement in the currency in which this undertaking's assets and obligations are denominated. A group with exposure to multiple currencies would be increasing its risk if it chose to hold all its capital in the reporting currency; however with the current design of the standard formula, that would imply a lower capital requirement.

2485. During the development of the advice on the currency risk at group level, EIOPA has considered different options for amending the standard formula.

- Option 1: adjust the standard formula to exclude assets that cover MCR locally.
- Option 2: Groups could be given flexibility to select a 'local' currency other than the one used for preparing their consolidated accounts.

24.13.2. Analysis of impact

Option 1: adjust the standard formula to exclude assets that cover MCR locally

2486. On the side of benefits, following observations can be made:

- Policyholders- no benefits compared to the current approach.
- Industry- this approach will result in reduction of group currency risk capital requirement and thus benefit them by providing a capital relief.
- Supervisors- no benefits compared to the current approach.

2487. On the side of costs, following observations can be made:

- Policyholders- no costs compared to the current approach.
- Industry- there will be implementation costs so that the standard formula still captures risks appropriately.
- Supervisors – the formula is more complex.

Option 2: Groups could be given flexibility to select a 'local' currency other than the one used for preparing their consolidated accounts

2488. On the side of benefits, following observations can be made:

- Policyholders- the reduction in capital requirements can be passed back to policyholders. However, this will apply in a limited number of cases.
- Industry- this approach can reduce currency risk capital requirements of some groups materially, where they have significant exposure to a single currency other than the currency used to prepare their consolidated accounts. In addition, it can allow groups to manage their FX exposures more effectively by determining the group currency risk capital requirement based on economic risk.
- Supervisors- no benefits compared to the current approach.

2489. On the side of costs, following observations can be made:

- Policyholders- no costs compared to the current approach.
- Industry- Implementation costs will be small but groups may need to spend resources on justifying their choice of the reference currency for determining the currency risk capital requirement.
- Supervisors- the supervisory assessment of FX exposures and capital requirement may be more complex. In particular, judgement may be required to assess whether choices of currencies by groups are appropriate.

24.13.3. Comparison of options

2490. EIOPA recommends option 2 (flexibility to select a 'local' currency other than the one used for preparing their consolidated accounts) and would like to get feedback from stakeholders on the benefits and costs. This option complies with the objective to simplify the standard formula at least in certain cases, while ensuring that the methods remain appropriate in average.

24.14. Unrated debt

24.14.1. Policy options

2491. The calculation of the capital requirement for spread risk on bonds and loans is based on risk factors which depend on the credit quality step (CQS) and the modified duration of the bond or loan. The higher the duration and the CQS, the higher the risk factor and the resulting capital requirement.

2492. CQS range from 0 to 6 and are assigned based on the credit assessments by one or more nominated ECAI. Bonds and loans for which a credit assessment by a nominated ECAI is not available receive a treatment between the risk factors applicable to bonds and loans with a CQS 4 and CQS 3.

2493. With the aim to reduce reliance on external credit ratings for regulatory purposes, the Commission asked EIOPA to provide criteria through which investments with a better risk profile can be identified ensuring that bonds

and loans benefit from a risk-based treatment, without limiting this benefit to instruments for which a credit assessment by a nominated ECAI is available. In particular, in its call for advice the Commission asked EIOPA to identify certain unrated debt, which would be allowed to receive the calibration associated with QCS 2 (as well as CQS 3 and CQS 1). During the development of the advice on unrated debt, EIOPA has identified two main policy issues for which different options have been considered and debated:

- policy issue 1: internal assessment approach; and
- policy issue 2: Use of results from approved internal banking or insurance models

Policy issue 1: internal assessment approach

2494. To identify the unrated bonds and loans eligible to such treatment, a first step is to require the insurer to perform an internal assessment in accordance with certain requirements to be defined in the regulation.

2495. The outcome of this internal assessment would allow the insurer to apply a treatment equivalent to the treatment applicable to bonds and loans with a credit quality step 2 or 3 respectively, benefiting from a lower capital requirement compared to the current regulation. The bonds and loans for which a credit assessment by an ECAI is not available and which do not meet the criteria defined by the internal assessment will still receive a treatment between CQS 3 and CQS 4.

2496. For the sake of harmonization and to ensure that the internal assessments would be sufficiently prudent, the process put in place by insurers shall respect certain criteria.

2497. In this respect the following options have been considered:

- Option 1.1 –Criteria based on financial ratios of the borrower.
- Option 1.2 –Criterion based on the yield of the bonds and loans considered relative to the yields of bonds with certain external ratings.
- Option 1.3 –Extended risk management requirements
- Option 1.4. – Combination of financial ratios criteria, spread criterion and extended risk management requirements

Policy issue 2: Use of results from approved internal banking or insurance models

2498. There are insurers that invest alongside banks in portfolios of unrated corporate loans. The bank underwrites the loans and performs the associated administrative tasks. The insurer purchases a part of the portfolio with the same rights as the bank (i.e. no differences in terms of seniority, collateralisation etc.).

2499. If the bank has an approved IRB model for quantifying the credit risk a standard formula insurer could use outputs of the internal model (probability

of default ("PD")) to determine whether the debt can be treated as rated debt with a certain credit quality step for the purpose of the spread risk sub-module.

2500. Instead of the results of IRB models, results from approved full or partial internal models used by an insurer could be used.

2501. In order to identify unrated debt and loans eligible to the specific treatment, the following options have been considered:

- Option 2.1 – Allow the use of the results from approved internal banking or insurance models
- Option 2.2. – Not allow the use of the results from approved internal models (current approach)

24.14.2. Analysis of impacts

Policy issue 1: internal assessment process

Option 1.1 - Implementing criteria based on financial ratios of the borrower.

2502. On the side of benefits, it is possible to detect the following effects:

- Policyholders – Financial ratios are effective in identifying borrowers with low credit quality thus limiting the risk subscribed by the insurer.
- Industry – Financial ratios can be easily computed based on financial statements.
- Supervisors – It can be easily verified that the unrated debt and loans to which the insurer applies a treatment equivalent to CQS 2 or 3 comply with the financial ratios criteria.

2503. On the side of costs, it is possible to detect the following effects:

- Policyholders –The developed methodology will inevitably produce some "false positives". Thus, the insurer might subscribe to risky asset without having the corresponding amount of eligible own funds.
- Industry – On the other hand, the methodology developed might generate some "false negatives" preventing the insurer from investing in debt with good credit quality.
- Supervisors –The methodology produces inevitably, some "false positives". Thus, the insurer might subscribe to risky asset without having the corresponding amount of eligible own funds.

Option 1.2 implementing a criterion based on the spread between the yield of the bonds and loans considered and the average yield of investment grade assets

2504. On the side of benefits, it is possible to detect the following effects:

- Policyholders – The implementing cost for the yield criterion would be low hence benefiting potentially policyholders via lower prices.
- Industry – The criterion is objective and can be easily evaluated.
- Supervisors – The yield criterion permits to take into account the risk of the borrower perceived by investors.

2505. On the side of costs, it is possible to detect the following effects of option 2:

- Policyholders – There might be incentives for the insurer to “under-price” the loan with the consequence that the risk associated with the loan is underestimated. This may compromise the solvency position of the insurer and then potentially hurt the policyholders.
- Industry – the use of the yield criterion may provide incentives to the insurer to “under-price” the loan.
- Supervisors – There is potentially the incentive for the insurer to “underprice” the loan.

Option 1.3 Extended risk management requirements

2506. On the side of benefits, it is possible to detect the following effects:

- Policyholders – The improvement in the risk management processes ensures a sound and prudent management of the associated credit risks that the insurer underwrites.
- Industry – As the criteria build on existing requirements and processes and insurers investing in unrated debt would need to manage the resulting risks irrespective of any capital requirements, the implementation costs are limited.
- Supervisors – The insurers have incentives to improve the internal processes for assessing credit risk.

2507. On the side of costs, it is possible to detect the following effects of option 3:

- Policyholders – The implementation of the extended risk management creates some costs. Some insurers might be tempted to establish less demanding processes that do not assess the risks adequately.
- Industry – The extended risk management creates some costs. Insurers with a more demanding internal assessment may be at a competitive disadvantage.

- Supervisors – There are higher costs for the supervision. Off-site monitoring of internal processes is difficult to perform. Hence, compliance with risk management requirements needs to be supervised by on-site visits.

Option 1.4. – Combination of financial ratios criteria, spread criterion and extended risk management requirements

2508. As a combination of the first three options it shares to a certain extent the benefits and the costs of the other options. The combination of different criteria makes it easier to determine the optimal trade-off between “false positives” and “false negatives”. At the same time, the implementation costs are increased.

Policy issue 2: Use of results from approved internal banking or insurance models

Option 2.1 – Use of the results from approved internal models

2509. On the side of benefits, it is possible to detect the following effects:

- Policyholders – The implementation costs of using internal models to identify unrated debt and loans qualifying to the treatment equivalent to a certain CQS, would be lower hence benefiting potentially policyholders via lower prices.
- Industry – Insurers may benefit from the expertise and the knowledge of the bank in the area of credit risk assessment.
- Supervisors – As the internal model is subject to approval and has to be regularly reviewed, the supervision may be less involved than with the internal assessment process.

2510. On the side of costs, it is possible to detect the following effects of option 3:

- Policyholders – Potential problems in the banking sector that result from insufficient regulatory capital calculated with internal models could be transmitted to the insurance sector thus increasing interconnectedness. This could undermine the solvency of the insurance sector and ultimately affect policyholders.
- Industry – The results for the same debt item can differ widely across internal models. As a result, there is a trend in banking regulation to reduce reliance on internal models. Furthermore, the bank may use its informational advantage to the detriment of the insurer.
- Supervisors – In Member States where bank and insurance supervision are organisationally separated, the insurance supervisor might have less information on the internal model.

Option 2.2- Not allow the use of the results from approved internal models

2511. On the side of benefits, it is possible to detect the following effects:

- Policyholders – Limit potential interconnectedness between insurance and bank sectors.
- Industry – No reliance on credit risk model of a bank.
- Supervisors – The insurance supervisor does not have to put reliance on the assessment by an internal model.

2512. On the side of costs, it is possible to detect the following effects:

- Policyholders – Insurers may invest less in unrated debt than optimal from an economic perspective as the “default” treatment of unrated debt overestimates the risk and the internal assessment is perceived as too burdensome.
- Industry – In order to benefit from a different treatment than currently set out in the regulation, insurers would have to implement an internal assessment process, which could lead to increasing costs.
- Supervisors – The capital requirement based on the results of the internal assessment process may reflect the risks better than the “default” treatment of unrated debt.

1.14. 3 Comparison of options

2513. Regarding policy issue 1(internal assessment process), **option 1.4 (Combination of financial ratios criteria, spread criterion and extended risk management requirements)** is preferred. Only by combining the different criteria, the credit risk of the unrated debt and unrated loan can be assessed with sufficient accuracy.

2514. In the following, an estimate of the possible effect on the capital requirement for this combined approach is provided.

2515. The effect depends on the proportion of unrated debt relative to the total investments, the credit quality of the unrated debt and the accurateness of the method.

2516. Based on data from the annual reporting unrated debt issued by corporates outside the financial and real estate sector represents a low single digit percentage of all investments by European insurers.

2517. Information on the credit quality of unrated debt is naturally difficult to obtain. The following table shows a possible distribution based on the rating categories for rated companies and a 2014 Bundesbank publication:¹³⁸

¹³⁸ See Deutsche Bundesbank (2015): Monthly Report. January 2015. Page 44.

CQS	2	3	4	5 and 6
%	10 %	40 %	35 %	15 %

2518. This overestimates probably the credit quality of unrated debt as these are often small(er) entities.

2519. The effectiveness of the yield criterion varies over time with the yield difference between higher and lower rated debt. It is also difficult to put a precise figure on the effectiveness of the internal assessment in "sorting out" borrowers with poor credit quality. Finally, the borrower and the debt item has to meet different criteria which interact (i.e. a lower credit quality borrower might for example pass the financial ratio requirement but not the yield criterion).

2520. These factors make it difficult to estimate the pass rates for the different credit qualities in the internal assessment approach.

2521. For the calculation below the pass-rates for the financial ratio requirement applied to unrated debt are estimated based on the pass-rates for rated companies.

2522. The estimate of the pass-rates for the yield criterion is based on the yields for constituents of bonds indices assuming a "yield premium" of 0.5 % for unrated debt.

2523. In order to produce a very conservative upper bound for the impact on the capital requirement the following assumptions are made:

- i. **None** of the debt items that pass the other criteria are disqualified in the internal assessment by the insurer.
- ii. The pass-rates for the financial ratio and yield criterion combined are calculated as the minimum of the respective pass rates. This implies that none of the debt items that meet the criterion with the lower pass rates are disqualified by the other criterion.
- iii. As the pass rates for the yield criterion the maxima of the pass rates for February 2007, November 2008 and December 2017 are used.

2524. Under the very strong assumptions described above for the credit quality distribution and the pass rates, a very conservative upper bound for the impact on the spread risk charge can be calculated: The spread risk charge for a portfolio of unrated debt with modified duration of 5 years would decrease from 15 % to 12.60 %. The actual decrease should be substantially smaller.

2525. Regarding policy issue 2 (use of results from internal models), based on the cost-benefit-analysis option 2.1 (Allow the use of the results from approved internal banking or insurance models) is preferred. The approach

offers substantial advantages and the suggested safeguards are considered to offer sufficient protection.

24.15. Unlisted equity

24.15.1. Policy options

2526. EIOPA is asked to develop criteria for identifying unlisted equities with a risk similar to type 1 equities. For this purpose EIOPA has developed an approach that combines an assessment of the similarity with listed companies and requirements on the investment vehicle (where relevant).

2527. The aim of the similarity approach is to ensure that the unlisted companies have a similar risk profile as the companies which were used to calibrate the type 1 equity risk charge.

2528. Regarding the method for the similarity assessment, the following policy options have been considered:

- Option 1 – Beta method: For each company a beta is calculated with a function that uses risk relevant properties as inputs. The function is derived based on the observed betas for listed companies. If the portfolio beta is sufficiently low then the type 1 risk charge can be applied.
- Option 2 – Stressed period loss method: For each company a stressed one-year loss is calculated with industry sector and leverage as inputs. If the portfolio loss is similar to the loss observed for a broad portfolio of listed equities then the type 1 risk charge can be applied.

24.15.2. Analysis of impacts

2529. In terms of the costs for their implementation the difference between the two methods are negligible. Therefore the only relevant aspect to consider is their risk-sensitivity.

Option 1 – Beta method

2530. On the side of benefits, it is possible to detect the following effects:

- Policyholders – As more factors can be considered the method is potentially more accurate in reflecting the differences in the risk between companies. It allows reproducing the historical betas for diversified portfolios of listed equities with sufficient accuracy and the calibration does not depend exclusively on a single crisis. This might on balance result in a better reflection of the risks in the regulatory capital requirement.
- Industry – As more factors can be considered the method is potentially more accurate in reflecting the differences in the risk between companies. It allows reproducing the historical betas for diversified portfolios of listed equities with sufficient accuracy and the calibration does not depend exclusively on a single crisis. This

might on balance result in a better reflection of the risks in the regulatory capital requirement.

- Supervisors – As more factors can be considered the method is potentially more accurate in reflecting the differences in the risk between companies. It allows reproducing the historical betas for diversified portfolios of listed equities with sufficient accuracy and the calibration does not depend exclusively on a single crisis. This might on balance result in a better reflection of the risks in the regulatory capital requirement.

2531. On the side of costs, it is possible to detect the following effects:

- Policyholders – The risk measure underlying the beta approach differs from the risk measure defined in Solvency II. While a strong relation between beta and the drop in the stock price during the financial crisis of 2007-2008 can be observed, this might on balance result in a worse reflection of the risks in the regulatory capital requirement
- Industry – The risk measure underlying the beta approach differs from the risk measure defined in Solvency II. While a strong relation between beta and the drop in the stock price during the financial crisis of 2007-2008, this might on balance result in a worse reflection of the risks in the regulatory capital requirement
- Supervisors – The risk measure underlying the beta approach differs from the risk measure defined in Solvency II. While a strong relation between beta and the drop in the stock price during the financial crisis of 2007-2008 can be observed, this might on balance result in a worse reflection of the risks in the regulatory capital requirement

Option 2 – Stressed period loss method

2532. On the side of benefits, it is possible to detect the following effects:

- Policyholders – The risk is measured based on the same metric which is defined in the Solvency II framework. The global financial crisis seems to be the best recent proxy for a 1 in 200 years event. This might on balance result in a better reflection of the risks in the regulatory capital requirement.
- Industry – The risk is measured based on the same metric which is defined in the Solvency II framework. The global financial crisis seems to be the best recent proxy for a 1 in 200 years event. This might on balance result in a better reflection of the risks in the regulatory capital requirement.
- Supervisors – The risk is measured based on the same metric which is defined in the Solvency II framework. The global financial crisis seems to be the best recent proxy for a 1 in 200 years event. This

might on balance result in a better reflection of the risks in the regulatory capital requirement.

2533. On the side of costs, it is possible to detect the following effects:

- Policyholders – As fewer factors are considered than in the other option the method is potentially less accurate in reflecting the differences in the risk between companies. The method is calibrated based on the 2008-2009 period and the next crisis may be different. This might on balance result in a worse reflection of the risks in the regulatory capital requirement.
- Industry – As fewer factors are considered than in the other option the method is potentially less accurate in reflecting the differences in the risk between companies. The method is calibrated based on the 2008-2009 period and the next crisis may be different. This might on balance result in a worse reflection of the risks in the regulatory capital requirement.
- Supervisors – As fewer factors are considered than in the other option the method is potentially less accurate in reflecting the differences in the risk between companies. The method is calibrated based on the 2008-2009 period and the next crisis may be different. This might on balance result in a worse reflection of the risks in the regulatory capital requirement.

24.15.3. Comparison of options

2534. There are no meaningful differences in terms of the costs for applying the methods. Therefore risk-sensitivity should be the main concern.

2535. Based on the cost-benefit analysis, EIOPA's preferred option is option 1 (Beta method). Beta is established in the investment industry and academia. Moreover, the beta method allows using more risk relevant factor.

2536. Based on data from the annual reporting the average share of private equity investments and unlisted direct equity investments in companies outside the financial and real estate sectors -excluding strategic participations and those backing unit linked business - of all investments is in the low single digits.

2537. Due to the limited information available, it is difficult to estimate what share of unlisted equity investments would meet the criterion in the beta method. 32% of listed European companies with a market cap between 100 million and 1 billion EUR at the end of 2016 have a predicted beta lower than 0.39/0.49.

2538. The actual number of companies qualifying would be substantially higher as in a portfolio of unlisted companies betas above the threshold can be offset by betas below the threshold.

24.16. Simplification of the counterparty default risk module

24.16.1. Policy options

2539. During the development of the advice on simplifications on the counterparty default risk module, EIOPA has identified three main policy issues for which different options have been considered and debated:

- policy issue 1: risk mitigation techniques
- policy issue 2: contractual netting agreements; and
- policy issue 3: treatment of derivatives.

Policy issue 1: Risk mitigation techniques

2540. Section 10 in the Delegated Regulation concerns risk mitigation techniques. The Articles in this section set out criteria for the recognition of a technique as risk mitigating. However, it is not clear whether the term “technique” refers to an individual contract or an entire strategy.

2541. With the general wish to clarify the regulation where necessary, EIOPA advises to clearly define what is meant by a risk mitigation technique to avoid different interpretations and practises across Europe.

2542. In this respect the following options have been considered:

- Option 1.1 – Individual contracts: in this option, a risk mitigation technique is defined as an individual contract. The individual contract should meet the criteria in section 10 to qualify as a risk mitigation technique, e.g. it should transfer risk on a stand-alone basis.
- Option 1.2 – Strategy: in this option, a risk mitigation technique is defined as a strategy. The strategy is clearly defined by the undertaking, potentially in a written policy. The strategy can entail both long and short positions, and the criteria for risk mitigation techniques should be met for the strategy as a whole and not for the individual contracts that form the strategy.

Policy issue 2: Contractual netting agreements

2543. Article 192(3) of the Delegated Regulation currently requires undertakings to calculate loss-given-default for each derivative. The calculation requires as input the risk-adjusted value of collateral in relation to the derivative.

2544. If an undertaking has entered a netting agreement with the counterparty, the collateral is not posted on each derivative but on the entire exposure to the counterparty. This makes it difficult to calculate the risk-adjusted value of collateral for an individual derivative.

2545. In this respect the following options have been considered:

- Option 2.1 – No change: in this option it is considered that the issue with netting agreements is not material for the undertakings and the calculation of loss-given-default captures the risk appropriately.
- Option 2.2 – Netting agreements included: under this option Article 192(3) should allow undertakings to calculate the loss-given-default so that it reflects the netting agreement that is entered with the counterparty/single name exposure.

Policy issue 3: Treatment of derivatives

2546. There is no reason for not covering the counterparty risk for all types of derivatives in the counterparty default risk module.

2547. The current wording in Article 189(2)(a) of the Delegated Regulation defines only risk-mitigating derivatives as type 1 exposures. However, the rationale for treating some derivatives as type 1 exposures and others as type 2 seems not fully justified. Risk-mitigating derivatives and derivatives used for exposure steering may have for example the same counterparty. The difference in the use of the derivatives has no effect on the counterparty default risk and it would be natural to cover the two exposures in the same category.

2548. In this respect the following options have been considered:

- Option 3.1 – All derivatives are treated as type 1 exposures.
- Option 3.2 – No change: Some derivatives are treated as type 2.

24.16.2. Analysis of impacts

Policy issue 1: Risk mitigation techniques

Option 1.1 – Individual contracts

2549. On the side of benefits, it is possible to detect the following effects:

- Policyholders – as only relatively simple methods for mitigating risks are recognised the risk that more complex strategies do not work as anticipated is avoided.
- Industry – as only relative simple methods are recognised the risks and costs associated with more complexity are avoided.
- Supervisors – it is easier to supervise since each individual contract should be categorised as risk-mitigating or not and supervisors do not have to assess potentially complex strategies.

2550. On the side of costs, it is possible to detect the following effects:

- Policyholders – effective strategies to mitigate risks are not used or less used than would be optimal. This can result in higher risks and/or lower benefits.

- Industry – effective strategies to mitigate risks are not used or less used than would be optimal. This can result in higher risks or lower returns for insurers.
- Supervisors – Insurers may use do less risk-mitigation that would be desirable in terms of risks.

Option 1.2 Strategy

2551. On the side of benefits, it is possible to detect the following effects:

- Policyholders – effective strategies to mitigate risks are not penalised by not recognising their effect in the calculation of the capital requirements with the possible result of lower risk and/or higher returns.
- Industry – effective strategies to mitigate risks are not penalised by not recognising their effect in the calculation of the capital requirements with the possible result of lower risk and/or higher returns.
- Supervisors – effective strategies to mitigate risks are not penalised by not recognising their effect in the calculation of the capital requirements with the possible result of lower risk and/or higher returns.

2552. On the side of costs, it is possible to detect the following effects:

- Policyholders – The effectiveness of complex strategies is more difficult to assess with the potential risk that they do not work as anticipated.
- Industry – The effectiveness of complex strategies is more difficult to assess with the potential risk that they do not work as anticipated.
- Supervisors – The effectiveness of complex strategies is more difficult to assess with the potential risk that they do not work as anticipated. The assessment of more complex strategies is more involved.

Policy issue 2: Contractual netting agreements

Option 2.1 – No change

2553. On the side of benefits, it is possible to detect the following effects:

- Policyholders – There is no need to assess the effectiveness of the netting agreement with the potential for misjudgement.
- Industry – There is no need to assess the effectiveness of the netting agreement with the potential for misjudgement.

- Supervisors – There is no need to assess the effectiveness of the netting agreement for the checking the regulatory capital requirement calculation.

2554. On the side of costs, it is possible to detect the following effects:

- Policyholders – the current method for calculating counterparty default risk on derivatives where netting agreements are in place makes it necessary to allocate the collective collateral in an artificial manner to individual contracts. It does not reflect the economic reality of the transactions and does not create incentives for insurers to enter in netting agreements with counterparties.
- Industry – the current method for calculating counterparty default risk on derivatives where netting agreements are in place makes it necessary to allocate the collective collateral in an artificial manner to individual contracts. It does not reflect the economic reality of the transactions and does not create incentives for insurers to enter in netting agreements with counterparties.
- Supervisors – The supervisor has to check the artificial allocation of collateral to individual contracts. No Incentives to enter into netting agreements are created.

Option 2.2 Netting agreements included

2555. On the side of benefits, it is possible to detect the following effects:

- Policyholders – There is no need to allocate the collateral to individual contracts. The capital requirements reflect the economic reality and there are incentives for the insurer to enter into nettings arrangements.
- Industry – There is no need to allocate the collateral to individual contracts. The capital requirements reflect the economic reality and there are incentives for the insurer to enter into nettings arrangements.
- Supervisors – There is no need to assess the allocation of collateral to individual contracts. The capital requirements reflect the economic reality and there are incentives for the insurer to enter into nettings arrangements.

2556. On the side of costs, it is possible to detect the following effects:

- Policyholders – There is the need to assess the effectiveness of the netting agreement with the potential for misjudgement.
- Industry – There is the need to assess the effectiveness of the netting agreement with the potential for misjudgement.
- Supervisors – An assessment is necessary whether the netting agreement is effective.

Policy issue 3: Treatment of derivatives

Option 3.1 – All derivatives as type 1

2557. On the side of benefits, it is possible to detect the following effects:

- Policyholders – the counterparty default risk of derivatives is better reflected in the regulatory capital requirement.
- Industry – the counterparty default risk of derivatives is better reflected in the regulatory capital requirement.
- Supervisors – the counterparty default risk of derivatives is better reflected in the regulatory capital requirement.

2558. On the side of costs, it is possible to detect the following effects:

- Policyholders – none.
- Industry – none.
- Supervisors – none.

Option 3.2 No change

2559. On the side of benefits, it is possible to detect the following effects:

- Policyholders – none.
- Industry – none.
- Supervisors – none.

2560. On the side of costs, it is possible to detect the following effects:

- Policyholders – No better reflection of the counterparty default risk for derivatives.
- Industry – No better reflection of the counterparty default risk for derivatives.
- Supervisors – No better reflection of the counterparty default risk for derivatives.

24.16.3. Comparison of options

2561. Regarding policy issue 1 (risk mitigation techniques) the preferred option is **option 1.2 (strategy)**. With the definition of the risk mitigation technique as a strategy (not excluding the strategy to consist of one single contract), the Delegated Regulation will better reflect how undertakings actually use e.g. derivatives in matching assets and liabilities. The risks associated with this option outlined above are manageable. This option also takes the regulation a step further to being able to recognize netting on single name exposures in the calculation of the counterparty default risk. It complies with the objective of appropriate methods and assumptions.

2562. Regarding policy issue 2 (contractual netting agreements) the preferred option is **option 2.2 (netting agreement included)**. Article 192(3) should reflect the effect of netting agreements. It results in higher risk sensitivity as the alternative option prevents undertakings from reflecting the actual counterparty default risk on their derivatives and forces them to allocate the collateral in an artificial manner to individual contracts. It complies with the objective of appropriate methods and assumptions.

2563. Regarding policy issue 3 (treatment of derivatives) the preferred option is **option 3.1 (all derivatives as type 1)** as it increases risk sensitivity. It complies with the objective of appropriate methods and assumptions.

24.17. Treatment of exposure to CCPs and changes resulting from EMIR

24.17.1. Policy options

Policy issue 1: Exposures to CCPs

2564. At the moment there is no specific treatment in the standard formula for exposures to central counterparties (CCPs). As they are often not rated, they would in many cases be assigned the same probability of default as rated exposures with a CQS of 5.

2565. CCPs pool the credit risk of many counterparties thus reducing the risk of default. The call for advice asks EIOPA to propose a treatment for exposures to CCPs that is consistent with the treatment in the banking sector. At the same time, there is limited historical evidence on which the choice of recovery rate and probability of default in line with the confidence level required in Article 101(3) of the Solvency II calibration can be based.

2566. The following options for a different treatment of exposures to CCPs as type 1 exposures in the counterparty default risk module have been considered:

2567. Option 1.1 - The probability of default and the recovery rate for qualifying transactions with a CCP are chosen so that the ratio for the capital requirements of bilateral and CCP transaction is similar under the standard formula and the banking regulation ("Relative consistency approach").

2568. Option 1.2 - For qualifying transactions the same probability of default as for AAA-counterparties and a recovery rate of 50 % (the same as for reinsurers) is used ("Alternative approach").

Policy issue 2: EMIR implications

2569. EMIR has introduced the obligation to exchange variation margin for bilateral derivatives transactions on a very frequent basis. The exchange of variation margin reduces the counterparty credit risk.

2570. Consequently, EIOPA has considered the introduction of a new formula for the loss-given default on a derivative to take into account the impact of variation margin. The following options have been considered:

2571. Option 2.1: No change

2572. Option 2.2: A new formula for the loss-given default to reflect the impact of variation margin. This new formula avoids the need to calculate the risk-adjusted value of the collateral.

24.17.2. Analysis of impacts

Policy issue 1: Exposures to CCPs

Option 1.1 – Relative consistency approach

2573. On the side of benefits, the following observations can be made:

- Policyholders – This option provides strong incentives to use central clearing instead of entering into a bilateral transaction. With central clearing the risk of losses resulting from a counterparty default is lower.
- Industry – This option does not put very high capital requirements on exposures to CCPs without an external rating. It incentivises central clearing with the result of lowering the counterparty risk involved in derivatives transactions.
- Supervisors- This option provides strong incentives for central clearing with a reduced risk of counterparty credit losses.

2574. On the side of costs, the following observations can be made:

- Policyholders- The calibration is lower than for option 1.2 (although the difference in absolute terms is small – especially when diversification and loss absorbency effects are taken into account). This means that the risk of an insufficient level of capital requirements is ceteris paribus higher.
- Industry- The calibration is lower than for option 1.2 (although the difference in absolute terms is small – especially when diversification and loss absorbency effects are taken into account). This means that the risk of an insufficient level of capital requirements is ceteris paribus higher than with the other option.
- Supervisors- The calibration is lower than for option 1.2 (although the difference in absolute terms is small – especially when diversification and loss absorbency effects are taken into account). This means that the risk of an insufficient level of capital requirements is ceteris paribus higher than with the other option.

Option 1.2 - Alternative approach

218. On the side of benefits, following observations can be made:

- Policyholders – This option provides strong incentives for central clearing. The calibration is higher than for the other option (but please see qualification above). This means that the risk of an insufficient level of capital requirements is ceteris paribus lower.
- Industry - The calibration is higher than for the other option (but please see qualification above). This means that the risk of an insufficient level of capital requirements is ceteris paribus lower.
- Supervisors- The calibration is higher than for the other option (but please see qualification above). This means that the risk of an

insufficient level of capital requirements is ceteris paribus lower. The approach for its calibration is easier which facilitates the communication with insurers.

219. On the side of costs, following observations can be made:

- Policyholders- With this option the resulting regulatory capital charge is higher (although the difference in absolute terms is small – especially when diversification and loss absorbency effects are taken into account). Other things being equal the incentives for central clearing are therefore weaker.
- Industry- With this option the resulting regulatory capital charge is higher (although the difference in absolute terms is small – especially when diversification and loss absorbency effects are taken into account).
- Supervisors- With this option the resulting regulatory capital charge is higher (although the difference in absolute terms is small – especially when diversification and loss absorbency effects are taken into account).

Policy issue 2: EMIR implications

Option 2.1: No change

2575. On the side of benefits, following observations can be made:

- Policyholders – There is no increase in the complexity of the standard formula in terms of additional assumptions to take into account events and actions during the year with the potential of underestimating the risks.
- Industry- There is no increase in the complexity of the standard formula in terms of additional assumptions to take into account events and actions during the year with the potential of underestimating the risks.
- Supervisors- There is no increase in the complexity of the standard formula in terms of additional assumptions to take into account events and actions during the year with the potential of underestimating the risks.

2576. On the side of costs, following observations can be made:

- Policyholders- The credit risk is potentially overestimated with the possible consequence that fewer derivatives are used for risk mitigation than would be desirable.
- Industry- The credit risk is potentially overestimated with the possible consequence that fewer derivatives are used for risk mitigation than would be desirable. The calculation is more complex as there is still the need to calculate the risk-adjusted value of collateral.
- Supervisors- The credit risk is potentially overestimated with the possible consequence of fewer derivatives for risk mitigation than would be desirable. The calculation is more complex as there is still the need to calculate the risk-adjusted value of collateral.

Option 2.2: A new formula for the loss-given default to reflect the impact of variation margin

2577. On the side of benefits, following observations can be made:

- Policyholders – Reflecting the positive effects of EMIR when calculating the capital requirement makes it more attractive for insurers to enter into derivatives to mitigate risks. This would reduce the risk for policyholders.
- Industry- it becomes less costly to enter into derivatives to mitigate risk thus reducing the risk of losing the franchise value or being forced to raise capital under stressed conditions. There is also a greater alignment between the treatment of variation margin in banking and insurance regulation. Finally, the calculation is simpler, as there is no longer the need to calculate the risk-adjusted value of collateral.
- Supervisors- An increased use of derivatives can make the companies safer. In addition, the calculation is simpler, as there is no longer the need to calculate the risk-adjusted value of collateral.

2578. On the side of costs, following observations can be made:

- Policyholders – the complexity of the standard formula is increased in terms of additional assumptions to take into account events and actions during the year with the potential of underestimating the risks.
- Industry – With the additional assumptions necessary, there is the potential of underestimating the risks.
- Supervisors- The need to make assumptions about events during the year introduces a risk that the risk is underestimated.

24.17.3. Comparison of options

2579. In Q4 2016, the market value of derivatives was approximately EUR 80.86 billion while the notional value of the contracts reached approximately EUR 89.6 trillion.¹³⁹

2580. The breakdown in terms of the instruments used is set out in the EIOPA Financial Stability Report June 2017.¹⁴⁰

2581. Information on the uses of derivatives is provided in the analysis section of the chapter on “Simplification of the counterparty default risk”.

2582. Based on the annual reporting, derivatives where a CCP was identified as the counterparty represented 1.37 % of the market value and 0.02 % of the notional values of all derivatives at the end of 2016.

2583. Regarding policy issue 1 (Exposures to CCPs), based on the cost-benefit analysis, none of the two options is clearly better. Both options provide incentives for central clearing and are comparable in terms of the absolute

¹³⁹ See EIOPA (2017): Financial Stability Report June 2017. Page 52.

¹⁴⁰ See EIOPA (2017): Financial Stability Report June 2017. Page 53.

capital requirement (especially when the effects of diversification and loss absorbency are considered).

2584. Regarding policy issue 2 (EMIR implications), based on the cost-benefit analysis, EIOPA's preferred option is option 2.2 (A new formula for the loss-given default to reflect the impact of variation margin). The exchange of variation margin reduces the counterparty risk substantially. The new formula represents also a substantial simplification as there is no longer the need to calculate the risk-adjusted value of collateral.

24.18. Simplification of the look-through approach

24.18.1. Policy options

2585. During the development of the advice on simplification of the look-through approach, EIOPA has identified the following policy issue for which different options have been considered and debated: application of the look-through approach for unit-linked business.

2586. Article 84(3) of the Delegated Regulation provides that data grouping may be used in a prudent manner as long as they do not apply to more than 20% of the total value of the assets. The following options have been considered:

- Option 1: no change, i.e. assets corresponding to unit-linked products should be subject to the 20% limit;
- Option 2: carve-out for assets corresponding to unit-linked products that either do not significantly contribute to the SCR (i.e. insurance products without significant guarantees or policyholder options) or where the change in the value of the underlying assets do not significantly affect the available own funds (due to future profits).

24.18.2. Analysis of impacts

Option 1: no change

2587. On the side of benefits, it is possible to detect the following effects:

- Policyholders – high risk sensitivity: certainty that the capital requirements correspond to the underlying risks, hence assuring full policyholders' protection.
- Industry – high risk sensitivity: insurers know in details to which risk they are exposed to; also beneficial from a "business conduct" point of view since they know in which products policyholders are investing.
- Supervisors – risk-sensitivity of the calculation is assured.

2588. On the side of costs, it is possible to detect the following:

- Policyholders – none.

- Industry – it is burdensome and costly to gather the information with sufficient details to allow for an SCR calculation.
- Supervisors – none.

Option 2: carve-out for assets corresponding to some UL products

2589. On the side of benefits, it is possible to detect the following effects:

- Policyholders – policyholders' protection is still assured since these assets do not contribute materially to the SCR. That is because only products without significant guarantees or policyholder options are excluded.
- Industry – simplify the process and the calculation for risks that do not contribute materially to the SCR.
- Supervisors – still assured that the SCR reflect the risks.

2590. On the side of costs, it is possible to detect the following:

- Policyholders – none.
- Industry – insurers have to assess which assets correspond to UL products without significant guarantees or policyholder options. This should be minimal cost.
- Supervisors – none

24.18.3. Comparison of options

2591. In view of the cost-benefit analysis, EIOPA's preferred option is option 2 (carve-out for assets corresponding to some UL products). In terms of conduct of business, the prudent person principle still applies to these products and a certain degree of look-through is required through the annual reporting. Therefore, this option has been selected, given that it meets the objective to simplify the standard formula.

24.19. Look-through approach at group level

24.19.1. Policy options

2592. During the development of the advice on the look-through approach at group level, EIOPA has identified the following policy issue for which different options have been considered and debated: application of the look-through approach at group level for related CIUs.

2593. In order to harmonise the practices at European level, the following options have been considered:

- Option 1: no change to the current approach in the Delegated Regulation;
- Option 2: applying look-through for related CIUs at group level where it has already been applied at solo level.

24.19.2. Analysis of impacts

Option 1: no change

2594. On the side of benefits, it is possible to detect the following effects:

- Policyholders – no benefits compared to the current situation.
- Industry – the current approach has already been implemented so there is no new implementation cost. The current approach is based on an assessment whether a CIU is related or not: there is more flexibility.
- Supervisors – they can apply supervisory judgment as to the evidence provided by the (re)insurance undertaking to prove that a CIU is related or not.

2595. On the side of costs, it is possible to detect the following:

- Policyholders – no costs compared to the current situation.
- Industry – look-through is applied at solo level to all CIUs, including related CIUs. Not applying it at a group level may lead to different outcome in terms of SCR (either higher or lower).
- Supervisors – since supervisory judgment is applied, there are cases where two different group supervisors came to different conclusions.

Option 2: applying look-through for related CIUs at group level where it has already been applied at solo level

2596. On the side of benefits, it is possible to detect the following effects:

- Policyholders – allocation of capital across the group follows an outcome that is consistent at group and solo level, hence no necessary changes in prices.
- Industry – the look-through is already applied at solo level and provides an outcome that is more sensitive to the risk of the underlying assets. There is consistency between the group and solo calculations, which simplifies the group SCR calculation.
- Supervisors – it enhances harmonisation across the EU.

2597. On the side of costs, it is possible to detect the following:

- Policyholders – this possible change would imply changes to the current group SCR calculation process, which may increase costs for groups and ultimately prices for policyholders. However, since look-through is already applied at solo level, costs should not be material.
- Industry – changes to the group SCR calculation process, which means further data to process.

- Supervisors – less supervisory judgment is applied to make the group solvency calculation appropriate to the risk profile of a given group.

24.19.3. Comparison of options

2598. In view of the cost-benefit analysis, EIOPA's preferred option is option 2 (applying look-through for related CIUs at group level where it has already been applied at solo level). It provides not only for an improved risk-sensitiveness of the calculation, thereby ensuring that the standard formula remains technical appropriate, but it also simplifies the calculation since it is aligned with that at solo level.

24.20. Loss-absorbing capacity of deferred taxes

24.20.1. Policy options

2599. LAC DT ranks among the most material quantitative elements of the solvency capital requirements, with the specificity that LAC DT reduces the final SCR. Despite of its materiality and negative sign, the Pillar 1 provisions of the Delegated Regulation do not cover a number of essential areas of LAC DT calculations. Furthermore, Pillar 2 and Pillar 3 provisions of the Delegated Regulation keep silence, at least explicitly, in respect of that element.

2600. In particular, current Pillar 1 provisions regarding LAC DT do not prevent similar undertakings in similar risk positions from recognising different LAC DT as a result of different assumptions in their projection of post stress taxable profits.

2601. It should be noted that the projection of post stress taxable profits is a challenging and complex exercise, with a high degree of uncertainty (higher degree the longer the projection post stress) and where expert judgement has a material influence and may deliver a wide range of outcomes.

2602. For all these reasons and according to articles 8 and 16 of EIOPA Regulation (Regulation (EU) 1094/2010 of 24 November 2010) in its draft advice EIOPA puts forward several policy options:

- To reduce the differences in projection of post stress taxable profits for similar undertakings,
- To introduce specific Pillar 2 and Pillar 3 provisions regarding LAC DT, consistently with the approach followed for other elements with similar materiality in the standard calculation of the SCR.

2603. In light of the analysis of the current situation, EIOPA has considered three options. Consistently with the three-Pillar basement of Solvency II framework, the three following options apply both regarding the calculation of the quantitative capital requirements (Pillar 1), its governance system (Pillar 2) and transparency to supervisors and public disclosure (Pillar 3):

- Option 1: no change, i.e. neither legal nor supervisory action;

- Option 2: adoption of high-level key supervisory guidance / principles, leaving to the dialogue among each supervisor and each undertaking the materialization of each principle and of the non-binding guidance.
- Option 3: proposal to complete the Delegated Regulation in each of the three Pillars with a set of new provisions preserving the sufficient flexibility to cover actually different undertakings, while fostering consistent practices among undertakings and supervisors.

2604. In particular with respect to Pillar I requirements, EIOPA proposes several amendments to the Solvency II Delegated Regulation on LAC DT to achieve convergence where differences are not justified. These can be divided into:

- Restricting the horizon over which profits from new business can be projected.
- Restricting the returns on assets in excess of the technical provisions (TP) to the forward rate unless the undertaking can provide credible evidence to do otherwise.
- Ensuring that assumptions used to project future taxable profits in the post stress environment are not more favourable than those used in the base case.
- Making clear that future management actions should meet the requirements of Article 23 of the Delegated Regulation.

24.20.2. Analysis of impact

2605. Table 1 below provides the different amounts of LAC DT across the different jurisdictions and the parts, either net DTL or future profits (plus carry-back where applicable), that contribute to these amounts of LAC DT. These are data from the annual QRT per 31 December 2016.

2606. Compared to the data presented in the first set of advice the data of five undertakings have been removed. These five undertakings accounted for less than 0.1% of the total bSCR* of the sample.

Table 1. Base-case - Amounts of LAC DT across the different jurisdictions in the EEA split in contributions by carry-back, net DTL and future profits per 31 December 2016 from annual QRT for whole sector

	EOF	SCR	ratio	bSCR*	net DTA	LAC DT	Carry-back	net DTL LACDT	Future profits	Tax Rate
EEA	1423.8	634.8	224.3%	731.2	-100.8 -13.8%	96.4 13.2%	1.4 0.2%	75.1 10.3%	19.9 2.7%	26.6%
AUSTRIA	35.3	13.2	268.0%	15.6	-2.8 -17.8%	2.4 15.5%	0.0 0.0%	2.3 14.5%	0.2 1.1%	25.0%
BELGIUM	32.3	18.4	175.4%	21.1	-2.2 -10.7%	2.6 12.6%	0.0 0.0%	2.6 12.5%	0.0 0.1%	34.0%
BULGARIA	1.2	0.6	197.2%	0.6	0.0 -5.1%	0.0 6.9%	0.0 0.0%	0.0 5.3%	0.0 1.5%	10.0%
CROATIA	1.5	0.6	233.6%	0.8	-0.1 -12.7%	0.1 17.6%	0.0 0.0%	0.1 12.1%	0.0 5.5%	20.0%
CYPRUS	1.4	0.5	270.8%	0.5	0.0 -9.1%	0.0 6.7%	0.0 0.0%	0.0 5.3%	0.0 1.4%	12.5%
CZECH REPUBLIC	4.3	1.9	225.1%	2.3	-0.4 -19.1%	0.4 15.5%	0.0 0.0%	0.3 15.2%	0.0 0.3%	19.0%
DENMARK	27.0	8.5	319.5%	9.0	-1.1 -12.8%	0.5 5.7%	0.0 0.0%	0.2 2.6%	0.3 3.1%	22.0%
ESTONIA	0.6	0.3	193.9%	0.3	0.0 -6.4%	0.0 3.4%	0.0 0.0%	0.0 3.4%	0.0 0.0%	25.0%
FINLAND	12.4	6.1	205.3%	7.2	-1.4 -19.4%	1.2 16.1%	0.0 0.3%	1.1 15.4%	0.0 0.4%	20.0%
FRANCE	301.1	133.9	224.9%	155.6	-23.9 -15.4%	21.7 14.0%	0.0 0.0%	18.4 11.9%	3.3 2.1%	34.0%
GERMANY	374.6	116.7	321.1%	145.1	-39.9 -27.5%	28.4 19.6%	0.0 0.0%	24.2 16.7%	4.2 2.9%	30.0%
GREECE	2.8	1.7	162.5%	1.7	0.4 25.0%	0.0 0.1%	0.0 0.0%	0.0 0.1%	0.0 0.0%	29.0%
HUNGARY	1.6	0.7	216.9%	0.8	-0.1 -11.7%	0.1 9.3%	0.0 0.0%	0.1 8.4%	0.0 0.8%	19.0%
IRELAND	39.2	22.7	172.9%	24.5	-1.5 -6.1%	1.8 7.4%	0.0 0.1%	1.3 5.2%	0.5 2.2%	12.5%
ITALY	116.2	53.6	216.8%	60.0	-3.9 -6.5%	6.4 10.7%	0.0 0.0%	3.7 6.1%	2.8 4.6%	24.0%
LATVIA	0.1	0.1	141.6%	0.1	0.0 3.5%	0.0 6.0%	0.0 0.0%	0.0 0.1%	0.0 5.9%	15.0%
LIECHTENSTEIN	3.1	1.3	233.4%	1.4	0.0 -2.5%	0.1 5.4%	0.0 0.0%	0.1 4.6%	0.0 0.7%	12.5%
LITHUANIA	0.3	0.2	193.3%	0.2	0.0 1.1%	0.0 3.8%	0.0 0.0%	0.0 0.2%	0.0 3.6%	15.0%
LUXEMBOURG	21.7	9.9	219.6%	12.5	-4.5 -36.3%	2.6 20.9%	0.0 0.0%	2.6 20.9%	0.0 0.0%	27.0%
MALTA	5.2	1.5	345.4%	2.1	-1.2 -56.8%	0.6 28.1%	0.0 0.0%	0.4 20.2%	0.2 7.9%	35.0%
NETHERLANDS	58.4	33.3	175.7%	38.3	2.0 5.2%	5.0 13.1%	0.2 0.4%	1.4 3.7%	3.5 9.0%	25.0%
NORWAY	24.1	11.6	207.5%	13.8	-1.9 -13.4%	2.2 16.2%	0.0 0.0%	1.4 9.8%	0.9 6.4%	25.0%
POLAND	14.0	5.4	260.4%	6.3	-1.3 -21.6%	0.9 14.2%	0.0 0.0%	0.8 12.3%	0.1 2.0%	19.0%
PORTUGAL	5.7	3.7	154.7%	4.0	0.1 2.0%	0.3 7.9%	0.0 0.0%	0.0 1.0%	0.3 6.8%	29.5%
ROMANIA	1.0	0.6	175.7%	0.6	0.0 -3.7%	0.0 6.0%	0.0 0.0%	0.0 4.5%	0.0 1.6%	16.0%
SLOVAKIA	1.4	0.6	225.8%	0.8	-0.2 -23.2%	0.1 18.9%	0.0 0.0%	0.1 18.5%	0.0 0.3%	22.0%
SLOVENIA	2.3	1.0	240.5%	1.1	-0.1 -9.9%	0.1 9.7%	0.0 0.0%	0.1 5.3%	0.0 4.4%	19.0%
SPAIN	48.9	20.6	237.6%	26.9	-5.6 -21.0%	6.3 23.5%	0.0 0.0%	4.1 15.3%	2.2 8.3%	30.0%
SWEDEN	73.8	27.8	264.9%	30.0	-2.2 -7.3%	2.1 7.1%	0.0 0.0%	1.8 6.1%	0.3 1.0%	22.0%
UNITED KINGDOM	210.2	137.8	152.5%	147.8	-8.3 -5.6%	10.0 6.7%	1.2 0.8%	7.8 5.3%	1.0 0.7%	20.0%

The eligible own funds for the SCR (EOF), the SCR and their ratio as well as bSCR*, SCR excluding LAC DT, or, put differently, the basic SCR plus operational risk and the loss absorbing capacity of technical provisions as well as the net DTA on the Solvency II balance sheet (negative numbers indicate a net DTL), the total LAC DT, the part of LAC demonstrated by carry-back, the part demonstrated by net DTL and the part of LAC DT demonstrated by future profits for 2794, Standard Formula, Partial and Full Internal Model, undertakings. In the second columns of net DTA, LAC DT, Carry-back, and Future profits these amounts are displayed as a percentage of the bSCR*. The last column contains the applicable tax rate in the specific jurisdiction.

2607. These data from the annual QRT as at 31 December 2016 lack sufficient details to perform an impact assessment on the advice regarding the profits from projected future profits. Therefore EIOPA sent out an information request to gather more data on how undertakings had demonstrated likely utilisation of LAC DT as at 31 December 2016. EIOPA received 262 valid submissions.

2608. Table 2 shows that the total LAC DT of these submissions amounts to 15.9% (39.0 billion euros of LAC DT compared to a total bSCR* of 244.5 billion euros). In contrast, the corresponding figure for all Solvency II undertakings were a total LAC DT of 13.2% (96.4 billion euros LAC DT on a total bSCR* of 731.2 billion euros).

2609. The information request thus covers 40% of total LAC DT and 33% of the total bSCR*.

Table 2. Base case - Amounts of LAC DT across the different jurisdictions in the EEA split in contributions by net DTL, carry-back, future profits and different sources of future profits for per 31 December 2016 from sample information request

	Solvency			bSCR*	net DTA		LAC DT		LAC DT sources						Future profits from new business						Future profits from returns									
	EOF	SCR	ratio						Carry-back		Net DTL		Fut. profits		Before BP:		Before BP:		After BP:		After BP:		Before BP:		Before BP:		After BP:		After BP:	
															BusPlan	excess	BusPlan	excess	risk-free	excess	risk-free	excess								
EEA	433	206	211%	245	-38	-16%	39	16%	0.6	0%	28	12%	10	4.2%	4.2	2%	0.1	0%	0.5	0%	1.2	1%	0	0%	1.1	0%	1.7	1%	1.3	1%
AT	9	4	228%	5	-1	-19%	1	17%	0	0%	1	16%	0	1.2%	0.0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
BE	14	7	193%	9	-2	-20%	2	20%	0	0%	2	20%	0	0.0%	0.0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
BG	1	1	205%	1	0	-6%	0	8%	0	0%	0	6%	0	1.6%	0.0	1%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
CY	0	0	247%	0	0	-7%	0	11%	0	0%	0	6%	0	5.3%	0.0	5%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
CZ	1	1	194%	1	0	-22%	0	19%	0	0%	0	18%	0	0.7%	0.0	1%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
DE	171	57	298%	73	-21	-29%	16	21%	0	0%	12	17%	3	4.6%	1.2	2%	0	0%	0.3	0%	1	1%	0	0%	0.6	1%	0.3	0%	0	0%
DK	4	2	194%	2	0	-17%	0	14%	0	0%	0	8%	0	5.9%	0.0	2%	0	0%	0	1%	0	1%	0	0%	0	1%	0	1%	0	0%
ES	24	10	252%	13	-3	-24%	3	26%	0	0%	2	16%	1	10.2%	0.9	7%	0	0%	0	0%	0.2	2%	0	0%	0	0%	0	0%	0.1	1%
FI	9	5	198%	6	-1	-18%	1	16%	0	0%	1	16%	0	0.1%	0.0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
HR	1	0	238%	0	0	-15%	0	18%	0	0%	0	14%	0	4.4%	0.0	1%	0	3%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
HU	1	0	228%	1	0	-15%	0	11%	0	0%	0	10%	0	1.0%	0.0	1%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
IE	14	9	153%	10	-1	-9%	1	10%	0	0%	1	7%	0	2.9%	0.2	2%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
IT	18	9	199%	11	-1	-6%	1	13%	0	0%	1	7%	1	6.9%	0.6	5%	0	0%	0.1	1%	0	0%	0	0%	0	0%	0	0%	0	0%
LI	1	0	170%	1	0	-12%	0	12%	0	0%	0	10%	0	1.9%	0.0	2%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
LU	5	3	175%	4	-1	-25%	1	21%	0	0%	1	21%	0	0.0%	0.0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
NL	18	11	158%	14	1	10%	3	20%	0.1	1%	0	2%	2	16.8%	0.1	0%	0	0%	0	0%	0	0%	0	0%	0.2	2%	1.1	8%	1	7%
NO	15	7	222%	8	-1	-11%	2	20%	0	0%	1	11%	1	9.3%	0.4	5%	0	0%	0	0%	0	0%	0	0%	0	1%	0.2	2%	0.2	2%
PL	12	5	272%	5	-1	-25%	1	15%	0	0%	1	13%	0	1.9%	0.1	1%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
RO	1	0	218%	0	0	-13%	0	9%	0	0%	0	8%	0	0.3%	0.0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
SE	5	2	206%	3	0	-6%	0	11%	0	0%	0	6%	0	4.5%	0.1	2%	0	0%	0	1%	0	0%	0	0%	0	1%	0	0%	0	0%
UK	83	55	151%	60	-4	-7%	5	9%	0.5	1%	4	7%	0	0.7%	0.3	1%	0	0%	0	0%	0	0%	0	0%	0	0%	0.1	0%	0	0%
Other	26	17	154%	19	-2	-8%	2	10%	0	0%	2	8%	1	2.5%	0.4	2%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%

The eligible own funds, SCR, and solvency ratio, bSCR, net DTA, sources of LAC DT (carry-back, net DTL and future profits) and determinants of future profits (profits from new business within the business plan and profits in excess of the business plan and profits from risk-free and excess returns on assets in excess of the technical provisions, before and after the horizon of the business plan with a maximum of five years) per jurisdiction for which more than 2 undertakings provided information on their LAC DT; other undertakings are added to "other".*

2610. EIOPA considers the sample of the information request representative for the total LAC DT in Europe. The fact that LAC DT in the sample of the information request is higher than on average stems from the selection of the undertakings: EIOPA and NSAs tried to select those undertakings that had a LAC DT larger than zero and select more undertakings that calculated LAC DT using future profits. As such, for example, tax-exempt undertakings that lower the average LAC DT in Europe are not in the impact assessment. This explains both the higher LAC DT as well as the relatively larger part of LAC DT that is being demonstrated by future profits.

2611. As a consequence of this, the impact assessment overestimates the impact when measured in percentages.

Profits from new business: only from business plan or 5 years if shorter

2612. EIOPA advises to restrict the profits from new business as a source of future taxable profits for demonstrating the likely utilization of nDT after the shock loss by:

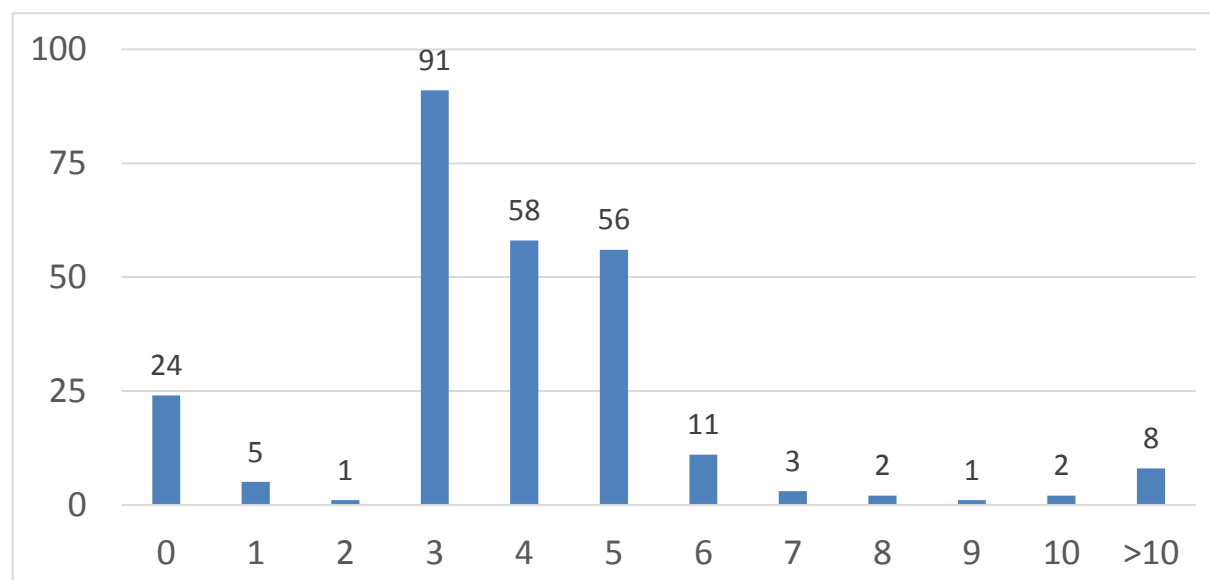
- Limiting profits from new business to profits in the business plan.
- Limiting the projection horizon to the lesser of 5 years and the horizon of the business plan, to reflect the increased uncertainty after the shock loss and the increase in uncertainty when profits are realized further in the future.

2613. Table 3 is the same as table 2 above except that it demonstrates how LAC DT is affected by capping the profits from new business to the profits in the business plan. The total LAC DT for the sample would decrease from 39.0 billion euros to 37.1 billion euros (15.9% to 15.2% of bSCR*) and **the average SCR ratio would decrease from 210.5% to 208.6%.**

2614. Out of 21 member states in the sample of the information request, undertakings in Croatia, Denmark and Germany experience the largest decrease in their SCR ratios; on average their SCR ratio decreases by more than 5%. In 9 member states the limitation has no impact and in 5 more the average impact on the SCR ratio is below 1%.

2615. The histogram below shows that limiting the maximum horizon of the business plan to five years would only affect 10 % of the undertakings; 27 of the 262 undertakings have a horizon of their business plan beyond five years.

Figure 1. Histogram of business plan horizon



2616. This impact on the sample is likely to be overestimated, as undertakings may opt for other ways to demonstrate likely utilisation of future taxable profits if the new business projection horizon were restricted.

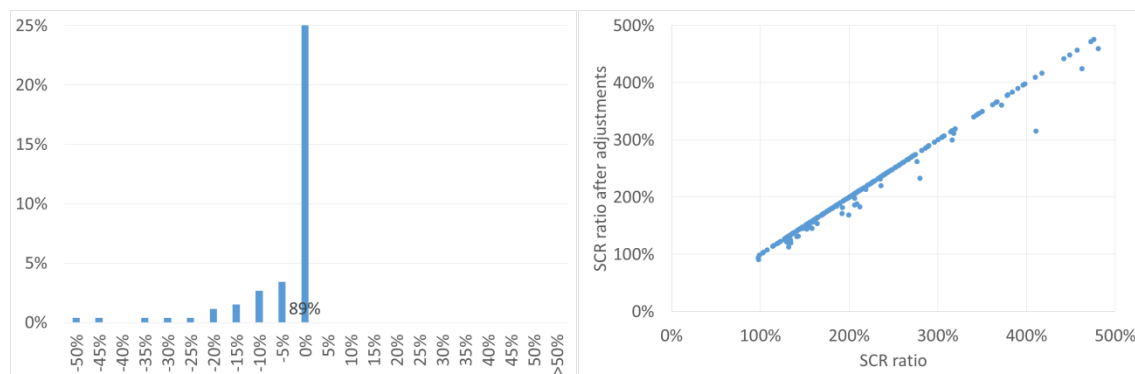
Table 3. Impact of restriction on profits from new business on sample information request

	Solvency			bSCR*	net DTA		LAC DT		LAC DT sources					Future profits from new business						Future profits from returns												
	EOF	SCR	ratio						Carry-back	Net DTL		Fut. profits		Before BP: BusPlan		Before BP: excess		After BP: BusPlan		After BP: excess		Before BP: risk-free		Before BP: excess		After BP: risk-free		After BP: excess				
EEA	433	207	209%	245	-38	-16%	37	15%	1	0%	28	12%	8	3%	4	2%	0	0%	0	0%	0	0%	0	0%	0	0%	1	0%	2	1%	1	1%
AT	9	4	227%	5	-1	-19%	1	17%	0	0%	1	16%	0	1%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
BE	14	7	193%	9	-2	-20%	2	20%	0	0%	2	20%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
BG	1	1	204%	1	0	-6%	0	8%	0	0%	0	6%	0	1%	0	1%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
CY	0	0	247%	0	0	-7%	0	11%	0	0%	0	6%	0	5%	0	5%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
CZ	1	1	194%	1	0	-22%	0	19%	0	0%	0	18%	0	1%	0	1%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
DE	171	59	292%	73	-21	-29%	14	20%	0	0%	12	17%	2	3%	1	2%	0	0%	0	0%	0	0%	0	0%	0	0%	1	1%	0	0%	0	0%
DK	4	2	187%	2	0	-17%	0	12%	0	0%	0	8%	0	4%	0	2%	0	0%	0	0%	0	0%	0	0%	0	0%	0	1%	0	1%	0	0%
ES	24	10	247%	13	-3	-24%	3	25%	0	0%	2	16%	1	9%	1	7%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	1%
FI	9	5	198%	6	-1	-18%	1	16%	0	0%	1	16%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
HR	1	0	230%	0	0	-15%	0	15%	0	0%	0	14%	0	2%	0	1%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
HU	1	0	228%	1	0	-15%	0	11%	0	0%	0	10%	0	1%	0	1%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
IE	14	9	152%	10	-1	-9%	1	10%	0	0%	1	7%	0	2%	0	2%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
IT	18	9	196%	11	-1	-6%	1	12%	0	0%	1	7%	1	6%	1	5%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
LI	1	0	170%	1	0	-12%	0	12%	0	0%	0	10%	0	2%	0	2%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
LU	5	3	175%	4	-1	-25%	1	21%	0	0%	1	21%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
NL	18	11	158%	14	1	10%	3	20%	0	1%	0	2%	2	17%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	2%	1	8%	1	7%
NO	15	7	222%	8	-1	-11%	2	20%	0	0%	1	11%	1	9%	0	5%	0	0%	0	0%	0	0%	0	0%	0	0%	0	1%	0	2%	0	2%
PL	12	5	272%	5	-1	-25%	1	15%	0	0%	1	13%	0	2%	0	1%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
RO	1	0	218%	0	0	-13%	0	9%	0	0%	0	8%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
SE	5	2	203%	3	0	-6%	0	10%	0	0%	0	6%	0	4%	0	2%	0	0%	0	0%	0	0%	0	0%	0	0%	0	1%	0	0%	0	0%
UK	83	55	151%	60	-4	-7%	5	9%	1	1%	4	7%	0	1%	0	1%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Other	26	17	153%	19	-2	-8%	2	10%	0	0%	2	8%	0	2%	0	2%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%

The eligible own funds, SCR, and solvency ratio, bSCR*, net DTA, sources of LAC DT (carry-back, net DTL and future profits) and determinants of future profits (profits from new business within the business plan and profits in excess of the business plan and profits from risk-free and excess returns on assets in excess of the technical provisions, before and after the horizon of the business plan with a maximum of five years) if the profits from new business are limited to the profits in the business plan with a horizon of no more than 5 years; the numbers for 261 undertakings are presented per jurisdiction for which more than 2 undertakings provided information on their LAC DT; other undertakings are added to "other".

2617. The figures below show the impact on the SCR ratio after applying the limitation of future profits from new business to those in the business plan. The left figure shows that the SCR ratios of 89% of the undertakings are unaffected by this advice; in this respect unaffected means that the impact is less than 5% SCR ratio. The right figure shows the SCR ratio before and after applying this cap on the profits from new business.

Figure 2. Impact of restriction on profits from new business



Left: Histogram of the impact on the SCR of restricting the profits from new business in the LAC DT calculation to the profits from new business in the business plan over a horizon equal to the business plan length with a maximum of five years. **Right:** scatter plot of the SCR ratio before the limiting the profits from new business and after this adjustment

2618. Table 4 shows the impact of limiting the profits from new business to those in the business plan with a maximum horizon of five years for the whole sector. The impact analysis of the 261 undertakings in the information request has been extrapolated to estimate the impact for the whole sector, i.e. 2794 undertakings.

2619. LAC DT would decrease by 3.2 billion euros from 96.4 billion euros (13.2% of bSCR*) to 93.2 billion euros (12.7% of bSCR*). Extrapolating, this would suggest a reduction of the weighted SCR ratio of the whole sector from 224.3% to 223.2%, i.e. **a decrease of 1 percentage point**.

2620. The weighted average SCR ratio would decrease with almost 10% in Croatia. Undertakings in Germany, Denmark and Spain would experience a decrease in their average ratio of 4%. Four out of 2794 undertakings would see their SCR ratio move from above to below 100%.

Table 4. Impact - Amounts of LAC DT across the different jurisdictions in the EEA split in contributions by carry-back, net DTL and future profits per 31 December 2016 if no profits from new business beyond the business plan from annual QRT for whole sector

	EOF	SCR	ratio	bSCR*	net DTA		LAC DT		Carry-back		net DTL LACDT		Future profits		Tax Rate
EEA	1423.9	638	223.2%	731.2	- 100.8	-13.8%	93.2	12.7%	1.4	0.20%	75.1	10.3%	16.7	2.3%	26.6%
AT	35.3	13.3	266.8%	15.6	-2.8	-17.8%	2.4	15.1%	0	0.00%	2.3	14.5%	0.1	0.7%	25.0%
BE	32.3	18.4	175.2%	21.1	-2.2	-10.7%	2.6	12.5%	0	0.00%	2.6	12.5%	0	0.0%	34.0%
BG	1.2	0.6	196.6%	0.6	0	-5.1%	0	6.6%	0	0.00%	0	5.3%	0	1.2%	10.0%
HR	1.5	0.7	224.0%	0.8	-0.1	-12.7%	0.1	14.0%	0	0.00%	0.1	12.1%	0	1.9%	20.0%
CY	1.4	0.5	270.8%	0.5	0	-9.1%	0	6.7%	0	0.00%	0	5.3%	0	1.4%	12.5%

CZ	4.3	1.9	225.1%	2.3	-0.4	-19.1%	0.4	15.5%	0	0.00%	0.3	15.2%	0	0.3%	19.0%
DK	27	8.6	315.4%	9	-1.1	-12.8%	0.4	4.5%	0	0.00%	0.2	2.6%	0.2	1.9%	22.0%
EE	0.6	0.3	193.8%	0.3	0	-6.4%	0	3.4%	0	0.00%	0	3.4%	0	0.0%	25.0%
FI	12.4	6.1	205.3%	7.2	-1.4	-19.4%	1.2	16.1%	0	0.30%	1.1	15.4%	0	0.4%	20.0%
FR	301.1	134	224.6%	155.6	-23.9	-15.4%	21.5	13.8%	0	0.00%	18.4	11.9%	3.1	2.0%	34.0%
DE	374.6	118	316.7%	145.1	-39.9	-27.5%	26.8	18.5%	0	0.00%	24.2	16.7%	2.6	1.8%	30.0%
EL	2.8	1.7	162.5%	1.7	0.4	25.0%	0	0.1%	0	0.00%	0	0.1%	0	0.0%	29.0%
HU	1.6	0.7	216.9%	0.8	-0.1	-11.7%	0.1	9.3%	0	0.00%	0.1	8.4%	0	0.8%	19.0%
IE	39.2	22.8	172.1%	24.5	-1.5	-6.1%	1.7	7.0%	0	0.10%	1.3	5.2%	0.4	1.8%	12.5%
IT	116.2	54.1	214.6%	60	-3.9	-6.5%	5.9	9.8%	0	0.00%	3.7	6.1%	2.2	3.7%	24.0%
LV	0.1	0.1	141.1%	0.1	0	3.5%	0	5.7%	0	0.00%	0	0.1%	0	5.6%	15.0%
LI	3.1	1.3	233.4%	1.4	0	-2.5%	0.1	5.4%	0	0.00%	0.1	4.6%	0	0.7%	12.5%
LT	0.3	0.2	192.9%	0.2	0	1.1%	0	3.6%	0	0.00%	0	0.2%	0	3.4%	15.0%
LU	21.7	9.9	219.6%	12.5	-4.5	-36.3%	2.6	20.9%	0	0.00%	2.6	20.9%	0	0.0%	27.0%
MT	5.2	1.5	343.2%	2.1	-1.2	-56.8%	0.6	27.6%	0	0.00%	0.4	20.2%	0.2	7.4%	35.0%
NL	58.5	33.3	175.5%	38.3	2	5.2%	5	13.0%	0.2	0.40%	1.4	3.7%	3.4	8.9%	25.0%
NO	24.1	11.6	207.5%	13.8	-1.9	-13.4%	2.2	16.2%	0	0.00%	1.4	9.8%	0.9	6.4%	25.0%
PL	14	5.4	260.1%	6.3	-1.3	-21.6%	0.9	14.1%	0	0.00%	0.8	12.3%	0.1	1.9%	19.0%
PT	5.7	3.7	154.0%	4	0.1	2.0%	0.3	7.5%	0	0.00%	0	1.0%	0.3	6.4%	29.5%
RO	1	0.6	175.7%	0.6	0	-3.7%	0	6.0%	0	0.00%	0	4.5%	0	1.6%	16.0%
SK	1.4	0.6	225.7%	0.8	-0.2	-23.2%	0.1	18.9%	0	0.00%	0.1	18.5%	0	0.3%	22.0%
SI	2.3	1	239.8%	1.1	-0.1	-9.9%	0.1	9.5%	0	0.00%	0.1	5.3%	0	4.2%	19.0%
ES	48.9	20.9	234.0%	26.9	-5.6	-21.0%	6	22.3%	0	0.00%	4.1	15.3%	1.9	7.1%	30.0%
SE	73.8	27.9	264.3%	30	-2.2	-7.3%	2.1	6.9%	0	0.00%	1.8	6.1%	0.2	0.8%	22.0%
UK	210.2	138	152.5%	147.8	-8.3	-5.6%	10	6.7%	1.2	0.80%	7.8	5.3%	1	0.7%	20.0%

The eligible own funds for the SCR (EOF), the SCR and their ratio as well as bSCR*, SCR excluding LAC DT, or, put differently, the basic SCR plus operational risk and the loss absorbing capacity of technical provisions as well as the net DTA on the Solvency II balance sheet (negative numbers indicate a net DTL), the total LAC DT, the part of LAC demonstrated by carry-back, the part demonstrated by net DTL and the part of LAC DT demonstrated by future profits for 2794, Standard Formula, Partial and Full Internal Model, undertakings **if profits from new business are capped at the profits in the business plan (with a maximum horizon of five years for the business plan)**. In the second columns of net DTA, LAC DT, Carry-back, and Future profits these amounts are displayed as a percentage of the bSCR*. The last column contains the applicable tax rate in the specific jurisdiction.

Profits from returns: risk-free returns as default

2621. EIOPA advises to restrict the profits from returns to risk-free returns unless an undertaking can provide credible evidence that it will generate profits in excess of the risk-free rates taking account of the increased uncertainty after the shock loss.

2622. Table 5 is similar to previous tables, but now shows the effect on LAC DT if profits from projected new business were restricted to 5 years and the profits from returns were restricted to the relevant risk-free rate. The total LAC DT would decrease from 15.9% to 14.2% and the average SCR ratio would decrease from 210.5% to 206.3% because of a decrease in LAC DT

from 39.0 to 34.7 billion euros for the 262 undertakings in the sample of the information request.

2623. 8 member states would be unaffected by the combined effect of these two restrictions, and two more would have a drop in capital coverage of less than 1%.

2624. Norway and the Netherlands would be most affected; undertakings in these jurisdictions would see their SCR ratio decrease by 6% and 15% respectively. Undertakings in these jurisdictions were hardly affected by the limitation on the profits from new business, so most of this effect arises from the limit on assumed rates of return.

2625. These estimates are greater than the actual impact is likely to be because undertakings can still allow for profits from returns in excess of the risk-free rates if they can provide credible evidence they would be able to realize these excess returns after the shock loss.

2626. Another source of overestimation of the impact arises from using returns derived from the basic risk-free interest rate term structure rather than from the relevant risk-free interest rate. The applicable Matching Adjustment and Volatility Adjustment usually result in rates higher than the basic risk-free interest rate term structure; deriving returns from the relevant term structure would thus generally imply higher risk-free returns and the impact from restricting excess returns would be smaller than presented here.

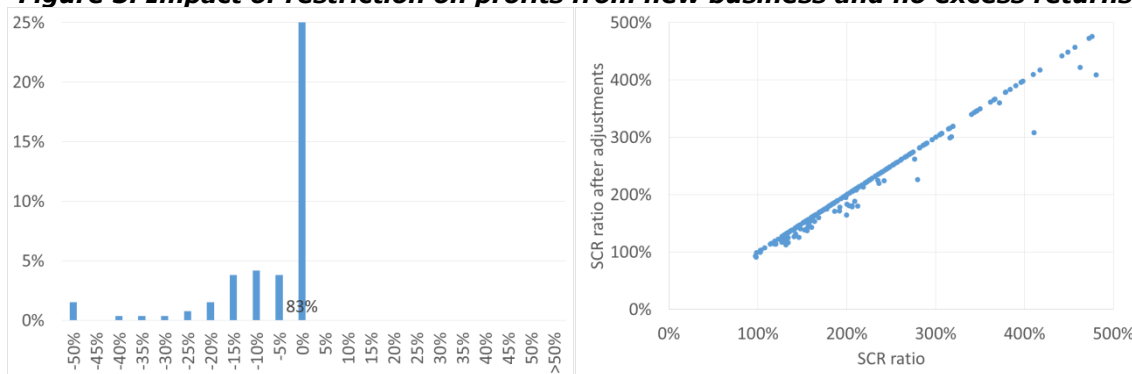
Table 5. Impact of restrictions on profits from new business and returns on sample information request

	Solvency			bSCR*	net DTA		LAC DT		LAC DT sources				Future profits from new business				Future profits from returns									
	EOF	SCR	ratio						Carry-back	Net DTL		Fut. profits	Before BP: BusPlan	Before BP: excess	After BP: BusPlan	After BP: excess	Before BP: risk-free	Before BP: excess	After BP: risk-free	After BP: excess						
EEA	433	210	206%	245	-38	-16%	35	14%	1	0%	28	12%	6	2%	4	2%	0	0%	0	0%	0	0%	2	1%	0	0%
AT	9	4	226%	5	-1	-19%	1	17%	0	0%	1	16%	0	1%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
BE	14	7	193%	9	-2	-20%	2	20%	0	0%	2	20%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
BG	1	1	204%	1	0	-6%	0	7%	0	0%	0	6%	0	1%	0	1%	0	0%	0	0%	0	0%	0	0%	0	0%
CY	0	0	247%	0	0	-7%	0	11%	0	0%	0	6%	0	5%	0	5%	0	0%	0	0%	0	0%	0	0%	0	0%
CZ	1	1	194%	1	0	-22%	0	19%	0	0%	0	18%	0	1%	0	1%	0	0%	0	0%	0	0%	0	0%	0	0%
DE	171	59	288%	73	-21	-29%	14	19%	0	0%	12	17%	1	2%	1	2%	0	0%	0	0%	0	0%	0	0%	0	0%
DK	4	2	185%	2	0	-17%	0	11%	0	0%	0	8%	0	3%	0	2%	0	0%	0	0%	0	0%	0	1%	0	0%
ES	24	10	242%	13	-3	-24%	3	23%	0	0%	2	16%	1	7%	1	7%	0	0%	0	0%	0	0%	0	0%	0	0%
FI	9	5	198%	6	-1	-18%	1	16%	0	0%	1	16%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
HR	1	0	229%	0	0	-15%	0	15%	0	0%	0	14%	0	1%	0	1%	0	0%	0	0%	0	0%	0	0%	0	0%
HU	1	0	228%	1	0	-15%	0	11%	0	0%	0	10%	0	1%	0	1%	0	0%	0	0%	0	0%	0	0%	0	0%
IE	14	10	151%	10	-1	-9%	1	9%	0	0%	1	7%	0	2%	0	2%	0	0%	0	0%	0	0%	0	0%	0	0%
IT	18	9	195%	11	-1	-6%	1	12%	0	0%	1	7%	1	5%	1	5%	0	0%	0	0%	0	0%	0	0%	0	0%
LI	1	0	170%	1	0	-12%	0	12%	0	0%	0	10%	0	2%	0	2%	0	0%	0	0%	0	0%	0	0%	0	0%
LU	5	3	175%	4	-1	-25%	1	21%	0	0%	1	21%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
NL	18	13	144%	14	1	10%	2	11%	0	1%	0	2%	1	8%	0	0%	0	0%	0	0%	0	0%	1	8%	0	0%
NO	15	7	215%	8	-1	-11%	1	18%	0	0%	1	11%	1	7%	0	5%	0	0%	0	0%	0	0%	0	2%	0	0%
PL	12	5	270%	5	-1	-25%	1	15%	0	0%	1	13%	0	1%	0	1%	0	0%	0	0%	0	0%	0	0%	0	0%
RO	1	0	218%	0	0	-13%	0	9%	0	0%	0	8%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
SE	5	2	201%	3	0	-6%	0	9%	0	0%	0	6%	0	2%	0	2%	0	0%	0	0%	0	0%	0	0%	0	0%
UK	83	55	151%	60	-4	-7%	5	9%	1	1%	4	7%	0	1%	0	1%	0	0%	0	0%	0	0%	0	0%	0	0%
Other	26	17	153%	19	-2	-8%	2	10%	0	0%	2	8%	0	2%	0	2%	0	0%	0	0%	0	0%	0	0%	0	0%

The eligible own funds, SCR, and solvency ratio, bSCR, net DTA, sources of LAC DT (carry-back, net DTL and future profits) and determinants of future profits (profits from new business within the business plan and profits in excess of the business plan and profits from risk-free and excess returns on assets in excess of the technical provisions, before and after the horizon of the business plan with a maximum of five years) if the profits from new business are limited to the profits in the business plan with a horizon of no more than 5 years and the profits from returns on assets in excess of the technical provisions are limited to risk-free returns; the numbers for 261 undertakings are presented per jurisdiction for which more than 2 undertakings provided information on their LAC DT; other undertakings are added to "other".*

2627. The figures below show the current SCR ratio and the SCR ratio after the limitation of future profits from new business to those in the business plan and the profits from returns limited to risk-free returns. The left figure shows that the SCR ratios of 83% of the undertakings are unaffected by this advice; in this respect unaffected means that the impact is less than 5% SCR ratio. The right figure shows the SCR ratio before and after applying this cap on the profits from new business and the limitation on returns to risk-free rates.

Figure 3. Impact of restriction on profits from new business and no excess returns



Left: Histogram of the impact on the SCR of restricting the profits from new business in the LAC DT calculation to the profits from new business in the business plan over a horizon equal to the business plan length with a maximum of five years and limiting the profits from returns to the risk-free rates. **Right:** scatter plot of the SCR ratio before limiting the profits from new business and limiting returns to risk-free rates, and after these limitations

2628. Table 6 shows the impact of limiting the profits from new business to those in the business plan with a maximum horizon of five years and additionally capping returns to the risk-free rates for the whole sector.

2629. LAC DT would decrease with 6.7 billion euros from 96.4 billion euros, 13.2%, to 89.7 billion euros, 12.3% of the bSCR*. This would imply a reduction of the weighted SCR ratio of the whole sector from 224.3% to 222.0%.

2630. The weighted average SCR ratio would decrease with more than 10% in Croatia; this is due to the restriction on profits from new business. The Netherlands were almost unaffected by limiting profits from new business, but limiting returns to risk-free returns would reduce the SCR ratio of the Dutch sector by 8.5%. In Spain the SCR ratio would reduce by 6.9%; this stems from both the limitation on profits from new business as limiting the returns to risk-free rates.

2631. Five out of 2794 undertakings would see their SCR ratio decrease from more than 100% to below 100%; from on average 101.8% to 95.7%.

Table 6. Impact - Amounts of LAC DT across the different jurisdictions in the EEA split in contributions by carry-back, net DTL and future profits per 31 December 2016 from annual QRT if no profits from new business beyond the business plan and no returns in excess of risk-free rates from annual QRT for whole sector

	EOF	SCR	ratio	bSCR*	net DTA	LAC DT	Carry-back	net DTL LACDT	Future profits	Tax Rate
EEA	1424.0	641.5	222.0%	731.2	-100.8 -13.8%	89.7 12.3%	1.4 0.2%	75.1 10.3%	13.2 1.8%	26.6%
AUSTRIA	35.3	13.3	266.0%	15.6	-2.8 -17.8%	2.3 14.9%	0.0 0.0%	2.3 14.5%	0.1 0.5%	25.0%
BELGIUM	32.3	18.4	175.2%	21.1	-2.2 -10.7%	2.6 12.5%	0.0 0.0%	2.6 12.5%	0.0 0.0%	34.0%
BULGARIA	1.2	0.6	196.5%	0.6	0.0 -5.1%	0.0 6.5%	0.0 0.0%	0.0 5.3%	0.0 1.2%	10.0%
CROATIA	1.5	0.7	222.7%	0.8	-0.1 -12.7%	0.1 13.5%	0.0 0.0%	0.1 12.1%	0.0 1.4%	20.0%
CYPRUS	1.4	0.5	270.8%	0.5	0.0 -9.1%	0.0 6.7%	0.0 0.0%	0.0 5.3%	0.0 1.4%	12.5%
CZECH REPUBLIC	4.3	1.9	225.1%	2.3	-0.4 -19.1%	0.4 15.5%	0.0 0.0%	0.3 15.2%	0.0 0.3%	19.0%
DENMARK	27.0	8.6	313.5%	9.0	-1.1 -12.8%	0.4 3.9%	0.0 0.0%	0.2 2.6%	0.1 1.3%	22.0%
ESTONIA	0.6	0.3	193.8%	0.3	0.0 -6.4%	0.0 3.4%	0.0 0.0%	0.0 3.4%	0.0 0.0%	25.0%
FINLAND	12.4	6.1	205.3%	7.2	-1.4 -19.4%	1.2 16.1%	0.0 0.3%	1.1 15.4%	0.0 0.4%	20.0%
FRANCE	301.1	134.1	224.5%	155.6	-23.9 -15.4%	21.5 13.8%	0.0 0.0%	18.4 11.9%	3.1 2.0%	34.0%
GERMANY	374.6	119.1	314.5%	145.1	-39.9 -27.5%	26.0 17.9%	0.0 0.0%	24.2 16.7%	1.8 1.2%	30.0%
GREECE	2.8	1.7	162.5%	1.7	0.4 25.0%	0.0 0.1%	0.0 0.0%	0.0 0.1%	0.0 0.0%	29.0%
HUNGARY	1.6	0.7	216.9%	0.8	-0.1 -11.7%	0.1 9.3%	0.0 0.0%	0.1 8.4%	0.0 0.8%	19.0%
IRELAND	39.2	22.9	171.2%	24.5	-1.5 -6.1%	1.6 6.5%	0.0 0.1%	1.3 5.2%	0.3 1.3%	12.5%
ITALY	116.2	54.2	214.5%	60.0	-3.9 -6.5%	5.8 9.7%	0.0 0.0%	3.7 6.1%	2.2 3.6%	24.0%
LATVIA	0.1	0.1	140.9%	0.1	0.0 3.5%	0.0 5.6%	0.0 0.0%	0.0 0.1%	0.0 5.5%	15.0%
LIECHTENSTEIN	3.1	1.3	233.4%	1.4	0.0 -2.5%	0.1 5.4%	0.0 0.0%	0.1 4.6%	0.0 0.7%	12.5%
LITHUANIA	0.3	0.2	192.8%	0.2	0.0 1.1%	0.0 3.6%	0.0 0.0%	0.0 0.2%	0.0 3.4%	15.0%
LUXEMBOURG	21.7	9.9	219.6%	12.5	-4.5 -36.3%	2.6 20.9%	0.0 0.0%	2.6 20.9%	0.0 0.0%	27.0%
MALTA	5.2	1.5	342.8%	2.1	-1.2 -56.8%	0.6 27.5%	0.0 0.0%	0.4 20.2%	0.2 7.3%	35.0%
NETHERLANDS	58.6	35.0	167.2%	38.3	2.0 5.2%	3.3 8.5%	0.2 0.4%	1.4 3.7%	1.7 4.4%	25.0%
NORWAY	24.1	11.8	203.2%	13.8	-1.9 -13.4%	2.0 14.4%	0.0 0.0%	1.4 9.8%	0.6 4.7%	25.0%
POLAND	14.0	5.4	258.8%	6.3	-1.3 -21.6%	0.9 13.7%	0.0 0.0%	0.8 12.3%	0.1 1.5%	19.0%
PORTUGAL	5.7	3.7	153.9%	4.0	0.1 2.0%	0.3 7.4%	0.0 0.0%	0.0 1.0%	0.3 6.3%	29.5%
ROMANIA	1.0	0.6	175.7%	0.6	0.0 -3.7%	0.0 6.0%	0.0 0.0%	0.0 4.5%	0.0 1.6%	16.0%
SLOVAKIA	1.4	0.6	225.7%	0.8	-0.2 -23.2%	0.1 18.9%	0.0 0.0%	0.1 18.5%	0.0 0.3%	22.0%
SLOVENIA	2.3	1.0	239.7%	1.1	-0.1 -9.9%	0.1 9.4%	0.0 0.0%	0.1 5.3%	0.0 4.1%	19.0%
SPAIN	48.9	21.2	230.7%	26.9	-5.6 -21.0%	5.7 21.2%	0.0 0.0%	4.1 15.3%	1.6 6.0%	30.0%
SWEDEN	73.8	28.0	263.6%	30.0	-2.2 -7.3%	2.0 6.6%	0.0 0.0%	1.8 6.1%	0.2 0.5%	22.0%
UNITED KINGDOM	210.2	137.8	152.5%	147.8	-8.3 -5.6%	10.0 6.7%	1.2 0.8%	7.8 5.3%	1.0 0.7%	20.0%

The eligible own funds for the SCR (EOF), the SCR and their ratio as well as bSCR, SCR excluding LAC DT, or, put differently, the basic SCR plus operational risk and the loss absorbing capacity of technical provisions as well as the net DTA on the Solvency II balance sheet (negative numbers indicate a net DTL), the total LAC DT, the part of LAC demonstrated by carry-back, the part demonstrated by net DTL and the part of LAC DT demonstrated by future profits for 2794, Standard Formula, Partial and Full Internal Model, undertakings **if profits from new business are capped at the profits in the business plan (with a maximum horizon of five years for the business plan) and if no profits from excess returns would be included.** In the second columns of net DTA, LAC DT, Carry-back, and Future profits these amounts are displayed as a percentage of the bSCR*. The last column contains the applicable tax rate in the specific jurisdiction.*

Future profits no more favourable assumptions than pre-shock

2632. EIOPA also advises to not allow for assumptions underlying future profits that are more favourable than the assumptions that could be used for the demonstration of likely utilization of the deferred tax assets on the balance sheet. This advice does not imply that excess returns would no longer be possible sources of future profits when calculating LAC DT.

2633. Profits from new business in the business plan and risk-free returns would still be possible when calculating LAC DT. This is the same scenario as the one discussed in the previous section on the impact if no excess returns and no profits beyond the business plan were used in the calculation of LAC DT. For the impact of the advice that assumptions should not be more favourable than pre-shock, EIOPA refers to this previous section.

Future management actions should meet the requirements of Article 23 of the Delegated Regulation

2634. EIOPA advises that future management actions applied in the calculation of LAC DT would have to meet the requirements of Article 23 of the Delegated Regulation.

2635. The impact analysis above has been performed as if no future management actions were applied, which is yet another source of potential overestimation of the impact analysis.

Strengthening the governance requirements regarding LAC DT

Option 1: no change

2636. On the side benefit it is not identified any benefit in continuing with a framework that does not meet Solvency II targets in terms of level playing field and sound governance.

2637. On the side costs,

- Policyholders – No direct and immediate impact on the pricing or benefits from insurance contracts. Nevertheless the protection of policy holders might bear an indirect impact due to the lack of level playing field, since undertakings with poorer governance on risks related to LAC DT might compete on the same (better) conditions than those undertakings that have paid attention to the governance of those risks.
- Industry – Undertakings remain exposed to inappropriate competition. Undertakings with a poor assessment of risks related to LAC DT do not

necessarily meet a balancing requirement compared to other competitors that have devoted resources to develop such assessment.

- Supervisors – Lack of a legal and supervisory framework appropriate to fulfil their responsibilities.
- Financial stability – Management of risks for the financial system related to LAC DT would remain unknown, as its measurement and degree of mitigation. Reliance on public governments only partially assessed (gilts, but not deferred taxes).

Option 2: High-level supervisory guidance / principles

2638. On the side benefits,

- Policyholders – No material direct or immediate benefit. Indirectly, the protection of policy holders might benefit from an improvement of the level playing field (undertakings having a common reference, although not legally binding, regarding governance of risks related to LAC DT).
- Industry – Undertakings will benefit of making explicit the key supervisory guidance / principles on governance related to LAC DT.
- Supervisors – Partially fixed the lack of an appropriate supervisory framework.
- Financial stability: Supervisory principles might incentivise a better and more generalized reflection on risks related to LAC DT.

2639. On the side costs,

- Policyholders – No direct and immediate impact on the pricing or benefits from insurance contracts. Indirectly, the protection of policy holders might not obtain any material benefit because the level playing field might not be substantially improved (since supervisory principles are not legally binding).
- Industry – Undertakings remain exposed to inappropriate competition. Supervisory guidance / principles are neither legally binding nor sufficiently harmonising. Although an appropriate dialogue among supervisors and undertakings is already in place, market practices remain materially divergent.
- Supervisors – Regarding LAC DT, principles have proved insufficient to fulfil supervisory responsibilities. Development of national ancillary provisions will be likely necessary (as the experience shows), which would end de facto in lack of harmonization. The complexity of projections of post stress taxable profits, its high degree of uncertainty, influence of expert judgement and materiality requires sufficiently binding provisions on governance of risks related to those projections.

- Financial stability: Management of risks for the financial system remain unknown as its measurement and degree of mitigation. Reliance on public governments might remain partially assessed.

Option 3: Complete appropriately the Delegated Regulation

2640. On the side benefits,

- Policyholders – No material direct or immediate benefit. Indirectly the protection of policy holders will likely benefit from an effective improvement of the level playing field (undertakings legally required to apply actually homogenous approaches to the governance of risks related to LAC DT).
- Industry – Undertakings will benefit of a legally binding framework guaranteeing the same governance requirements related to LAC DT applies to all undertakings, provided the legal framework continues respecting the freedom of undertakings to decide the best manner to organize themselves in order to meet governance provisions. Furthermore, each undertaking will benefit by developing its own risk self-assessment and evaluation of its overall capital needs considering LAC DT according to a common legal framework. This provides legal certainty.
- Supervisors – Fixed the lack of a legal and supervisory framework. The 'appropriateness' of the new legal provisions secures the supervisory basement while providing flexibility enough to treat differently cases that are actually different.
- Financial stability: This option promotes a better and more generalized reflection on the management of risks related to LAC DT.

2641. On the side costs,

- Policyholders – No material direct or immediate cost.
- Industry – The cost at market level will be negligible (see above the impact assessment on Pillar 1 provisions).

Regarding individual undertakings, no material costs for those undertakings that have already implemented a sound governance on LAC DT. The new provisions do not set out procedures additional to those already expected within a sound governance.

At individual level the cost might be low-to-medium only for those undertakings whose solvency position relies to a material extent on LAC DT and they have not implemented adequate governance in place yet. These undertakings are a minor part of market participants.

- Supervisors – No material cost.
- Financial stability – Not relevant.

2642. Option 1 is clearly not eligible, since it does neither address the problem definition nor achieve the objectives pursued.

2643. Among option 2 and 3 it is preferred option 3, since it is clearly superior for the sake of harmonization and to satisfy supervisory needs and financial stability concerns.

2644. Option 3 is better than option 2 when assessing the impact on industry, among other reasons because under option 3 market participants benefit from a higher legal certainty about the requirements of regulators and expectancies supervisors.

2645. Neither option 2 nor option 3 have a direct or immediate impact on policy holders' rights, although indirectly option 3 better protects policy holders' rights, by ensuring that the same robust governance of risks related to LAC DT applies to all undertakings.

Improving the supervisory reporting and public disclosure on LAC DT

Option 1: no change

2646. On the side benefit it is not identified any benefit in continuing with a framework that does not meet Solvency II targets in terms of level playing field and transparency. It should be noted that the current reporting to supervisors only envisages the final figure of LAC DT, without any disclosure of either its sources or its justification. The same scarcity of information applies to public disclosure

2647. On the side costs,

- Policyholders – No direct and immediate impact on the pricing or benefits from insurance contracts. Indirectly the protection of policy holders might bear the consequences of an inadequate level playing field (public information on risks assumed by each undertaking insufficiently comparable, and hence pricing and benefits of insurance contracts not comparable).
- Industry – Undertakings remain exposed to inappropriate competition, due to different quality of reporting and disclosure. Undertakings providing more valuable and reliable information regarding risks related to LAC DT do not necessarily receive an adequate recognition (no incentives for better transparency).
- Supervisors – Lack of a legal and supervisory framework appropriate to fulfil their responsibilities.
- Financial stability: Risks for the financial system related to LAC DT would remain unknown as its measurement and degree of mitigation. Reliance on public governments only partially assessed (gilts, but not deferred taxes).

Option 2: High-level supervisory guidance / principles

2648. On the side benefits,

- Policyholders – No material direct or immediate benefit.
- Industry – Undertakings will benefit of making explicit the key supervisory principles on Pillar 3 related to LAC DT.
- Supervisors – No material benefit (see costs below).
- Financial stability: (see costs below).

2649. On the side of costs,

- Policyholders – No direct and immediate impact on the pricing or benefits from insurance contracts. Indirectly the protection of policy holders might still bear the consequences of an inadequate level playing field (it is unlikely than an approach based on supervisory principles may lead to public information sufficiently comparable from the viewpoint of consumers). In absence of easily comparable public disclosure policyholders cannot protect their interests by putting into relation pricing and risks assumed by the undertaking providing protection.
- Industry – Undertakings remain exposed to inappropriate competition. Supervisory principles are neither legally binding nor sufficiently harmonising. More transparent undertakings might not receive an adequate recognition to their efforts.
- Supervisors – Lack of a legal and supervisory framework appropriate to fulfil their responsibilities. A principle based approach to report to supervisors makes costly its supervisory analysis and does not necessarily promote convergent practices. It should be noted the complexity, wide range for expert judgement and materiality of LAC DT, as the incompleteness of the current reporting to supervisors. Coordination within college of supervisors regarding risks related LAC DT might remain challenging.
- Financial stability: It is not guaranteed the same quality and degree of comparability of the information on the risks for the financial system related to LAC DT. This endangers the capacity to assess at market level the measurement and degree of mitigation of those risks.

Option 3: Complete appropriately the Delegated Regulation

2650. On the side of benefits,

- Policyholders – Policy holders are better protected with a framework that fosters an actual level playing field, in particular fostering an adequate reporting to supervisors and the disclosure of comparable information. An easily comparable public disclosure facilitates policy holders to protect their interests by putting into relation pricing and risks assumed by the undertaking providing insurance coverage.

- Industry – Undertakings will benefit of a legally binding framework guaranteeing the same transparency requirements related to LAC DT applies to all undertakings, provided that framework allows to apply materiality and limits costs to a justified level (e.g. it requires calculations relevant for risk management purposes or financial stability). The regulation should distinguish the contents regarding supervisory report and the content regarding public disclosure (preventing to disclose sensitive information from a competition viewpoint).
- Supervisors – Fixed the lack of a legal framework. Furthermore, this approach will make easier to achieve an efficient exchange of comparable information regarding LAC DT among members of Colleges of Supervisors.
- Financial stability: An adequate (reliable and comparable) transparency helps to anticipate risks related to LAC DT and assess the preparedness of the financial system should such risks materialize.

2651. On the side of costs,

- Policyholders – No direct and immediate impact on the pricing or benefits from insurance contracts.
- Industry – The cost of reporting or disclosing the relevant information. That cost should not be material.

The cost of producing the relevant information should not be considered since anyway undertakings should produce such information for the sake of risk management and sound governance. Therefore his approach does not require the implementation of additional reporting procedures. It just guarantees a comparable and complete scope of the already existing reporting procedures, treating LAC DT with the same degree of regulation than other elements of the SCR with similar materiality.

- Supervisors – The cost of collecting and analysing information on systematic basis. This cost offsets the cost of making individual requirements on each relevant case and processing heterogeneous contents.
- Financial stability: Not relevant.

2652. Option 1 is clearly not eligible, since it does neither address the problem definition nor achieve the objectives pursued.

2653. Among option 2 and 3 it is preferred option 3, since it is clearly superior for the sake of harmonization and to satisfy supervisory needs and financial stability concerns.

2654. Option 3 is better than option 2 when assessing the impact on industry, among other reasons because under option 3 market participants benefit from a higher legal certainty about the requirements of regulators and expectances supervisors.

2655. Neither option 2 nor option 3 have a direct or immediate impact on policy holders' rights, although indirectly option 3 better protects policy holders' rights, to the extent that it facilitates policyholders to protect their interests by putting into relation pricing and risks assumed by the undertaking providing insurance coverage.

24.21. Risk margin

24.21.1. Policy options

2656. The value of technical provisions shall be equal to the sum of a best estimate and a risk margin. The risk margin shall be calculated by determining the cost of providing an amount of eligible own funds equal to the SCR necessary to support the insurance and reinsurance obligations over the lifetime thereof. The rate used in the determination of the cost of providing that amount of eligible own funds (Cost-of-Capital rate) shall be the same for all insurance and reinsurance undertakings and shall be reviewed periodically.

2657. During the development of the advice on the risk margin and on the cost-of-capital, EIOPA has identified the following policy issue for which different options have been considered and debated: calculation methods for the equity risk premium (ERP). ERP is a key element in the calculation of the Cost-of Capital rate and represents the extra return that investors demand above a risk-free rate to invest in an equity class.

2658. In order to harmonise the practices at European level, the following options have been considered:

- Option 1: historical return model;
- Option 2: dividend discount model.

24.21.2. Analysis of impacts

Option 1: historical return model

2659. On the side of benefits, it is possible to detect the following effects:

- Policyholders – if the period considered is sufficiently long, the model provides for an ERP that is through the cycle and that reflects periods of stability and crisis. Policyholders' protection is therefore ensured.
- Industry – it provides regulatory stability since this method was used by CEIOPS.
- Supervisors – ensures that in case of (re)insurance liabilities transfer undertakings are able to pay the transfer value in different economic situations.

2660. On the side of costs, it is possible to detect the following:

- Policyholders – the ERP could be misstated as the past data that it is derived from includes periods of particularly high returns and very low returns (crashes) that were not anticipated by investors at the time: it could generate an either too low or too high cost of capital rate, hence affecting policyholders' protection.
- Industry – the outcome depends on the time period chosen. If future updates consider different time period this would introduce regulatory volatility in terms of final outcome of cost of capital rate.
- Supervisors – none.

Option 2: dividend discount model

2661. On the side of benefits, it is possible to detect the following effects:

- Policyholders – none.
- Industry – the model aims at taking into account differences between past and future levels of ERP, hence (re)insurance liabilities are valued based on current economic conditions.
- Supervisors – the model takes account of new academic work.

2662. On the side of costs, it is possible to detect the following:

- Policyholders – the model relies on strong assumptions about future economic development. If the future economic development envisaged does not realise, the cost-of-capital and the technical provisions could be underestimated hence policyholders' protection reduced.
- Industry – this model is not consistent with the way other elements of the cost-of-capital are derived, hence it is more difficult to assess the underlying assumptions, which could adversely affect risk management. This would be change compared to CEIOPS method and would create regulatory volatility.
- Supervisors – the model is sensitive to assumptions hence supervisors would need to assess whether the assumptions match sufficiently the specific risk-profile of supervised (re)insurance undertakings.

24.21.3. Comparison of options

2663. The preferred option is **option 1 (historical return model)**. This model provides for a more stable ERP over time, it is appropriate in different economic environments and it depends less on assumptions. The historical return model provides for a better policyholders' protection. Therefore, this option complies best with the objectives to avoid pro-cyclicality and to have appropriate methods, assumptions and parameters.

24.22. Comparison of own funds in insurance and banking sectors

24.22.1. Policy options

2664. Since certain own funds items are shared by the insurance and banking frameworks (e.g. certain debt instruments), EIOPA was asked to consider whether changes should be made to the Solvency II requirements for these items to minimise differences between the banking and insurance regulatory frameworks.

2665. Solvency II permits undertakings to recognise subordinated debt instruments, that they have issued as own funds (i.e. available capital), provided those instruments have certain features (e.g. minimum durations) intended to ensure that they are available to absorb losses by the insurer. These instruments may be classified in Tier 1, Tier 2 and Tier 3 own funds depending on which features they exhibit and are then eligible as own funds up to certain limits. Tier 1 subordinated debt instruments are the highest quality and therefore need to satisfy the “strictest” criteria. These items are eligible up to a limit of 20% total tier 1 and accordingly are known as “restricted tier 1” instruments (rT1).

2666. During the development of the advice on this section, EIOPA has identified the following policy issue for which different options have been considered and debated: possibility of a tax exemption for rT1 instruments in some circumstances.

2667. Under some national fiscal regimes writing down an rT1 can create an exceptional profit which is taxable. So, if the rT1 triggers when an insurance undertaking is still making taxable profits, the write down could increase the quality of own funds but at the same time lower the quantity, by causing a tax liability. In this respect, the following two options have been considered:

- Option 1.1: allowing for tax exemption from the requirement to write down or convert; in exceptional circumstances the supervisor could have the ability to consider whether to give an exceptional waiver from the requirement to write down or convert, on a case specific basis, if certain conditions are met.
- Option 1.2: not allowing for tax exemption from the requirement to write down or convert.

24.22.2. Analysis of impacts

Option 1: allowing for tax exemption from the requirement to write down or convert

2668. On the side of benefits, it is possible to detect the following effects:

- Policyholders – in exceptional circumstances the write down or conversion could adversely affect the solvency position of the undertaking and reduce its capacity to meet its insurance obligations to the detriment of policyholders. The tax waiver avoids that situation.

- Industry – in exceptional circumstances the write down or conversion could adversely affect the solvency position of the undertaking and reduce its capacity to meet its insurance obligations. The tax waiver avoids that situation.
- Supervisors – the tax waiver is a decision of the supervisor who has the flexibility to assess the solvency situation and likely tax effect, if any, of the trigger on the undertaking.

2669. On the side of costs, it is possible to detect the following effects:

- Policyholders – since it is based on an assessment of the likelihood of a future tax effect, the waiver could be granted in cases where writing down or conversion would not affect the solvency position of the undertaking. If that happened, the own funds would not absorb losses as well as it could, and policyholder protection would be impaired.
- Industry – since it is based on an assessment of the likelihood of a future tax effect, the waiver could be granted in cases where writing down would not affect the solvency position of the undertaking. If that happened, the own funds would not absorb losses as well as it could, and policyholder protection would be impaired.
- Supervisors – since it is based on an assessment of the likelihood of a future tax effect, the waiver could be granted in cases where writing down would not affect the solvency position of the undertaking. If that happened, the own funds would not absorb losses as well as it could, and policyholder protection would be impaired.

Option 2: not allowing for tax exemption from the requirement to write down or convert

2670. On the side of benefits, it is possible to detect the following effects:

- Policyholders – the write down or conversion allows the own funds item to absorb losses, which provides policyholder protection.
- Industry – the write down or conversion allows the own funds item to absorb losses, which provides policyholder protection.
- Supervisors – the write down increase the quality of own funds, which increase the likelihood of the undertaking meeting its insurance obligations.

2671. On the side of costs, it is possible to detect the following effects:

- Policyholders – in exceptional circumstances the write down could adversely affect the solvency position of the undertaking and reduce its capacity to meet its insurance obligations to the detriment of policyholders.

- Industry – in exceptional circumstances the write down could adversely affect the solvency position of the undertaking and reduce its capacity to meet its insurance obligations.
- Supervisors – in exceptional circumstances the write down could adversely affect the solvency position of the undertaking and reduce its capacity to meet its insurance obligations to the detriment of policyholders.

24.22.3. Comparison of options

2672. The preferred option is **option 1 (allowing for tax exemption from the requirement to write down)**. Option 2 would be more consistent with the banking framework, but since the tax exemption is considered by the supervisor under exceptional circumstances and allowed on a discretionary basis, option 1 ensures maximum level of policyholders' protection.

24.23. Capital instruments only eligible as tier 1 up to 20% of total tier 1

24.23.1. Policy options

2673. During the development of the advice on own funds, EIOPA has identified the following policy issues for which different options have been considered and debated:

- Policy issue 1: removing the 20% limit for rT1 instruments
- Policy issue 2: Possibility of changes in the mandatory trigger

Policy issue 1: Removing the 20% limit for rT1 instruments

2674. During the development of the advice on which features required of rT1 instruments would need to be changed, EIOPA has analysed the impact of the following two options:

- Option 1: removing the 20% limit.
- Option 2: keeping the 20 % limit.

Policy issue 2: Possibility of changes in the mandatory trigger

2675. The Commission has asked EIOPA which features required of rT1 instruments should be strengthened to maintain the quality of Tier 1, should the 20% limit be removed. One of the elements analysed is to make the mandatory trigger of write down stronger.

2676. During the development of the advice on strengthening the features required of rT1 instruments, EIOPA has considered the change of the mandatory trigger of 75% of SCR.

2677. To assess to which level the trigger should be increased EIOPA has performed a quantitative analysis.

24.23.2. Analysis of impacts

Policy issue 1: Removing the 20% limit for rT1 instruments

Option 1.1: removing the 20% limit

2678. On the side of benefits, it is possible to detect the following effects:

- Policyholders – none.
- Industry – the cost of financing may be reduced for few undertakings since more hybrid instruments would be eligible to cover the SCR. EIOPA analysed the data it receives from the 2016 annual reporting of undertakings. It received data pertaining to 2707 undertakings, out of which 204 have recognised rT1 capital. Of those 204, only 30 entities (i.e. 1.1%) had rT1 above the 20% total tier 1 limit (and therefore relegate some rT1 to Tier 2). Of those only eight (0.029%) have more than 30% of total Tier 1 (before relegation). In four extreme cases undertakings have rT1 (before relegation) of over 50% of total Tier 1. This being the case, the limit is not considered to be a material impediment to the industry.
- Supervisors – none.

2679. On the side of costs, it is possible to detect the following effects:

- Policyholders – less policyholders' protection: If the 20% limit is removed undertakings would be able to comply with the requirement for at least 50% of the SCR to be presented by Tier 1 own funds by holding more hybrid capital and equity-like capital than at present. This would weaken the ability of Solvency II to deliver protection to policy holders and beneficiaries at the 1 in 200 level of risk.
- Industry – the loss-absorbency capacity may be reduced at the 1 in 200 level of risk, which could make the cost of financing through equity higher.
- Supervisors – the supervision of Tier 1 own funds is made more difficult; the assessment whether the characteristics and features of Article 93 of the Solvency II Directive may need to be deepen.

Option 1.2: keeping the 20% limit

2680. On the side of benefits, it is possible to detect the following effects:

- Policyholders – better policyholders' protection since Tier 1 own funds items would meet the requirements of Article 93 of the Solvency II Directive.
- Industry – better loss-absorbency capacity at the 1 in 200 level of risk.
- Supervisors – the 20% limit is easy to supervise; it is easier to assess the quality of Tier 1 own funds; it ensures better policyholders' protection.

2681. On the side of costs, it is possible to detect the following effects:

- Policyholders – none.
- Industry – for the vast majority of the industry, there is no cost in keeping the 20% limit: EIOPA analysed the data it receives from the 2016 annual reporting of undertakings. It received data pertaining to 2707 undertakings, out of which 204 have recognised rT1 capital. Of those 204, only 30 entities (i.e. 1.1%) had rT1 above the 20% total tier 1 limit (and therefore relegate some rT1 to Tier 2). Of those only eight (0.029%) have more than 30% of total Tier 1 (before relegation). In four extreme cases undertakings have rT1 (before relegation) of over 50% of total Tier 1. This being the case, the limit is not considered to be a material impediment to the industry.
- Supervisors – none.

Policy issue 2: Possibility of changes in the mandatory trigger

2682. The trigger would need to be increased in such a way that it strengthens the features of rT1. However, if it is increased to a too high level, the trigger could be reached not because of a real decrease in own funds, but because of the volatility of the Solvency II balance-sheet and of the SCR that is due to market consistent valuation.
2683. A too high trigger capturing the volatility of the Solvency II balance-sheet would be to the detriment of the industry: this would cause difficulties in risk management. For policyholders, the benefit would be that the quality of own funds would be reinforced. The cost would be a risk that industry does not finance itself through these instruments but with more costly instruments, which could ultimately increase prices for policyholders.
2684. EIOPA has looked at evolution of solvency ratios over time and built some indicators: standard deviations, averages and number of undertakings that breach their SCR and recovered “quickly”.
2685. Time series of solvency ratios from Q1 2016 to Q4 2016 from undertakings that provided numbers for these 5 quarters (1770 undertakings) were analysed.
2686. The analysis has been restricted to undertakings, solvency ratios of which were below 120% or 150%. This is because
- using the data from the quarterly reporting, undertakings with higher solvency ratio appear to have higher volatility in their solvency ratio;
 - undertakings with high solvency ratio are less expected to breach their SCR.
2687. EIOPA has looked at standard deviations as a measure to quantify the amount of variation in the SCR ratio. A low standard deviation indicates that data points tend to be close to the mean, while a high standard deviation indicates that data points are spread out.

2688. In Q1, there are 451 undertakings that have a SCR ratio lower than 150%. The average SCR ratio is 133%. We calculated the standard deviation of the SCR ratio over 4 quarters for each undertaking and took the average over the whole sample. The average standard deviation is 12%. That means that approximately two third of the undertakings have a SCR ratio that varies between 121% and 145%.

2689. In Q1, there are 144 undertakings that have a SCR ratio lower than 120%. The average SCR ratio is 114%. The average standard deviation is 13%. That means that approximately two third of the undertakings have a SCR ratio that varies between 101% and 127%.

2690. 11. Looking at the difference in the SCR ratio from Q1 to Q2, from Q2 to Q3 and from Q3 to Q4 for all undertakings that have a SCR ratio below 150%. There is average difference of 14% from one quarter to another.

24.23.3. Comparison of options

Policy issue 1: Removing the 20% limit for rT1 instruments

2691. The preferred option is **Option 2 (keeping the 20% limit)**. This protects the prudential quality of Solvency II Tier 1 own funds necessary to deliver the adequate protection of policy holders and beneficiaries. If the 20% limit would not be kept, EIOPA believes that no changes to the features required of hybrid instruments would fully mitigate the resulting loss in capital quality. The methods, assumptions and parameters would not be appropriate with other options.

Policy issue 2: Possibility of changes in the mandatory trigger

2692. The average movement of SCR ratio from one quarter to another is 14%, for those undertakings that have a SCR ratio below 150% in Q1. Looking at the standard deviation, the results are similar whether one looks at a sample of undertakings with SCR ratio below 150% or below 120%. That would tend to indicate that we can observe the same level of volatility.

2693. It appears that raising the trigger point higher than 85% would not be reasonable, in the sense that it would capture the volatility of the SCR ratio rather than situations where write-down is necessary. That would be the case at least on average.

2694. The preferred option is to increase the trigger from 75% to 80% to take a margin of prudence as regards the volatility observed. This parameter appears the most appropriate.

2695. EIOPA notes that this change in the mandatory trigger would not compensate for the removing of the 20% limit, since it is not only based on ensuring similar quality of own funds, but also on feasibility given the volatility observed.

25. Annex to chapter 1 – USP calibration

2696. The USP sigma factors are calculated as described in Annex XVII of the delegated regulation without taking into account the credibility factor described in paragraph G of Annex XVII.

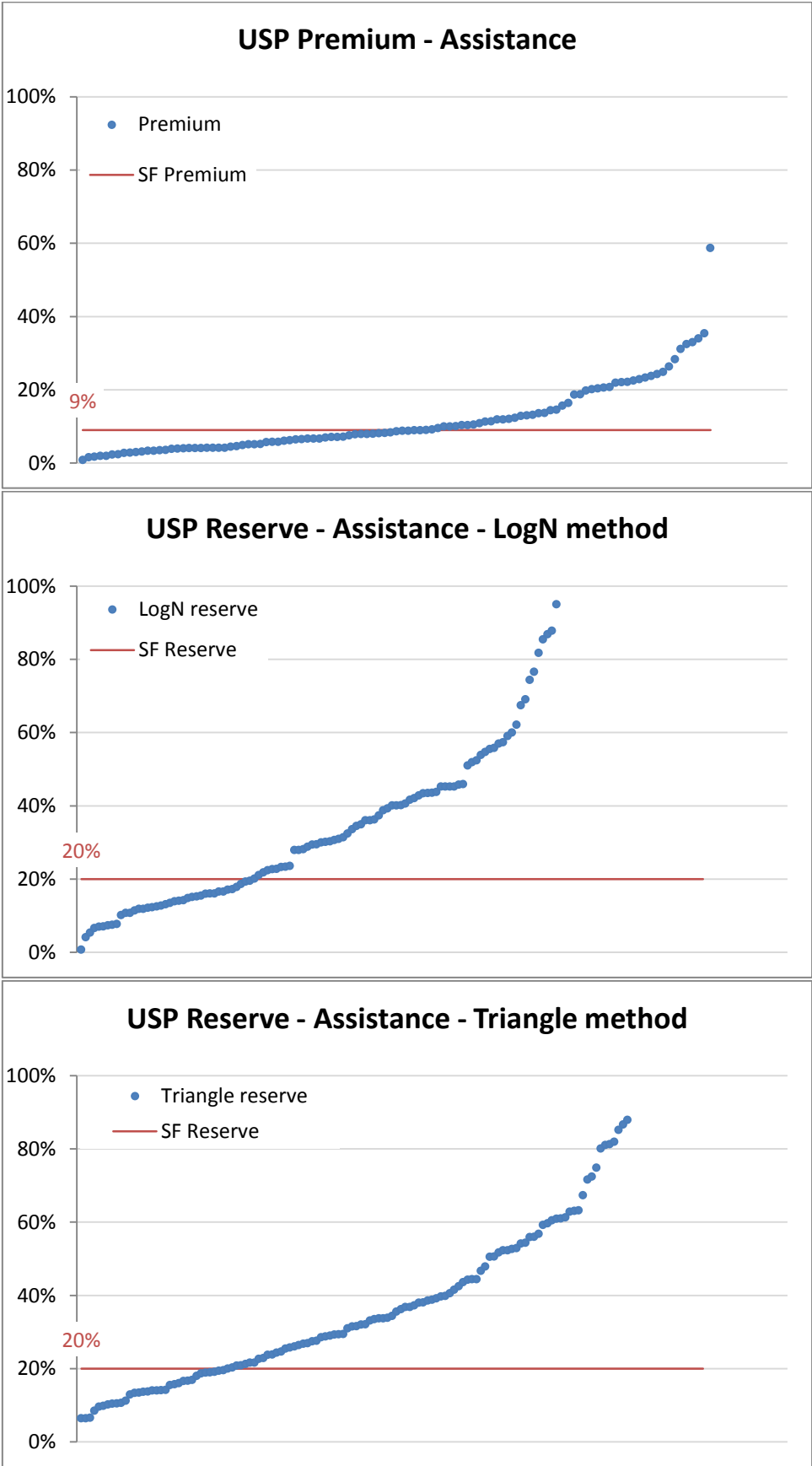
2697. LogN method refers to the reserve risk method 1 of the paragraph C of Annex XVII. Triangle method refers to the reserve risk method 2 of the paragraph D of Annex XVII. These are calculated using paid triangles.

2698. For the sake of clarity, figures above 100% are ignored. The number of excluded figures varies from a graph to another.

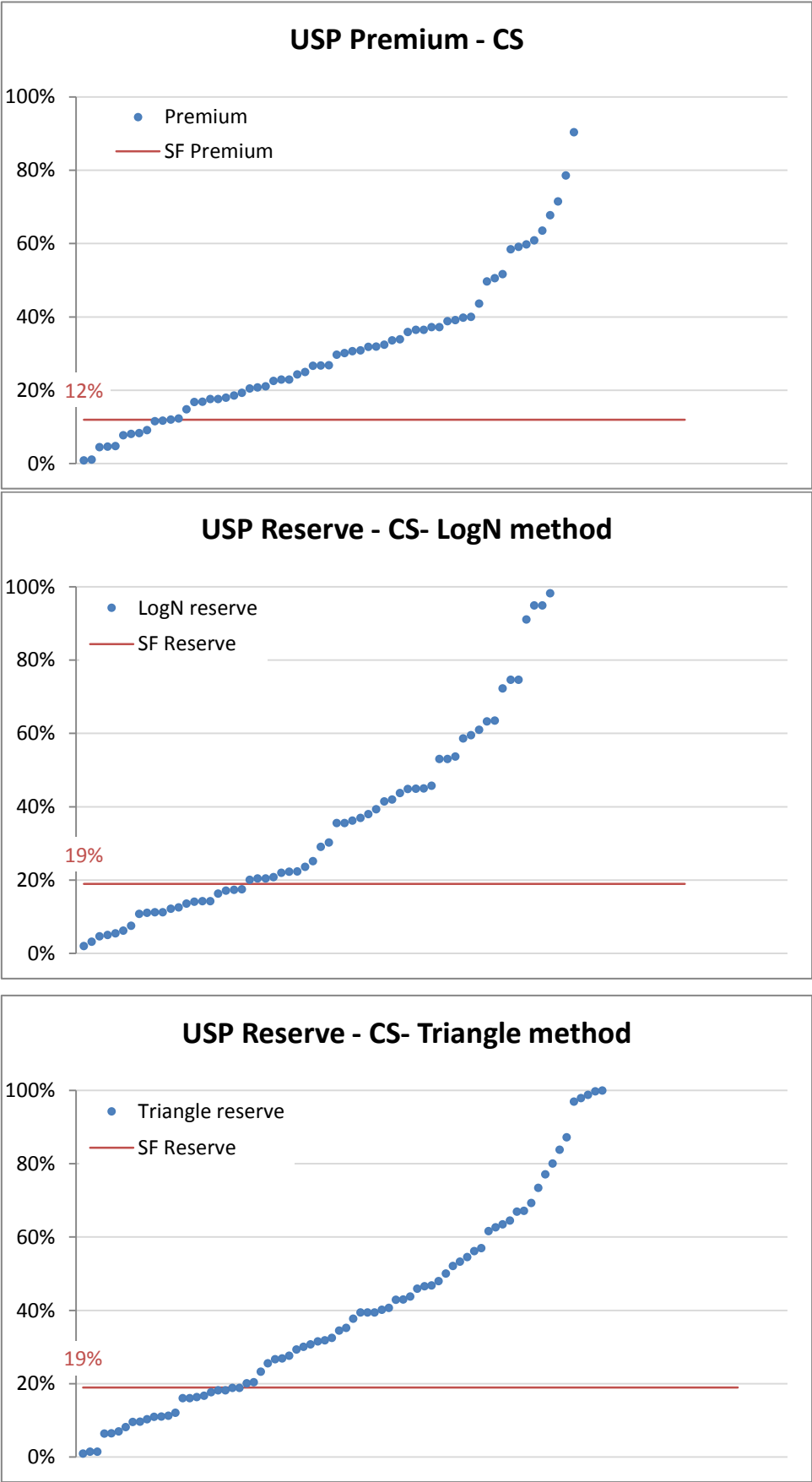
2699. The following table discloses the amount of USP for a given line of business that is below standard formula's calibration.

	Amount of USP below the standard formula calibration		
	<i>Premium</i>	<i>Reserve LogN</i>	<i>Reserve Triangle</i>
AS	51%	36%	28%
CS	19%	35%	31%
HME	41%	11%	9%
HWC	46%	22%	45%
LE	59%	46%	52%

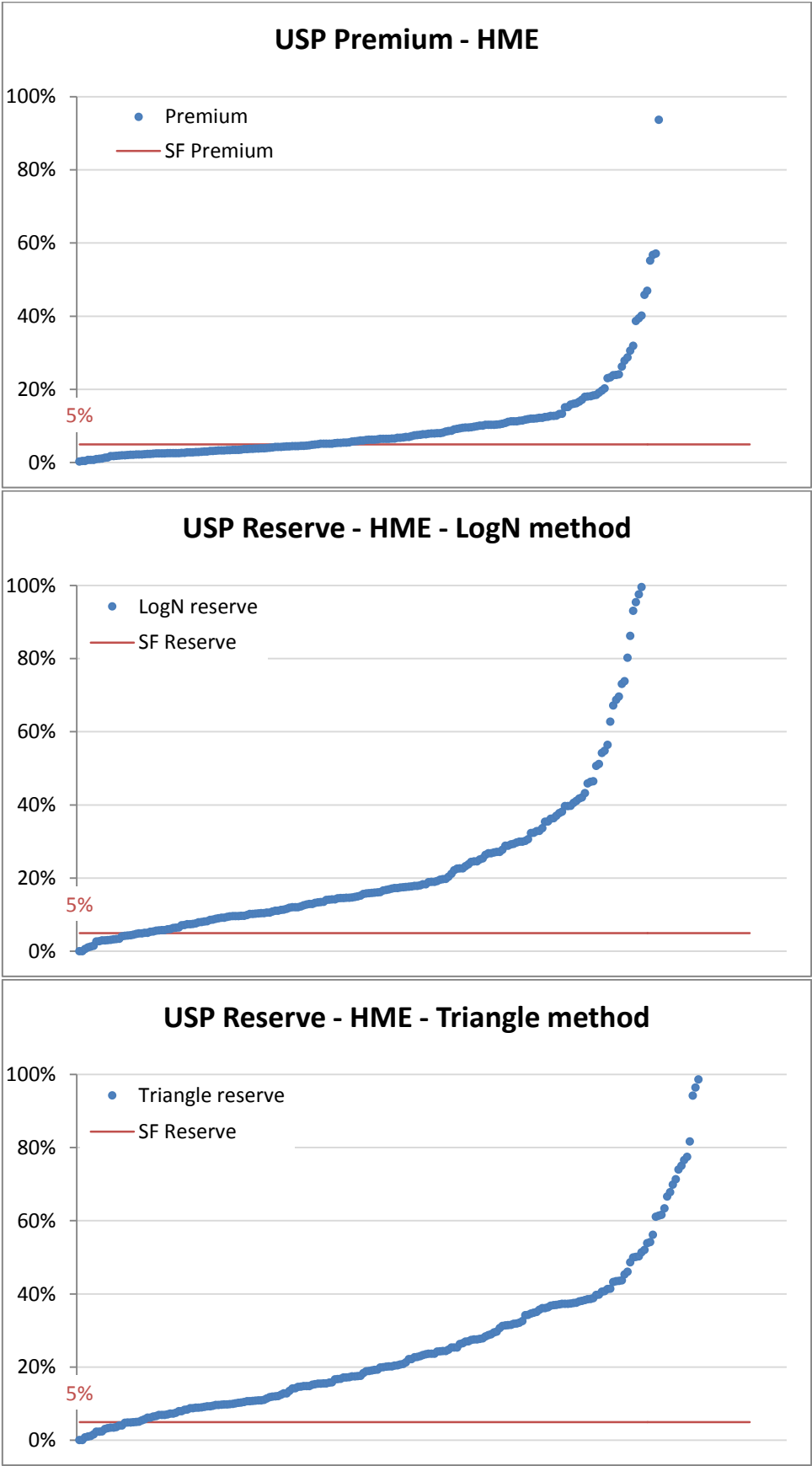
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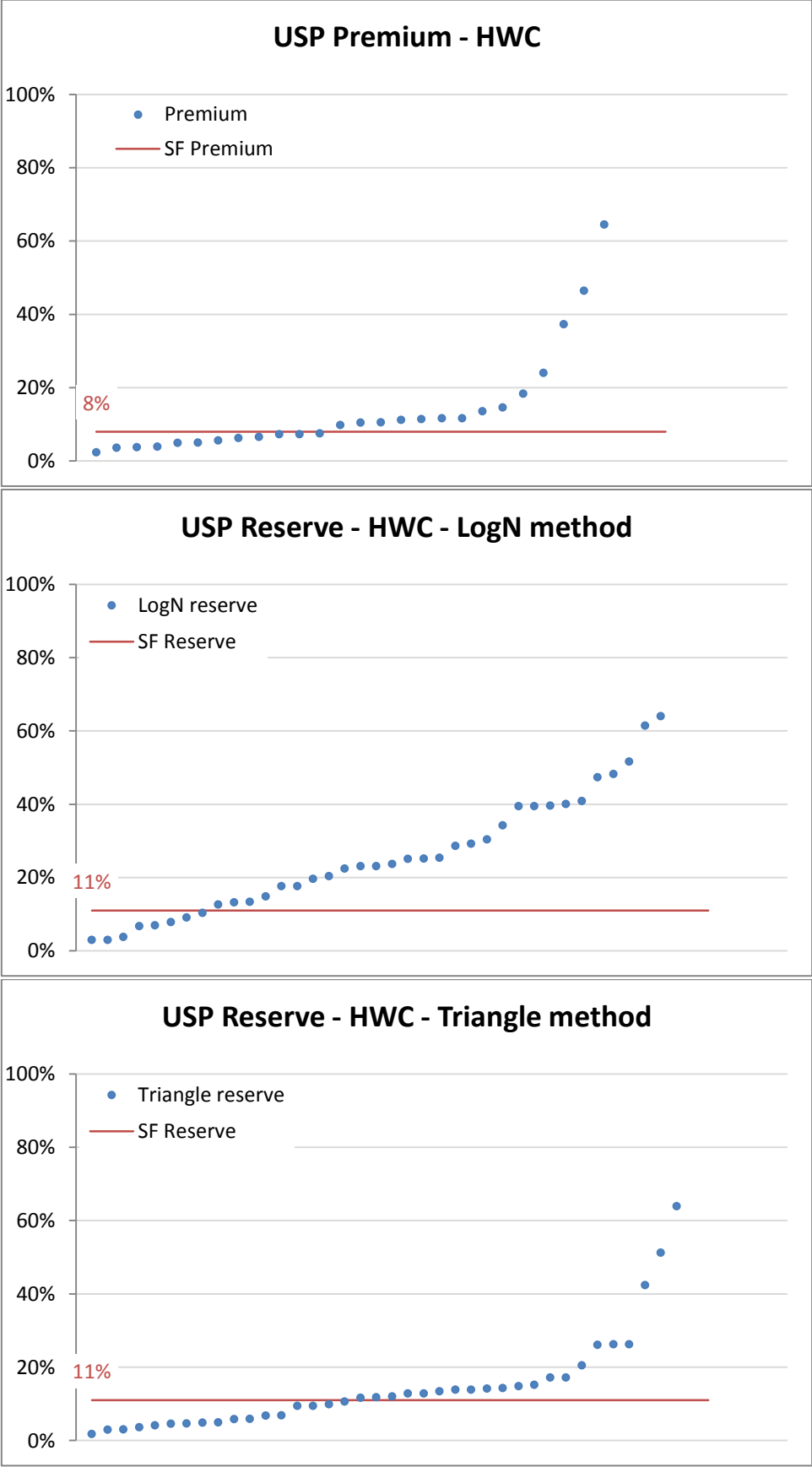
Credit and Suretyship



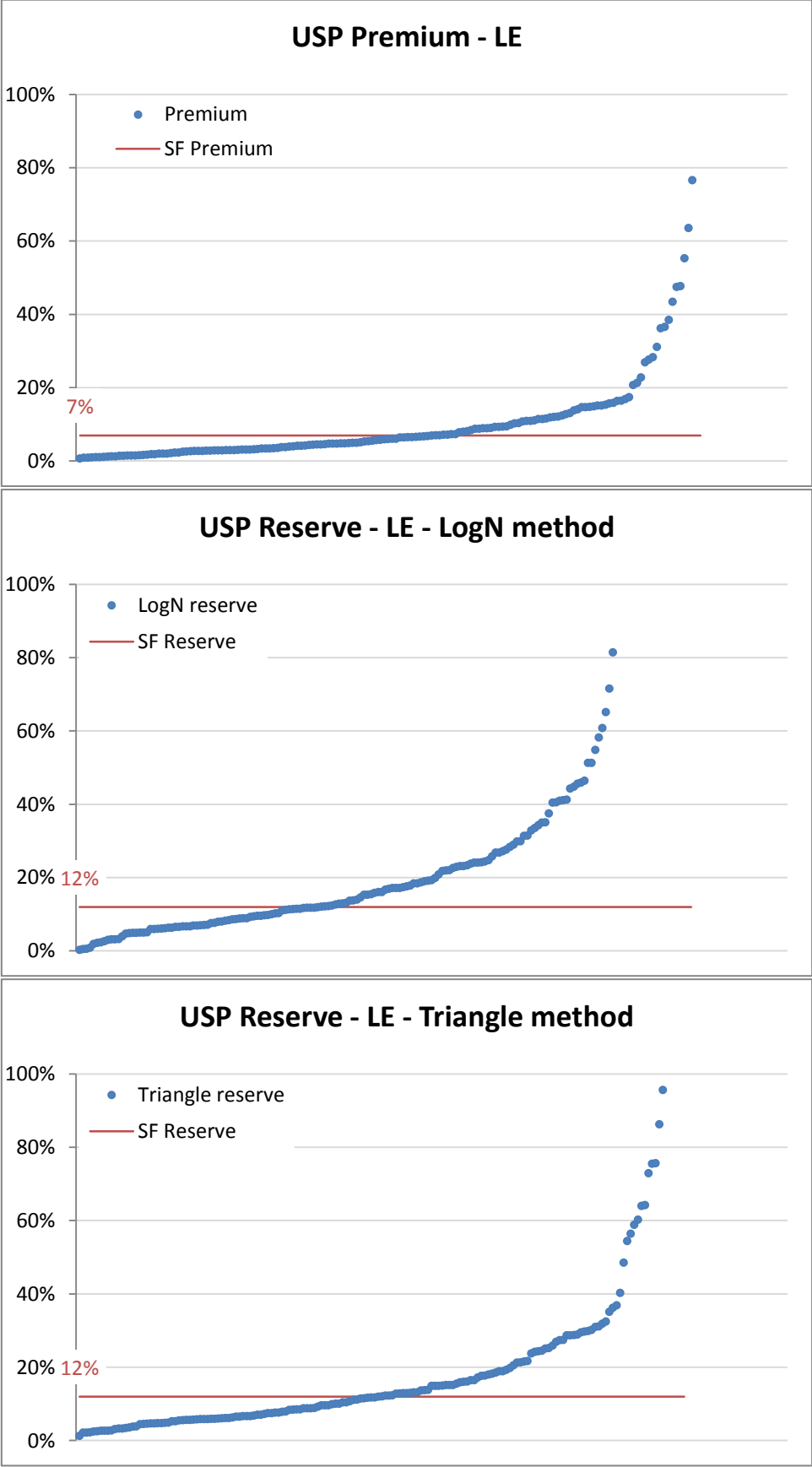
Health Medical Expense



Health Worker’s Compensation



Legal Expenses

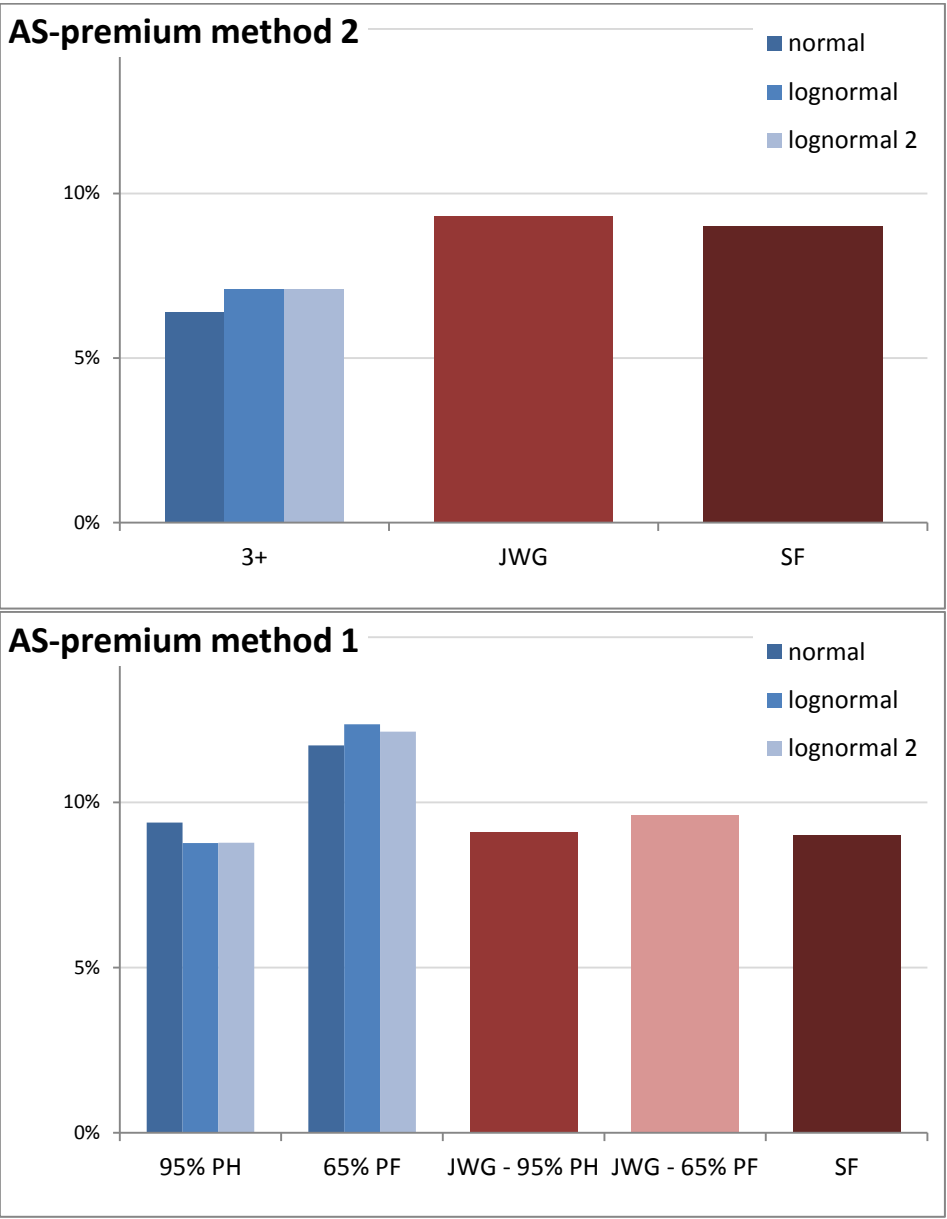


26. Annex to chapter 1 – Results of the calibration for premium risks

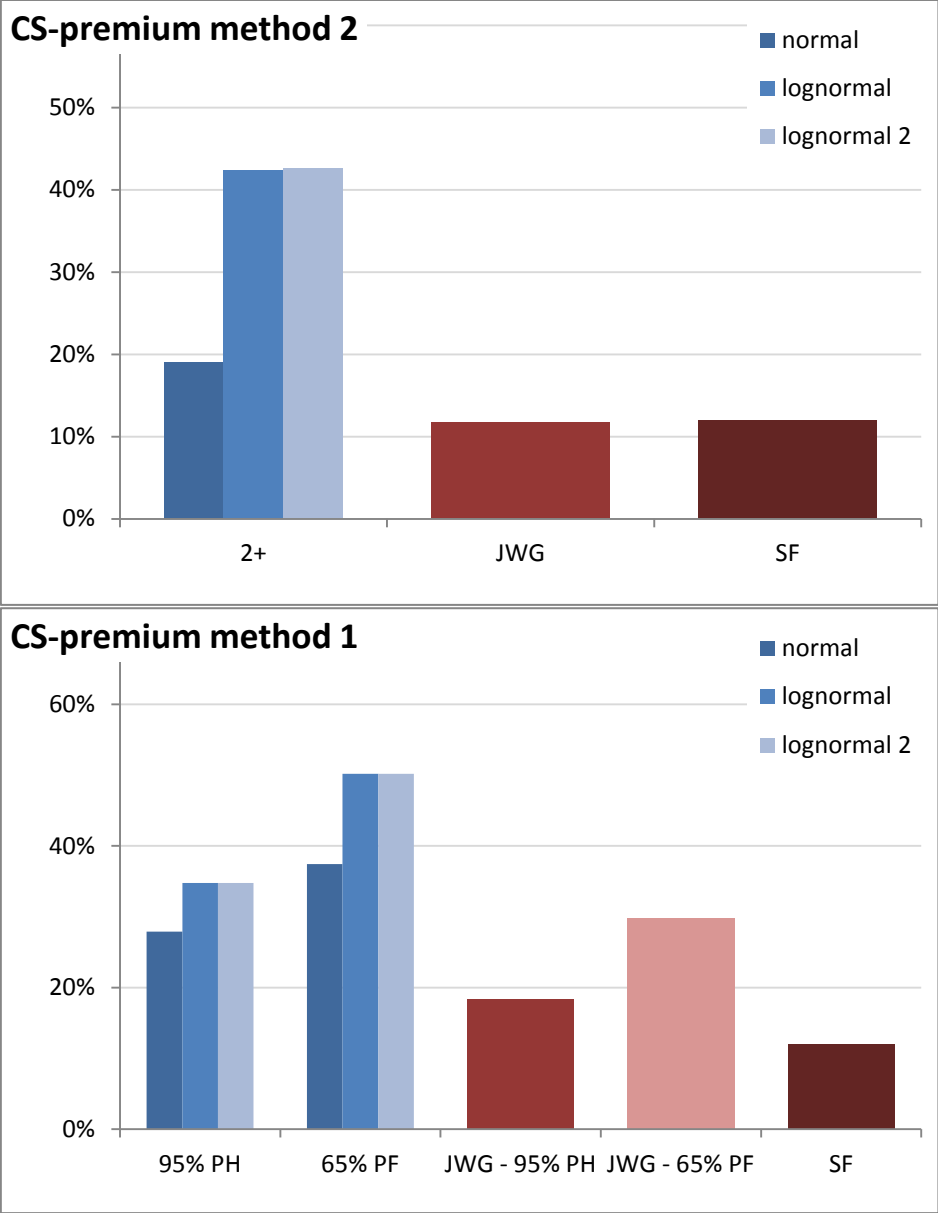
2700. In the following are disclosed the outcomes of the recalibration work performed. Both method 1 and method 2 results are displayed and for all different model (normal, lognormal and lognormal 2). Final 2011 calibration was performed thanks to the normal method 2.
2701. In the method 1 graphs, 95% PH correspond to the policyholder approach and 65% PF to the company approach. In the method 2, 3+ corresponds to the non-inclusion of countries with strictly less than three submissions (AS, LE and HME), and 2+ to the non-inclusion of countries with strictly less than two submissions (HWC and CS).
2702. After comments to the consultation paper received, weights of the medical expenses line of business were too high. Specificities of the Dutch market, in particular the Health Risk Equalisation System (HRES), were indeed not dully taken into account. Therefore, medical expenses weights were amended and the calibration was updated accordingly.
2703. Calibration of the credit and suretyship line of business was amended thanks to the new submissions received after the latest consultation paper (EIOPA-CP-17-006).

			Recalibration 2017			JWG			
			Method 2	Method 1		Method 2	Method 1		SF
			3+/2+	95% PH	65% PF	normal	95% PH	65% PF	
Premium	AS	normal	6,4%	9,4%	11,7%	9,3%	9,1%	9,6%	9%
		lognormal	7%	9%	12%				
		lognormal 2	7%	9%	12%				
	CS	normal	19,0%	27,9%	37,4%	11,7%	18,3%	29,7%	12%
		lognormal	42%	35%	50%				
		lognormal 2	43%	35%	50%				
	HME	normal	5,3%	7,0%	9,9%	5,0%	7,0%	9,2%	5%
		lognormal	5%	18%	41%				
		lognormal 2	5%	18%	41%				
	HWC	normal	9,6%	10,8%	10,8%	8,0%	11,8%	14,9%	8%
		lognormal	11%	14%	19%				
		lognormal 2	11%	14%	19%				
	LE	normal	8,3%	7,1%	8,6%	6,5%	7,9%	12,4%	7%
		lognormal	16%	9%	11%				
		lognormal 2	16%	9%	11%				

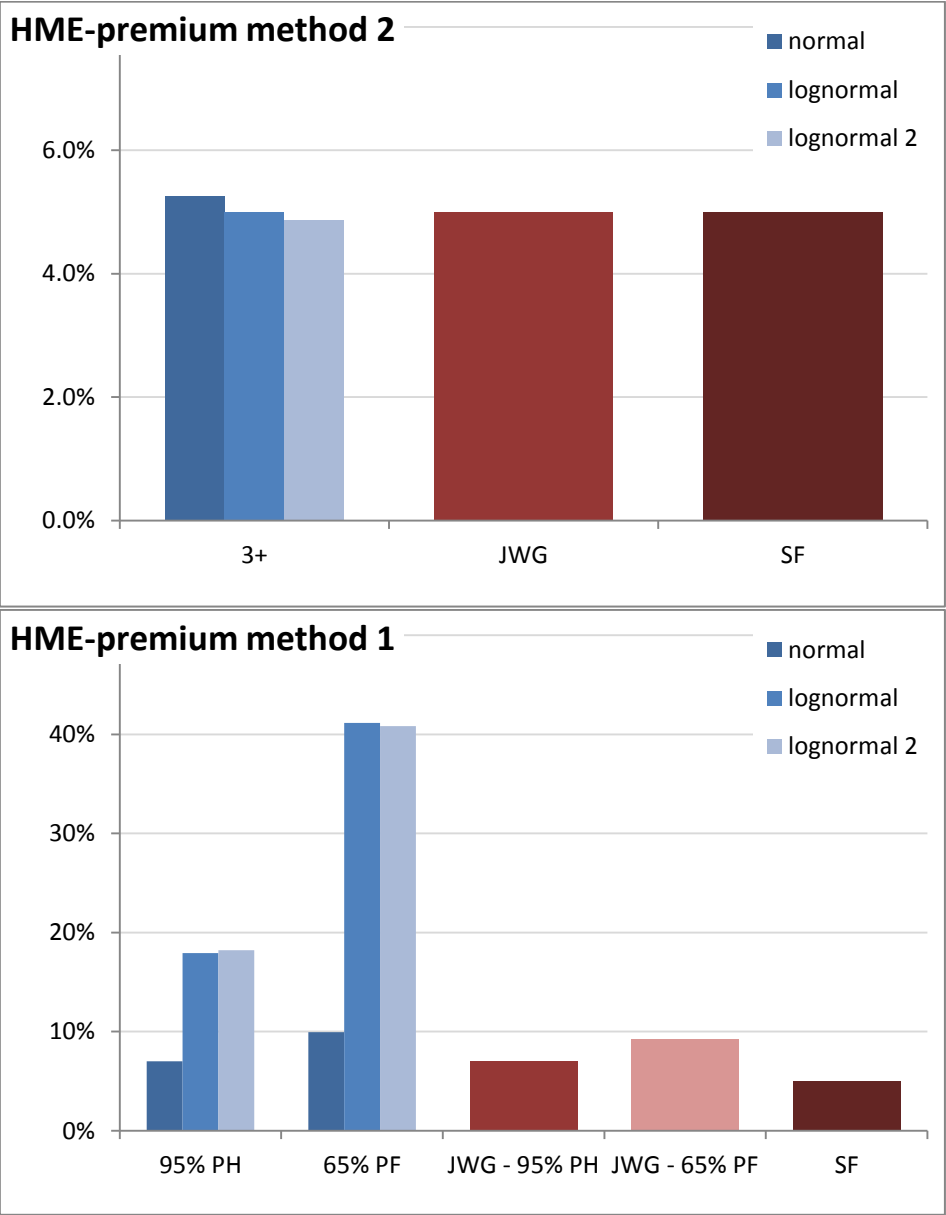
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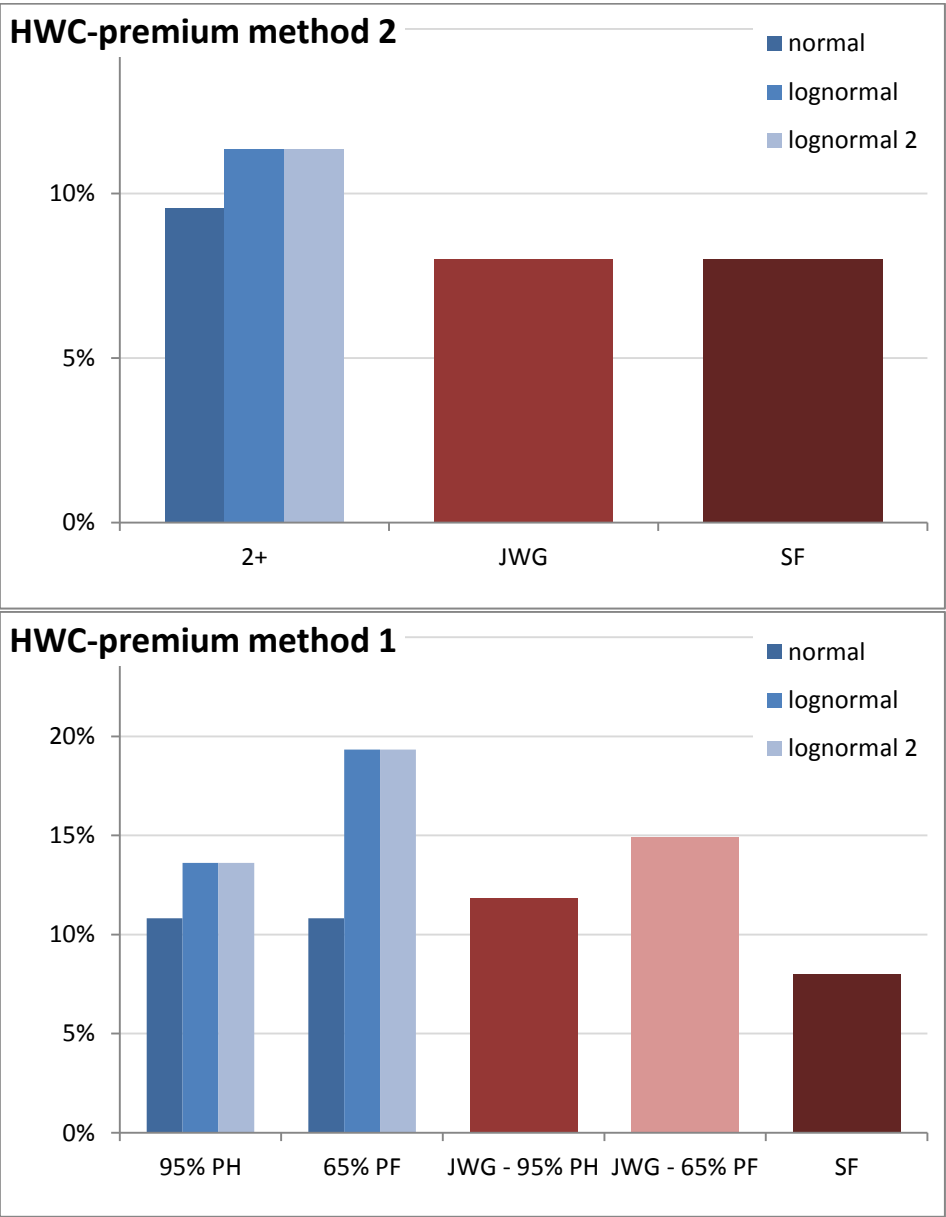
Credit and suretyship



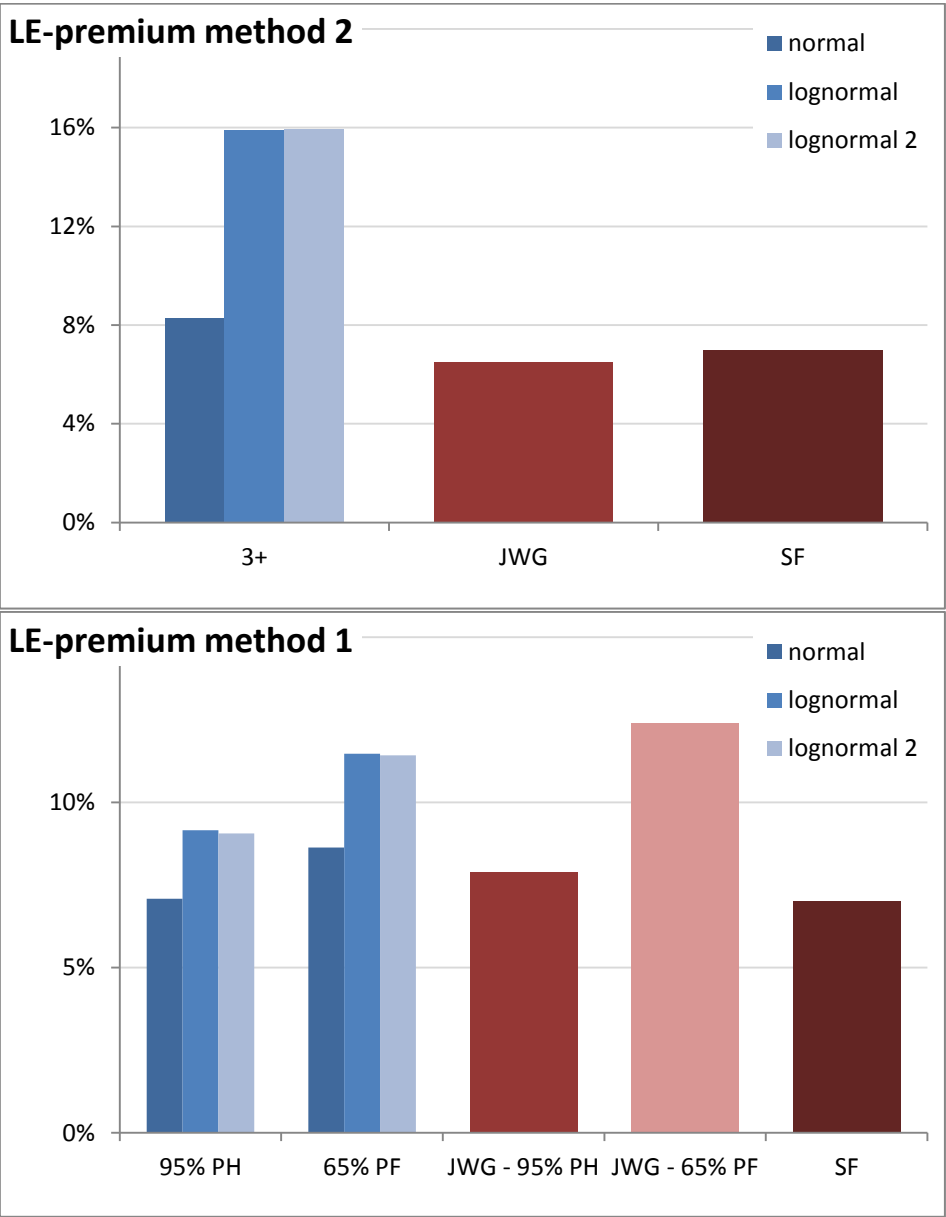
Health Medical Expense



Health Worker’s Compensation



Legal Expenses

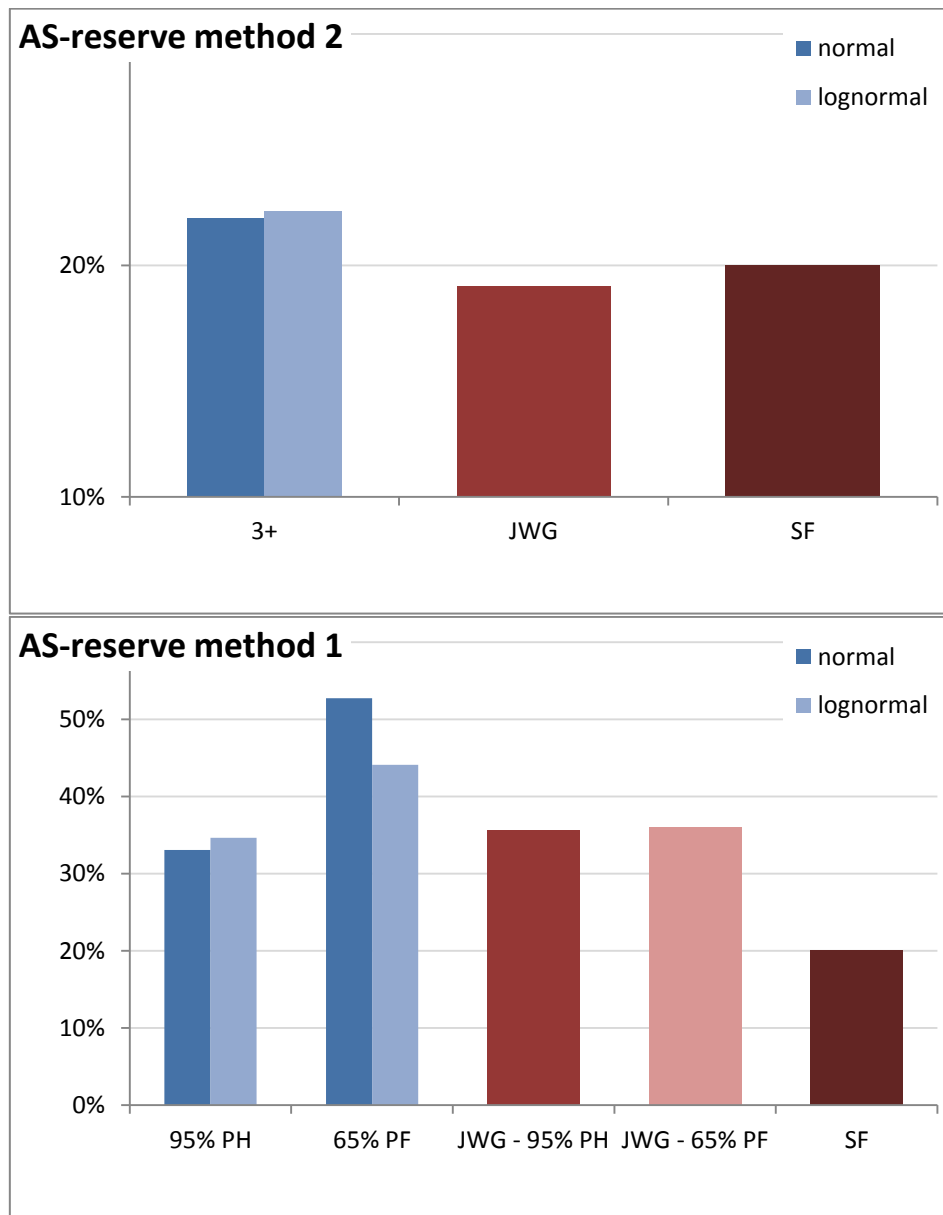


27. Annex to chapter 1 – Results of the calibration for reserve risks

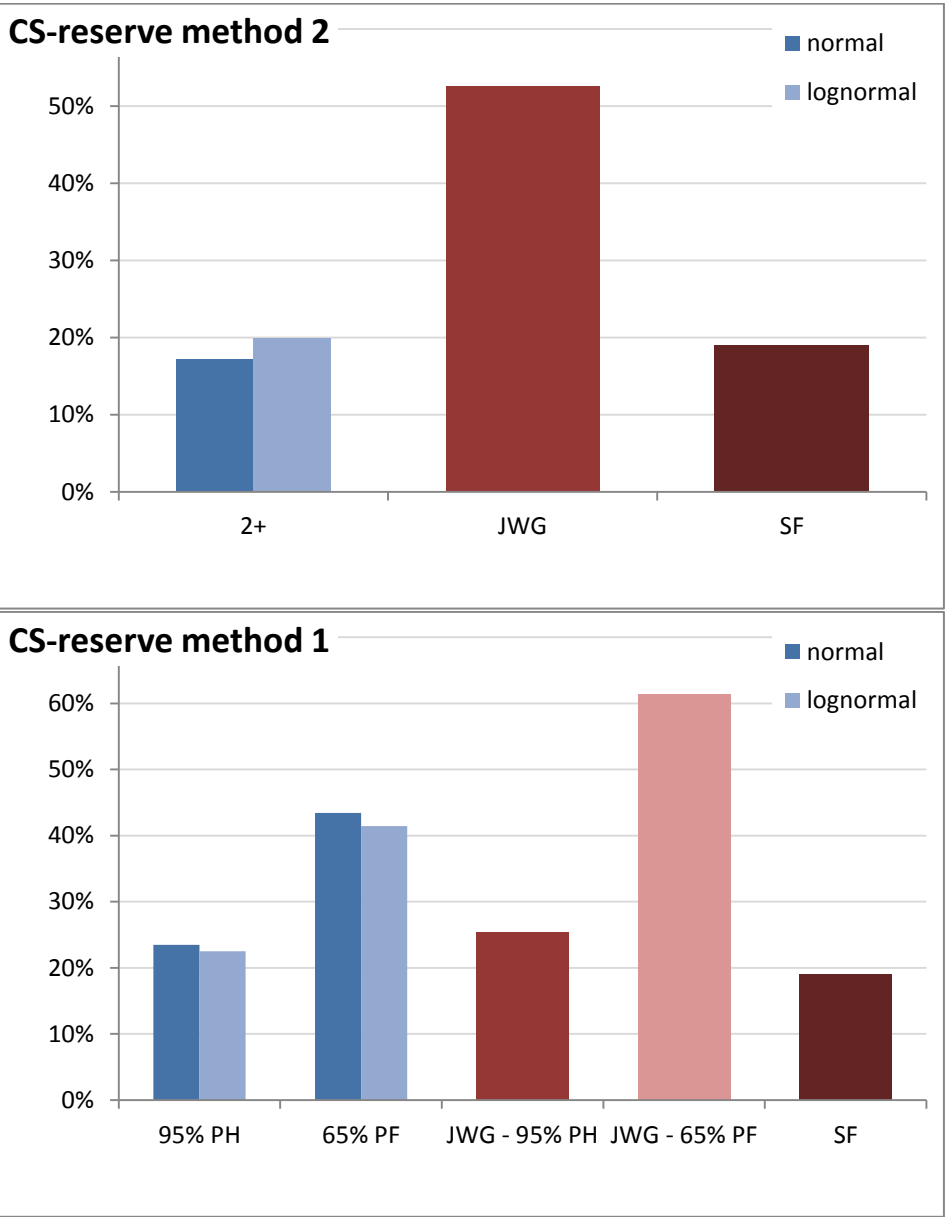
2704. In the following are disclosed the outcomes of the recalibration work performed. Both method 1 and method 2 results are displayed and for all different model (normal and lognormal). Final 2011 calibration was performed thanks to the normal method 2.
2705. In the method 1 graphs, 95% PH correspond to the policyholder approach and 65% PF to the company approach. In the method 2, 3+ corresponds to the non-inclusion of countries with strictly less than three submissions (AS, LE and HME), and 2+ to the non-inclusion of countries with strictly less than two submissions (HWC and CS).
2706. As reserve risks were calibrated on data gross of reinsurance, figures from the JWG report are disclosed gross of reinsurance (see section 1.5.4). Standard formula figures for reserve are net of reinsurance.
2707. After comments to the consultation paper received, weights of the medical expenses line of business were too high. Specificities of the Dutch market, in particular the Health Risk Equalisation System (HRES), were indeed not dully taken into account. Therefore, medical expenses weights were amended and the calibration was updated accordingly.
2708. Calibration of the credit and suretyship line of business was amended thanks to the new submissions received after the latest consultation paper (EIOPA-CP-17-006).

			Recalibration 2017			JWG				
			Method 2	Method 1		Method 2 (gross)	Method 1 (gross)		Gross to net factor	SF (net)
			3+	95% PH	65% PF	gross	95% PH	65% PF	gross to net	net
Reserve	AS	normal lognormal	22,0% 22%	33,1% 35%	52,7% 44%	19,1%	35,6%	36,0%	100%	20%
	CS	normal lognormal	17,2% 20%	23,5% 22%	43,4% 41%	52,6%	25,4%	61,3%	100%	19%
	HME	normal lognormal	9,9% 12%	15,3% 27%	27,4% 30%	9,2%	15,8%	17,8%	58%	5%
	HWC	normal lognormal	12,0% 9%	12,9% 13%	17,1% 24%	12,7%	15,3%	30,9%	90%	11%
	LE	normal lognormal	5,5% 12%	9,7% 10%	37,0% 20%	12,3%	16,0%	19,9%	100%	12%

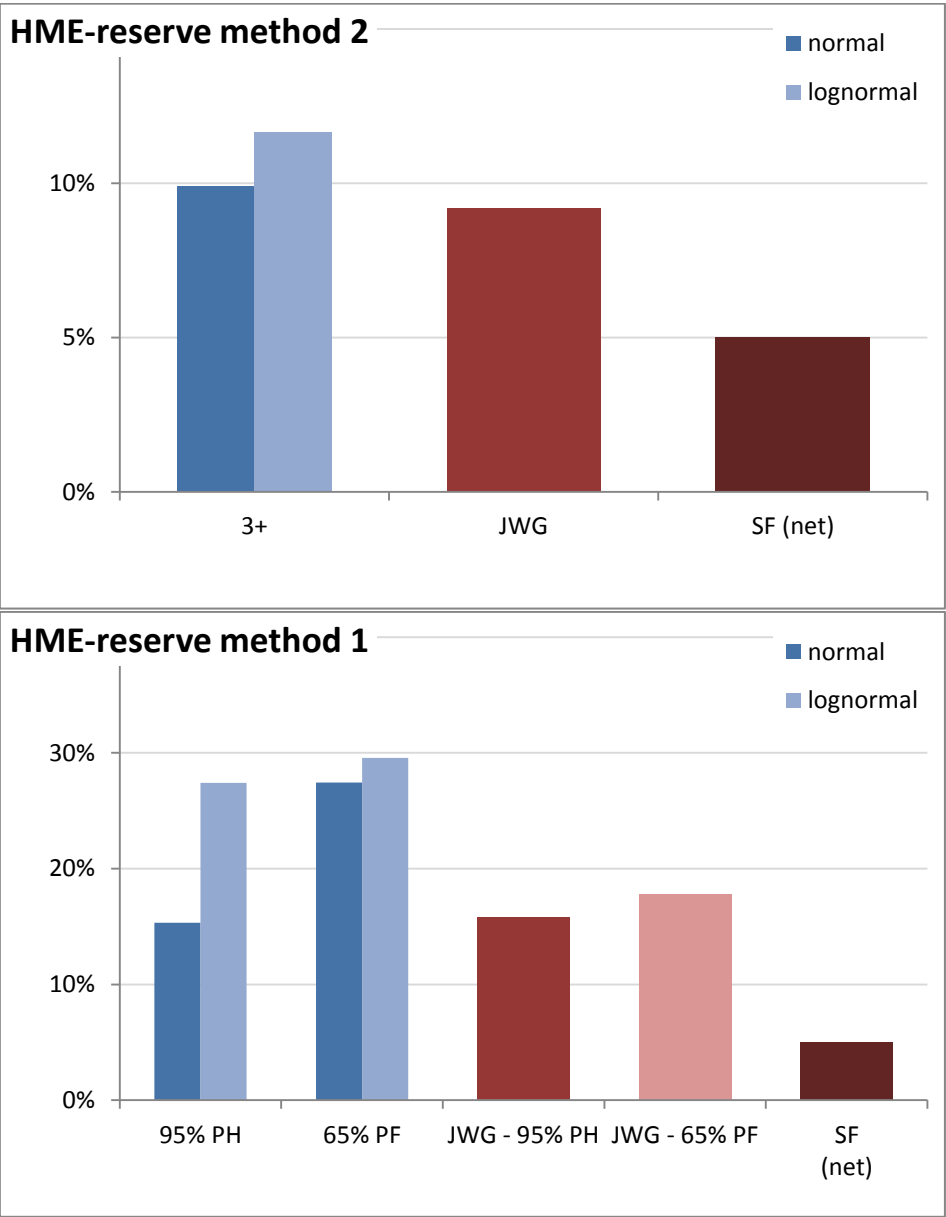
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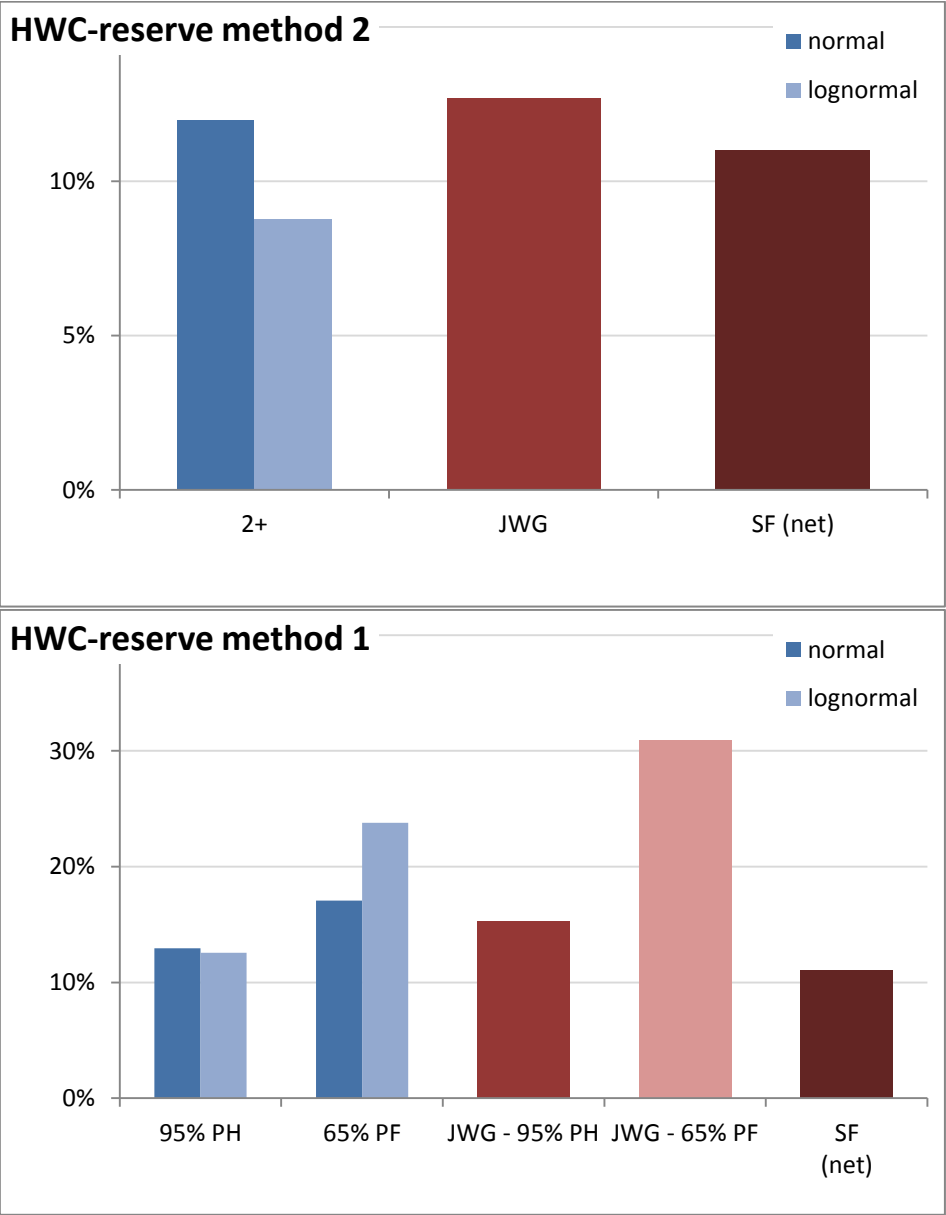
Credit and suretyship



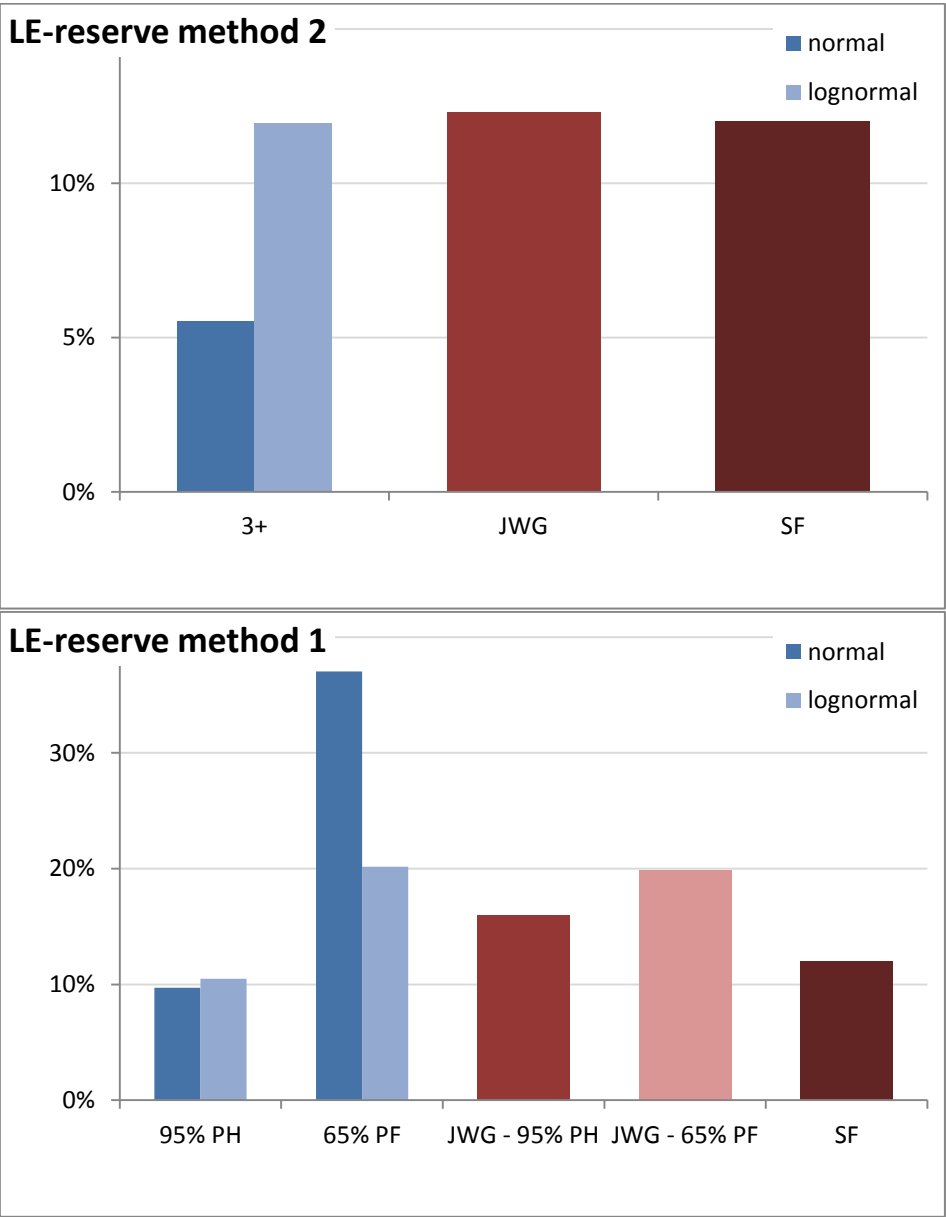
Health Medical Expense



Health Worker’s Compensation



Legal Expenses



28. Annex to chapter 1 – Weights used in method 2

2709. Below are displayed the weights used to aggregate the country sigma in the method 2. They are based on the 2016 end of year reporting.

2710. For the ease of the reading, the weights that are lower than 0.05% are in light grey.

2711. After comments to the consultation paper received, weights of the medical expenses line of business were too high. Specificities of the Dutch market, in particular the Health Risk Equalisation System (HRES), were indeed not dully taken into account. Therefore, medical expenses weights were amended.

Premium

	Premium				
	AS	CS	HME	HWC	LE
AT	0,2%	0,9%	0,0%	0,0%	19,3%
BE	10,5%	1,0%	1,0%	30,0%	5,1%
BU	0,2%	0,1%	0,1%	0,2%	0,0%
CY	0,0%	0,0%	0,1%	0,0%	0,0%
CZ	0,3%	0,1%	0,2%	0,0%	0,0%
DE	8,0%	18,8%	2,8%	0,1%	43,4%
DK	17,1%	0,0%	0,9%	0,7%	0,1%
EE	0,0%	0,0%	0,1%	0,0%	0,0%
EL	0,9%	0,1%	0,4%	0,0%	0,4%
ES	13,4%	14,8%	13,4%	0,9%	2,6%
FI	0,0%	0,6%	1,0%	20,6%	0,9%
FR	27,2%	12,3%	55,3%	11,6%	16,3%
HR	0,1%	0,6%	0,0%	0,0%	0,0%
HU	0,2%	0,2%	0,0%	0,1%	0,1%
IE	0,3%	15,6%	2,4%	1,5%	0,0%
IT	6,4%	3,3%	2,5%	0,0%	2,6%
LI	0,0%	0,0%	0,4%	0,0%	0,0%
LT	0,0%	0,1%	0,1%	0,0%	0,0%
LU	0,2%	4,2%	0,5%	1,2%	0,5%
LV	0,2%	0,1%	0,1%	0,0%	0,0%
MT	0,2%	0,0%	0,0%	0,0%	0,1%
NL	2,5%	0,5%	8,7%	0,1%	4,8%
NO	3,8%	0,1%	0,3%	9,9%	0,7%
PL	2,6%	3,1%	0,2%	0,0%	0,6%
PT	2,0%	0,4%	1,3%	21,7%	0,3%
RO	0,3%	0,4%	0,1%	0,0%	0,0%
SE	1,3%	1,9%	0,6%	1,0%	0,1%
SI	0,4%	2,1%	0,9%	0,0%	0,0%
SK	0,3%	0,0%	0,0%	0,0%	0,0%
UK	1,4%	18,3%	6,5%	0,4%	1,9%

Reserve

	Reserve				
	AS	CS	HME	HWC	LE
AT	0,0%	0,4%	0,0%	0,0%	8,1%
BE	9,0%	0,9%	3,5%	17,2%	10,9%
BU	0,4%	0,1%	0,0%	0,0%	0,0%
CY	0,0%	0,0%	0,1%	0,0%	0,0%
CZ	0,4%	0,2%	0,1%	0,0%	0,0%
DE	4,3%	25,0%	2,4%	0,0%	57,9%
DK	20,9%	0,1%	1,0%	1,7%	0,2%
EE	0,0%	0,0%	0,0%	0,0%	0,0%
EL	0,0%	0,2%	1,3%	0,1%	0,2%
ES	10,9%	12,1%	15,7%	0,3%	1,3%
FI	0,0%	0,2%	3,5%	14,4%	1,1%
FR	29,3%	21,0%	48,5%	9,8%	10,8%
HR	0,1%	0,1%	0,0%	0,0%	0,0%
HU	0,1%	0,0%	0,0%	0,1%	0,0%
IE	0,1%	16,3%	3,1%	2,5%	0,1%
IT	8,5%	8,1%	5,3%	0,0%	3,6%
LI	0,0%	0,1%	0,7%	0,0%	0,0%
LT	0,0%	0,1%	0,0%	0,0%	0,0%
LU	0,1%	3,8%	1,1%	1,7%	0,5%
LV	0,1%	0,2%	0,0%	0,0%	0,0%
MT	0,4%	0,0%	0,0%	0,0%	0,0%
NL	1,1%	0,4%	4,3%	0,2%	3,0%
NO	7,1%	0,2%	1,2%	31,5%	0,6%
PL	2,0%	1,5%	0,1%	0,0%	0,1%
PT	1,6%	0,5%	1,2%	4,2%	0,1%
RO	0,8%	0,3%	0,0%	0,0%	0,0%
SE	0,9%	1,4%	1,6%	15,7%	0,1%
SI	0,6%	0,3%	0,3%	0,0%	0,0%
SK	0,2%	0,0%	0,0%	0,0%	0,0%
UK	1,0%	6,6%	4,5%	0,5%	1,4%

29. Annex to chapter 1 – Kappa factors used in method 2 and goodness of fit graphs

2712. Below are displayed by countries the kappa factors of the policyholder approach used to standardize the outcomes in the method 2.

2713. For the ease of the reading, the kappa factors that are equal to 1.00 are in light grey.

Premium

	Premium				
	AS	CS	HME	HWC	LE
AT	1,1	0,8			1,1
BE	1,0		1,2	1,0	1,2
BU					
CY					
CZ	1,0	1,0	1,1		1,0
DE	1,0		1,0		1,1
DK			1,0	1,0	
EE	1,0	1,0	1,0		1,0
EL	1,0	1,0	1,1		1,0
ES	1,0	1,0	1,0	1,0	1,0
FI		1,0	1,0	1,0	1,0
FR	1,0	1,0	1,1		1,0
HR	1,0	1,0	0,9		
HU	1,0	1,0	1,0	1,0	1,6
IE	1,6	1,0	1,0		
IT	1,0	1,2	2,1		1,2
LI			1,0		
LT	1,0	1,0	1,0		
LU	1,5	1,0	1,3		1,1
LV	1,0	1,0	1,6		
MT	0,9	1,0	1,0	1,0	1,0
NL	1,0	1,0	1,0		1,0
NO					
PL	1,0	1,4	1,2	1,0	1,0
PT	1,1	1,4	1,0	1,1	1,0
RO	1,0	1,6	1,0	1,0	
SE	1,0		1,4		
SI	1,0	1,6	1,0		
SK	1,0		1,0		
UK	1,0	1,0	1,0	1,0	

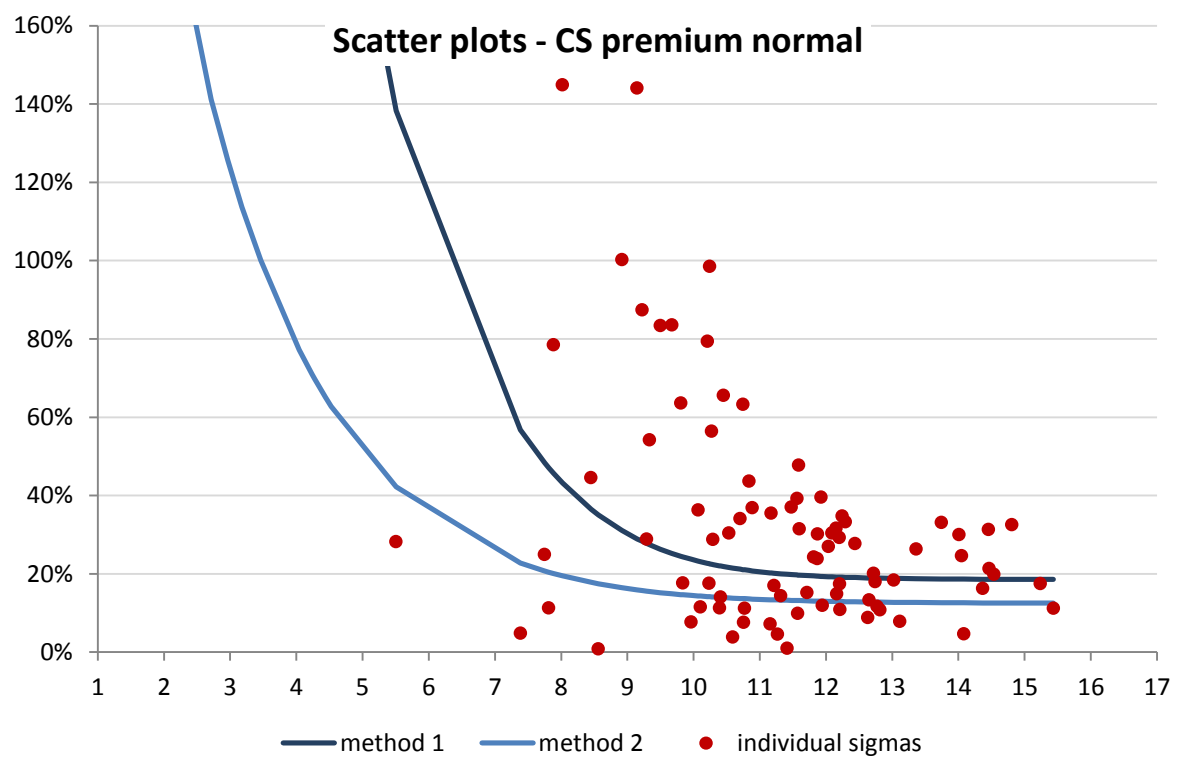
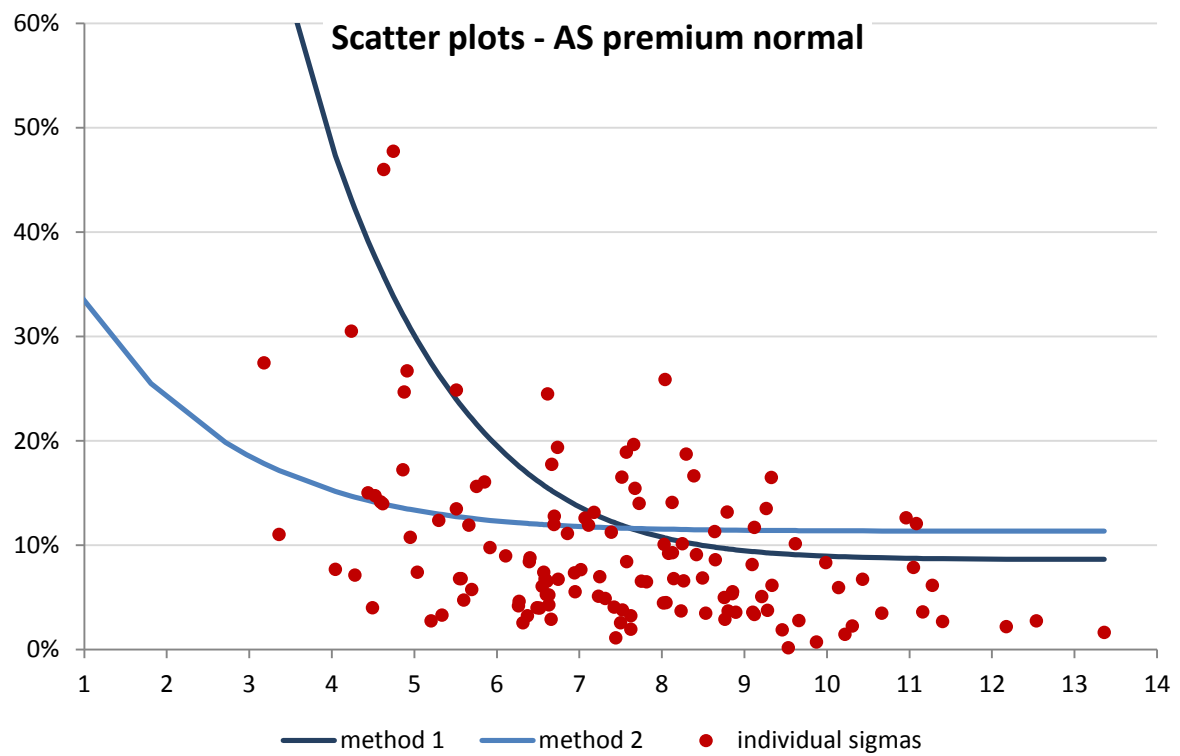
Reserve

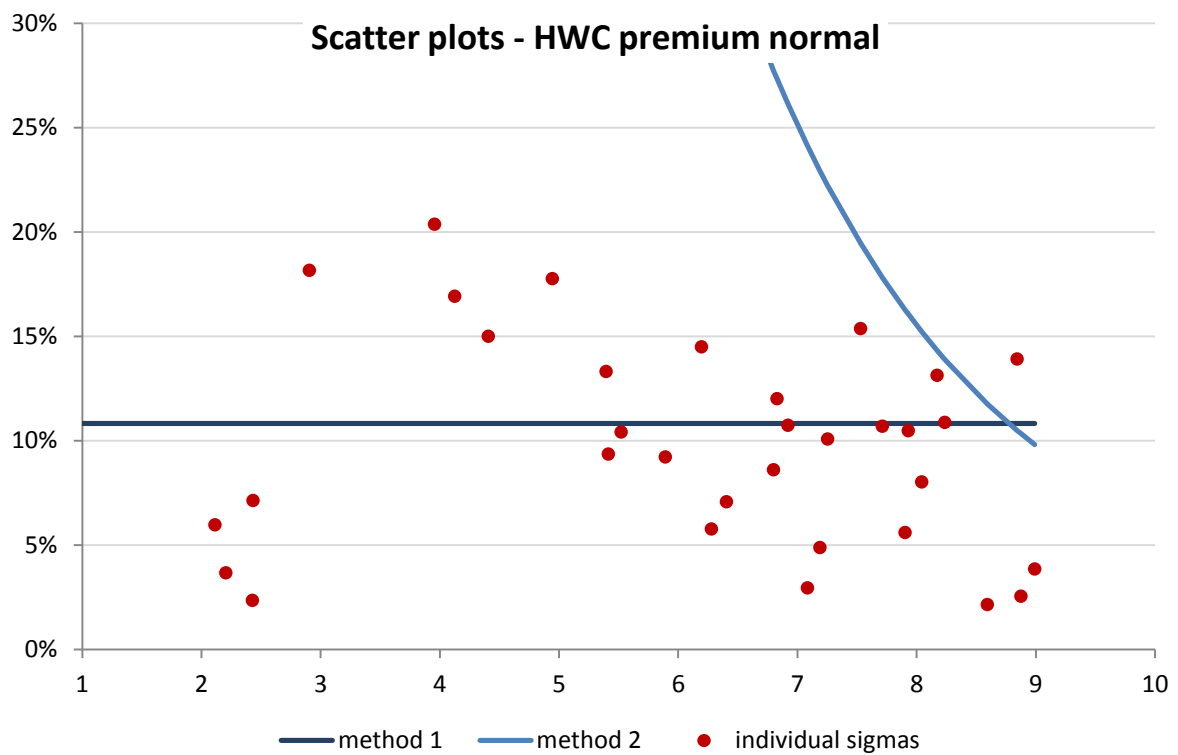
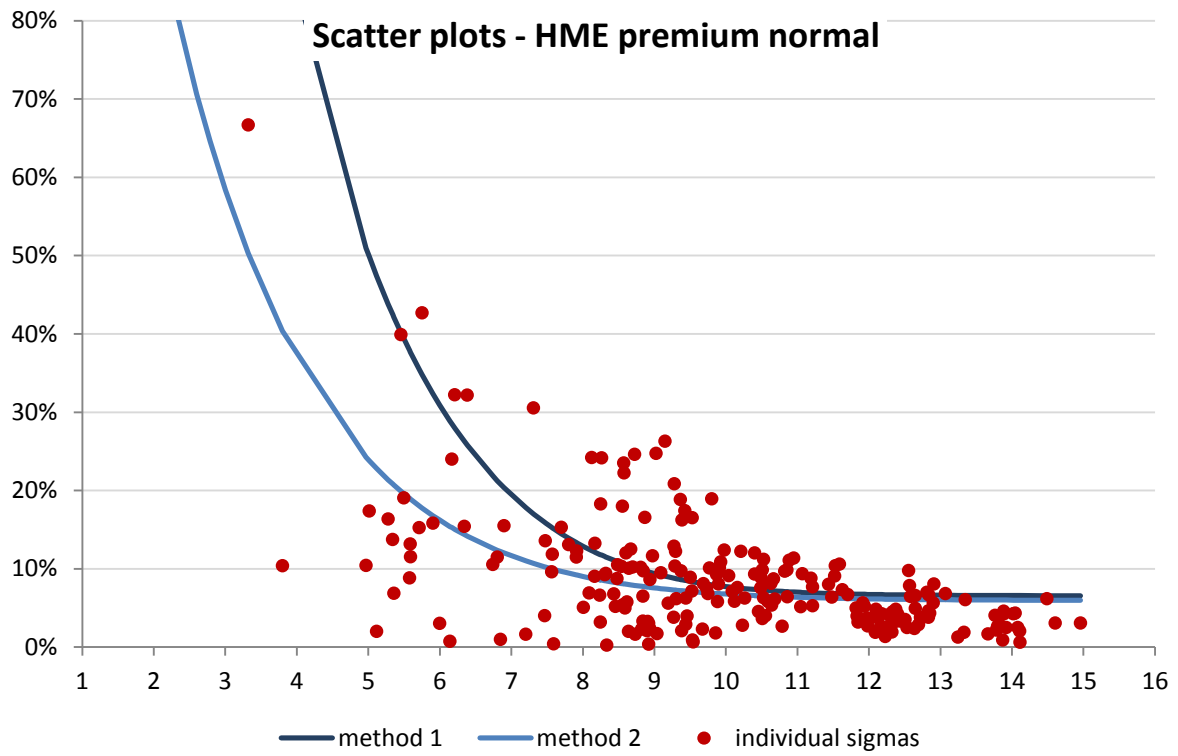
	Reserve				
	AS	CS	HME	HWC	LE
AT	1,0	1,0			1,1
BE	1,0	1,0	1,0	1,0	1,1
BU					
CY					
CZ	1,0	1,0	1,0		1,1
DE	1,6		1,2		1,0
DK			1,0	1,0	
EE	1,0	1,0	1,0		1,0
EL	1,0		1,0		1,7
ES	1,0	1,0	1,3		1,0
FI		1,0	1,0	1,0	1,4
FR	1,0	1,0	1,1		1,0
HR	1,6	1,1	1,1	1,0	
HU	1,4	1,0	1,5	1,0	1,1
IE	1,0	1,0	1,0		
IT	1,0	1,4	1,2		1,0
LI			1,0		
LT	1,0	1,5	1,2		
LU	1,0	1,0	1,1		1,0
LV	1,0	0,9	1,3		
MT	1,1	1,0	1,0	1,0	1,0
NL	1,0	1,6	1,1		1,3
NO					
PL	1,0	1,0	1,2	1,0	1,0
PT	1,0	1,0	2,1	1,1	1,0
RO	1,6	1,1	1,0	1,0	
SE	1,0		1,4	1,0	1,0
SI	1,1	1,0	1,3		
SK	1,0		1,0		
UK	1,0	1,0	1,0	1,0	

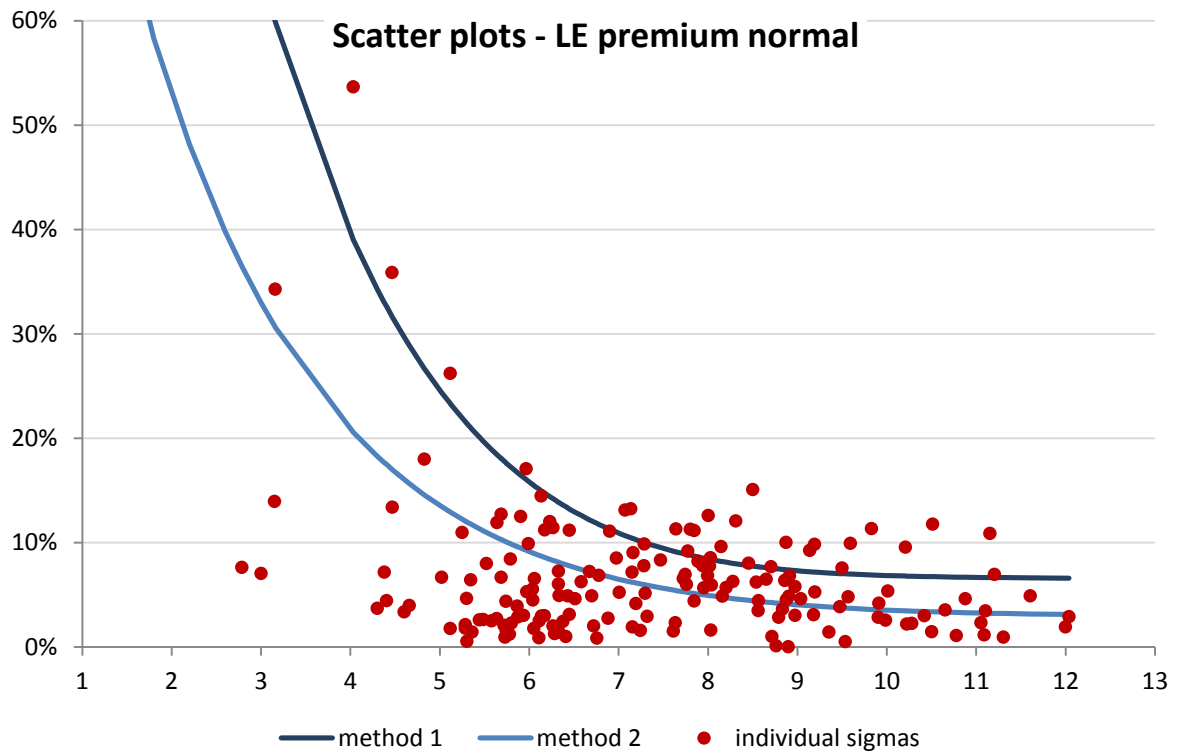
2714. Below are displayed by line of business the scatter plots of calibration used to assess the goodness of fit of the methodology. In abscissa, is the size in logarithm scale (initially in k€). In ordinate, is the volatility in percentage.

2715. Both normal modelling of the data according to method 2 (light blue) and method 1 (dark blue) are displayed. Red plots are the individual sigma of each firm.

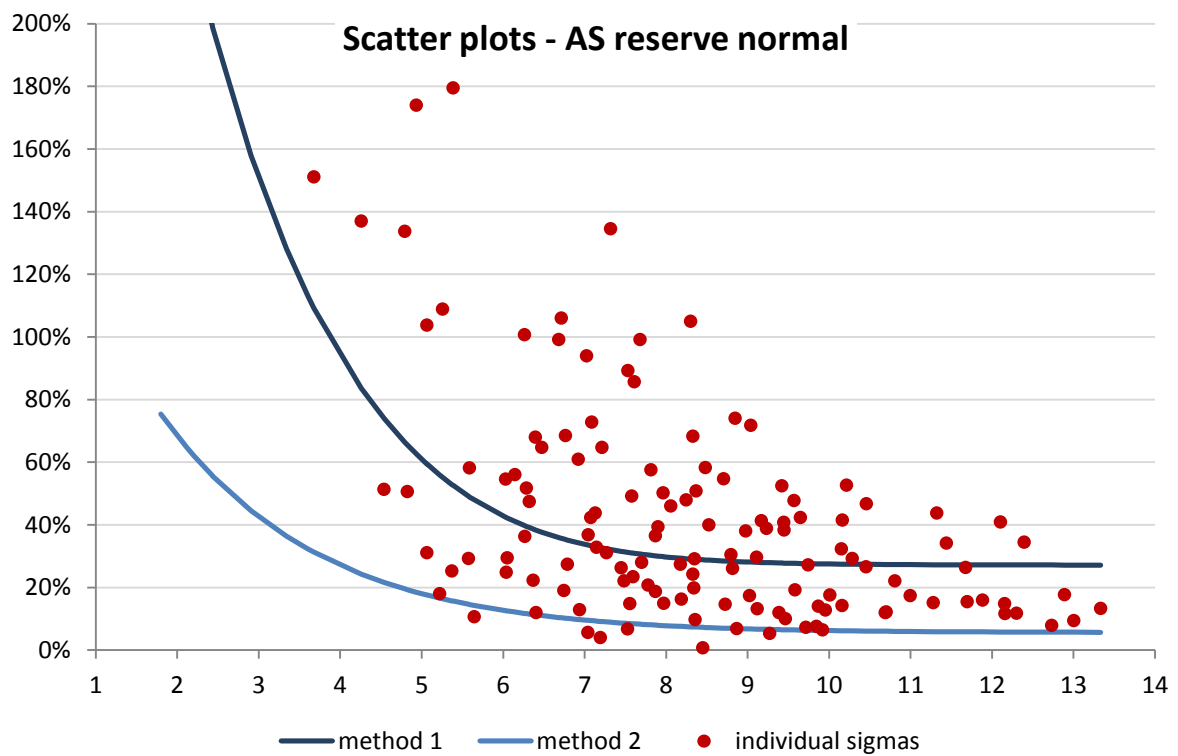
Premium

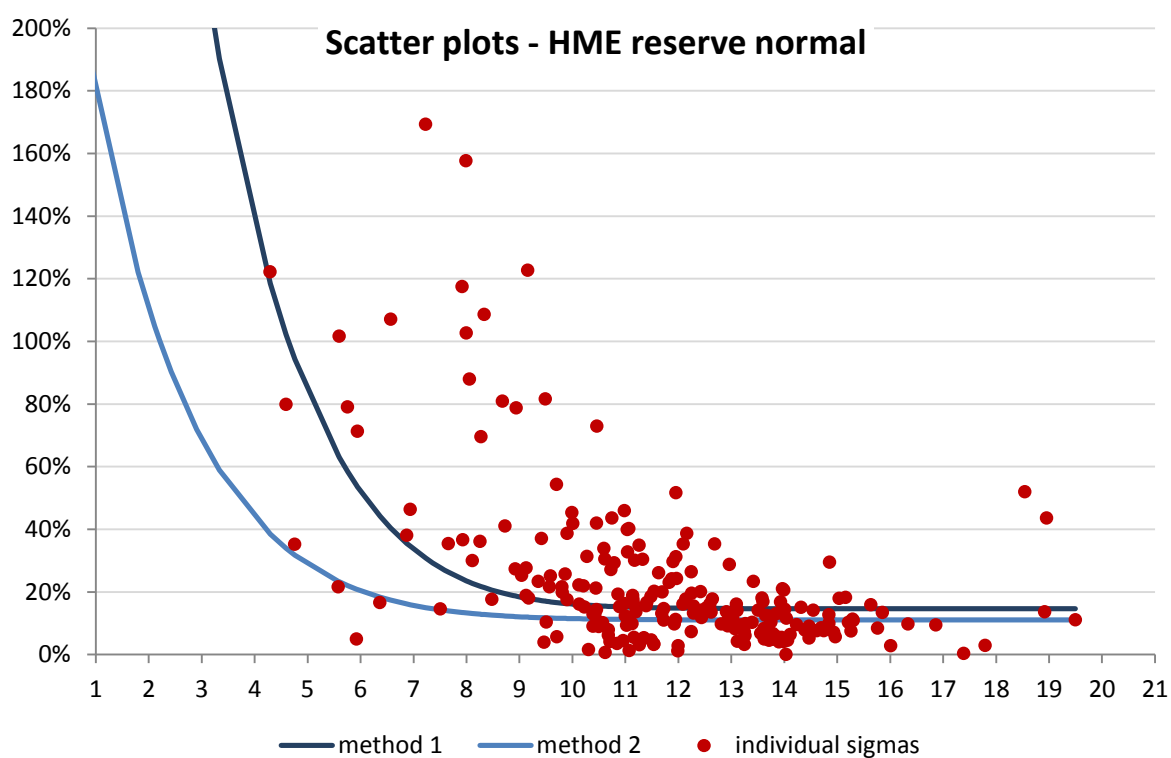
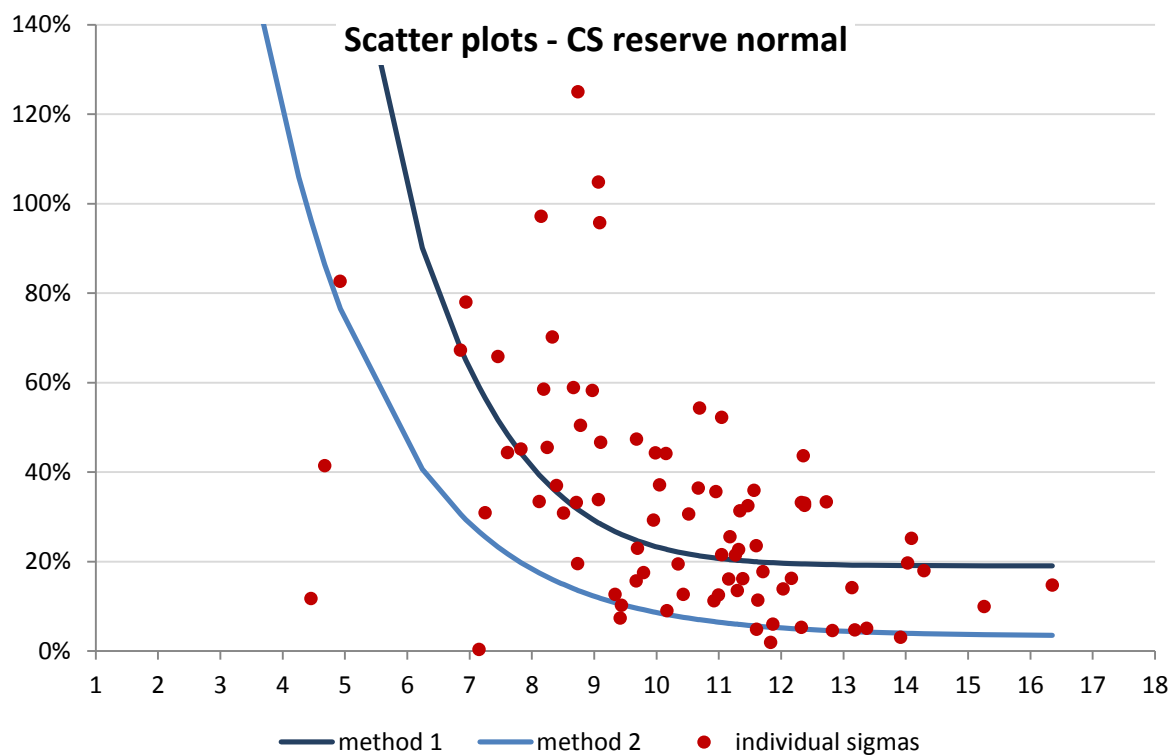


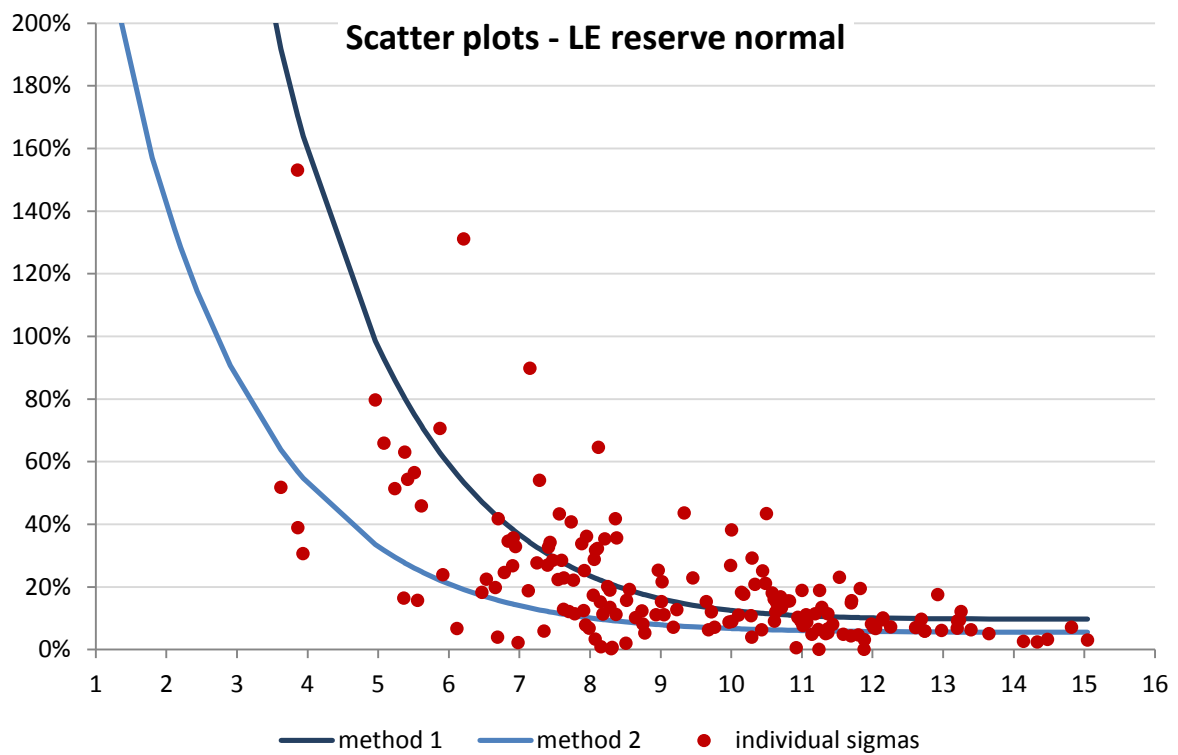
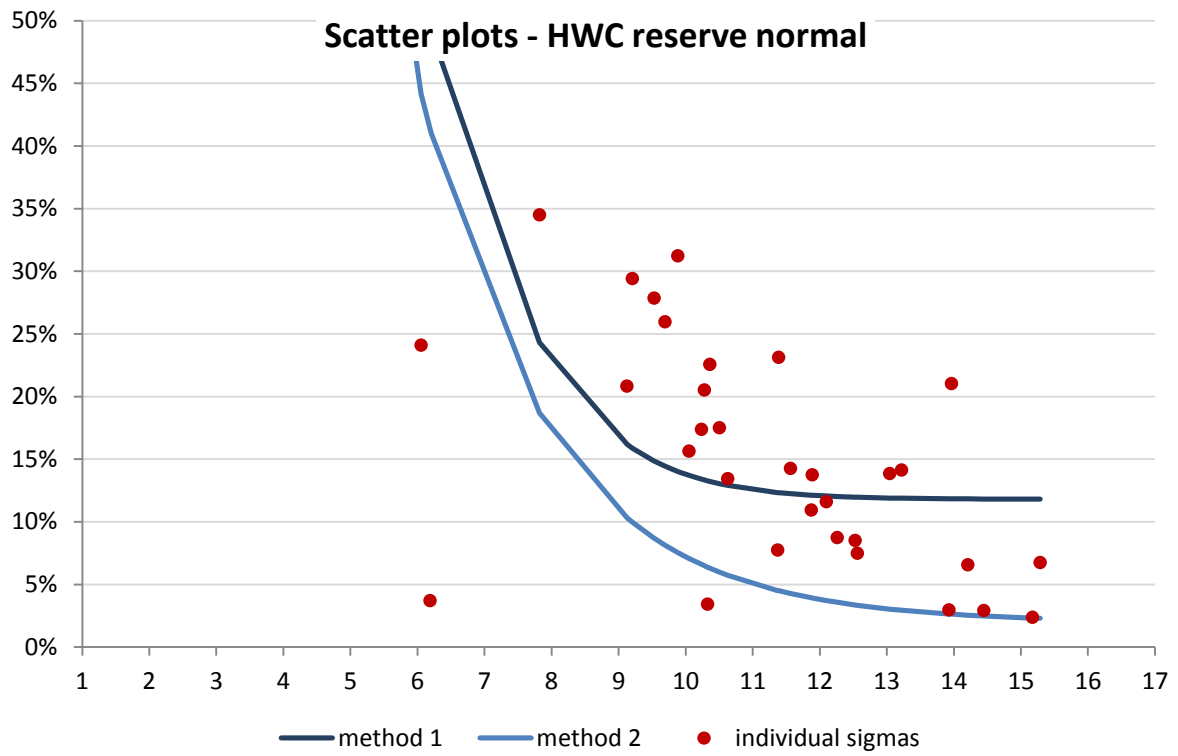




Reserve







30. Annex to chapter 5 – Identification of largest man-made catastrophe exposures

Potential implication of recommendation

2716. The following issue which arises when identification of the largest risk exposure is carried out “net of reinsurance where that reinsurance cover alters the relative ranking of the exposure within the undertaking’s portfolio, based on the size of the exposure.”

Reporting

2717. Undertakings are required to report their risk exposures arising from the MFA submodule scenarios both gross and net of risk mitigation. Altering the scenario-based calculations in the MFA submodules as proposed, i.e. so that they are assessed “net of reinsurance where that reinsurance cover alters the relative ranking of the exposure within the undertaking’s portfolio, based on the size of the exposure” effectively creates an additional categorisation of exposure which we define to be ‘adjusted gross’ exposure. This gives rise to multiple possibilities of what the reported gross and net exposures could be.

2718. Experts agreed that the net reported amount should be calculated as the net exposure from the adjusted gross scenario. This is implicit in the recommendation.

2719. However, the gross amount to be defined as either:

1. The “true” gross amount i.e. the maximum risk exposure assessed without consideration of any reinsurance.
2. The gross amount from the ‘adjusted gross’ scenario.

2720. Option 1 would provide a better representation of an undertaking’s counterparty risk but would effectively require undertakings to complete multiple scenarios to provide their reporting up to the level of the overall SCR figure (QRT S.25.01).

2721. Option 2 is more straightforward but arguably provides a less good representation of the true gross amount before all reinsurance.

EXAMPLE FOR ILLUSTRATION: Fire risk

2722. Insurer has facultative covers for 2 specific exposures and a XL per risk treaty cover with retention of 30M EUR. Risk concentration 1 illustrates the identification of top 5 maximum concentration on a gross basis while Risk Concentration 2 illustrates the identification of top 5 maximum concentration net of certain Reinsurance as per this proposal.

Risk concentration 1 (identification using gross exposure)

Exposure	Gross	Facultative Reinsurance	Net of Facultative Reinsurance	Risk XL Reinsurance	Net
A	200	(200)	0	0	0
B	50	(10)	40	(10)	30
C	40	-	40	(10)	30
D	30	-	30	-	30
E	20	-	20	-	20
Total	350	(210)	130	(20)	110

Risk concentration 2 (identification using net of facultative exposure)

Exposure	Gross	Facultative Reinsurance	Net of Facultative Reinsurance	Risk XL Reinsurance	Net
B	50	(10)	40	(10)	30
C	40	-	40	(10)	30
D	30	-	30	-	30
E	20	-	20	-	20
F	10	-	10	-	10
Total	150	(10)	140	(20)	120

2723. In this example, the proposal to change the identification of the maximum risk exposure results in concentration 2 being the applicable scenario for the SCR calculation. Therefore, the net figure should clearly be reported as 120.

2724. For option 1, the gross figure would be 350 and the risk mitigating effect (before any diversification effects with other risks) would be 230. This is calculated as a combination of the two risk concentration scenarios i.e. gross from concentration 1 and net from concentration 2 (350 – 120).

2725. For option 2, the gross figure would be 150, the net figure 120 and the risk mitigating effect would be 30. This risk mitigating effect of 30 is consistent with the scenario relevant for the SCR; in the example only the best estimate reinsurance recoverable related to the facultative reinsurance of exposure A is considered in the counterparty risk module.

Counterparty default risk submodule

2726. The risk mitigating effect of the reinsurance is an input into the counterparty default risk submodule and the decision on which gross is most applicable will also impact on this submodule.

31. Annex to chapter 5 – Fire risk simplification

Risk sensitivity

2727. The calculation has been designed to result in a sufficient level of risk sensitivity:

- The assessment of the five largest exposures, for each risk type, increases granularity and is intended to capture the scenario where clusters of commercial or residential portfolios result in a greater concentration of exposure than higher value, but more isolated, industrial exposures.
- The underpin is designed to provide a minimum level of capital for portfolios of homogenous residential properties where the largest risks are less likely to provide the proxy for concentration.

2728. Other changes that could be made to the proposal to further increase the level of risk sensitivity were discussed.

- Require for the five 200m radius circles being assessed per risk type to be mutually exclusive. This would be intended to improve the assessment of concentration in portfolios where multiple contracts are written to the same address. For example, where an undertaking has multiple exposures to the same industrial site.
- Require undertakings to assess every 200m radius circle containing the largest risks rather than having it as a central point.

2729. These alterations would bring improved risk sensitivity. However, it was agreed that a balance needed to be struck between simplicity and risk sensitivity. It was also noted that undertakings needed to provide a qualitative assessment of the simplification through their ORSA process. It was therefore proposed not to incorporate these changes into the proposal.

Calibration of the underpin factor

2730. The underpin is intended to provide a minimum capital requirement for undertakings who have a portfolio of residential, largely homogenous exposures. In this case, the identification of the largest exposure may be difficult (i.e. if there are lots of policies with the same level of sum insured). The largest residential properties by sum insured may also not give a good reflection of any clustering and therefore not a good proxy for the true concentration of risk.

2731. The underpin is designed to capture the impact on a residential portfolio from a large-scale conflagration event. The calculation is based on the Enschede event in the Netherlands in 2000 which they assessed to be a good proxy for such a future event.

2732. The final calibration of the underpin has been developed with regard to the following considerations:

- Using the portfolio-specific average sum insured provides a better reflection of the risk profile of the insurer and enables the value to vary across different countries.
- As the underpin is expected to be applicable mostly in cases where the portfolio is relatively homogenous, the average sum insured provides a good proxy for the portfolio exposures.
- The factor of 500 represents the number of properties affected during the conflagration event and is derived from loss information from the Enschede event, supplemented by expert judgement.
- The undertaking's market share provides the proportion of properties which the undertaking could be expected to provide cover for.

2733. A minimum market share of 5% was prescribed to reflect the possibility of regional concentrations within portfolios which would not be adequately captured by using undertaking's national market share.

32. Annex to chapter 6 – Natural Catastrophe risk simplification: mathematical formulation and quantitative results

1 Mathematical Formulation for options 3, 5, and 6

2735. The starting point for the discussion below is the formula for the loss in a region r , given by

$$L_r = Q_r \sqrt{\left(\sum_{(i,j)} \text{Corr}_{ij} WSI_i WSI_j \right)}$$

2736. with the weighted sum insured WSI given by the product of weight W for the (Cresta)zone i and sum insured in this zone (W and SI always refer to the zones in region r hereafter, the sum goes over all zones of the region)

$$WSI_i = W_i SI_i$$

2737. Depending on the peril, the sums insured include weights for the different lines of business. For simplicity this is not considered here.

2738. We further define the quantity $\tilde{SI}^r$ for any exposure in the region r not allocated to zones i . Therefore the proportion of exposure that is not allocated is given by

$$\gamma_r = \frac{\tilde{SI}^r}{\tilde{SI}^r + \sum_i SI_i}, 0 \leq \gamma_r \leq 1$$

1.1 Use of risk factor for the region and applying prudency factor (Option 3)

2739. For this option, the loss in the region r is given by

$$L_r = Q_r \left[\sqrt{\left(\sum_{(i,j)} \text{Corr}_{ij} WSI_i WSI_j \right)} + p_r \tilde{SI}^r \right]$$

where $p_r \geq 1$ is the prudency factor ($p_r = 1$ is the limiting case of no prudency, option 2). It would not be appropriate to assume diversification effects between $\sqrt{\left(\sum_{(i,j)} \text{Corr}_{ij} WSI_i WSI_j \right)}$ and $p_r \tilde{SI}^r$, as this is already considered in the calibration of Q_r .

2740. For the case, where the undertaking uses the simplification for the overall exposure in region r , this simplifies to

$$L_r = p_r Q_r \tilde{SI}^r$$

1.2 Allocation to zone with highest risk weight (Option 5)

2741. In this case, the formula for the loss in the region r remains unchanged

$$L_r = Q_r \sqrt{\left(\sum_{(i,j)} Corr_{ij} WSI_i WSI_j \right)}$$

2742. However, the sum insured for the zone $\hat{i}$ with highest risk weight is replaced by

$$SI_{\hat{i}} \rightarrow SI_{\hat{i}} + \tilde{I}^r$$

2743. For the case that this simplification is done for the overall portfolio of region r , this simplifies to

$$L_r = W_{\hat{i}} Q_r \tilde{I}^r$$

2744. Therefore, using this simplification for the overall portfolio, the result is equivalent to Option 2 with the special choice of prudency factor $p_r = W_{\hat{i}}$.

2745. The formulas for variation a) (not using the highest risk weight, but some other) are equal, the only difference is the choice of $\hat{i}$.

2746. This applies to variation b) (using the highest risk weight within the subset of zones where the exposure could be) as well. In this case, there might be more than one zone $\hat{i}$, where SI consists of the sum of allocated and not (fully) allocated parts.

1.3 Allocation to undertaking's average (Option 6)

2747. This option can be written as

$$L_r = Q_r \sqrt{\left(\sum_{(i,j)} Corr_{ij} WSI_i / 1 - \gamma_r WSI_j / 1 - \gamma_r \right)} = Q_r / 1 - \gamma_r \sqrt{\left(\sum_{(i,j)} Corr_{ij} WSI_i WSI_j \right)}$$

2748. Therefore, it is simply the scaled figure for the allocated exposure. Mathematically the solution fails when no exposure has been allocated to risk zones before applying the simplification (i.e. $\gamma_r \rightarrow 1$, or $\sum_i SI_i \rightarrow 0$). To avoid the risk of cherry-picking, there is agreement that in practice γ_r should be relatively large.

2749. There is no intuitive way to implement the concept of prudency into this approach. The easiest solution – from a technical point of view – is the replacement of the factor $1/1 - \gamma_r = (1 - \gamma_r)^{-1}$ with another function that diverges faster for $\gamma_r \rightarrow 1$, e.g. with $(1 - \gamma_r)^{-\alpha}$, $\alpha \geq 1$.

2 Quantitative results and prudency for options 3, 5 and 6

2750. In the following we list quantitative criteria for the choice of options and prudency factors. To demonstrate the results of the different options we consider two different undertakings, one being the “average industry” (AI) undertaking, the other one being the “regionally concentrated” (RC)

undertaking. AI and RC are meant to span the limiting cases, and especially RC is likely exaggerated.¹⁴¹ The sum insured of AI are approximately¹⁴² the one used to normalize the aggregation matrix $Corr_{ij}$ of the standard formula, so that without applying simplifications, the result is proportional to the country factor ($L_r^{AI} \approx Q_r \sum_i SI_i^{AI} = Q_r SI^{AI}$) and the sum insured summed over all risk zones $SI^{AI} = \sum_i SI_i^{AI}$. We define RC as an undertaking where 40% of the exposure is additionally concentrated in the two risk zones k, l with highest risk weights, and 60% are distributed as for AI, or

$$SI_i^{RC} = 60\% SI_i^{AI} | i \notin (k, l),$$

$$SI_i^{RC} = 60\% SI_i^{AI} + 20\% SI^{AI} | i \in (k, l).$$

2751. The example is constructed such that $\sum_i SI_i^{AI} = SI^{AI} = \sum_i SI_i^{RC} = SI^{RC}$.

2752. Let us further consider the three cases that 10%, 40%, 100% of the exposure is not allocated ($\gamma_r = 0,1; 0,4; 1$). As we are considering an extreme case RC applies the simplification for the exposure on the highest risk zones first, with equal weight for the two zones. Here we show result for the following four perils/ region combinations only, that are representative for the regions where the corresponding peril is material (we briefly comment why we consider the peril/ region as representative). The result is always normalized to $Q_r SI$. The table is based on the scenario with 100% loss (as there is no reinsurance considered this will give the same results as using SCR).

2753. The colour coding is based on the following criteria:

- Green: Estimate of simplification largely in line with result without simplification (80%-150%)
- Yellow: Material overestimation (>150%)
- Red: Material underestimation (<80%)

2754. Clearly these criteria are subject to expert judgement, and other thresholds can be selected. It should be pointed out, that the colour coding cannot take into account if the peril/ region is material for the undertaking for its overall SCR.

2755. The reasons for choosing specific peril/ regions are – first – that all perils (except subsidence) should be covered. It is of specific importance that one considers both perils with low correlations between risk zones (Hail, EQ) and large correlations (Storm)¹⁴³. Second we focus on the material perils for specific countries. Last, we cover both larger and smaller regions (with the exception of “One-Risk-Zone” regions, where the simplifications are not applicable).

¹⁴¹ Probably the impact of anti-selecting risks within a risk zone is more relevant for an undertaking (but not covered by the standard formula) than the anti-selection of risk zones.

¹⁴² The identity $L_r^{AI} = Q_r \sum_i SI_i^{AI} = Q_r SI^{AI}$ does not hold exactly, as our AI undertaking is approximated by equal distribution of SI^{AI} to all the risk zones, which is not the actual contribution used to normalize the standard formula. For the purpose here the difference is not relevant.

¹⁴³ For flood, the materiality of correlations depend on the regions.

- EQ Italy: major peril for Italy; larger region in the sample
- Flood Poland: major peril for Poland; larger region in the sample
- Storm Denmark: major peril for Denmark; smaller region in the sample
- Hail Austria: major peril for Austria; smaller region in the sample

2.1 Results and discussion of the examples

2.1.1 Earthquake Italy

	No simplification	Option 3 ¹⁴⁴ $p_r = 1$	Option 3 $p_r = 3$	Option 3 $p_r = \max_i W_i$	Option 5	Option 5 90% quantile factor	Option 6	Option 6 with loading ($\alpha = 2$)
AI, 10%	100%	101%	122%	205%	162%	124%	100%	111%
AI, 40%	100%	102%	187%	521%	478%	303%	100%	167%
AI, 100%	100%	106%	317%	1152%	1152%	719%	./.	./.
RC, 10%	100%	80%	86%	111%	103%	84%	86%	95%
RC, 40%	100%	29%	54%	150%	138%	97%	29%	48%
RC, 100%	100%	30%	91%	332%	332%	207%	./.	./.

2.1.2 Flood Poland

	No simplification	Option 3 $p_r = 1$	Option 3 $p_r = 3$	Option 3 $p_r = \max_i W_i$	Option 5	Option 5 90% quantile factor	Option 6	Option 6 with loading ($\alpha = 2$)
AI, 10%	100%	99%	117%	203%	176%	130%	100%	111%
AI, 40%	100%	96%	168%	514%	487%	255%	100%	167%
AI, 100%	100%	90%	271%	1135%	1135%	532%	./.	./.
RC, 10%	100%	80%	85%	109%	104%	85%	87%	96%
RC, 40%	100%	26%	45%	139%	131%	69%	27%	45%
RC, 100%	100%	24%	73%	307%	307%	144%	./.	./.

¹⁴⁴ This limiting case of Option 3 is identical to Option 2.

2.1.3 Storm Denmark

	No simplification	Option 3 $p_r = 1$	Option 3 $p_r = 3$	Option 3 $p_r = \max_i W_i$	Option 5	Option 5 90% quantile factor	Option 6	Option 6 with loading ($\alpha = 2$)
AI, 10%	100%	99%	116%	107%	106%	102%	100%	111%
AI, 40%	100%	94%	163%	129%	126%	113%	100%	167%
AI, 100%	100%	86%	259%	172%	172%	155%	./.	./.
RC, 10%	100%	95%	112%	103%	102%	99%	98%	109%
RC, 40%	100%	82%	142%	112%	110%	98%	87%	145%
RC, 100%	100%	75%	225%	150%	150%	135%	./.	./.

2.1.4 Hail Austria

	No simplification	Option 3 $p_r = 1$	Option 3 $p_r = 3$	Option 3 $p_r = \max_i W_i$	Option 5	Option 5 90% quantile factor	Option 6	Option 6 with loading ($\alpha = 2$)
AI, 10%	100%	101%	123%	349%	307%	166%	100%	111%
AI, 40%	100%	104%	192%	1098%	1064%	511%	100%	167%
AI, 100%	100%	110%	330%	2595%	2595%	1244%	./.	./.
RC, 10%	100%	78%	81%	115%	109%	79%	85%	94%
RC, 40%	100%	15%	28%	162%	157%	76%	15%	25%
RC, 100%	100%	16%	49%	383%	383%	184%	./.	./.

2.2 Discussion

2756. Based on the results above, the following conclusions can be drawn (most of them as expected):

- The simplifications tend to deviate more from the true result (without using the simplification), the higher the proportion of non-allocated exposure.
- The simplifications tend to deviate more from the true result without simplification for perils where the zonal weights have large variability (see Hail Austria for large variability and WS Denmark for low variability)

- Option 3 (with maximal prudence factor p_r) and Option 5 tend to be very conservative, especially for the “average industry” (AI) undertaking. However, option 5 tends to overestimate the SCR a bit less than option 3 (with maximal prudence factor p_r), and is thus the – quantitatively – superior solution.
- Option 3 without prudence factor (which is identical to Option 2) tends underestimate the risk for the risk concentrated undertakings, when the non-allocated exposure exceeds 10%, for some settings materially so. This still applies when the prudence factor is set to a moderate value of 3.
- Option 6 works well for AI (by construction), but not so for RC, where the risk can be underestimated to a large degree for $\gamma_r > 10\%$.

33. Annex to chapter 6 – Description of recalibration process

I. Input to the recalibration

2757. Two different types of input are used in the recalibration process:

- **Models:**
Compared to the situation of the CAT Task Force (CTF) of EIOPA's predecessor organisation CEIOPS, nowadays more models are available for most of the scenarios. This means in all but one case, that now at least one model exists in the market, where the CTF might have had to find solutions without any model as a starting point.
- **Industry Exposure Data:**
The data used is, where available for a particular scenario, provided by PERILS AG. Where this is not the case, model owners are asked to use their own data. For the zonal calibration, NSAs were able to support by providing exposure data in some cases.

2758. In all cases, model and data providers revealed features, assumptions and policy conditions, implicit to their input.

II. Recalibration of the country factors

2759. It was agreed to first recalibrate the country risk factor for each scenario: as a global factor to the SCR-determining 1-in-200y scenario loss, it has the most impact on a (re)insurance undertaking's SCR for a given scenario.

2760. The following inputs were considered for each country factor of a given scenario:

- Collection of candidate values from all models available for a given scenario, incl. a set of objective criteria; Country factors of neighbouring (current, and potentially recalibrated values) regions/countries need to be taken into account to ensure proper risk relativities per perils.
- In case there is no model available for a given scenario, experts were asked to come up with an estimate for an initial value, based on their specific expertise. Plausible proposal values were derived from the gathered information for country factor, raw risk zone weights and aggregation matrix, which were subsequently discussed. Experts provided documentation on what, why and how the information outlined above was used to produce the estimates.
- Comparison with internal model results where appropriate; information collected via on-site inspections.
- Information of historical losses and assessment of plausibility of country factors against these historical losses and against neighbouring values.

III. Decision on recalibration of more granular parameters

2761. For certain scenarios (currently: GR EQ, HU FL, SK EQ, SE WS), particular zonal weights and correlations have been challenged. For five newly introduced scenarios (CZ Hail, FI WS, HU WS, SI Hail and SI WS) risk zone weight vector and aggregation matrix needed to be proposed and calibrated.

2762. It was assessed, that no other scenarios (apart from the nine already identified above) currently require recalibration of the risk zone weights and/or aggregation matrices.

IV. Recalibration of risk zone weights and aggregation matrices

2763. Due to the increased granularity, only a subset of the models used to provide candidate values for the recalibration of the country factors above were capable of providing candidate input for risk zone weight and/or aggregation matrix recalibration.

2764. For scenarios where it was agreed to also recalibrate these latter sets of parameters, it was proposed to provide experts with only one set of parameters per scenario (vector of zonal weights and aggregation matrix), as the use of more than one set would increase the complexity by several orders of magnitude¹⁴⁵. Even more important, zonal weights and aggregation matrix form a coherent set, as they are calculated on the basis of a) the same model and b) with a common set of industry exposure data (IED). Thus, combining individual elements of the zonal weight vector or the matrix across several model-IED combinations is not an option.

2765. The following steps were followed when recalibrating risk zone weights and aggregation matrix for a given scenario:

- Choose a model or a set of models, where the output of each provides for a level of granularity that corresponds to the SF's risk zones for a given scenario; the set of models should be a subset of those used for the first iteration of the country factor recalibration;
- Collect industry exposure data via the help of the supervisors where possible;
- Let the relevant model(s) generate a vector of raw risk zone weights and an aggregation matrix (all amounts w.r.t. the specific peril, e.g. SI_i^{ind} is meant to be the industry exposure to windstorm risk in risk zone j of a given scenario, when windstorm risk is calibrated for this scenario):

Raw risk zone weights / zonal relativities

¹⁴⁵ n risk zone weights, plus n^2 aggregation matrix entries equals $n(n+1)$ times the same mini-Delphi method to be applied as described above for the country factor; in addition, certain scenario-specific restrictions on the risk zone weights and between the aggregation matrix entries might further complicate the iterations involved when using more than one model for input.

Calculate

$$F_i = \frac{GLR_{0.995,i}}{GLR_{0.995,r}}$$

with

F_i – non-normalised zonal relativity for zone i in region r ,

$GLR_{0.995,i}$ – 1-in-200 years occurrence industry gross loss ratio in risk zone i ,

$GLR_{0.995,r}$ – 1-in-200 years occurrence industry gross loss ratio for region r (current country),

where

$GLR_{0.995,i}$ is calculated as $GL_{0.995,i}/SI_i^{ind}$, with $GL_{0.995,i}$ being the 99.5% quantile of the distribution of industry gross loss for zone i and SI_i^{ind} being the total industry exposure in zone i and

$GLR_{0.995,r}$ is calculated as $GL_{0.995,r}/SI_r^{ind}$, with $GL_{0.995,r}$ being the 99.5% quantile of the distribution of industry gross loss for region r and SI_r^{ind} being the total industry exposure in region r (i.e. the country which's scenario is currently calibrated).

Aggregation Matrix Coefficients

Method 1 (to be used for most windstorm, flood and hail scenario calibration cases): calculate

$$2766. \text{Corr}_{ij} = \frac{GL_{0.995,ij}^2 - GL_{0.995,i}^2 \cdot GL_{0.995,j}^2}{2 \cdot GL_{0.995,i} \cdot GL_{0.995,j}}$$

with

Corr_{ij} – non-normalised correlation of risk zones i and j ,

$GL_{0.995,i}$ – 1-in-200 years occurrence industry gross for risk zone i and

$GL_{0.995,ij}$ – 1-in-200 years occurrence industry gross loss for risk zones i and j combined

Method 2 (to be used for most earthquake scenario calibration cases): calculate

$$2767. \text{Corr}_{ij} = \frac{TCE_{0.995,ij}^2 - TCE_{0.995,i}^2 \cdot TCE_{0.995,j}^2}{2 \cdot TCE_{0.995,i} \cdot TCE_{0.995,j}}$$

with

Corr_{ij} – non-normalised correlation of risk zones i and j ,

$TCE_{0.995,i}$ – 1-in-200 years occurrence industry gross for risk zone i and

$TCE_{0.995,ij}$ – 1-in-200 years occurrence industry gross loss for risk zones i and j combined,

where $TCE_{0.995,i}$ is the mean of all losses larger than the 1-in-200 years loss. This parameter/random variable is sometimes also designated as 'Tail Value-at-Risk' (*TVaR*), 'Conditional Value-at-Risk' (*CVaR*), 'Average Value-at-Risk' (*AVaR*), or 'expected tail loss' (*ETL*).

- Form an element-wise average for the vector and the matrix across the submitted sets/models used.

- experts to comment on potential inconsistencies/peculiarities they might discover when assessing the appropriateness of each parameter (set).
- experts to receive the output of the previous step for final consistency checks.

2768. Rounding and normalisation of both the risk zone weights and the aggregation matrix coefficients is done according to the following steps:

- *Set each $\text{Corr}_{\text{peril,region},i,j} \in \{0,.25,.5,.75,1\}$, i.e. choose the value from this set that is closest to the $\text{Corr}_{\text{peril,region},i,j}$ above; zonal relativities to be rounded to one decimal place;*
- risk zone weights and aggregation matrix are normalised under the restriction that, for an exposure with industry average spatial distribution across zones in region r (i.e. $\text{SI}_r^{\text{ind}} = \sum_i \text{SI}_i^{\text{ind}}$), the 1-in-200y loss based on the zonal aggregation must equal the total exposure times the country risk factor:

$$(*) \quad Q_r \text{SI}_r^{\text{ind}} = L_r = Q_r \sqrt{\sum_{(i,j)} \text{Corr}_{r,i,j} \cdot F_{r,i} \cdot \text{SI}_{r,i}^{\text{ind}} \cdot F_{r,j} \cdot \text{SI}_{r,j}^{\text{ind}}}$$

As Q_r can be cancelled out on both sides of the equation, this shows the independence of the zonal weights – or relativities, as they are sometimes called – from the regional/country risk factor.

- Input the industry zonal distribution into the formula (*) (PERILS data sets to be used where available);
- Set the normalisation weight to 1;
- Repeat the following steps as many times as necessary:
 - i. Multiply the raw zonal weights/relativities by the normalisation weights and round to the nearest 1-digit mantissa;
 - ii. Calculate the result of the scenario as a percentage of exposure using the normalised weights/relativities;
 - iii. Divide the country factor by the result of (ii);
 - iv. If the result of (iii) is not sufficiently close to 1, then multiply the normalisation weight by (iii) and repeat from step (i); otherwise: arrive at final W_r and AGG_r (i.e. the calibrated versions of the vector F_r of risk zone weights and of the aggregation matrix Corr_r for the current scenario).

34. Annex to chapter 6 – Spanish Windstorm country factor recalibration

CONSORCIO DE COMPENSACIÓN DE SEGUROS.

2769. The 'Consortio de Compensación de Seguros' (CCS), is a public business organization that is attached to the Ministry of Economy, Industry and Competitiveness of Spain, through the General Directorate for Insurance and Pension Funds. It performs many functions within the insurance field, and amongst which those related to coverage of catastrophic risk. The Consortio was not considered in the 2010 initial calibration but it covers directly most of losses caused by windstorms in Spain (in the Spanish market only a residual part of windstorm losses are covered by the Spanish insurance undertakings, less than a third). Therefore the recalibration has to be net of Consortio coverage, to pick up only the losses that (re)insurers effectively pay. This is the main explanation for the modification of the country factor for WS in Spain.

2770. The Consortio cannot be considered a risk mitigating technique because the Consortio assumes NAT CAT risks directly from the insurance policies written by the insurers for any risk located in Spain, in a way that insurers never assume the CAT risks. Therefore, there is not a previous CAT risk acquisition by the insurers and a posterior risk transfer to the Consortio; the CAT risk is acquired by the Consortio at inception. In the event that the Consortio were to bankruptcy, policyholders would not have any right to demand any claim for CAT events to their insurers with which they signed the contracts. This system operates by law (it does not depend on contractual arrangements).

2771. The Consortio de Compensación de Seguros has its own capital, independent to that of the State. Its revenue is formed by its premiums, its surcharges and the product of its investments, and as with any other insurance company, it constitutes the corresponding technical provisions and it upholds a solvency margin. Being a public entity, the CCS does not depend on the budgets of any Public Administration.

2772. For every insurance policy covering risks located in Spain there is a surcharge over the prime in order to cover catastrophic events. This surcharge associated to the risk is transferred to the Consortio, which is the Entity in charge of paying the claims and assuming the risks. This applies not only to Spanish undertakings but also to every undertaking assuming risks in Spain.

2773. Consortio pays all losses caused by windstorm in which there are bursts exceeding 120 km/h (in case of doubt about the wind speed, Consortio will pay as well).

METHODOLOGY FOLLOWED TO RECALIBRATE THE COUNTRY FACTOR FOR WINDSTORM AND CONCLUSIONS.

2774. A statistical study was carried out to collect data of payments and insured sums in the Spanish market. Data were collected net of payments

recovered by the CCS and gross of reinsurance. The sample obtained was necessarily small, given the nature of the event analyzed.

2775. The losses due to WS phenomenon were modeled by means of Extreme Value Theory, having in mind that the Generalized Pareto distribution (GPD, Pareto case) should be an adequate model for this kind of losses. Due to the small amount of data available, the justification for this model selection relied mainly on a well-known limit theorem for the excesses called the Pickands-Balkema-de Haan theorem.
2776. To obtain the parameters of GDP, two different approaches were applied, always taking the most prudent decisions. The first approach is a **Bayesian estimation** and the outcome for the country factor is 0.0093%.
2777. The second approach was more **classical**, and different estimation methods were applied, choosing the most prudent and conservative outcome (in this case, obtained from probability weighted moments). After it, a non-parametric bootstrap was applied to add the estimation error, obtaining finally a country factor equal to 0.00997%.
2778. This analysis had been developed choosing in all cases the most conservative alternative.
2779. Finally, once the outcomes were studied, the proposal is to define the Spanish WS country factor as **0.01%**.
2780. A more detailed explanation on this recalibration can be found in <http://www.dgsfp.mineco.es/>

35. Annex to chapter 7 – Statistical estimation of the affine model

2781. First, an affine stress has the general form

$$r_t^{up,down}(m) = a^{up,down}(m)r_t + b^{up,down}(m). \quad (7)$$

2782. The slope parameter $a(m)$ is specified through the relative stress factors from the Delegated regulation. Then, the stress can be written

$$r_t^{up,down}(m) = (1 \pm s^{up,down}(m))r_t + b^{up,down}(m). \quad (8)$$

2783. The estimation reduces to estimating the additive component $b^{up,down}(m)$. Solving (8) for the additive component, we obtain

$$r_t^{up,down}(m) - (1 \pm s^{up,down}(m))r_t(m) = b^{up,down}(m). \quad (9)$$

2784. To make an estimation feasible, one can use the one-year later observable interest rate $r_{t+\omega}(m)$ with $\omega = 262$ as a proxy for $r_t^{up,down}$ and then perform a quantile regression on a constant to estimate the additive components.

2785. In this simple and special case of a quantile regression on a constant, the estimator reduces to the corresponding quantile of the empirical distribution.

2786. That is,

$$Q_p(r_{t+\omega}(m) - (1 \pm s^{up,down}(m))r_t(m)) = \widehat{b^{up,down}}(m), \quad (10)$$

2787. where Q denotes the empirical quantile function and p is the considered 0.995 (0.005) quantile.

2788. Then one can readily obtain an estimate for the additive components in the affine approach for each maturity and each RFR currency.

2789. To simplify the approach in the standard formula and to avoid currency specific parameters, a unique additive shift in the affine approach is estimated for the two interest rate scenarios.

2790. To do so, in the first step a maturity and currency-dependent additive component is estimated for the RFR data currencies EUR, SEK, GBP, CZK and CHF. As the affine model only applies in the lower yield environment, only those currencies, which have significantly been exposed to a low yield environment, have been considered in the estimation below. Moreover, as the considered currencies have not been in a low yield environment for the entire historical data period available, a more representative subsample for the low yield environment is specified as well. In this case the data period from 01/10/2010 until 30/12/2016 is considered a suitable candidate for a for the low yield environment subsample.

2791. In the second step, the maximum (minimum) additive shock is derived for each currency in the data set considered. This yields a prudent currency-specific estimate for the additive components.

2792. Table 4 presents the results of the second step for the representative subsample from 2010 until 2016.

Table 1: Estimation of the maximum (minimum) additive parameter in the affine shock for different currencies and the entire available data set.

Currency	b_{min}^{down}	b_{max}^{up}
EURO	-1.10%	0.33%
GBP	-0.84%	0.94%
CHF	-1.07%	0.99%
CZK	-0.91%	0.43%
SEK	-0.91%	1.41%

2793. In the final third step, the selected currency-specific additive components are transformed into a unique additive shock component. To do so the following summary statistic of the empirical distribution of the currency-specific additive components in table 2 provides useful insight.

Table 2: Summary statistic of the estimation results in table 4.

Statistic	b_{min}^{down}	b_{max}^{up}
Median	-0.91%	0.94%
Mean	-0.96%	0.82%
p-quantile(0.995,0.005)	-1.10%	1.4%

2794. For the additive component in the interest rate down scenario, all descriptive statistics are sufficiently close to -1%. An estimate of -1% seems to be a good candidate for the additive component in the down scenario. This estimate is in line with the observation in figure 4 that in the low yield environment absolute annual downward movements considerably larger than -1% have rarely been observed. Consequently, an additive downward component of **-1 %** is set for the downward scenario.

2795. For the additive component, the distribution of the currency-specific additive up components is wider (larger difference between the 0.995% quantile and the median). The current standard formula already includes a 1% minimum upward shock. From an economic perspective, a large upward movement seems to be more likely than a large downward movement in a low yield environment.¹⁴⁶ Taking these further insights into consideration, the

¹⁴⁶Note the absolute change in the affine model is $r*s+b$.

99.5 % quantile in table 5 is considered a prudent estimate of the additive upward component in the affine model. Accordingly, an additive upward component of **+1.4 %** is set for the upward scenario.

36. Annex to chapter 7- Multivariate testing against historic data

2796. In the following annex the results of the multivariate test against historic data is presented for several currencies and the interest rate down scenario.¹⁴⁷ The calibration of the stressed risk-free curves is performed according to the calibration in the analysis section. The multivariate test against historic data indicates how often a specific number of simultaneous breaches has occurred for the specified currency and what the empirical probability is that the specified number of simultaneous breaches occurs. As an example, consider the first sub-table below for the EUR. 10 simultaneous breaches of the realized risk-free curve, that is 10 of 20 tenor points have breached the corresponding realized spot rate one year later on the same observation date, have been observed 13 times. The corresponding empirical probability is 0.29%. The other lines can be interpreted analogously. An interesting case, is particularly the case with 20 simultaneous breaches, that is the entire liquid part of the term structure has breached the realized part of the term structure one year later on the same date. For comparison reasons, the multivariate test against historic data is additionally performed for the standard formula and the former CEIOPS advice in table 2.

Table 1: Multivariate Backtesting in the interest rate down scenario for several currencies. The corresponding currency is shown in the header of the sub-table. k denotes the number of simultaneous daily breaches considered, N denotes the number of occurrences for k simultaneous daily breaches, p (N/Data points) denotes the empirical probability of having k simultaneous daily breaches and Data Points is the number of daily observations of the risk-free curve considered in the multivariate test against historic data.

EUR			
k	N	p	Data points
2	65	1.47%	4433
5	28	0.63%	4433
10	13	0.29%	4433
11	9	0.20%	4433
12	6	0.14%	4433
15	0	0.00%	4433
16	0	0.00%	4433
18	0	0.00%	4433
20	0	0.00%	4433

¹⁴⁷ For the interest rate up scenario, the conservative calibration leads to only a few, if any, simultaneous breaches. Therefore to avoid showing a lot of zeros these tables are omitted here.

GBP			
k	N	p	Data points
2	44	1.36%	3233
5	4	0.12%	3233
10	0	0.00%	3233
11	0	0.00%	3233
12	0	0.00%	3233
15	0	0.00%	3233
16	0	0.00%	3233
18	0	0.00%	3233
20	0	0.00%	3233

SEK			
k	N	p	Data points
2	156	3.74%	4172
5	63	1.51%	4172
10	0	0.00%	4172
11	0	0.00%	4172
12	0	0.00%	4172
15	0	0.00%	4172
16	0	0.00%	4172
18	0	0.00%	4172
20	0	0.00%	4172

CZK			
k	N	p	Data points
2	2	0.05%	4004
5	1	0.02%	4004
10	0	0.00%	4004
11	0	0.00%	4004
12	0	0.00%	4004
15	0	0.00%	4004
16	0	0.00%	4004
18	0	0.00%	4004
20	0	0.00%	4004

HUF			
k	N	p	Data points
2	65	1.68%	3859
5	28	0.73%	3859
10	15	0.39%	3859
11	13	0.34%	3859
12	7	0.18%	3859
15	0	0.00%	3859
16	0	0.00%	3859
18	0	0.00%	3859
20	0	0.00%	3859

RON			
k	N	p	Data points
2	15	1.12%	1342
5	5	0.37%	1342
10	0	0.00%	1342
11	0	0.00%	1342
12	0	0.00%	1342
15	0	0.00%	1342
16	0	0.00%	1342
18	0	0.00%	1342
20	0	0.00%	1342

HRK			
k	N	p	Data points
2	0	0.00%	2342
5	0	0.00%	2342
10	0	0.00%	2342
11	0	0.00%	2342
12	0	0.00%	2342
15	0	0.00%	2342
16	0	0.00%	2342
18	0	0.00%	2342
20	0	0.00%	2342

PLN			
k	N	p	Data points
2	50	1.27%	3924
5	16	0.41%	3924
10	3	0.08%	3924
11	0	0.00%	3924
12	0	0.00%	3924
15	0	0.00%	3924
16	0	0.00%	3924
18	0	0.00%	3924
20	0	0.00%	3924

CHF			
k	N	p	Data points
2	187	4.20%	4454
5	87	1.95%	4454
10	54	1.21%	4454
11	44	0.99%	4454
12	43	0.97%	4454
15	22	0.49%	4454
16	9	0.20%	4454
18	5	0.11%	4454
20	0	0.00%	4454

Table 2: Multivariate Backtesting in the interest rate down scenario for the EUR and the standard formula approach and the former CEIOPS advice.

EUR Standard formula			
k	N	p	Data points
2	1071	24%	4433
5	835	19%	4433
10	646	15%	4433
11	625	14%	4433
12	602	14%	4433
15	543	12%	4433
16	521	12%	4433
18	496	11%	4433
20	298	7%	4433

EUR former CEIOPS advice			
k	N	p	Data points
2	587	13,24%	4433
5	471	10,62%	4433
10	359	8,10%	4433
11	345	7,78%	4433
12	328	7,40%	4433
15	188	4,24%	4433
16	166	3,74%	4433
18	151	3,41%	4433
20	41	0,92%	4433

37. Annex to chapter 7- Simple forward curves

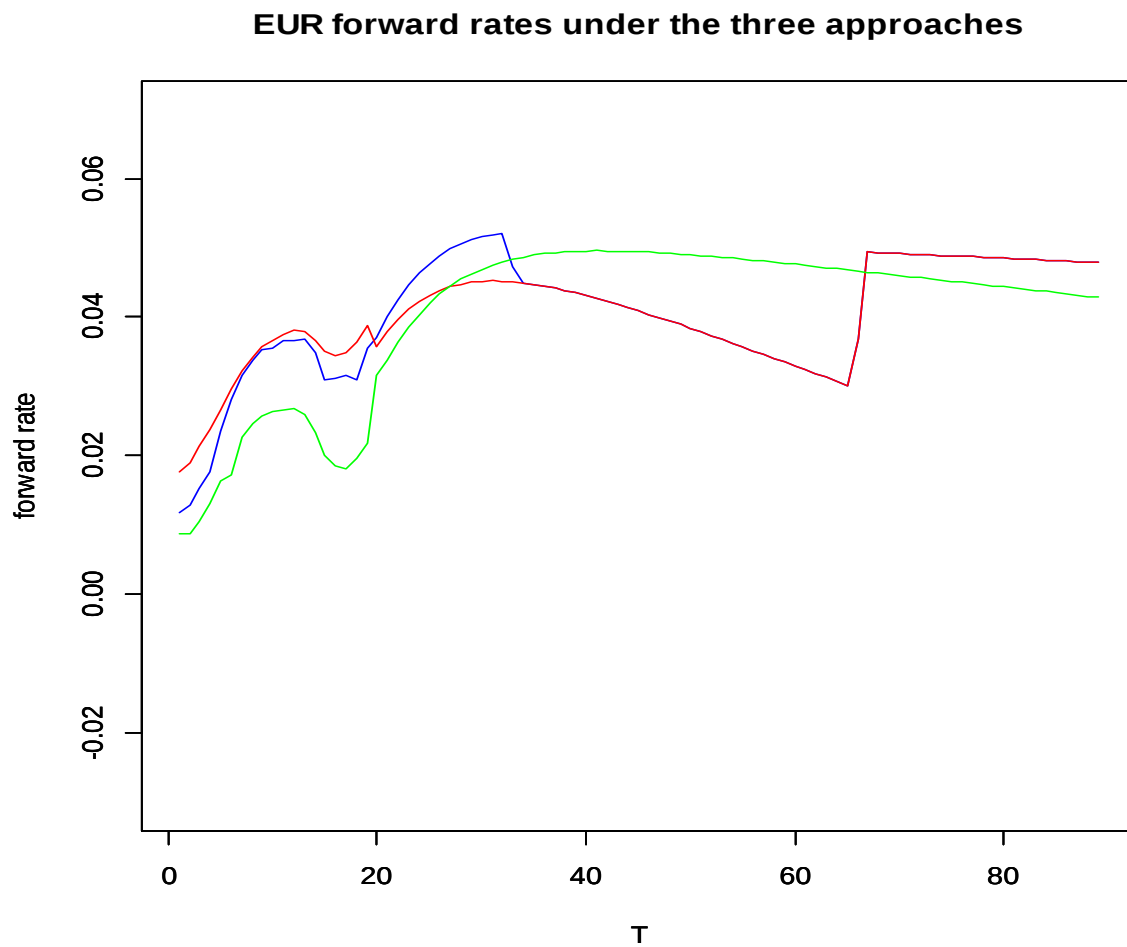


Figure 1: Simple forward rates on 30.12.2016 under the proposal A (red line), proposal B (blue line) and the relative shifted approach (green line) for the EUR in the interest rate up scenario.

38. Annex to chapter 10 – Possible financial ratios

2797. Below possible financial ratios are listed. For the categories Leverage I, Leverage III and Margins also averages over a number of years are considered (so far 5 years were tested). Also ratios based on the coefficient of variation were so far tested for a period of 5 years.

Leverage I

Total Debt / EBITDA
Net Debt / EBITDA
Net Debt / EBITDA after CAPEX
Total Debt / EBIT
Net Debt / EBIT
Net Debt / Cash from Operations
Total Debt / Funds from Operations
Total Debt / Cash From Operations
Total Debt / Free Cash Flow
Net Debt/ Retained Cash Flow

Leverage II

Total Equity / Share Capital
Total Debt / Total Capital
Net Debt / Total Capital
Long-Term Debt / Total Capital
Total Liabilities / Total Equity
Total Debt / Total Equity
Net Debt / Total Equity
Short-Term Debt / Total Equity
Long-Term Debt/ Total Equity
Total Liabilities / Total Assets
Total Debt / Total Assets
Long-Term Debt / Total Assets
Long-Term Debt / Total Capital
Total Equity / Total Assets
Total Assets / Total Equity
Retained Earnings / Total Assets
Long-Term Debt / Total Assets
Long-Term Debt /Total Capital
Total Debt / Cash Equivalents
Total Debt / Enterprise Value

Leverage III

EBITDA / Total Interest Expense

EBITDA / Interest Expense
EBITDA less CAPEX / Total Interest Expense
Fixed Charge Coverage
EBIT / Interest Expense
EBIT / Total Interest Expense
EBT / Interest Expense
Cash From Operations / Total current liabilities

Growth

5-Year Growth Sales
5-Year Growth EBITDA
5-Year Growth Operating Income
5-Year Growth Net Income
5-Year Growth Book Value
5-Year Growth Earnings per Share
One-Year Change Sales
One-Year Change EBITDA
One-Year Change Net Income
One-Year Change Funds from Operations
One-Year Change Earnings per Share

Margins

EBITA Margin
EBITDA Margin
Gross Margin
Operating Margin
EBIT Margin
Pre-tax Profit Margin
Net Margin
Free Cash Flow Margin

Returns

Return on Common Equity
Return on Total Equity
Return on Assets
Return on Capital
Return on Invested Capital
Return on Capital Employed
Cash From Operations / Total Assets
Funds from Operations / Total Assets

Stability

Volatility of Net Income
Volatility of Net Sales
Volatility of Total Assets
Coefficient of Variation Net Sales
Coefficient of Variation Total Assets
Coefficient of Variation Return on Total Equity
Coefficient of Variation Return on Invested Capital
Coefficient of Variation Return on Capital Employed
Coefficient of Variation Return on Assets
Coefficient of Variation Net Income
Coefficient of Variation Profit Margin
Coefficient of Variation EBITDA Margin
Coefficient of Variation Operating Margin
Coefficient of Variation Total Debt / EBITDA
Coefficient of Variation EBITDA / Total Interest Expense
Coefficient of Variation Interest Rate Coverage Ratio
Coefficient of Variation EBITDA less CAPEX/Total Interest Expense

Consecutive years of dividends
Consecutive Years without a Net Loss
No Net Loss in last 5 Years (Yes/No)
No Net Loss in last 10 Years (Yes/No)
Dividend per Share > 0 (Yes/No)
Basic Earnings per Share > 0 (Yes/No)
Net Income > 0 (Yes/No)
Annual Change in Current Liabilities

Liquidity

Current Ratio
Cash Ratio
Quick Ratio
CFO / Short-Term Debt

Other

Altman's Z-Score
Health Grade
Capital Expenditure / Sales
Working Capital / Sales

39. Annex to chapter 13 – Derivation of a simplification for the risk-mitigating effect of reinsurance arrangements

2798. Assuming that the reinsurance obligation has no impact on non-life lapse risk one can approximate the risk mitigating effect of a reinsurance obligation on a single LOB, according to Art. 196 as follows

$$RM(Re) = SCR_{uw}^{hyp} - SCR_{uw}^{net}$$

$$= \sqrt{(SCR_{CAT}^{hyp})^2 + (SCR_{P\&R}^{hyp})^2 + 2 * 0.25 * SCR_{CAT}^{hyp} SCR_{P\&R}^{hyp}} - \sqrt{(SCR_{CAT}^{net})^2 + (SCR_{P\&R}^{net})^2 + 2 * 0.25 * SCR_{CAT}^{net} SCR_{P\&R}^{net}} \quad (1)$$

$$\leq \sqrt{(SCR_{CAT}^{hyp} - SCR_{CAT}^{net})^2 + (SCR_{P\&R}^{hyp} - SCR_{P\&R}^{net})^2 + 2 * 0.25 * (SCR_{CAT}^{hyp} - SCR_{CAT}^{net})(SCR_{P\&R}^{hyp} - SCR_{P\&R}^{net})} \quad (2)$$

where the approximation (2) is implied by the triangle inequality.

2799. If one considers premium and reserve risk as two separate risks and aggregates these two risks as well assuming that the correlation between the Cat risk and these two sub risks is the same (i.e. 0.25) one obtains:

$$RM(Re) = SCR_{uw}^{hyp} - SCR_{uw}^{net}$$

$$= \sqrt{(SCR_{CAT}^{hyp})^2 + (SCR_P^{hyp})^2 + (SCR_R^{hyp})^2 + 2 * 0.5 * SCR_P^{hyp} SCR_R^{hyp} + 2 * 0.25 * SCR_{CAT}^{hyp} SCR_P^{hyp} + 2 * 0.25 * SCR_{CAT}^{hyp} SCR_R^{hyp}} - \sqrt{(SCR_{CAT}^{net})^2 + (SCR_P^{net})^2 + (SCR_R^{net})^2 + 2 * 0.5 * SCR_P^{net} SCR_R^{net} + 2 * 0.25 * SCR_{CAT}^{net} SCR_P^{net} + 2 * 0.25 * SCR_{CAT}^{net} SCR_R^{net}} \quad (1*)$$

$$\leq \sqrt{(SCR_{CAT}^{hyp} - SCR_{CAT}^{net})^2 + (SCR_P^{hyp} - SCR_P^{net})^2 + (SCR_R^{hyp} - SCR_R^{net})^2 + 2 * 0.5 * (SCR_P^{hyp} - SCR_P^{net})(SCR_R^{hyp} - SCR_R^{net}) + 2 * 0.25 * (SCR_{CAT}^{hyp} - SCR_{CAT}^{net})(SCR_P^{hyp} - SCR_P^{net}) + 2 * 0.25 * (SCR_{CAT}^{hyp} - SCR_{CAT}^{net})(SCR_R^{hyp} - SCR_R^{net})} \quad (2*)$$

2800. The different terms within the square root expression containing the differences between the underwriting SCR's can be approximated by the same expressions as in the Technical specifications

$$\sqrt{(NL_{CAT}^{hyp} - NL_{CAT}^{without})^2 + (3\sigma_p(P_p^{hyp} - P_p^{without}))^2 + (3\sigma_R recoverables)^2 + 9\sigma_p\sigma_R(P_p^{hyp} - P_p^{without})recoverables + 2 * 0.25 * \sigma_p * 3\sigma_p(P_p^{hyp} - P_p^{without})(NL_{CAT}^{hyp} - NL_{CAT}^{without}) + 2 * 0.25 * \sigma_R recoverables(NL_{CAT}^{hyp} - NL_{CAT}^{without})} \quad (3*)$$

where

- $(NL_{CAT}^{hyp} - NL_{CAT}^{without})$ denotes the counterparty's share of CAT losses
- $(P_p^{hyp} - P_p^{without})$ is the reinsurance premium of the counterparty in the affected line of business

- *recoverables* are the Reinsurance recoverables in relation to the counterparty in the affected line of business
- σ_p and σ_R are the standard deviation for premium risk, reserve risk respectively.

2801. The first term in the square root formula (3*) is the former QIS 5 simplification, which was suggested by some stakeholders. Other stakeholders came up with a proposal that adds the second and third line in (3*) to the QIS 5 simplification. From the fact that all terms in (3*) are nonnegative one can immediately observe that this latter amendment leads to a more conservative approximation.

2802. Both suggestions, the QIS 5 and the adjusted QIS 5 simplification, in particular rely on the assumption that the premium and reserve risks are considered as two separate sub risks and not as a unique (integrated) risk as in the current version of the standard formula. Moreover, the proposal in equation (3*) additionally relies on assumption about the correlation between CAT and premium risk, reserve risk respectively, which is not specified as such in the Delegated Regulation.

2803. Applying instead similar approximations for the SCR differences in (2) one could alternatively come up with the following approximation

$$\sqrt{\frac{(NL_{CAT}^{hyp} - NL_{CAT}^{without})^2 + (3\sigma_S(P_p^{hyp} - P_p^{without} + recoverables))^2}{+ 2 * 0.25 * 3 \sigma_S(P_p^{hyp} - P_p^{without} + recoverables)(NL_{CAT}^{hyp} - NL_{CAT}^{without})}} \quad (3)$$

where σ_S is the standard deviation for non-life premium and reserve risk as defined in Article 117(2) of the Delegated Regulation and the other terms are defined as above. This formula does not disentangle the premium and reserve risk and it relies on the current correlation between the CAT and the non-life premium and reserve risk.

40. Annex to chapter 18 – Relative size of the risk margin

2804. Based on the reporting of insurance and reinsurance undertakings to their national supervisory authorities EIOPA has analysed the size of the risk margin at the end of the first, second and third quarter of 2016. The size of the risk margin was compared to the best estimate (BEL), the own funds and the SCR. The comparison was performed for all undertakings and separately for life insurance undertakings, non-life insurance undertakings and undertakings pursuing both life and non-life insurance activities simultaneously.

2805. The ratio of the risk margin over the best estimate can be negative where the best estimate is negative.

All insurance and reinsurance undertakings

Risk Margin as % SCR				Risk Margin as % Own Funds				Risk Margin as % BEL			
Country	Q1	Q2	Q3	Country	Q1	Q2	Q3	Country	Q1	Q2	Q3
AUSTRIA	27%	25%	25%	AUSTRIA	11%	10%	10%	AUSTRIA	4%	4%	4%
BELGIUM	27%	29%	28%	BELGIUM	16%	16%	17%	BELGIUM	2%	2%	2%
BULGARIA	11%	12%	13%	BULGARIA	7%	7%	7%	BULGARIA	4%	4%	4%
CROATIA	20%	17%	19%	CROATIA	9%	7%	8%	CROATIA	4%	4%	4%
CYPRUS	18%	18%	18%	CYPRUS	7%	7%	7%	CYPRUS	4%	4%	4%
CZECH REPUBLIC	33%	34%	35%	CZECH REPUBLIC	15%	16%	15%	CZECH REPUBLIC	6%	6%	7%
DENMARK	16%	17%	20%	DENMARK	6%	7%	7%	DENMARK	1%	1%	1%
ESTONIA	32%	31%	31%	ESTONIA	18%	17%	16%	ESTONIA	8%	8%	8%
FINLAND	32%	32%	32%	FINLAND	16%	17%	16%	FINLAND	4%	4%	4%
FRANCE	24%	25%	25%	FRANCE	11%	12%	12%	FRANCE	2%	2%	2%
GERMANY	29%	31%	30%	GERMANY	11%	11%	11%	GERMANY	3%	3%	3%
GREECE	27%	28%	30%	GREECE	20%	19%	23%	GREECE	5%	5%	5%
HUNGARY	27%	28%	28%	HUNGARY	13%	13%	13%	HUNGARY	3%	3%	3%
IRELAND	39%	40%	40%	IRELAND	23%	24%	24%	IRELAND	3%	3%	3%
ITALY	15%	15%	15%	ITALY	7%	7%	7%	ITALY	1%	1%	1%
LATVIA	9%	8%	10%	LATVIA	6%	6%	4%	LATVIA	2%	2%	3%
LIECHTENSTEIN	44%	35%	35%	LIECHTENSTEIN	19%	14%	14%	LIECHTENSTEIN	2%	1%	1%
LITHUANIA	28%	29%	31%	LITHUANIA	13%	14%	15%	LITHUANIA	6%	7%	7%
LUXEMBOURG	34%	34%	35%	LUXEMBOURG	15%	15%	15%	LUXEMBOURG	1%	1%	1%
MALTA	59%	58%	63%	MALTA	15%	16%	16%	MALTA	12%	12%	13%
NETHERLANDS	51%	52%	51%	NETHERLANDS	28%	28%	28%	NETHERLANDS	4%	4%	4%
NORWAY	30%	28%	30%	NORWAY	15%	14%	15%	NORWAY	3%	3%	3%
POLAND	28%	27%	27%	POLAND	11%	10%	10%	POLAND	6%	6%	6%
PORTUGAL	20%	20%	21%	PORTUGAL	17%	15%	15%	PORTUGAL	3%	2%	2%

ROMANIA	12%	12%	12%
SLOVAKIA	39%	38%	40%
SLOVENIA	20%	20%	20%
SPAIN	28%	30%	30%
SWEDEN	19%	19%	18%
UNITED KINGDOM	20%	19%	21%

ROMANIA	7%	7%	7%
SLOVAKIA	17%	16%	17%
SLOVENIA	9%	8%	8%
SPAIN	12%	13%	13%
SWEDEN	7%	7%	7%
UNITED KINGDOM	13%	13%	14%

ROMANIA	3%	3%	3%
SLOVAKIA	6%	6%	6%
SLOVENIA	4%	4%	4%
SPAIN	3%	4%	4%
SWEDEN	3%	2%	2%
UNITED KINGDOM	1%	1%	1%

Life insurance undertakings

Risk Margin as % SCR				Risk Margin as % Own Funds				Risk Margin as % BEL			
Country	Q1	Q2	Q3	Country	Q1	Q2	Q3	Country	Q1	Q2	Q3
AUSTRIA	17%	18%	18%	AUSTRIA	11%	11%	12%	AUSTRIA	1%	1%	1%
BELGIUM	21%	23%	23%	BELGIUM	16%	17%	16%	BELGIUM	1%	2%	1%
BULGARIA	18%	24%	24%	BULGARIA	8%	8%	7%	BULGARIA	3%	5%	6%
CROATIA	15%	16%	14%	CROATIA	5%	5%	5%	CROATIA	2%	2%	2%
CYPRUS	30%	30%	25%	CYPRUS	11%	12%	9%	CYPRUS	4%	4%	2%
CZECH REPUBLIC				CZECH REPUBLIC				CZECH REPUBLIC			
DENMARK	6%	7%	10%	DENMARK	1%	2%	3%	DENMARK	0%	0%	0%
ESTONIA	48%	48%	48%	ESTONIA	28%	28%	26%	ESTONIA	8%	9%	9%
FINLAND	35%	35%	36%	FINLAND	20%	20%	21%	FINLAND	3%	3%	3%
FRANCE	27%	28%	28%	FRANCE	16%	16%	16%	FRANCE	1%	1%	1%
GERMANY	48%	51%	47%	GERMANY	23%	25%	24%	GERMANY	2%	2%	2%
GREECE	29%	29%	43%	GREECE	21%	23%	45%	GREECE	2%	2%	2%
HUNGARY	32%	34%	38%	HUNGARY	15%	15%	14%	HUNGARY	2%	2%	2%
IRELAND	49%	51%	50%	IRELAND	26%	27%	27%	IRELAND	2%	2%	2%
ITALY	22%	23%	22%	ITALY	10%	12%	13%	ITALY	1%	1%	1%
LATVIA				LATVIA				LATVIA			
LIECHTENSTEIN	59%	46%	47%	LIECHTENSTEIN	40%	29%	28%	LIECHTENSTEIN	1%	1%	1%
LITHUANIA	48%	48%	47%	LITHUANIA	23%	22%	22%	LITHUANIA	18%	20%	19%
LUXEMBOURG	45%	44%	45%	LUXEMBOURG	26%	26%	27%	LUXEMBOURG	1%	1%	1%
MALTA	43%	43%	43%	MALTA	15%	15%	14%	MALTA	2%	2%	2%
NETHERLANDS	76%	78%	76%	NETHERLANDS	46%	42%	43%	NETHERLANDS	4%	4%	4%
NORWAY	78%	72%	75%	NORWAY	65%	52%	53%	NORWAY	4%	4%	3%
POLAND	43%	43%	42%	POLAND	12%	13%	12%	POLAND	5%	5%	6%
PORTUGAL	33%	27%	30%	PORTUGAL	21%	17%	18%	PORTUGAL	1%	1%	1%
ROMANIA	27%	27%	28%	ROMANIA	9%	9%	9%	ROMANIA	2%	2%	2%

SLOVAKIA	67%	48%	47%
SLOVENIA			
SPAIN	45%	47%	45%
SWEDEN	23%	22%	20%
UNITED KINGDOM	22%	20%	23%

SLOVAKIA	34%	26%	27%
SLOVENIA			
SPAIN	20%	21%	21%
SWEDEN	8%	8%	7%
UNITED KINGDOM	15%	14%	17%

SLOVAKIA	12%	9%	9%
SLOVENIA			
SPAIN	3%	3%	3%
SWEDEN	2%	2%	2%
UNITED KINGDOM	1%	1%	1%

Non-life insurance undertakings

Risk Margin as % SCR				Risk Margin as % Own Funds				Risk Margin as % BEL			
Country	Q1	Q2	Q3	Country	Q1	Q2	Q3	Country	Q1	Q2	Q3
AUSTRIA	6%	6%	6%	AUSTRIA	2%	2%	2%	AUSTRIA	7%	7%	7%
BELGIUM	26%	30%	31%	BELGIUM	14%	17%	18%	BELGIUM	11%	11%	12%
BULGARIA	10%	11%	11%	BULGARIA	6%	7%	6%	BULGARIA	4%	5%	4%
CROATIA	12%	6%	13%	CROATIA	7%	3%	7%	CROATIA	7%	4%	7%
CYPRUS	9%	8%	8%	CYPRUS	4%	3%	3%	CYPRUS	5%	5%	5%
CZECH REPUBLIC	9%	10%	12%	CZECH REPUBLIC	5%	5%	7%	CZECH REPUBLIC	4%	4%	5%
DENMARK	18%	20%	23%	DENMARK	8%	9%	9%	DENMARK	4%	4%	4%
ESTONIA	9%	9%	9%	ESTONIA	4%	4%	4%	ESTONIA	4%	4%	4%
FINLAND	26%	27%	27%	FINLAND	12%	12%	12%	FINLAND	7%	7%	7%
FRANCE	23%	22%	22%	FRANCE	9%	9%	9%	FRANCE	7%	7%	7%
GERMANY	24%	25%	28%	GERMANY	8%	8%	10%	GERMANY	4%	4%	4%
GREECE	16%	17%	17%	GREECE	11%	11%	12%	GREECE	6%	6%	6%
HUNGARY	10%	14%	15%	HUNGARY	6%	8%	8%	HUNGARY	6%	8%	8%
IRELAND	15%	15%	15%	IRELAND	9%	9%	9%	IRELAND	4%	4%	4%
ITALY	20%	20%	20%	ITALY	12%	12%	12%	ITALY	5%	5%	5%
LATVIA	9%	8%	10%	LATVIA	7%	6%	4%	LATVIA	4%	3%	4%
LIECHTENSTEIN	17%	18%	11%	LIECHTENSTEIN	5%	5%	3%	LIECHTENSTEIN	6%	8%	4%
LITHUANIA	12%	12%	14%	LITHUANIA	8%	7%	8%	LITHUANIA	6%	5%	6%
LUXEMBOURG	19%	18%	18%	LUXEMBOURG	8%	7%	7%	LUXEMBOURG	6%	6%	6%
MALTA	13%	14%	17%	MALTA	6%	9%	10%	MALTA	5%	4%	4%
NETHERLANDS	13%	13%	13%	NETHERLANDS	6%	7%	6%	NETHERLANDS	4%	4%	4%
NORWAY	14%	12%	14%	NORWAY	7%	6%	7%	NORWAY	7%	7%	7%
POLAND	20%	18%	18%	POLAND	9%	8%	8%	POLAND	8%	7%	7%
PORTUGAL	14%	15%	16%	PORTUGAL	10%	10%	10%	PORTUGAL	4%	4%	5%
ROMANIA	9%	8%	9%	ROMANIA	7%	7%	7%	ROMANIA	3%	3%	3%

SLOVAKIA			
SLOVENIA	10%	11%	12%
SPAIN	17%	17%	17%
SWEDEN	15%	16%	15%
UNITED KINGDOM	19%	23%	21%

SLOVAKIA			
SLOVENIA	4%	4%	5%
SPAIN	9%	9%	8%
SWEDEN	7%	7%	7%
UNITED KINGDOM	12%	14%	13%

SLOVAKIA			
SLOVENIA	10%	10%	11%
SPAIN	7%	7%	7%
SWEDEN	7%	7%	7%
UNITED KINGDOM	6%	7%	6%

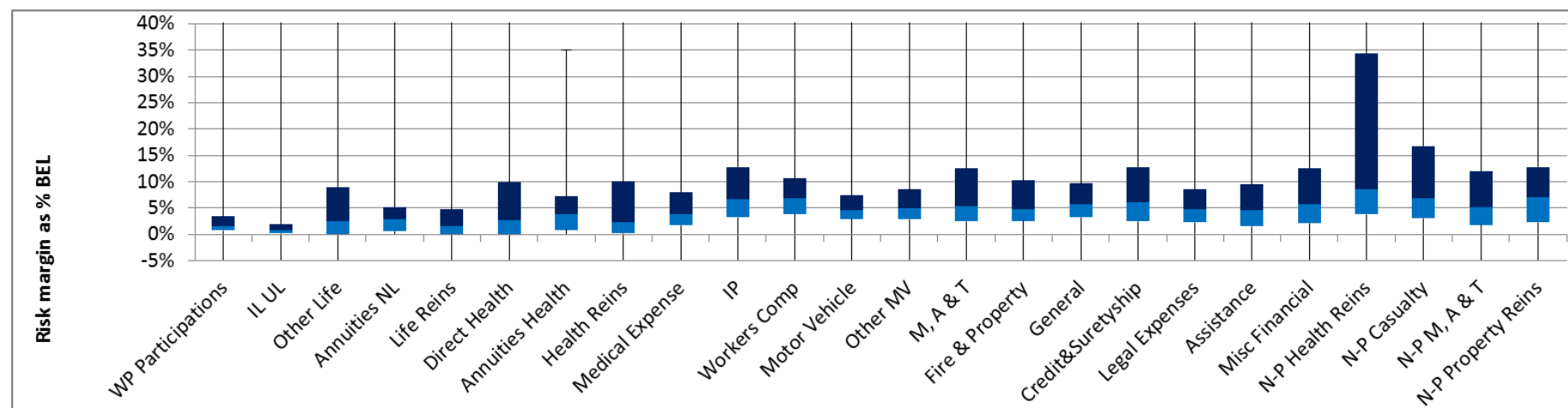
Undertakings that pursue life and non-life insurance activities simultaneously

Risk Margin as % SCR				Risk Margin as % Own Funds				Risk Margin as % BEL			
Country	Q1	Q2	Q3	Country	Q1	Q2	Q3	Country	Q1	Q2	Q3
AUSTRIA	40%	38%	37%	AUSTRIA	20%	19%	19%	AUSTRIA	5%	4%	4%
BELGIUM	28%	29%	28%	BELGIUM	16%	15%	17%	BELGIUM	2%	2%	2%
BULGARIA	25%	27%	28%	BULGARIA	14%	15%	17%	BULGARIA	5%	3%	3%
CROATIA	23%	22%	22%	CROATIA	9%	9%	9%	CROATIA	4%	4%	4%
CYPRUS	17%	17%	28%	CYPRUS	5%	5%	9%	CYPRUS	7%	7%	5%
CZECH REPUBLIC	34%	35%	36%	CZECH REPUBLIC	15%	16%	16%	CZECH REPUBLIC	6%	7%	7%
DENMARK				DENMARK				DENMARK			
ESTONIA	69%	66%	62%	ESTONIA	55%	44%	41%	ESTONIA	12%	12%	11%
FINLAND	48%	47%	47%	FINLAND	31%	32%	30%	FINLAND	4%	4%	4%
FRANCE	23%	25%	25%	FRANCE	11%	12%	12%	FRANCE	1%	1%	1%
GERMANY	4%	9%	9%	GERMANY	1%	3%	3%	GERMANY	6%	6%	6%
GREECE	32%	33%	33%	GREECE	23%	21%	26%	GREECE	5%	5%	5%
HUNGARY	29%	29%	28%	HUNGARY	13%	14%	13%	HUNGARY	3%	3%	3%
IRELAND	57%	58%	60%	IRELAND	38%	40%	41%	IRELAND	18%	19%	19%
ITALY	13%	13%	13%	ITALY	6%	6%	6%	ITALY	1%	1%	1%
LATVIA	8%	8%	8%	LATVIA	6%	6%	5%	LATVIA	1%	1%	1%
LIECHTENSTEIN			52%	LIECHTENSTEIN			24%	LIECHTENSTEIN			23%
LITHUANIA	35%	37%	41%	LITHUANIA	11%	13%	16%	LITHUANIA	3%	4%	4%
LUXEMBOURG	43%	45%	47%	LUXEMBOURG	13%	12%	13%	LUXEMBOURG	4%	5%	5%
MALTA	87%	73%	77%	MALTA	16%	16%	17%	MALTA	21%	21%	22%
NETHERLANDS	30%	29%	31%	NETHERLANDS	17%	17%	19%	NETHERLANDS	7%	6%	7%
NORWAY	36%	38%	37%	NORWAY	18%	19%	18%	NORWAY	3%	3%	3%
POLAND				POLAND				POLAND			
PORTUGAL	19%	19%	20%	PORTUGAL	18%	17%	16%	PORTUGAL	4%	3%	3%
ROMANIA	10%	10%	11%	ROMANIA	7%	6%	6%	ROMANIA	4%	3%	4%

SLOVAKIA	33%	37%	38%	SLOVAKIA	14%	15%	16%	SLOVAKIA	5%	5%	5%
SLOVENIA	24%	23%	23%	SLOVENIA	11%	10%	10%	SLOVENIA	4%	4%	4%
SPAIN	29%	31%	31%	SPAIN	12%	13%	13%	SPAIN	3%	3%	3%
SWEDEN	20%	20%	19%	SWEDEN	6%	6%	6%	SWEDEN	1%	1%	1%
UNITED KINGDOM	16%	14%	15%	UNITED KINGDOM	11%	9%	10%	UNITED KINGDOM	3%	3%	2%

Dispersion of risk margin by line of business

2806. With regard to the ratio of the risk margin and the best estimate the following graph shows the dispersion of ratios across undertakings for different lines of business. For each line of business the bottom of the box correspond to the 25% quantile and the top to the 75% quantile of the distribution of ratios. The median of the distribution is indicated by the change of colour of the box.



41. Annex to chapter 18 – EEA (re)insurance undertakings used to derive beta factor

Undertaking	Country
Admiral Group plc	United Kingdom
AEGON N.V.	Netherlands
Ageas SA/NV	Belgium
Allianz SE	Germany
Alm. Brand A/S	Denmark
Aon plc	United Kingdom
April Société Anonyme	France
ASR Nederland N.V.	Netherlands
Assicurazioni Generali S.p.A.	Italy
Assiteca S.p.A.	Italy
Aviva plc	United Kingdom
AXA SA	France
Beazley plc	United Kingdom
Charles Taylor plc	United Kingdom
Chesnara plc	United Kingdom
CNP Assurances SA	France
Coface SA	France
Curtis Banks Group plc	United Kingdom
Delta Lloyd NV	Netherlands
Direct Line Insurance Group PLC	United Kingdom
esure Group plc	United Kingdom
Euler Hermes Group SA	France
Europejskie Centrum Odszkodowan Spółka Akcyjna	Poland
Gjensidige Forsikring ASA	Norway
Grupo Catalana Occidente, S.A.	Spain
Hastings Group Holdings plc	United Kingdom
Helios Underwriting Plc	United Kingdom
Insplanet AB	Sweden
Insr Insurance Group ASA	Norway
Jardine Lloyd Thompson Group plc	United Kingdom

KD Group, finančna družba, d. d.	Slovenia
Lancashire Holdings Limited	United Kingdom
Legal & General Group Plc	United Kingdom
Mapfre, S.A.	Spain
Net Insurance S.p.A.	Italy
NN Group N.V.	Netherlands
Novae Group Plc	United Kingdom
NÜRNBERGER Beteiligungs-Aktiengesellschaft	Germany
Old Mutual plc	United Kingdom
Personal Group Holdings Plc	United Kingdom
Phoenix Group Holdings	Channel Islands
Poste Italiane SpA	Italy
Powszechny Zakład Ubezpieczeń Spółka Akcyjna	Poland
Protector Forsikring ASA	Norway
Prudential plc	United Kingdom
Rheinland Holding AG	Germany
RSA Insurance Group plc	United Kingdom
Saga plc	United Kingdom
Sampo Oyj	Finland
Silesia One S.A.	Poland
Società Cattolica di Assicurazione - Società Cooperativa	Italy
St. James's Place plc	United Kingdom
Standard Life plc	United Kingdom
Storebrand ASA	Norway
Talanx AG	Germany
Topdanmark A/S	Denmark
Tryg A/S	Denmark
Unipol Gruppo Finanziario S.p.A.	Italy
UnipolSai Assicurazioni S.p.A.	Italy
UNIQA Insurance Group AG	Austria
Vienna Insurance Group AG	Austria
Vittoria Assicurazioni S.p.A.	Italy
Votum Spółka Akcyjna	Poland
WDB Brokerzy Ubezpieczeniowi Spółka Akcyjna	Poland

Wüstenrot & Württembergische AG	Germany
Zavarovalnica Triglav, d.d.	Slovenia