Technical Specifications

Quantitative Assessment of Further Work on Solvency of IORPs

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1.   Introduction

I.0.1   This document contains the technical specifications for the Quantitative Assessment of Further Work on Solvency of Institutions for Occupational Retirement Provision (IORPs). In the following text, this will be referred to as the "assessment". EIOPA is conducting this assessment on its own initiative.

I.0.2   The aim of the assessment is to facilitate the technical advice to the European Commission on EU solvency rules for IORPs which EIOPA intends to provide on its own initiative by March 2016.

I.0.3   The assessment is to be carried out between mid-May and mid-August 2015. The deadline for IORPs to provide the data to national supervisory authorities (NSAs) is set to 10 August 2015.

I.0.4   All documents necessary to participate in this assessment are available on EIOPA's website: https://eiopa.europa.eu/.

I.0.5   The technical specifications will also be used for the IORP stress test 2015[1].

1.1.   Background

I.1.1.   The assessment is the next step of the further work by EIOPA on solvency of IORPs. It follows the Quantitative Impact Study (QIS) on IORPs, which EIOPA conducted as part of its work following from the Call for Advice from the European Commission[2] and the consultation EIOPA performed between 13 October 2014 and 13 January 2015[3] on its own initiative.

I.1.2.   The QIS on IORPs raised a number of issues regarding definitions and methodologies for establishing the holistic balance sheet. Moreover, it did not specify possible EU-wide supervisory frameworks that could underlie the holistic balance sheet. EIOPA committed in the QIS on IORPs final report[4] to seek to resolve these matters.

I.1.3.   The outcomes of the QIS on IORPs therefore showed that further work is needed before a European prudential regime based on the holistic balance sheet can be devised. The holistic balance sheet aims to achieve a market-consistent and risk-based approach, providing an objective and transparent view of the financial situation of IORPs and promoting proper risk management, including sound asset and liability management techniques. The outcomes of the QIS also made clear that in order to reflect the nature of IORPs across all Member States, a methodology like the holistic balance sheet is needed that allows for the specificities of occupational pension provision.

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[1] See EIOPA, IORP Stress Test 2015 Specifications, EIOPA-BoS-15/072v2, 11 May 2015.

[2] European Commission, Call for Advice from the European Insurance and Occupational Pensions Authority (EIOPA) for the Review of Directive 2003/41/EC (IORP II), 30 March 2011.

[3] EIOPA Consultation Paper on Further Work on Solvency of IORPs, EIOPA-CP-14/040, 13 October 2014.

[4] EIOPA, Report on QIS on IORPs, EIOPA-BoS-13/124, 4 July 2013.

I.1.4.   EIOPA also concluded in its final report on the IORP QIS that it was not yet in a position to fully assess the practicality of the holistic balance sheet. IORP QIS introduced and tested a number of new concepts and approaches and, as expected, considerable practical difficulties were encountered. In many cases it was not possible to satisfactorily resolve issues that were identified before and during the IORP QIS. Moreover, a full assessment of a comprehensive supervisory framework would have required the definition of supervisory responses.

I.1.5.   The European Commission noted in May 2013 that further technical information is needed before taking a decision on any European initiative on solvency of IORPs.[5] EIOPA, on its own initiative, committed to undertake further work to resolve these matters. This work, including this assessment, is not related to the Commission's proposal for a revision of the IORP Directive, adopted on 27 March 2014.

I.1.6.   EIOPA identified a number of areas where further work would be necessary in order to better specify or bring more clarity on elements of the holistic balance sheet, and on the use that could be made of the holistic balance sheet.

1.2.   EIOPA Consultation Paper on Further Work on Solvency of IORPs

I.2.1.   The consultation paper addressed possible improvements of the technical specifications for valuing the holistic balance sheet and considered various elements for specifying the underlying supervisory framework. Six examples of supervisory frameworks were discussed, which had been selected as representing a broad range of possibilities.

I.2.2.   EIOPA received stakeholder responses to the consultation paper from 77 respondents, including EIOPA's Occupational Pensions Stakeholder Group (OPSG). EIOPA would like to thank all stakeholders for providing their feedback to the consultation paper.

High-level overview of responses

I.2.3.   The respondents appreciated that the consultation paper seriously considers the issues raised during the QIS on IORPs and takes into account suggestions made by stakeholders. At the same time, most respondents questioned whether EIOPA should proceed with its work on the holistic balance sheet. According to stakeholders, there is insufficient justification for EIOPA to continue the work on its own initiative, since the European Commission decided not to include solvency rules in its IORP II proposal. According to stakeholders, additional solvency rules are unnecessary, since members and beneficiaries are already protected by national prudential regimes and social and labour law, and will even be harmful by deterring occupational pension

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[5] European Commission, Occupational Pension Funds (IORP): Next Steps, Memo/13/454, 23 May 2013.

provision by employers and discouraging long-term investments by IORPs.

I.2.4. Most respondents concluded that the holistic balance sheet is not suitable to establish solvency capital requirements. One reason is that the holistic balance sheet already includes all security and benefit adjustment mechanisms, which means that IORPs will have no other measures at their disposal to restore compliance with the solvency requirement. Therefore, most respondents preferred the holistic balance sheet to be used – if at all – as a risk management tool. However, it was also stated that more effective instruments for risk management are available, such as ALM models and the risk evaluation for pensions in the IORP II proposal. There were strong and diverging views on the public disclosure of the risk assessment either emphasising the adverse consequences for sponsoring employers or the benefits for IORPs as institutional investors.

I.2.5. Respondents generally agreed with the proposals to take a more principle-based approach to the valuation of the holistic balance sheet, especially in the area of sponsor support, as pension arrangements vary widely between member states and between IORPs within member states. Moreover, the need was stressed to apply the holistic balance sheet in a proportionate manner, especially for small- and medium-sized IORPs. As such, stakeholders welcomed the possibility to value certain items on the holistic balance sheet as a balancing item. However, respondents also pointed out that a principle-based approach and simplifications may be incompatible with the aim of the holistic balance sheet to enhance transparency, because they were reducing the comparability and quality of valuations.

Publication of responses and reasoned feedback

I.2.6. Twelve stakeholders out of the 77 requested their response to remain confidential. All non-confidential responses to the consultation paper have been made available on EIOPA's website[6]. The reasoned feedback on the responses to questions 1-71 of the consultation paper, which deal with valuation, have also been published together with these technical specifications[7]. The reasoned feedback limits itself to the comments and suggestions made relating to the valuation of the holistic balance sheet.

I.2.7. The reasoned feedback on the general comments provided by stakeholders as well as on section 5 (questions 72 – 111) of the consultation paper, which addresses supervisory responses, will be published together with the technical advice to the European Commission. The focus of the technical advice to the European Commission will be on supervisory responses and the possible uses of the holistic balance sheet. Therefore, postponing the reasoned feedback on these parts of the stakeholder responses will allow

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[6] See https://eiopa.europa.eu/Pages/Consultations/Consultation-Paper-on-Further-Work-on-Solvency-of-IORPs-(CP-14040).aspx
[7] See EIOPA, Resolutions on Comments on Consultation Paper on Further Work on Solvency of IORPs – EIOPA-CP-14/040 – Q1-Q71, EIOPA-BoS-15/095, 11 May 2015.

EIOPA to align it with the content of the advice.

I.2.8.   EIOPA will not only consider stakeholder responses to the part of the consultation paper relating to supervisory responses, but may also revisit stakeholder responses to the part relating to valuation when drafting the advice to the European Commission.

1.3.   Objective of the assessment

I.3.1.   The objective of the assessment is to collect data to facilitate the technical advice to the European Commission on EU solvency rules for IORPs which EIOPA intends to provide on its own initiative by March 2016.

I.3.2.   This assessment contains additional testing compared to the previous QIS on IORPs. It will provide quantitative information about the six examples of supervisory frameworks included in the EIOPA consultation paper. It will also provide information about the practicality of the approaches presented in the consultation paper which were not included in the QIS on IORPs, like new methodologies for determining sponsor support. In addition, the quantitative information it will provide will be based on more up-to-date market data than the QIS on IORPs. All this information will be considered when drafting the technical advice to the European Commission.

I.3.3.   The assessment does not pre-empt any decisions on the content of the technical advice of EIOPA to the European Commission, in particular on the items to be included on or the possible uses of the holistic balance sheet, or on the confidence level that could be part of a possible future prudential framework for IORPs.

I.3.4.   The assessment does not include any proposals for transitional measures or grandfathering. EIOPA acknowledges that there might be a need for such measures, if a harmonised risk-based prudential framework based on the holistic balance sheet was introduced. But the design of such measures will depend to a large extent on the choices made with regard to the implementation of such a framework.

1.4.   Scope and process

Scope

I.4.1.   The assessment will limit itself to assessing the potential impact of a possible prudential regime based on the holistic balance sheet on the financial requirements for IORPs providing schemes which include any guarantees to members and beneficiaries. This implies that:

•   IORPs providing only pure defined contribution schemes (i.e. that do not provide any guarantees to the participants) will not be included in the assessment.

•   The assessment will not constitute a broad impact assessment of all costs and benefits which a possible future European prudential framework for

IORPs may have. However, the costs and benefits will be considered when drafting the technical advice to the European Commission.

Participation

I.4.2.   Member states can participate in the assessment on a voluntary basis. The assessment may be performed by IORPs and insurance undertakings that apply part of the IORP Directive in accordance with Article 4 of the IORP Directive.

I.4.3.   EIOPA encourages IORPs to participate in the assessment, in order to achieve outcomes which are as representative as possible and based on the most comprehensive information which is available.

Questions and Answers

I.4.4.   The NSAs will coordinate the assessment in their member states. Participating IORPs have to direct questions on the technical specifications and the accompanying spreadsheets to their respective NSA.

I.4.5.   The NSAs will forward questions of general relevance on the technical specifications to EIOPA as well as potential errors in spreadsheets. Questions with regard to the use of any spreadsheet may be answered by the NSAs themselves direct, if they are able to do so.

I.4.6.   EIOPA will put in place a questions-and-answer procedure (Q&A) to ensure consistency of responses to questions raised during the assessment. A Q&A document will be published on EIOPA's website, which EIOPA intends to update once every week.

Validation

I.4.7.   IORPs will have to submit the completed spreadsheets and word-templates to their NSA no later than 10 August 2015. The NSAs will validate the data submissions and will follow up with IORPs if inconsistencies are discovered.

I.4.8.   The NSAs will submit the spreadsheets and word-templates to EIOPA by 24 August. The data provided by individual IORPs will be validated at EIOPA by a validation team, consisting of a limited number of EIOPA staff and of NSAs of participating member states, to ensure consistency of outcomes between and within member states. Moreover, the validation team will analyse the data and prepare figures and tables for presentation of outcomes.

I.4.9.   The validation team will refer any issues or questions with regard to the data to the relevant NSAs, which will follow up with IORPs where necessary. The validation team will not directly contact the participating IORPs.

I.4.10.   EIOPA has a process in place for ensuring confidentiality of all[8] data collected and stored by EIOPA for the purpose of the assessment. These data will only be used for the purpose of the assessment. Only the members of the

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[8] This includes data referring to the IORP's sponsor(s).

validation team will be granted access to the data that are submitted to EIOPA by an NSA, subject to strict confidentiality and security protocols. The data will not be accessible to staff/representatives of any other organisations.

Report

I.4.11. The outcomes of the assessment will be reported together with the EIOPA technical advice to the European Commission. The data will be presented in aggregated form, which means that figures will be grossed up to a national level. In addition to this aggregated data, distributions of outcomes may also be published.

I.4.12. No data will be published which can be linked to individual IORPs. This also implies that no aggregate country-specific data will be published, if such data reveals information about individual IORPs. This would, for example, be the case when only a few IORPs of a member state participate in the assessment.

1.5. Purpose of technical specifications

I.5.1. The purpose of these technical specifications is to provide IORPs completing the assessment with guidance and prescriptions to value the holistic balance sheet and calculate the solvency capital requirement (SCR).

IORP stress test 2015

I.5.2. These technical specifications also provide guidance and prescription in valuing the holistic balance sheet for the DB/hybrid part of the IORP stress test 2015. The baseline scenario in the stress test is the same as the first baseline of the quantitative assessment, i.e. the holistic balance sheet valued on a risk free basis and including all security and benefit adjustment mechanisms.

I.5.3. The IORP stress test does not include the calculation of the SCR. This means that only section 2 on valuation is relevant for the stress test and not section 3 on the SCR and section 4 on the MCR. For calculating the longevity stress scenario in the IORP stress test, though, the same methodology as described in section 3 for the calculation of the SCR for longevity risk is used.

1.6. Practical approach to the quantitative assessment

Holistic balance sheet

I.6.1. This assessment is based on the holistic balance sheet put forward by EIOPA in its advice to the European Commission[9]. The holistic balance sheet illustrates the overall funding of IORPs by comparing the different components of liabilities (mainly technical provisions) and the solvency capital requirement with the different components of assets the IORP might

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[9] EIOPA, EIOPA's Advice to the European Commission on the review of the IORP Directive 2003/41/EC, EIOPA-BoS-12/015, 15 February 2012.

have available (mainly financial assets, sponsor support and pension protection schemes).

I.6.2.   These technical specifications for the holistic balance sheet have been developed starting from the technical specifications for the IORP QIS. The main amendments refer to issues presented in the EIOPA Consultation Paper on Further Work on Solvency of IORPs and to changes which occurred in the provisions for Solvency II since the IORP QIS.

I.6.3.   The holistic balance sheet allows for the security and benefit adjustment mechanisms IORPs dispose of, e.g. conditional and mixed benefits, benefit adjustment mechanisms, sponsor support and pension protection schemes. The security and benefit adjustment mechanisms may, insofar as applicable in a specific example of a supervisory framework, impact on the valuation of the holistic balance sheet as well as the calculation of the solvency capital requirement (SCR).

I.6.4.   Very often the use and value of security and benefit adjustment mechanisms will depend on the IORP's financial situation. For example:

- The IORP is expected to pay more benefits when it has more assets at its disposal, if these benefits are conditional on the IORP's financial position.

- The sponsor is expected to pay more contributions in the future when the IORP has fewer assets to cover liabilities, if it is required to supplement shortfalls.

- A pension protection scheme is expected to contribute less to secure benefits when the IORP's financial situation is more favourable.

I.6.5.   Security and benefit adjustment mechanisms will lower the SCR by absorbing losses incurred by the IORP in a stress situation. In other words, they act as a substitute for financial capital. In a scenario with adverse demographic and capital market developments the value of future benefits - subject to adjustments - will decline and/or the value of sponsor contributions will rise. These changes in value should be taken into account in the calculation of the capital requirement.

I.6.6.   Sponsor support does not only act as a risk-mitigating mechanism, but also poses a risk for IORPs. The creditworthiness of the sponsor may deteriorate, which would reduce the expected value of future contributions. Exposure to sponsor default risk increases the SCR. A pension protection scheme acts as a risk-mitigating mechanism by providing cover in case of sponsor default.

I.6.7.   IORPs that are eligible to use the balancing item approach in the valuation of sponsor support should not include sponsor support in the calculation of the SCR for counterparty default risk.

Six examples of a possible future prudential framework

I.6.8.   The assessment will produce data for the six examples of a supervisory

framework presented in EIOPA's consultation paper.[10] The following table[11] gives an overview of those examples:

Table 5.1: Overview of examples of supervisory frameworks						
EXAMPLES	**1**	**2**	**3**	**4**	**5**	**6**
HOLISTIC BALANCE SHEET						
Security mechanisms						
- legally enforceable sponsor support	yes	yes	yes	yes	no	
- non-legally enforceable sponsor support	yes	yes	no	yes	no	
- pension protection schemes	no	no	yes	yes	no	
Benefit adjustment mechanisms						
- pure conditional benefits	yes	yes	yes	yes	yes	
- mixed benefits	yes	no	no	no	yes	
- ex ante benefit reductions	yes	yes	yes	yes	yes	
- ex post benefit reductions	no	no	no	yes	no	
- reductions in case of sponsor default	no	no	no	yes	no	
Risk margin cost-of-capital	yes	yes	yes	yes	yes	
SCR AND TIERING OF ASSETS (INCL. SECURITY MECHANISMS)						
Solvency Capital Requirement (SCR)	yes	yes	yes	yes	MS	minimum funding requirements and valuation standards according to current IORP Directive
Discount rate: Level A / Level B	L. A	L. B	L. A	L. A	L. A	
Supervisory action [a]	RP	RP	RP	RP	RP	
Recovery period [b]	< 1 y	MS-PL	MS-PL	MS-SLL	MS-PL	
Additional requirements by MS [c]	n/a	PL	n/a	n/a	n/a	
TIERING OF FINANCIAL ASSETS						
Liabilities to be covered with financial assets						
- pure conditional benefits	yes	yes	yes	yes	yes	
- mixed benefits	yes	no	no	no	yes	
- pure discretionary benefits	no	no	no	no	no	
- ex ante benefit reductions	yes	no	yes	no	yes	
- ex post benefit reductions	no	no	no	no	no	
- reductions in case of sponsor default	no	no	no	no	no	
Risk margin cost-of-capital	yes	no	no	no	yes	
Discount rate: Level A / Level B	L. A	L. B	L. B	L. B	L. A	
Supervisory action [a]	RP	RP	RP	RP	RP	
Recovery period [b]	< 1 y	MS-PL	MS-PL	MS-SLL	MS-PL	
Additional requirements by MS [c]	n/a	PL	PL	SLL	PL	
RISK MANAGEMENT TOOL						
HBS part of pillar 2 requirements	-	-	yes	-	yes	yes
- all security and benefit adjustment mechanisms	-	-	yes	-	yes	yes
- SCR	-	-	no	-	yes	yes

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[10] See sections 5.3 and 5.4 of EIOPA Consultation Paper on Further Work on Solvency of IORPs, EIOPA-CP-14/040, 13 October 2014.

[11] See EIOPA Consultation Paper on Further Work on Solvency of IORPs, EIOPA-CP-14/040, 13 October 2014, page 115.

Two baseline scenarios

I.6.9.   EIOPA has endeavoured to keep the assessment as practical as possible and to limit the number of calculations that IORPs will have to perform. IORPs are requested to calculate two baseline scenarios, as compared to eighteen scenarios in the QIS on IORPs.

I.6.10.   In the two baseline scenarios IORPs have to value the holistic balance sheet including all available security mechanisms, types of benefits and benefit reduction mechanisms. In addition, IORPs have to calculate the solvency capital requirement (SCR) relating to these holistic balance sheets. In practice, the latter means that IORPs have to value stressed balance sheets after applying the shocks of the different (sub-)modules in the SCR standard formula.

I.6.11.   The two baseline scenarios differ with respect to discount rate curves used to value the items on the holistic balance sheet:

1. The risk free discount rate curve in scenario 1.

2. The expected return on assets in scenario 2.

Adjustments to the risk free discount rate curve

I.6.12.   EIOPA has consistently recommended that a risk-free discount rate should take into account the long-term nature of liabilities of IORPs. Therefore, adjustments to the risk-free discount rate similar to those provided for the long-term liabilities of insurance undertakings could be considered for IORPs, such as the volatility adjustment and the matching adjustment.

I.6.13.   IORPs are not being asked to assess a full scenario, i.e. valuation of the holistic balance sheet and calculation of the SCR, using the risk free interest rate including the volatility adjustment or matching adjustment. Instead, IORPs should establish only the best estimate of technical provisions using these adjustments (as far as they are applicable) under baseline scenario 1. Although both adjustments are not mandatory for insurance undertakings, and are only applicable subject to certain conditions and/or the approval of the supervisory authority or the member state, all IORPs are requested to perform this calculation on a best-effort basis.

I.6.14.   This calculation is meant to give an impression of the possible impact of applying the adjustments to the risk free discount rate curve. Among the reasons for not requiring in this assessment the calculation of the full holistic balance sheet using these adjustments are:

• The assessment should be manageable and practical and the burden on

IORPs should be limited.

- The application of the volatility adjustment and matching adjustment is not mandatory, so even a more comprehensive calculation would only give a rough impression of the actual impact.

- Depending on the methodologies used for preparing the holistic balance sheet, there could be technical difficulties in modelling the effects of applying adjustments to the risk free discount rate curve.

Current IORP systems and supervisory frameworks

I.6.15.   The valuation of the holistic balance sheet in the two baseline scenarios should be consistent with existing national IORP systems and national prudential regulation, i.e. the valuation should not take into account possible changes in trigger points and supervisory responses.

I.6.16.   EIOPA would like to emphasise that this does not imply that the values of items on the holistic balance sheet will be the same as similar items on national prudential balance sheets. It does imply, though, that the cash flows relating to security and benefit adjustments should be consistent with existing pension arrangements and supervisory regimes.

I.6.17.   The timing of sponsor payments is often determined by national funding targets – i.e. the level of technical provisions that has to be covered with financial assets – and recovery periods.

I.6.18.   The first two (of three) simplifications (see I.7.9) provided for the valuation of unlimited sponsor support all assume that sponsors restore any shortfall with respect to the value of technical provisions included in the holistic balance sheet - hence not the national value of technical provisions – within the average duration of the liabilities. The third simplification links the period for contributions to an approximate assessment of what the sponsor can afford. These methods are approximations of the timing of sponsor payments only.

Providing data for six examples of supervisory frameworks

I.6.19.   The reporting spreadsheet will automatically derive the examples of supervisory frameworks which were presented in the consultation paper from the results of the two baseline scenarios. The balance sheets in examples 1 - 5 (as well as the stressed balance sheets for the SCR calculations) can be constructed on the basis of the two baseline scenarios by excluding the relevant security and benefit adjustment mechanisms. However, EIOPA will also be able to analyse possible modifications to these examples by using the values of the different items on the holistic balance sheet in the two baseline scenarios as building blocks. It is assumed that the holistic balance sheet used for risk management purposes in examples 3, 5 and 6 is identical with the one in baseline scenario 1, so no additional calculation has to be performed with regard to this.

I.6.20. IORPs may consider that a separate calculation of an example is conceptually more suitable than deriving the six examples from the two baseline scenarios (the "baseline approach"), because excluding particular security or benefit adjustment mechanisms will affect the values of other items on the holistic balance sheet. Reasons for this may include:

1. The supervisory frameworks in the six examples may have different funding targets and/or recovery periods and, hence, the distribution of cash-flows relating to security and benefit adjustment mechanisms over time would also differ between examples.

2. There may be interdependencies of items on the asset and liabilities side of the holistic balance sheet.[12] In case an item is excluded from the holistic balance sheet, there may be "corresponding items", for which a corresponding exclusion or adjustment may be appropriate in order to avoid a misstatement of the actual financial situation of the IORP and an inadequate setting of trigger points in the holistic balance sheet.

3. The granting of certain types of benefits (e.g. conditional/mixed benefits, like indexation of benefits) may depend on information provided by the holistic balance sheet (e.g. a "funding ratio"). This means that the modelling of these types of benefits may be different, leading to different values, depending on which items are recognised on the holistic balance sheet.

4. Exclusion of certain items may lead to a different SCR which does have an impact on the risk margin. This impact is not taken into account when deriving the examples of a supervisory framework from the baseline scenarios.

I.6.21. Deriving an example from the two baseline scenarios does not allow for such timing differences, corresponding items or dependent granting of benefits.

I.6.22. If IORPs think that a separate calculation of the holistic balance sheets for all or some of the examples is conceptually more suitable they are invited to do this separate calculation, in addition to providing the data for the two baseline scenarios, and report the outcomes in the sheets Example 1 "alternative", etc. which are provided for this purpose in the reporting spreadsheet. It may be helpful to consider the descriptions of the examples provided in the EIOPA consultation paper[13].

I.6.23. All IORPs, including those that use the baseline approach only, are asked in

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[12] An example for this is the exclusion of mixed benefits: If mixed benefits are excluded from the "complete" holistic balance sheet, this makes the financial situation of the IORP appear better. However, it could be that the value of sponsor support included on the asset side of the holistic balance sheet is linked (fully or partially) to the provision of mixed benefits of the IORP, so not the complete value of sponsor support may be available to cover the benefits included in the holistic balance sheet after exclusion of mixed benefits. In general, it may be difficult to determine the amount of a "corresponding adjustment", and also whether such an adjustment is required, since this may even be contract-specific.

[13] See sections 5.3 and 5.4 of EIOPA Consultation Paper on Further Work on Solvency of IORPs, EIOPA-CP-14/040, 13 October 2014.

the qualitative questionnaire whether they think a separate calculation would be conceptually more suitable. As a consequence, IORPs that are only using the baseline approach will still be able to indicate whether separate valuations for the examples would have materially enhanced the reliability of outcomes. Using the baseline approach only will therefore not be interpreted as consent with this approach.

I.6.24. The data provided by those IORPs which do not only use the baseline approach could be used to examine if, and in which cases, these two approaches actually deliver materially different outcomes.

Balancing item approach

I.6.25. EIOPA recognises that the holistic balance sheet may, dependent on the characteristics of a pension scheme and the set-up of the holistic balance sheet, include an element that will always ensure that the IORP will meet its capital requirements, i.e. will always 'balance the holistic balance sheet'. This could be the case because this element can in all cases provide additional assets to cover technical provisions and the capital requirements, or because this element can in all cases decrease the technical provisions to such a level that the available assets can cover the (amended) technical provisions and capital requirements. In these cases, EIOPA considers that applying a balancing item approach would be appropriate.

I.6.26. Under the balancing item approach, the value of the element at hand would simply be the required value in order to equal the assets to technical provisions on the holistic balance sheet and the required value to accomplish full loss-absorbency in the SCR calculation. Considering that this method can only be used for elements that can always 'balance the holistic balance sheet', the value thus calculated is equal to the best estimate that would be the result of a full valuation of the element. The balancing item approach would therefore render the market-consistent value of the element.

I.6.27. There are several elements that could, under specific circumstances, serve as a balancing item:

- Unlimited, legally enforceable sponsor support provided by a strong sponsor;

- Unlimited, legally enforceable sponsor support provided by a sponsor that is supported by a pension protection scheme that covers 100% of benefits (or where there is a pension protection scheme that covers <100% but the reduction in benefits is accounted for in the valuation of the holistic balance sheet), if the pension protection scheme is included on the holistic balance sheet by means of impacting the default rate of the sponsor;[14]

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[14] This specific type of (potential) balancing item will not be tested in this assessment, since the baseline approach requires all elements of the holistic balance sheet to be separately valued, in order to derive certain examples of supervisory frameworks. Therefore, the baseline approach implies that only one individual element can serve as a balancing item, which could be, dependent on the national or IORP

- A pension protection scheme that covers 100% of benefits (or a pension protection scheme that covers <100% but the reduction in benefits is accounted for in the valuation of the holistic balance sheet[15]) and is valued separately (from sponsor support) on the holistic balance sheet;

- Unlimited benefit reductions. This could be ex ante benefit reductions, ex post benefit reductions, or benefit reductions in case of sponsor default.

I.6.28. The holistic balance sheet can be balanced only "once", and in case there are different mechanisms available which may in principle act as a balancing item, only the ultimate balancing item can be valued using the balancing item approach. All other elements[16] would then have to be valued in accordance with regular valuation methods.

I.6.29. Whether or not an element can in a specific case be valued using the balancing item approach depends on the characteristics of the element. The section in these technical specifications on the valuation of the holistic balance sheet specifies the conditions which must be met for an element to qualify as a balancing item.

1.7. Overview technical specifications

Valuation holistic balance sheet

I.7.1. As a first step in the assessment, IORPs are asked to perform the valuation of the various components of the holistic balance sheets in the "baseline approach" or in further holistic balance sheets calculated separately: technical provisions, sponsor support, pension protection schemes, recoverables from (re)insurance and other assets and liabilities.

I.7.2. The technical specifications put forward the general method to value the best estimate of technical provisions by calculating the probability weighted average of the discounted value of future cash flows. They contain general guidance with respect to the principles and the assumptions used in such stochastic valuation, such as with regard to behaviour of boards of IORPs, members and sponsors.

I.7.3. The technical specifications discuss the way future cash flows should be determined for the calculation of the best estimate of technical provisions. They include a definition of "contract boundaries" which is based on the one included in the EIOPA consultation paper, but amended following stakeholder comments.

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specifics and under the restriction that they need to fulfil the conditions, either sponsor support, a pension protection scheme that covers 100% of benefits or a benefit reduction mechanism.

[15] This specific type of balancing item will not be tested in this assessment, for the same reasons as mentioned in footnote 14.

[16] An example of this could be if there is a combination of unlimited, legally enforceable sponsor support and a pension protection scheme that covers 100% of benefits. In case sponsor support and the pension protection scheme are separately recognised on the holistic balance sheet, both elements could in theory be eligible for applying the balancing item approach. However, as the pension protection scheme would be the last mechanism to be used, in this case sponsor support should be valued in accordance with other valuation methods.

I.7.4. The specifications for the valuation of the best estimate of technical provisions also contain more elaborate definitions of pure conditional, mixed and pure discretionary benefits as well as benefit reduction mechanisms, in line with further work undertaken by EIOPA.

I.7.5. More elaborate rules for calculation of the risk margin using the cost of capital approach are included, to encourage IORPs to not only use the simplification which sets the risk margin to 8% of the best estimate of technical provisions.

I.7.6. The valuation of sponsor support follows a principle based approach, as presented in the EIOPA consultation paper.

I.7.7. The balancing item approach presented in the EIOPA consultation paper for valuation of sponsor support, pension protection schemes and benefit adjustment mechanisms is also included, which may be applied by IORPs subject to certain conditions. In addition, in relation to sponsor support, IORPs are requested to provide additional data in order for EIOPA to analyse the results and possible refinement of the conditions for the balancing item in more detail.

I.7.8. IORPs which do not satisfy the conditions to use the balancing item approach for (unlimited) sponsor support will have to value it explicitly. The principles for the valuation of sponsor support specify that IORPs should take into account the default probability of the sponsor and the maximum amount of support that the sponsor is able to afford. IORPs are provided with a more elaborate set of possibilities to establish the default probability of the sponsor, instead of just the credit-rating approach in the QIS on IORPs. Moreover, only broad principles for the calculation of the maximum amount of sponsor support are specified, supporting an IORP- and member states specific assessment.

I.7.9. The technical specifications put forward three simplifications for the valuation of unlimited sponsor support compared to two in the QIS on IORPs. The third simplification is based on the Alternative Simplified Approach (ASA) put forward in the consultation paper. The simplifications may be used by IORPs which do not wish or are not able to perform their own principle-based valuation.

Solvency capital requirement

I.7.10. As a second step in the assessment, IORPs are asked to perform the calculation of the solvency capital requirement in the two baseline scenarios. The technical specifications prescribe the risks that should be considered and how the capital requirements relating to these risks should be established. The stresses and correlations relating to the risks are based on Solvency II, which uses a confidence level of 99.5%.

I.7.11. The following risk modules are distinguished: operational risk, market risk, counterparty default risk (including default risk of the sponsor) and pension

liability risk. The market module can be subdivided into specific risks relating to the IORP's investment portfolio. A significant simplification compared to the QIS on IORPs is that the pension liability module only consists of the longevity risk sub-module. The sub-modules for mortality risk, disability-morbidity risk, expenses risk, revision risk, benefit option risk and catastrophe risk are not part of the basic request. However, IORPs that consider, in consultation with their respective NSA, that these sub-modules represent important risks may include them in the calculation of the SCR. The same holds true for the intangible assets risk module. The specifications for the intangible asset risk module and the six pension liability sub-modules are included in Annex 5 and Annex 6.

I.7.12.   IORPs will first have to calculate gross capital requirements for SCR (sub-)modules. IORPs will have to value complete stressed balance sheets for the market- and pension liability risk (sub-)modules without taking into account the loss-absorbing capacity of technical provisions, sponsor support and pension protection schemes. Subsequently, IORPs will also have to value the stressed holistic balance sheets for those (sub-)modules including the loss absorbing capacity of technical provisions, sponsor support and pension protection schemes in order to determine the (net) SCR. In the counterparty default and operational risk modules, IORPs will not have to value a complete stressed holistic balance sheet, but will have to determine a gross SCR using the formulas provided in these technical specifications and then allocate the loss absorbing capacity to items on the holistic balance sheet[17]. This way it will be possible to derive the gross and net SCRs for the examples of a supervisory framework from the two baseline scenarios.

I.7.13.   The calculation of loss absorbing capacity has been simplified compared to the QIS on IORPs, to better reflect situations where a loss absorbing capacity (e.g. of sponsor support) is related to the IORP as a whole, not to the absorption of certain risks. In those cases, a calculation of a stressed holistic balance sheet including the loss absorbing capacity of security and adjustment mechanisms and technical provisions for every (sub-)module is not required. Other changes in the SCR calculation compared to the QIS on IORPs have been made to reflect the changes which occurred in Solvency II since the QIS on IORPs.

I.7.14.   The SCR equity risk sub-module takes into account the so-called "symmetric adjustment". The "duration-based equity risk sub-module"[18] is not included in the quantitative part of this assessment. A question is included in the qualitative questionnaire asking IORPs to provide an estimate of the potential impact of the application of the duration-based equity risk sub-module on the SCR.

I.7.15.   The minimum capital requirement (MCR) is determined in this assessment

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[17] If the IORP decides to include the intangible asset risk sub-module then it has to allocate the loss absorbing capacity to items on the holistic balance sheet also for this sub-module.
[18] See Article 304 of Directive 2009/138/EC.

using a simplification, where the MCR equals 35% of the net SCR.

1.8. Proportionality and simplifications

I.8.1. IORPs may adopt simplifications for the valuation of the holistic balance sheet or the calculation of the SCR when these simplifications are proportionate to the nature, scale and complexity of the underlying risk.

I.8.2. Simplifications are provided in these technical specifications and further simplifications can be adopted by IORPs as long as it is appropriate to do so and a description of the simplifications used can be provided by the IORPs (see Annex 4 for an overview of possible simplifications). It should be emphasised that excluding a particular risk (sub-)module in the SCR calculation is also considered to be a simplification that may be used where appropriate. The technical specifications are the same for every member state participating in the assessment. However, some elements of the technical specifications will not be relevant for IORPs in some member states, but have been included because they are relevant in other member states. In addition, the degree of materiality of many of the issues included within the specifications will vary depending on the nature of IORPs in member states.

I.8.3. IORPs should perform two steps to determine the proportionality of a simplification.

Step 1: Nature, scale and complexity of underlying risks

I.8.4. The assessment of nature, scale and complexity of underlying risks serves as a guide to identify where simplified methods are likely to be appropriate. The assessment should include:

- for the purpose of valuing the holistic balance sheet all risks which materially affect the amount or timing of cash flows;

- for the purpose of calculating the SCR all risks that are included in the SCR formula.

I.8.5. The nature and complexity of risks – including the impact of future management actions and behaviour of members/beneficiaries and sponsors – determines the level of sophistication and expertise needed to value the items on the holistic balance sheet. In this respect, it is important to establish whether risks have a significant asymmetric impact on cash flows of pension obligations and sponsor support, in particular if pension schemes contain embedded options like caps and floors. If this is the case, a stochastic valuation may be more suitable than a deterministic valuation.

I.8.6. The measurement of scale allows IORPs to distinguish between 'small' and 'large' or material and non-material risks. It provides a threshold below which it would be justifiable not to take into account certain risks. IORPs need to compare the size of risks against a benchmark – such as contributions or technical provisions – to assess the scale of risks in relative terms.

<u>Step 2: Establish that model-error is not material</u>

I.8.7. IORPs are not required to quantify the degree of model error, or to re-calculate the value of the components of the holistic balance sheet or the value of the SCR using a more accurate method in order to demonstrate that the difference between the result of the chosen method and the result of a more accurate method is immaterial. Instead, it is sufficient if there is reasonable assurance that the model error implied by the application of the chosen method (and hence the difference between those two amounts) is immaterial. The particular situation of an assessment like this, which usually requires a lower degree of accuracy than financial and supervisory reporting, may be taken into account in the assessment.

I.8.8. Time, costs and unavoidable model-error: It should be recognised that time available to complete the assessment is limited. IORPs are requested to perform the calculations on a best effort basis and may have to apply simplifications that result in material model error due to time constraints.

I.8.9. IORPs may have to choose methods and simplifications that lead to material model-errors due to a lack of resources. For example, IORPs may apply a deterministic valuation method where a stochastic method seems more suitable. The latter is very time consuming and potentially costly, especially when the IORP does not already have the necessary data and modelling infrastructure in place.

I.8.10. IORPs may have to make assumptions which are uncertain or conjectural and cannot be validated due to data deficiencies.

1.9. Assessment package

I.9.1. Together with these technical specifications EIOPA will publish the following documents / spreadsheets on its website to assist IORPs with completing the assessment:

- Input spreadsheet – IORPs are requested to enter the results of their calculations under the two baseline scenarios in this spreadsheet. The spreadsheet will not only collect data, but also perform some of the calculations, such as adding up the individual capital charges using the relevant correlation matrices and deriving the examples of a supervisory framework that were included in the consultation paper.

- Helper tabs - These spreadsheets assist IORPs in valuing sponsor support and pension protection schemes using the simplifications, establishing the risk margin and calculating the capital requirement for concentration risk, spread risk, counterparty default risk and longevity risk.

- Interest rate and inflation curves – The basic risk-free interest rate curves and inflation curves are necessary in the valuation of the holistic balance sheet. The yield curve spreadsheet also provides the stressed interest rate and inflation curves to calculate the SCR for interest rate risk. Interest rate and inflation curves are included for the currencies of

each participating member state. The relevant risk-free interest rate curves including the volatility adjustment t are needed for the analysis of the impact of this adjustment on the best estimate of technical provisions. The fundamental spreads for the purpose calculating the matching adjustment are contained in a separate spreadsheet file.

- Qualitative questionnaire - The questionnaire allows IORPs to provide their assessment of the quality of inputs and results, the methodology of the assessment, the practicability of the calculations involved and the use of simplifications. In addition, IORPs will be invited to provide a qualitative assessment of the impact of the six examples of supervisory frameworks.

2.   Valuation holistic balance sheet

2.1.   Valuation date

HBS.1.1   The reporting date to be used by all participants should be end December 2014. If data is not available at this date, then a suitable roll forward method should be used from the date of the most recent available data. If IORPs are unsure as to how to do this, they should contact their NSA.

2.2.   General principle for valuations

HBS.2.1   As a general principle, the best estimate of technical provisions as well as the value of sponsor support should correspond to the probability weighted average of discounted future cash flows in possible future scenarios.

2.3.   Segmentation

HBS.3.1   IORPs in different Member States and even IORPs in the same Member State may offer pension schemes covering different sets of risks. Therefore it is appropriate for each IORP to define the homogenous risk group and the level of granularity most appropriate for their IORP and in the manner needed to derive appropriate assumptions for the calculation of the best estimate.

HBS.3.2   For the purpose of this assessment pension obligations should be segmented into two segments.

- Pure defined contribution obligations

- All other obligations

HBS.3.3   The segment "other obligations" should include all obligations arising out of schemes/contracts which provide any guarantees to members and beneficiaries.

HBS.3.4   The purpose of segmentation of pension obligations is to achieve an accurate valuation of technical provisions. For example, in order to ensure that appropriate assumptions are used, it is important that the assumptions are derived at the level of homogeneous risk groups to avoid introducing distortions which might arise from combining dissimilar schemes / contracts.

HBS.3.5   IORPs may manage their obligations in more granular homogeneous risk groups than the proposed minimum segmentation where it achieves a more accurate valuation of technical provisions. Pension obligations should be allocated in a way that best reflects the nature of the underlying risks. In particular, the principle of substance over form should be followed for the allocation. In other words, the segmentation should reflect the nature of the risks underlying the scheme / contract (substance), rather than the legal form of the scheme / contract (form).

2.4. Best estimate of technical provisions: principles and assumptions

Principles

HBS.4.1   The best estimate of technical provisions should be valued on a market consistent basis. IORPs are asked to carry out two calculations for the technical provisions with different discount rates.

     i.   Firstly, discounting future cash flows using the risk free interest curve (Level A), which includes an analysis of possible adjustments to the risk free rate following application of the matching or volatility adjustment.

     ii. Secondly discounting future cash flows using the expected return on assets (Level B).

HBS.4.2   No adjustment to take account of the own credit standing of the IORP should be made.

HBS.4.3   The best estimate should correspond to the probability weighted average of future cash in- and outflows taking account of the time value of money.

HBS.4.4   Therefore, the best estimate calculation should allow for the uncertainty in the future cash-flows. The calculation should consider the variability of the cash flows in order to ensure that the best estimate represents the mean of the distribution of cash flow values. Allowance for uncertainty does not suggest that additional margins should be included within the best estimate.

HBS.4.5   The best estimate is the average of the outcomes of all possible scenarios, weighted according to their respective probabilities. Although, in principle, all possible scenarios should be considered, it may not be necessary, or even possible, to explicitly incorporate all possible scenarios in the valuation of the liability, nor to develop explicit probability distributions in all cases, depending on the type of risks involved and the materiality of the expected financial effect of the scenarios under consideration. Moreover, it is sometimes possible to implicitly allow for all possible scenarios, for example using explicit formulae.

HBS.4.6   Cash-flow characteristics that should, in principle and where relevant, be taken into consideration in the application of the valuation technique include the following (non-exhaustive list):

a) Uncertainty in the timing, frequency and magnitude of benefit payments;

b) Uncertainty in member and sponsor behaviour;

c) Uncertainty in contributions.

HBS.4.7   The calculation of the best estimate should be based on actuarial and statistical techniques which appropriately reflect the risks that affect the

cash-flows. This may include simulation methods, deterministic techniques and analytical techniques.

HBS.4.8   The best estimate should be calculated gross, without deduction of the amounts recoverable from (re)insurance contracts and special purpose vehicles. Recoverables from (re)insurance should be calculated separately.

Simplification

HBS.4.9   For the purpose of this quantitative assessment, in cases where cash-flows are not available or a calculation based on those cash-flows is considered to be too burdensome a simplification can be used to determine the best estimate of technical provisions. For example the best estimate of technical provisions can be determined based on the duration of the corresponding obligations.

Assumptions consistent with information provided by financial markets

HBS.4.10   In order to calculate the best estimate and solvency requirements of the IORP in line with the general principle for valuation, assumptions consistent with information about or provided by financial markets shall be made, including:

- relevant risk-free interest rate term structure;

- currency exchange rates;

- market inflation rates (consumer price index or sector inflation); and

- economic scenario files (ESF).

HBS.4.11   When IORPs derive assumptions on future financial market parameters or scenarios, they should be able to demonstrate that the choice of the assumptions is appropriate and consistent with the valuation principles set out in subsection 2.11.

HBS.4.12   Where the IORP uses a model to produce future projections of market parameters (market consistent asset model, e.g. an economic scenario file), such model should comply with the following requirements:

i.   it generates asset prices that are consistent with deep, liquid and transparent financial markets;

ii. it assumes no arbitrage opportunity;

iii. the calibration of the parameters and scenarios is consistent with the relevant risk-free rate term structure used to calculate the best estimate.

HBS.4.13   The following principles should be taken into account in determining the appropriate calibration of a market consistent asset model:

a) The asset model should be calibrated to reflect the nature and term of the liabilities, in particular of those liabilities giving rise to significant

guarantee and option costs;

b) The asset model should be calibrated to the current risk-free term structure used to discount the cash flows;

c) The asset model should be calibrated to a properly calibrated volatility measure.

HBS.4.14 In principle, the calibration process should use market prices only from financial markets that are deep, liquid and transparent. If the derivation of a parameter is not possible by means of prices from deep, liquid and transparent markets, other market prices may be used. In this case, particular attention should be paid to any distortions of the market prices. Corrections for the distortions should be made in a deliberate, objective and reliable manner.

HBS.4.15 A financial market is deep, liquid and transparent, if it meets the requirements:

a) a large number of assets can be transacted without significantly affecting the price of the financial instruments used in the replications (deep);

b) assets can be easily bought and sold without causing a significant movement in the price (liquid);

c) current trade and price information are normally readily available to the public, in particular to the undertakings (transparent).

HBS.4.16 The calibration of the above mentioned assets models may also be based on adequate actuarial and statistical analysis of economic variables provided they produce market consistent results. For example:

a) To establish the appropriate correlations between different asset returns;

b) To determine probabilities of transitions between credit quality steps and default of corporate bonds;

c) To determine property volatilities. As there is virtually no market in property derivatives, it is difficult to derive property implied volatility. Thus the volatility of a property index may often be used instead of property implied volatility.

Assumptions consistent with generally available data on pension technical risks

HBS.4.17 Generally available data refers to a combination of:

- Internal data;

- External data sources such as industry or market data.

HBS.4.18 Internal data refers to all data which is available from internal sources. Internal data may be either:

- IORP-specific data;

- Pension scheme/contract-specific data.

HBS.4.19　All relevant available data whether external or internal, should be taken into account in order to arrive at the assumption which best reflects the characteristics of the underlying portfolio of pension obligations. In the case of using external data, only the data to which the IORP can reasonably be expected to have access to should be considered.

HBS.4.20　The extent to which internal data is taken into account should be based on:

- The availability, quality and relevance of external data;

- The amount and quality of internal data.

HBS.4.21　Where IORPs use data from an external source, they should derive assumptions on risks that are based on that data according to the following requirements:

a) IORPs are able to demonstrate that the use of data from an external source is more suitable than the use of data which are exclusively available from an internal source; and

b) IORPs know the origin of the data and the assumptions or methodologies used to process that data;

c) IORPs identify any trends in the data from an external source and the variation, over time or across data, of the assumptions or methodologies in the use of the data;

d) IORPs are able to demonstrate that the assumptions and methodologies referred to in points b) and c) appropriately reflect the characteristics of the portfolio of pension obligations.

Members/beneficiaries or sponsor behaviour

HBS.4.22　IORPs are required to identify members/beneficiaries or sponsor behaviour where it impacts on the calculation of the best estimate of technical provisions.

HBS.4.23　IORPs may exclude any allowance for members/beneficiaries or sponsor behaviour if they consider it would be immaterial.

HBS.4.24　Any assumptions made by IORPs with respect to the likelihood that members/beneficiaries or sponsor will exercise contractual options, should be realistic and based on current and credible information. The assumptions should take account, either explicitly or implicitly, of the impact that future changes in financial and non-financial conditions may have on the exercise of those options.

HBS.4.25　Assumptions about the likelihood that members/beneficiaries or sponsor will exercise contractual options should be based on analysis of past

members/beneficiaries or sponsor behaviour and a prospective assessment of expected members/beneficiaries or sponsor behaviour.

IORP management actions

HBS.4.26 The methods and techniques for the estimation of future cash-flows, and hence the assessment of the provisions for pension liabilities, should take account of potential future management actions by the IORP.

HBS.4.27 For the purpose of this quantitative assessment, IORPs may exclude any allowance for management actions if they consider they would be immaterial.

HBS.4.28 Assumed future management actions should be realistic and consistent with the IORPs current business practice and business strategy and take due account of possible correlations with the financial position of the IORP. If there is sufficient evidence that the IORP will change its practices or strategy, the assumed future management actions should be consistent with the changed practices or strategy.

HBS.4.29 Assumed future management actions should be consistent with each other.

HBS.4.30 IORPs should not assume that future management actions would be taken that would be contrary to their obligations towards members/beneficiaries or sponsor or to legal provisions applicable to the IORPs. The assumed future actions should take account of any public indications by the IORP as to the actions that it would expect to take, or not take in the circumstances being considered.

HBS.4.31 Assumptions about future management actions should take account of the time needed to implement the actions and any expenses caused by them. IORPs should be able to verify that assumptions about future management actions are realistic through:

1) a comparison of assumed future management actions with actions actually taken previously by the IORP;

2) a comparison of future management actions taken into account in the current and past calculations of the best estimate;

3) an assessment of the impact of changes in the assumptions of future management actions on the value of the technical provisions.

Expert judgement

HBS.4.32 IORPs should choose assumptions based on the expertise of persons with relevant knowledge, experience and understanding of the risks inherent in the pension business thereof (expert judgement). In certain circumstances expert judgement may be necessary when calculating the best estimate, among other:

- in selecting the data to use, correcting its errors and deciding the treatment of outliers or extreme events;

- in adjusting the data to reflect current or future conditions, and adjusting external data to reflect the IORPs features or the characteristics of the relevant portfolio of pension obligations;

- in selecting the time period of the data;

- in selecting realistic assumptions;

- in selecting the valuation technique or choosing the most appropriate alternatives existing in each methodology;

- in incorporating appropriately to the calculations the environment under which the IORPs have to run its business.

2.5. Best estimate of technical provisions: methodology for calculation

Cash-flow projections

HBS.5.1 Cash-flow projections should reflect expected realistic future demographic, legal, medical, technological, social or economic developments over the lifetime of the pension obligations (see HBS.10.42 ff. for the inclusion of inflation and salary increases).

HBS.5.2 Mortality tables may differ between IORPs as mortality rates are different between member states as well as between different IORPs, given the individual structure of the population of members and beneficiaries. However, the cash-flow projections should be based on appropriate and recent mortality tables and include a future trend in mortality rates.

HBS.5.3 The cash-flow projections used in the calculation of the best estimate should be made separately for each contract or pension obligation. Where the separate calculation for each obligation would be an undue burden on the IORP, it may carry out the projection by grouping obligations, provided that the grouping complies with the following requirements:

a) There are no significant differences in the nature and complexity of the risks underlying the obligations that belong to the same group;

b) The grouping of obligations does not misrepresent the risk underlying the contracts and does not misstate their expenses;

c) The grouping of obligations is likely to give approximately the same results for the best estimate calculation as a calculation on a per contract basis, in particular in relation to financial guarantees and contractual options included in the obligations.

HBS.5.4 In certain specific circumstances, the best estimate element of technical provisions may be negative (e.g. for some individual obligations under some types of IORP). This is acceptable and IORPs should not set to zero the value of the best estimate with respect to those individual contracts.

Time horizon

HBS.5.5   The projection horizon used in the calculation of best estimate should cover the full lifetime of all the cash in- and out-flows required to settle the obligations related to existing pension schemes / contracts on the date of the valuation, unless an accurate valuation can be achieved otherwise.

HBS.5.6   The determination of the lifetime of pension obligations should be based on up-to-date and credible information and realistic assumptions about when the existing pension obligations will be discharged or cancelled or expired.

HBS.5.7   IORPs may not be able to perform stochastic valuations of non-unconditional benefits over the full lifetime of the pension obligations due to model restrictions. In that case IORPs may apply simplifications with regard to the projection horizon, and are requested to provide an explanation of the simplification in the qualitative questionnaire.

Benefits and contributions to be included in cash flows[19]

HBS.5.8   For IORPs/schemes where obligations of the IORP to pay benefits are only established following payments of contributions to the IORP/scheme, cash flows to be included in the calculation of technical provisions should be determined as follows:

1. All cash-flows relating to obligations of the IORP relating to current members and beneficiaries shall be recognised in the calculation of technical provisions, unless otherwise stated below. Apart from the cases described below, obligations shall include those obligations relating to current members and beneficiaries which result from contributions received by the IORP after the valuation date.

2. Any cash-flows relating to obligations of the IORP relating to contributions received by the IORP after any of the following dates shall not be recognised in technical provisions:

   a. The future date where the IORP has a unilateral right or obligation to terminate the agreement with the plan sponsor and/or the plan members to provide the pension benefits as agreed between plan sponsor and plan members;

   b. The future date where the IORP has a unilateral right or obligation to reject additional contributions;

   c. The future date where the IORP has a unilateral right or obligation to amend the contributions payable after this date or the benefits related to those contributions in such a way that the contributions fully reflect the risks related to them and the related benefits; or

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[19] In the Consultation Paper on Further Work on Solvency of IORPs the term "contract boundaries" was used in reference to the definitions for determining what benefits and contributions should be included in the cash flows underlying the calculation of the best estimate of technical provisions.

d. The future date where the sponsor or sponsors has a unilateral right to terminate future accrual of benefits.

HBS.5.9   For IORPs/schemes where obligations of the IORP to pay benefits are established independently from payments of contributions to the IORP, cash flows to be included in the calculation of technical provisions should be determined as follows:

1. All cash-flows relating to obligations of the IORP relating to current members and beneficiaries shall be recognised in the calculation of technical provisions unless otherwise stated below. Apart from the cases described below, obligations shall include those obligations relating to current members and beneficiaries which are established after the valuation date. Any contributions which are directly linked to the financing of certain obligations established after the valuation date shall also be recognised in technical provisions, unless otherwise stated below.

2. Any cash-flows relating to obligations established after any of the following dates shall not be recognised in technical provisions:

   a. The future date where the IORP has a unilateral right or obligation to terminate the agreement with the plan sponsor and/or the plan members to provide the pension benefits as agreed between plan sponsor and plan members;

   b. The future date where the IORP has a unilateral right or obligation to reject the establishment of additional obligations;

   c. In cases where contributions are directly linked to the financing of certain obligations established after the valuation date, the future date where the IORP has a unilateral right or obligation to amend those contributions or those obligations to fully reflect the risk; or

   d. The future date where the sponsor or sponsors has a unilateral right to terminate future accrual of benefits.

HBS.5.10   Depending on the specifications in HBS.5.8 and HBS.5.9 above, cash flows to be included in the calculation of technical provisions on the holistic balance sheet may only include accrued benefits the IORP is obliged to pay, whereas the IORP conducts a valuation based on a going concern assumption. In that case IORPs may apply simplifications to determine the proportion of adjustment and security mechanisms that are attributable to accrued benefits and are requested to provide an explanation of any material simplifications in the qualitative questionnaire.

Expenses

HBS.5.11   In determining the best estimate, the IORP should take into account all cash flows arising from expenses that will be incurred in servicing all future obligations related to existing pension schemes/contracts.

HBS.5.12　Simplifications may be used where expenses borne by IORPs are not material. For the purpose of this quantitative assessment expenses borne by the employer should be disregarded.

HBS.5.13　Expenses in respect of (re)insurance contracts and special purpose vehicles should be taken into account in the gross calculation of the best estimate. IORPs should split expenses between existing pension schemes/contracts and possible future schemes/contracts, while only the former should be included in the best estimate of technical provisions.

HBS.5.14　Expenses should include both allocated and overhead expenses. Allocated expenses are those expenses which could be directly assignable to the source of expense that will be incurred in servicing pension obligations. Overhead expenses comprise all other expenses which the IORP incurs in servicing pension obligations.

HBS.5.15　Overhead expenses should be allocated in a realistic and objective manner and on a consistent basis over time to the parts of the best estimate to which they relate.

HBS.5.16　IORPs should consider their own analysis of expenses and any relevant data from external sources such as average industry or market data.

HBS.5.17　Assumptions with respect to future expenses arising from commitments made on or prior to the date of valuation have to be appropriate and take into account the type of expenses involved. IORPs should ensure that expense assumptions allow for future changes in expenses and such an allowance for inflation is consistent with the economic assumptions made. Future expense cash flows are usually assumed to vary with assumed rates of general level of expense inflation in a reasonable manner.

HBS.5.18　Relevant market data needs to be used to determine expense assumptions which include an allowance for future cost increase. Furthermore, expense inflation must be consistent with the types of expenses being considered.

HBS.5.19　Any assumptions about the expected cost reduction should be realistic, objective and based on verifiable data and information.

HBS.5.20　For the assessment of the future expenses, IORPs should take into account all the expenses that are directly related to the on-going administration of obligations related to existing pension schemes/contracts, together with a share of the relevant overhead expenses. Overhead expenses should be split between existing and future schemes/contracts based on recent analyses of the operations of the business and the identification of appropriate expense drivers and relevant expense apportionment ratios. Cash flow projections should include, as cash out-flows, the recurrent overheads attributable to the existing business at the calculation date of the best estimate.

HBS.5.21　In order to determine which expenses best reflect the characteristics of the underlying portfolio and to ensure that the technical provisions are

calculated in a reliable and objective manner, IORPs should consider the appropriateness of both market consistent expenses and IORP specific expenses. If sufficiently reliable, market consistent expenses are not available participants should use IORP-specific information to determine expenses that will be incurred in servicing pension obligations provided that the IORP-specific information is assessed to be appropriate.

HBS.5.22   Expenses that are determined by contracts between the IORP and third parties have to be taken into account based on the terms of the contract.

Pure conditional, mixed and pure discretionary benefits

HBS.5.23   Three types of non-unconditional benefits should be valued separately for this quantitative assessment exercise:

1. pure conditional benefits;

2. mixed benefits; and

3. pure discretionary benefits.

HBS.5.24   'Pure conditional benefits' are benefits which are granted based on certain "objective" conditions without a realistic discretionary power of the IORP to deviate from that policy. This means that pure conditional benefits have a payoff that can be objectively linked to some observable realisation. The following examples of pure conditional benefits may illustrate the concept:

a) Benefits that are granted on the basis of legally or contractually established policies which only contain certain "objective" conditions;

b) Benefits that are legally or contractually based on the performance of the contract or the IORP;

c) Benefits that are subject to an ex-ante benefit adjustment mechanism, i.e. a mechanism based on a contract concluded beforehand and which describes precisely under which conditions and to which extent adjustments will take place; and

d) Benefits that are granted on the basis of a specified policy of adjusting the accrued benefits without a realistic discretionary power of the IORP to deviate from that policy.

HBS.5.25   'Pure discretionary benefits' are benefits which are only granted based on a "subjective" decision making process. The results of this process are not concluded beforehand, but the fact that there is such a process may be. The granting of those benefits can be based upon financial or demographic developments, but does not have any a-priori link to these developments. Pure discretionary benefits are typically granted by means of a periodical decision of the IORP based on non-formalised criteria. In addition, there is no recurrent practice or expectation of granting those benefits.

HBS.5.26   'Mixed benefits' are benefits that are based on "objective" conditions as part of a "subjective" decision making process. As such, these benefits

combine elements of pure conditional and pure discretionary benefits. Although they often have a specified or perceived policy of adjusting the accrued benefits, they also have a realistic discretionary power to deviate from that policy. The realistic discretionary power is closely linked to the communication to members and beneficiaries, as it must be clear for them that no legal rights can be derived from possible "objective" conditions (for example a specified or perceived policy of adjusting the accrued benefits) to obtain these benefits.

HBS.5.27 The distinction between pure discretionary benefits and mixed benefits on the one hand, and pure conditional benefits on the other hand is determined by the existence of a discretionary decision-making process. Where pure conditional benefits are granted solely on the basis of an objective measure (for example an ex-ante benefit adjustment mechanism), the existence of a discretionary power to grant certain benefits or to deviate from an existing policy to grant benefits qualifies these benefits as either pure discretionary or mixed benefits (dependent on the next characteristic);

HBS.5.28 The distinction between pure discretionary benefits and mixed benefits is determined by whether or not an objective measure (explicit policy), or a series of historical decisions and/or communications from which a pattern can be derived (implicit policy), is available to assist in the discretionary decision-making process. In pure discretionary benefits there is no such explicit or implicit policy to assist the decision-maker and the benefit is granted by means of a one-off decision. In mixed benefits, the decision-maker can use an explicit or implicit policy in the (discretionary) decision-making process, as an indication of the amount of benefits that could be granted based on the actual funding position, and can use the discretionary power to deviate from that policy;.

HBS.5.29 The granting of pure discretionary benefits and mixed benefits is a management/trustee action and assumptions about it should be realistic and verifiable. In particular assumptions about the granting of discretionary benefits should take the relevant and material characteristics of the mechanism for their distribution into account.

HBS.5.30 Similar to pure conditional benefits, pure discretionary benefits, mixed benefits and surplus funds are or can be related to surplus-sharing. The differences can be clarified as follows:

i. surplus funds are specific reserves which are formed of non-distributed surpluses which are (more or less softly) ear-marked to be used to enhance the benefits of members and beneficiaries (by paying e.g. mixed or discretionary benefits), but could also be used for other purposes, e.g. to absorb losses;

ii. mixed benefits are not a type of reserves, but a type of benefits which are granted as a result of an explicit or implicit surplus-sharing policy.

Mixed benefits could be financed from any source, including investment returns. A dedicated reserve, exclusively earmarked for surplus-sharing to members and beneficiaries, that may not be used for any other purpose, could also be formed to fund future mixed benefits;

    iii.   pure discretionary benefits are also a type of benefits, not a type of reserves, which are granted as a result of a pure discretionary decision-making process, without any explicit or implicit surplus-sharing policy, but possibly as a type of surplus-sharing. As for mixed benefits, pure discretionary benefits may or may not be financed through a dedicated reserve.

HBS.5.31   IORPs from the following countries should consider including pure discretionary and mixed benefits on the holistic balance sheet.[20]

Element	Countries
Pure discretionary benefits	BE, DE, FR, IE, IT, MT, NL, PT
Mixed benefits	AT, BE, DE, DK, FR, IT, NL, SI

Valuation requirements for non-unconditional benefits

HBS.5.32   The value of mixed benefits and pure discretionary benefits depends on a wide range of factors, which includes future IORP management actions and sponsor behaviour. Valuing these benefits incorporates some degree of estimation, even when (as may be the case for mixed benefits) the benefits are not only subject to a discretionary decision-making process, but also to a conditionality which would in itself be capable of being objectively modelled. Obtaining a best estimate value includes a level of complexity in the necessary modelling. Furthermore, it may be difficult to model how the discretionary powers of the IORP management / sponsor will be exercised under different future scenarios. For example, past experience may not be a reliable guide for future behaviour.

HBS.5.33   For every non-unconditional benefit, IORPs are required to identify the risk drivers which have the potential to materially affect (directly or indirectly) the value of the benefit. The risk drivers may differ, depending on the nature of the conditions under which the benefits are paid.

HBS.5.34   As a first step, the non-unconditional benefits could be valued separately as if unconditional, in order to provide an upper limit.

HBS.5.35   The best estimate of non-unconditional benefits may be valued by using

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[20] Taken from section 3.3 and 3.4 of EIOPA, Mapping Exercise for Further Work on Solvency of IORPs, EIOPA-14/514, 13 October 2014.

one or more of the following methodologies:

a. a stochastic approach using for instance a market-consistent asset model (includes both closed form and stochastic simulation approaches);

b. a deterministic valuation based on expected cash-flows in cases where this delivers a market-consistent valuation of the technical provision, including the cost of options and guarantees.

HBS.5.36 For the purposes of valuing the best estimate of non-unconditional benefits, a stochastic simulation approach would consist of an appropriate market consistent asset model for projections of asset prices and returns (such as equity prices, fixed interest rate and property returns), together with a dynamic model incorporating the corresponding value of liabilities (incorporating the stochastic nature of any relevant non-financial risk drivers).

HBS.5.37 For the purposes of the stochastic approach, a range of scenarios or outcomes appropriate to both valuing the benefits and the underlying asset mix, together with the associated probability of occurrence should be set. A stochastic approach typically uses a large number of projections (scenarios) with attributed probabilities. The number and type of scenarios are not prescribed but should be set so that a market consistent valuation is determined. The range of scenarios should be sufficiently wide, reflecting the range of possible outcomes.

HBS.5.38 If appropriate, simplifications regarding the projection horizon may be applied because of model restrictions that prohibit stochastic valuations of non-unconditional benefits over the full lifetime of the pension obligations. Simplifications may also be applied to determine the proportion of adjustment and security mechanisms that are attributable to accrued benefits as valuations are conducted based on a going concern assumption, whereas the best estimate on the holistic balance sheet may only include accrued benefits (depending on the contract boundaries).

HBS.5.39 If no marked-to-market model can be defined, the benefit should be marked-to-model and as much market consistent as possible. Assumptions, variables and parameters should be explicitly mentioned and explained.

HBS.5.40 Mixed benefits are subject to a conditionality which, depending on the characteristics of the conditionality, may in itself be capable of being objectively modelled, and to a discretionary decision-making process.

HBS.5.41 Sometimes mixed benefits are very similar to pure discretionary benefits and sometimes they are very close to pure conditional benefits. For example, the discretionary powers may only apply to the timing and the beneficiaries of the mixed benefits.

HBS.5.42 IORPs should take into account the discretionary element of mixed benefits and pure discretionary benefits in their valuation. IORPs are

expected to be able to clarify their assumptions regarding discretionary elements and to be able to explain the way that these elements are incorporated in the valuation. Given their discretionary nature, no methodology for the inclusion of discretionary elements is prescribed. IORPs are allowed to use simplifications in the valuation where appropriate.

HBS.5.43 Where relevant, the assumptions on members' behaviour should be appropriately founded in statistical and empirical evidence, to the extent that it is deemed representative of the future expected behaviour.

HBS.5.44 Appropriate consideration should also be given to an increasing future awareness of policy options as well as members' and beneficiaries' possible reactions to a changed financial position of an IORP. In general, members' and beneficiaries' behaviour should not be assumed to be independent of financial markets, a firm's treatment of customers or publicly available information unless proper evidence to support the assumption can be observed

HBS.5.45 Given the pattern that is visible in the use of discretionary decision-making processes, IORPs may or may not find a correlation between their funding position and the granting of pure discretionary or mixed benefits.

HBS.5.46 Some other examples of characteristics of mechanisms that the IORP will take into account when distributing benefits with a realistic discretionary power are the following. IORPs should consider whether they are relevant and material for the valuation of the benefits and take them into account accordingly, applying the principle of proportionality.

- Allocation to groups: How is a benefit divided between groups of members? What constitutes a homogenous group of members and what are the key drivers for the grouping?

- Severe events: When is an IORP's solvency position so weak that granting the benefits is considered by the IORP to jeopardize the interests of the IORP or groups of members? How will the mechanism for the benefits be affected by a large change in the solvency ratio? How is management / are trustees expected to behave in such a situation?

- Drivers and restrictions: What are the key drivers affecting the level of benefits? What is an IORP's investment strategy? How are the benefits made available to members and what are the key drivers affecting for example conditionality, changes in smoothing practice, level of discretionary benefits provided by the IORP? What other restrictions are in place for determining the level of benefits?

- Expectations: What is an expected level of the benefits? How will the experience from current and previous years affect the level of benefits? How will the expectations regarding years to come affect the level of benefits?

Treatment and valuation of surplus funds

HBS.5.47 When taking into account pure discretionary or mixed benefits with the exception of surplus funds in the calculation of the best estimate, IORPs should understand surplus funds as follows:

- Surplus funds should be deemed to be accumulated profits which have been earmarked to be used for distribution to members and beneficiaries, but have not been made available for distribution yet;

- In so far as authorised under national law, surplus funds should not be considered as pension liabilities.

HBS.5.48 Surplus funds should be reported separately and can be valued at their nominal value.

Reduction of benefits

HBS.5.49 Three types of benefit reductions should be calculated and shown separately on the holistic balance sheet:

1. An ex-ante benefit reduction mechanism is a mechanism based on a contract/bylaws, concluded beforehand and which describes precisely under which conditions and to which extent reductions will take place;

2. An ex-post benefit reduction is a measure of last resort (i.e. to be used when no other means are available), which may be allowed by national law and regulation;

3. A benefit reduction in the event of sponsor default/sponsor insolvency allows for the possibility to reduce pension benefits in the event of a default of the sponsor, in particular in cases when it provides unlimited support and/or when there are not enough assets to cover liabilities. The benefit reduction could occur as part of a transfer to a pension protection scheme or another institution, or as part of a recovery plan of the IORP, if the IORP continues to exist after the default of the sponsor.

HBS.5.50 The below table[21] highlights the member states where IORPs should carry out these calculations:

	Type of reduction allowed		
	Ex ante	**Ex post**	**Sponsor default**
Austria	Y	Y	Y
Belgium	N	N	Y
Denmark	Y	Y	Y
Finland *	N	N	Y
France	Y	Y	N

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[21] Taken from section 4 of EIOPA, Mapping Exercise for Further Work on Solvency of IORPs, EIOPA-14/514, 13 October 2014.

Germany	Y	Y	N
Greece	Y	Y	Y
Ireland	N	Y	Y
Italy	Y	Y	Y
Netherlands	Y	Y	N
Portugal	N	Y	Y
Slovenia	N	Y	N
Spain	Y	Y	Y
Sweden **	Y	N	Y
U.K.	N	N	Y

* Finland noted that there has not been a case of benefit reduction for a long time and therefore this subject is merely theoretical. In Finland benefit reductions are an absolute measure of the last resort.
** Sweden noted that ex ante benefit reductions are only applicable to participating/with profit Article 4 insurance companies.

Valuation of benefit reductions

HBS.5.51 The general valuation objective is that the adjustment to technical provisions made in respect of benefit reductions be consistent with the overall valuation methodology of the holistic balance sheet, involving the valuation of expected future (negative) cash-flows on a market consistent basis.

HBS.5.52 As mentioned in the introduction, benefit reduction mechanisms may be valued using the balancing item approach if the holistic balance sheet includes an allowance for those mechanisms and if there are no limits to the amount of the reductions, as any limitation would mean that there could be instances in which the element would not be able to 'balance the holistic balance sheet'.

HBS.5.53 By their nature, benefit reduction mechanisms will be the last mechanisms taken into account. Only where all mechanisms meant to strengthen the promise are fully taken into account will benefit reductions be considered. If a benefit reduction mechanism can be recognised as a balancing item on the holistic balance sheet, other elements of the holistic balance sheet will then have to be valued using other valuation methods.

HBS.5.54 A direct approach to the calculation of the amount of benefit reduction mechanisms is based on a modelling of future (negative) cash-flows. Where the occurrence and amount of benefit reductions are reasonably predictable, probabilities can be assigned to different amounts of reductions and to put a total value on the effect of the adjustments.

HBS.5.55 When there is insufficient data on which to base a more exact modelling a simplified approach could be applied. The objective of a simplification is that the benefit reduction to be valued in the technical provisions will be a best estimate of the average future annual reduction, consistent with the underlying market consistent assumptions. The estimate should take

account of any past and foreseen policies and/or communications to members that would influence or determine the benefit. There should be consistency between the treatment of benefit reductions and pure discretionary, mixed and pure conditional benefits, as the economic effect of paying non-unconditional benefits only in economically favourable times is similar to making reductions to contractual benefits in economically unfavourable circumstances.

Ex ante benefit reductions

HBS.5.56 IORPs should include the value of ex ante benefit reductions on the holistic balance sheet in the valuation of the best estimate of technical provisions. The value should be calculated and shown separately from the rest of the best estimate. This way, the best estimate of technical provisions reflects under which conditions and to which extent reductions will take place following from contracts and bylaws.

Ex post benefit reductions

HBS.5.57 National law and regulation may allow for ex post benefit reductions as a measure of the last resort (i.e. the IORP is no longer able to provide the benefits it originally aimed for or promised).

HBS.5.58 IORPs should include the value for ex post benefit reductions– when permitted by national law and contractual arrangements - in the valuation of the best estimate of technical provisions. They should be calculated and shown separately from the rest of the best estimate.

HBS.5.59 Ex post benefit reductions are per definition not explicit and will require an assessment under what circumstances benefits may be reduced and by how much. This assessment could among other things be based on 1) stipulations in national law and regulation, 2) rules or behaviour of the supervisor as regards to when reductions are allowed or required, 3) policy behaviour of the management of the IORP, and 4) historical evidence.

Reduction of benefits in case of sponsor default

HBS.5.60 National law and regulation or contractual arrangements (e.g. collective bargaining) may allow for the possibility to reduce pension benefits in the event of a default of the sponsor that provides unlimited support. This implies that such benefits are conditional on the sponsor continuing to exist.

HBS.5.61 IORPs should include the value of benefit reductions in case of sponsor default – when permitted by national law and contractual arrangements - in the valuation of the best estimate of technical provisions. The value should be calculated and shown separately from the rest of the best estimate. Two cases can be discerned:

a) The sponsor provides unlimited support and a pension protection scheme is in place that guarantees a reduced amount of benefits.

b) The sponsor provides unlimited support and there is no pension protection scheme in place.

In both cases, pensions are reduced in the event of sponsor default when financial assets plus amounts recoverable from the sponsor are insufficient to meet technical provisions.

HBS.5.62 The value of the reduction of benefits in case of sponsor default can be determined by calculating:

a) In case a) above the difference between the value of the pension protection scheme guaranteeing the full level of benefits and its actual value, taking into account the level of financial assets in the IORP.

b) In case b) above the difference between the value of sponsor support without default risk and its actual value including default risk.

The spreadsheets provided by EIOPA for the calculation of the simplification for the valuation of pension protection schemes (see HBS.8.12 ff.) and simplification 2 for the valuation of sponsor support (see HBS.7.72 ff.) automatically calculate the benefit reductions in case of sponsor default for respectively case a) and case b).

Valuation of options and guarantees embedded in pension contracts

HBS.5.63 When calculating the best estimate, IORPs should identify and take into account:

a. all contractual options and financial guarantees embedded in their schemes and pension rules;

b. all factors which may affect the likelihood that members will exercise contractual options or the value of the guarantees.

HBS.5.64 IORPs are allowed to ignore an option if exercising the option would be actuarially neutral and second order effects are minimal. This could be the case, for example, if members have an option to choose to have the actual value of their pension benefits paid out in the form of a lump sum payment at pension date. Second order effects refer to, for instance, the impact of exercising the option on the value of other pension obligations and holistic balance sheet items. Where future member behaviour is difficult to estimate – for example due to ongoing changes in pensions legislation that may affect member choices – for ease, assumptions should be made assuming these changes are not in place.

Definition of contractual options and financial guarantees

HBS.5.65 A contractual option is defined as a right to change the benefits, to be taken at the choice of its holder (generally the member), on terms that are established in advance. Thus, in order to trigger an option, a deliberate decision of its holder is necessary.

HBS.5.66　A financial guarantee is present when there is the possibility to pass losses to the IORP or to receive additional benefits as a result of the evolution of financial variables (solely or in conjunction with non-financial variables). In the case of guarantees, the trigger is generally automatic (the mechanism would be set in the contract's terms and conditions) and thus not dependent on a deliberate decision of the holder. In financial terms, a guarantee is linked to option valuation. The case of defined benefits paid until the death of the beneficiary should not be regarded as an implicit financial guarantee which has to be valued separately as part of the technical provisions.

Valuation requirements

HBS.5.67　For each type of contractual option IORPs are required to identify the risk drivers which have the potential to materially affect (directly or indirectly) the frequency of option take-up rates considering a sufficiently large range of scenarios, including adverse ones.

HBS.5.68　When determining the likelihood that members will exercise contractual options, IORPs should take into consideration past member behaviour and a prospective assessment of expected member behaviour. IORPs should consider whether the following elements are relevant and material for the valuation of options and should take them into account accordingly, applying the principle of proportionality:

- how beneficial the exercise of the options was and will be to the members under circumstances at the time of exercising the option;

- the influence of past and future economic conditions;

- the impact of past and future management actions;

- any other circumstances that are likely to influence decisions by members on whether to exercise the option.

HBS.5.69　Assumptions for the valuation of options should be realistic. Where it is not possible to determine whether assumptions are realistic, e.g. due to insufficient empirical evidence, assumptions should be chosen such as to avoid underestimation of values. The best estimate of contractual options and financial guarantees must capture the uncertainty of cash flows, taking into account the likelihood and severity of outcomes from multiple scenarios combining the relevant risk drivers.

HBS.5.70　The best estimate of contractual options and financial guarantees should reflect both the intrinsic value and the time value.

HBS.5.71　The best estimate of contractual options and financial guarantees may be valued by using one or more of the following methodologies:

- a stochastic approach using for instance a market-consistent asset model (includes both closed form and stochastic simulation approaches);

- a deterministic valuation based on expected cash-flows in cases where this delivers a market-consistent valuation of the technical provision, including the cost of options and guarantees.

HBS.5.72 For the purposes of valuing the best estimate of contractual options and financial guarantees, a stochastic simulation approach would consist of an appropriate market consistent asset model for projections of asset prices and returns (such as equity prices, fixed interest rate and property returns), together with a dynamic model incorporating the corresponding value of liabilities (incorporating the stochastic nature of any relevant non-financial risk drivers) and the impact of any foreseeable actions to be taken by management.

HBS.5.73 For the purposes of the stochastic approach, a range of scenarios or outcomes appropriate to both valuing the options or guarantees and the underlying asset mix, together with the associated probability of occurrence should be set. A stochastic approach typically uses a large number of projections (scenarios) with attributed probabilities. The number and type of scenarios are not prescribed but should be set so that a market consistent valuation is determined. The range of scenarios should be sufficiently wide, reflecting the range of possible outcomes.

HBS.5.74 When the valuation of the best estimate of contractual options and financial guarantees is not being done on a contract-by-contract basis, the segmentation considered should not distort the valuation of technical provisions.

HBS.5.75 Regarding contractual options, the assumptions on members/beneficiaries or sponsor behaviour should be appropriately founded in statistical and empirical evidence, to the extent that it is deemed representative of the future expected behaviour.

2.6. Risk Margin

HBS.6.1 IORPs should add to the best estimate of technical provisions an explicit risk margin based on the cost-of-capital approach. The risk margin is then part of the technical provisions in order to value technical provisions as equivalent to the amount that IORP would be expected to require in order to take over and meet the pension obligations. A simplification is available (see next section) if this calculation is too burdensome.

HBS.6.2 Where IORPs value the best estimate and the risk margin separately, the risk margin should be calculated by determining the cost of providing an amount of eligible own funds equal to the Solvency Capital Requirement necessary to support the pensions obligations over the lifetime thereof.

HBS.6.3 The rate used in the determination of providing that amount of eligible own funds (Cost-of-Capital rate) should be the same for all IORPs and be assumed to be equal to 6%.

HBS.6.4 The calculation of the risk margin should be based on all of the following

assumptions:

(a) the whole portfolio of pension obligations of the IORP that calculates the risk margin (the original IORP) is taken over by another IORP (the reference IORP);

(b) the transfer of pension obligations includes any (re)insurance contracts and arrangements with special purpose vehicles relating to these obligations;

(c) the reference IORP does not have any pension obligations or own funds before the transfer takes place;

(d) after the transfer, the reference IORP does not assume any new pension obligations beyond those already included in the technical provisions of the IORP calculating the risk margin;

(e) after the transfer, the reference IORP raises eligible own funds equal to the SCR necessary to support the pension obligations over the lifetime thereof;

(f) after the transfer, the reference IORP has assets which amount to the sum of its SCR and of the technical provisions net of the amounts recoverable from (re)insurance contracts and special purpose vehicles;

(g) the assets are selected in such a way that they minimise the SCR for market risk that the reference IORP is exposed to;

(h) the SCR of the reference IORP captures all of the following risks:

   i. pension liability risk with respect to the transferred business,

   ii. where it is material, the market risk referred to in point (g), other than interest rate risk,

   iii. credit risk with respect to (re)insurance contracts, arrangements with special purpose vehicles, intermediaries, members or sponsor and any other material exposures which are closely related to the pension obligations,

   iv. operational risk;

(i) the loss-absorbing capacity of technical provisions in the reference IORP corresponds for each risk to the loss-absorbing capacity of technical provisions in the original IORP;

(j) there is no loss-absorbing capacity of deferred taxes for the reference IORP;

(k) the reference IORP will, subject to points (d) and (e), adopt future management actions that are consistent with the assumed future management actions of the original IORP.

HBS.6.5   For the purposes of point (h) of HBS.6.4, a risk should be considered to be

material where its impact on the calculation of the risk margin could influence the decision-making or the judgment of the users of that information, including supervisory authorities.

HBS.6.6   The SCR necessary to support the pension obligations over the lifetime thereof should be assumed to be equal to the SCR of the reference IORP under the assumptions set out in HBS.6.4.

HBS.6.7   The risk margin for the whole portfolio of pension obligations shall be calculated using the following formula:

$$RM = CoC \cdot \sum_{t \geq 0} \frac{SCR(t)}{(1 + r(t+1))^{t+1}}$$

where:

(a) *CoC* denotes the Cost-of-Capital rate;

(b) the sum covers all integers including zero;

(c) SCR(t) denotes the SCR for year *t* as calculated for the reference IORP;

(d) r(t+1) denotes the basic risk-free interest rate for the maturity of t+1 years.

The basic risk-free interest rate r(t+1) should be chosen in accordance with the currency used for the financial statements of the IORP.

HBS.6.8   IORPs should allocate the risk margin for the whole portfolio of pension obligations to the segments referred to in HBS.3.2. The allocation should adequately reflect the contributions of the segments to the SCR of the reference IORP over the lifetime of the whole portfolio of pension obligations.

Simplifications

HBS.6.9   IORPs may use the following simplification to establish the risk margin. According to this simplification the risk margin (*CoCM*) should be calculated as a percentage of the best estimate technical provisions net of (re)insurance (at *t* = 0), that is

CoCM = a·BE$_{Net}$(0),

where

BE$_{Net}$(0) = the best estimate technical provisions net of (re)insurance as assessed at time *t* = 0 for the IORP's portfolio of pension obligations; and

a= a fixed percentage (8%)

HBS.6.10 The fixed percentage simplification (8%) above was derived from the results of the QIS 5 for Solvency II for life insurance undertakings taking

into account the changes in the provisions for the calculation of the risk margin since that QIS. If the IORP finds the proposed simplification not appropriate in the context of this quantitative assessment the IORP is allowed to use a different fixed percentage and is requested to report the percentage used.

HBS.6.11 If the IORP finds the proposed simplification not appropriate in the context of this quantitative assessment or wants to do a more precise calculation, the following hierarchy should be used as a decision basis regarding the choice of methods for projecting future SCRs (in this hierarchy the calculations get simpler with each step):

1. Make a full calculation of all future SCRs without using simplifications;

2. Approximate the individual risks or sub-risks within some or all modules and sub-modules to be used for the calculation of the future SCRs;

3. Approximate the whole SCR for each future year, e.g. by using a proportional approach;

4. Estimate all future SCRs "at once", e.g. by using an approximation based on the duration approach;

5. Approximate the risk margin by calculating it as a percentage of the best estimate.

HBS.6.12 An example of a simplification belonging to the level 3 of the hierarchical structure is to calculate the reference IORP's SCR for year t in the following manner:

$$SCR(t)=SCR(0) \cdot BE_{Net}(t)/BE_{Net}(0) \qquad t=1,2,3,…$$

where

$SCR(t)$ = the SCR as calculated at time t for the reference IORP;

$BE_{Net}(t)$ = the best estimate technical provisions net of (re)insurance as assessed at time t for the IORP's portfolio of pension obligations.

HBS.6.13 An example of a simplification belonging to the level 4 of the hierarchical structure is using the modified duration of the liabilities in order to calculate the present and all future SCRs in one single step:

$$RM=(CoC/(1+r1)) \cdot Dur_{mod}(0) \cdot SCR(0),$$

where

CoC = the Cost-of-Capital rate;

$r1$ = the basic risk-free interest rate for the maturity of 1 year;

$Dur_{mod}(0)$ = the modified duration of the reference IORP's pension obligations net of (re)insurance at t=0; and

$SCR(0)$ = the SCR as calculated at time $t=0$ for the reference IORP.

2.7. Sponsor support

HBS.7.1 IORPs should recognise the value of sponsor support as an asset on the holistic balance sheet. As set out in EIOPA's advice on the review of the IORP Directive, four forms of sponsor support can be distinguished which relate to the support that the sponsor may provide in addition to that committed for financing benefits on an ongoing basis:

A – Increases in contributions

B – Subsidiary liability of the sponsor

C – Contingent assets of the sponsor

D – Claims on the sponsor

HBS.7.2 Forms A & B can be valued by estimating the future cash flows of the sponsor that could be available to the IORP (Form A), or to pay the benefits directly to members and beneficiaries (Form B).

HBS.7.3 For reasons of simplicity the wording in the text below often takes into account Form A (payments to the IORP) only, but is meant to capture Form B (payments to members and beneficiaries) as well.

HBS.7.4 Form C relates to contingent assets of the sponsor. These assets are still in the possession of the sponsor at the accounting date, but are locked in a legally binding way for the purpose of flowing to the IORP under a predefined set of circumstances.

HBS.7.5 Contingent assets of the sponsor should be recognised separately on the holistic balance sheet and valued in accordance with the principles laid down in section 2.11 applying to the valuation of financial assets of IORPs. Where appropriate, the value of contingent assets should be deducted from the value of sponsor support where it would result in double counting.

HBS.7.6 Form D relates to claims on the sponsor on discontinuance of the IORP. In essence this form of support is what would be available to the IORP if the link between the IORP and the sponsor is broken.

Overarching principles valuation

HBS.7.7 Sponsor support should be valued consistent with the general principle that it is on a 'market-consistent basis' where the value of the sponsor support should be calculated as the probability weighted average of the discounted value of future cash-flows that is expected to be paid by the sponsor in possible future scenarios.

HBS.7.8   A one-size-fits-all methodology to the valuation of sponsor support is not possible as the position of sponsors can vary significantly and the appropriate approach for one type of sponsor may not be appropriate for another - for example, understanding the affordability position of a commercial sponsor will require very different analysis to that of a sponsor in the not-for-profit sector. The specifics of how IORPs should do this are left to IORPs and supervisors to decide on the most appropriate approach.

Valuation approach

HBS.7.9   The value of the sponsor support should be calculated as the probability weighted average of the discounted value of future cash-flows, that would be required to be paid by the sponsor to the IORP in excess of its regular contributions for funding the cost of new accrual, in order to ensure assets in the IORP meet a required level (i.e. the gap between the total of all other assets of the IORP and the assumed target level of total assets). Where the cost of new accrual is valued as part of the technical provisions (see section 2.5) IORPs may use their current policy as the basis for valuing the required contributions for future accrual. IORPs are asked to carry out the calculations for the valuation of sponsor support with two different discount rates. Since changing the discount rate for the valuation will also change the funding position of the IORP (i.e. the valuation of the liabilities will also change), the IORP will need to recalculate the expected cash flows from the sponsor under these two different valuation bases:

   i.   Firstly, using the risk free interest rate curve (Level A);

   ii.   Secondly, using the expected return on assets (Level B);

HBS.7.10   The valuation of sponsor support should be consistent with the general valuation principles outlined in section 2.4 with respect to the incorporation of:

   • Assumptions consistent with information provided by financial markets;

   • Members/beneficiaries or sponsor behaviour;

   • IORP management actions;

   • Expert judgement.

HBS.7.11   This approach may use elements of various modelling techniques (i.e. probabilistic or deterministic) relevant to the IORP's specific circumstances and overlaid with expert judgment relating to the specific circumstance of the sponsor, to allow IORPs and supervisors to value sponsor support for inclusion in the holistic balance sheet or to come to a view on the ability of the sponsor to provide for the assessed requirements of the IORP.

HBS.7.12   In some circumstances a 'balancing item' approach (see HBS.7.43 ff.) may be applied, such that the value of sponsor support is simply the required amount to balance the holistic balance sheet. Then a detailed approach to valuing that sponsor support may not be needed. Application of the

balancing item approach requires, among other things, that the strength of the sponsor is sufficient. However, for the purpose of this quantitative assessment, IORPs that have access to the relevant data are requested to also calculate the three simplifications[22] for the valuation of sponsor support to enable EIOPA to analyse the results in detail.

Contributions and timing of cash flows

HBS.7.13 Future contributions to be included in the valuation of sponsor support should be consistent with the following rules:

i. Only contributions in excess of the cost of new accruals should be taken into account – see "Benefits and contributions to be included in cash flows" section 2.5.

ii. Only future additional contributions with respect to existing obligations and accrued rights included in the best estimate of technical provisions at the calculation date shall be taken into account

iii. Both contributions paid by the employer(s) and employees should be taken into account where employees can be required to make additional contributions. The credit risk associated with employee contributions can be assumed to be the same as for the associated employer(s).

iv. Possible restitutions (i.e. negative contributions) by the IORP to the employer(s) and employees in favourable scenarios should be taken into account where legislation allows for this.

HBS.7.14 IORPs should consider the timing of sponsor support when making projections of future cash flows. The distribution of sponsor support over time may depend on the pension contract and / or social and labour law.

Probability of occurrence of future sponsor support

Overarching approach

HBS.7.15 The probability of occurrence and default risk of future support of the sponsor to the IORP including any recoverables should be taken into account in order to derive the probability weighted expected value. In order to do this it is important to take into account two key elements.

HBS.7.16 Firstly, the ability of the sponsor to make payments (financial constraints) that includes the financial position of the sponsor and also its credit risk. When deriving the amounts and probabilities of future sponsor support cash-flows, IORPs should appropriately take into account their own financial situation, as well as the quantitative uncertainty on this situation.

HBS.7.17 Secondly, the ability of the IORP/supervisors to demand payments (level of obligation). In determining the probability rating to attach to the

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[22] See HBS.7.61.

sponsor support cash-flows, IORPs should therefore take into account whether where the sponsor support is limited by contract or otherwise, the limit should be taken into account in the calculation of cash-flows.

HBS.7.18   Where sponsor support is non-legally enforceable, IORPs should take into account the likelihood of their sponsor providing additional resources in future scenarios and be in a position to demonstrate to their supervisor the appropriateness of the modelling assumptions used for this purpose. This could be done, for example, by adjusting the default probability of the sponsor to reflect the additional risk that the sponsor may not provide the required cash flows. Where this is not possible, IORPs should use the sponsor's normal default probability and report this as non-legally enforceable sponsor support in the spreadsheets. Elements that could play a role in this assessment are the current financial strength of the plan sponsor, the level of cyclicality with economic scenarios of the plan sponsor's activities and the accounting consequences for the plan sponsor in case he would provide additional funding. IORPs should take into account past experience when assessing the likelihood of non-legally enforceable sponsor support being available. The value of non-legally enforceable sponsor support should be calculated and shown separately on the holistic balance sheet.

Sponsor default probabilities

HBS.7.19   IORPs should use whatever method is most appropriate for their circumstances to derive the default probability for their sponsor. IORPs should take into account how the default probability will change over time, however for the purpose of this exercise, IORPs may assume that the probability of default remains constant throughout which in practice would not be the case.

HBS.7.20   To help IORPs assess the sponsor default probability, below methodologies may be used:

HBS.7.21   Option 1 – IORPs may use probabilities as implied by securities traded on financial markets, such as credit default swaps and corporate bonds.

HBS.7.22   Option 2 - Probability of default assessed according to the sponsor's credit rating. The following table, which is used for the counter party default risk module of the SCR, can be used to derive a suitable default probability from a sponsor's credit rating.

$Rating_i$	Credit Quality Step	PD_i
AAA	0	0.002%
AA	1	0.01%
A	2	0.05%

BBB	3	0.24%
BB	4	1.20%
B	5	4.175%
CCC or lower	6	4.175%

HBS.7.23 Option 3 **-** IORPs can use data from their sponsors' financial accounts to derive a suitable default probability. This approach is used by the Pension Protection Fund in the UK.[23] It is not expected that non-UK IORPs will be able to derive these for this assessment, and so IORPs may apply the first stage of the Alternative Simplified Approach (see HBS.7.88) to derive an approximate credit rating. This approach is also possible for smaller and/or unrated sponsors. The above table can then be used to derive the probability of default.

Recovery rate on sponsor default

HBS.7.24 The recovery rate of claims on the sponsor in the event of default should not exceed 50%. If the IORP has evidence as to why a different level of recovery would be more appropriate in their circumstances including for example allowing for the different recoveries from different insolvency processes in different member states, this can be used and the reasons should be specified. In particular, for some member states, a much smaller figure might be more appropriate under the circumstances in which insolvency occurs.

Scope of guarantees

HBS.7.25 In cases where there are legally enforceable guarantees protecting the sponsor and/or the support provided by it to an IORP, whether granted by other group- or parent-companies of the sponsor, or by third parties such as credit insurance, bank guarantees or government guarantees, those guarantees should be taken into account when calculating the value of sponsor support. Calculations for valuing sponsor support should in this case be done in the same way as for "standard" sponsor support, but taking into account the financial strength and data of the respective guarantor(s). If the guarantee covers the full sponsor support, replacing the sponsor with the guarantor in calculating sponsor support will probably simplify the procedure, as the guarantor may be more likely to have a credit rating and more easily available data for assessing credit quality. Where information from the sponsor (or from the sponsor's accounts) is available on any material commitment of those guarantors towards other

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http://www.pensionprotectionfund.org.uk/DocumentLibrary/Documents/1516_insolvency_risk_appendix.pdf

IORPs, as well as other on- or off-balance commitments, these should be taken into account, in order to avoid any multiple gearing. Where information on other commitments is not available or is likely to be immaterial, IORPs may ignore it for the purpose of this exercise.

Maximum value of sponsor support

Approach

HBS.7.26   In order to ensure that the valuation of sponsor support does not exceed an amount that the sponsor could reasonably afford, IORPs should derive an approximation of the Maximum Sponsor Support.

HBS.7.27   In addition, this figure is also needed in the calculation of the SCR to determine the maximum loss absorbing capacity of sponsor support.

HBS.7.28   This value is also used to test Condition 2 of the balancing item approach (see HBS.7.49 below).

HBS.7.29   Where sponsor support may be contractually limited to a certain value in some way, the value of maximum sponsor support should not exceed this limit.

Principles for valuation

HBS.7.30   IORPs are free to choose the most appropriate approach to the valuation of Maximum Sponsor Support for their IORP. The aim of this assessment is to determine the maximum support the sponsor may be reasonably able to provide the IORP over an appropriate period of time.

HBS.7.31   IORPs can take a proportionate approach to the valuation. For example, where the sponsor is extremely strong and the relative size and risk of the scheme is small, a simple approach can be taken to valuing maximum sponsor support. This is left to IORPs to decide on and they should be in a position to justify the approach they have taken.

HBS.7.32   The approach to valuing maximum sponsor support will depend on the information available to the IORP from the sponsor and/or from the sponsor's accounts.

HBS.7.33   Where IORPs have credible and sufficient information regarding the future business plans of the sponsor that will affect the estimation of future cash flows, then this should be taken into account.

HBS.7.34   In practice, the IORP should be able to demonstrate to the supervisor the validity of the assumptions and analysis used in this assessment and the supervisor to have the power to require the IORP to amend its approach where appropriate.

HBS.7.35   IORPs are asked to provide an explanation through the qualitative questionnaire on how they arrived at their estimate for maximum sponsor support.

Simplification

HBS.7.36 In general, valuing maximum sponsor support will involve valuing two broad two components:

a) the wealth (or surplus) of the sponsor currently available for the IORP;

b) the wealth which can be foreseen to be made available for the IORP through future cash flows of the sponsor.

HBS.7.37 As a simplification, IORPs may take an approach that combines the valuation of these two areas accounting for any appropriate adjustments for double counting – for example where items valued on the balance sheet of the sponsor are present values of items included in future cash flow projections.

HBS.7.38 A user tab spreadsheet is available to carry out the calculation of maximum sponsor support using the below simplified approach. The below inputs are required for the calculation. The value of these is being left to IORPs to decide on what is the most appropriate for their sponsors. Also, there are differing metrics which IORPs may use for the current and future wealth (e.g. EBITDA, profits before taxes (PBT), shareholder funds) which is up to the IORP to decide on. For non-profit or charitable sponsors, 'operating profit' type metrics may need to be replaced with 'operating surplus' metrics.

HBS.7.39 The calculation for maximum sponsor support is requested to be done both with and without taking credit risk into account. For the former, the annual probability of default of the sponsor should be assessed according to the sponsor's rating. For the latter, the probability of default can be ignored.

HBS.7.40 When using metrics from the sponsor's accounts, there may be a time lag between reporting and the date of this exercise. IORPs may ignore this unless there is evidence that the metrics require significant adjustment to allow for events since the data was reported. IORPs will need to use expert judgement in these scenarios as to how to adjust the data.

$d =$ The number of future years for which sponsor support cash flows are included in the assessment.

$i^t =$ Discount factor for year t.

p_{def} : The annual probability of default of the sponsor.

$EC_t =$ Expected sponsor cash flow at year t. This figure should be the sum of:

(i) current recovery plan contributions extended to year d; plus

(ii) a fixed percentage (which may be set to zero) of the expected future cash flows (e.g. EBITDA, PBT) in the years from "now" to year d, adjusting for any double counting.

$Z =$ The wealth (or surplus) of the sponsor (e.g. shareholder funds).

ξ =   Proportion of this wealth that is available for the IORP (which may be set to zero).

y =   The value of the liabilities already accounted for in the sponsor accounts (using IFRS where applicable or the national accounting standards).

Lim M_{ss} = Any contractual limit on the maximum value of sponsor support available. If there is no limit, this value can be ignored.

Output

HBS.7.41   This delivers the following output:

M_{ss} =   Maximum value of sponsor support without credit risk

M_{ss} cr =   Maximum value of sponsor support with credit risk

Calculation

HBS.7.42   The formula to be used for this quantitative assessment to derive the maximum value is as follows. In carrying out this calculation a spreadsheet is provided by EIOPA meaning that only the inputs will be required from IORPs.

Maximum value of sponsor support taking account of credit risk

$$M_{ss} \, cr = \text{Min} \left(\text{Lim} \, M_{ss} ; \sum^{d} i^t * (1 - p_{def})^t * EC_t + (\xi * z + y) \right)$$

Maximum value of sponsor support without taking account of credit risk

$$M_{ss} = \text{Min} \left(\text{Lim} \, M_{ss} ; \sum_{t=1}^{d} i^t * EC_t + (\xi * z + y) \right)$$

Balancing item – legally enforceable, unlimited sponsor support

HBS.7.43   IORPs are eligible to use the balancing item approach where the value of unlimited sponsor support will be treated as a balancing item on the holistic balance sheet with full loss-absorbency in the SCR calculation and the IORP complies with conditions set for the use of the balancing item approach. The balancing item approach is only possible where sponsor support is legally enforceable and unlimited in nature. EIOPA has identified three potential conditions, which are described below.

HBS.7.44   IORPs are also asked to provide the below data to allow EIOPA to assess different calibrations of what conditions the IORP would be able to meet. IORPs are therefore asked to provide:

1. One year insolvency rate of the sponsor (see HBS.7.19 to 7.23)

2. Value of maximum sponsor support (see above section)

3. To indicate if the IORP is eligible for a pension protection scheme and if it guarantees 100% of the benefits promised to the member.

HBS.7.45 Even where IORPs may satisfy one (or all) of the below conditions, IORPs are also requested to calculate the three simplifications for sponsor support (see below sections), to enable EIOPA to carry out analysis of the results in a more detailed way.

Balancing item - Condition 1

HBS.7.46 The one-year survival rate of the sponsor (or the equivalent in the case of multi-employer IORPs) exceeds the confidence level of the supervisory framework.

HBS.7.47 For this assessment, a default rate of the sponsor of 0.5% or lower, simulating a confidence level of 99.5%, would in principle allow using sponsor support as a balancing item.

HBS.7.48 In theory, the IORP should be able to demonstrate that the sponsor has sufficient financial strength to cover the resulting value of sponsor support on the holistic balance sheet and the stressed balance sheet for the SCR calculation. Also, the IORPs should also be required to show that the default rate of the sponsor is likely to be stable over time. This may, for example, be the case if the IORP is covered by multiple employers that cover a significant part of a strong national economy or the sponsor may be operating in an industry that is not very susceptible to cyclical movements. However for the sake of simplicity in this exercise, IORPs are not required to check whether they comply with these additional conditions.

Balancing item - Condition 2

HBS.7.49 Under this condition, the strength of the sponsor could be considered with an approach similar to that provided by PwC research[24].

HBS.7.50 As a first step it would be assessed whether the value of the sponsor (or the equivalent in the case of multi-employer IORPs) is larger than a certain multiple (M) of the value (of sponsor support) required to balance the holistic balance sheet. For this purpose, the "value required to balance the holistic balance sheet" should be taken equal to liabilities + SCR' – financial assets, where SCR' is calculated gross of the loss-absorbing capacity of sponsor support. As a second step, the IORP should be able to demonstrate that M will be stable over time.

HBS.7.51 If the value of the sponsor is larger than M times the value required to balance the holistic balance sheet, and M is demonstrated to be stable, no further steps would be necessary and sponsor support could be included in the holistic balance sheet as a balancing item.

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[24] PwC research, in Institute and Faculty of Actuaries, Options for assessing employer covenant and the holistic balance sheet, Research Report, January 2013, Edinburgh/London.

HBS.7.52   For the purpose of this exercise, 'M' is assumed to be 2 and the "value of the sponsor" should, for this purpose be determined by using the method set out for maximum sponsor support (see paragraphs above).

HBS.7.53   However, EIOPA recognises that an appropriate value for M will depend on a number of factors, and may vary depending on the approach taken to valuing maximum sponsor support (e.g. which cash flow or balance sheet metrics are used by the IORP). EIOPA would like the data to be available so analysis may be done in which proposals for an appropriate value for M may be developed.

Balancing item - Condition 3

HBS.7.54   If a pension protection scheme guarantees 100% of benefits (or where the pension protection scheme guarantees <100%, but the reduction in benefits is accounted for on the holistic balance sheet) and has negligible default risk, the benefits promised to members and beneficiaries will always be paid with a sufficient level of security.

HBS.7.55   Application of this condition is only possible in case of a supervisory framework that includes pension protection schemes as impacting on the default rate of the sponsor. As the baseline approach that is chosen for this assessment does not allow for such a treatment, this condition cannot be tested in this assessment.

Multi-employer IORPs

HBS.7.56   For multi-employer IORPs where the calculation of the above mentioned figures for every single employer is not possible or would be too burdensome for the IORP, it is sufficient to make the calculations only for a sufficient number of (larger) employers for which data is available. If these results can be seen as being representative for all employers they can be grossed up to the level of all employers appropriately.

HBS.7.57   Alternatively, for example where the IORP is sponsored by a large amount of small sponsors, it could be sufficient in the first step to determine the value of a sample of sponsors which collectively have a value larger than a multiple of the value of sponsor support included in the holistic balance sheet. One approach would then be to use a sample of, for example, the 5 largest sponsors which cover a specified percentage of the members of the IORP. But this approach could be modified, for example if there is a problem with availability of data. In this case the sample could be chosen in a different way.

HBS.7.58   In cases where a second step would be necessary, if the sponsor support is not deemed very strong, the "normal" assessment of the maximum value of sponsor support could also be restricted to a sample of sponsors, which would provide a maximum value of sponsor support which is (collectively) assessed as larger than the value necessary to meet the liabilities and cover the SCR in the holistic balance sheet.

Multi IORP sponsors

HBS.7.59   For sponsors with multiple IORPs, IORPs should be able to use all of the sponsor support valuation approaches, subject to data availability, by using the same principles but adapted to the multiple IORP situation by taking account of the proportion (which might be considered to relate to each IORP of the sponsor) of what would be the maximum sponsor support of the sponsor if there were only one sponsor. This information should be available from the sponsor and/or sponsors accounts. Where IORPs are unable to collect this data and/or it is regarded as immaterial, it can be ignored for the purpose of this exercise.

Simplifications for the valuation of sponsor support

HBS.7.60   IORPs are requested to perform their own calculations using a stochastic modelling approach. However, EIOPA recognises that many IORPs may not have access to such modelling techniques, or it is not reasonable to ask IORPs to pay for such an approach to be done for the purpose of this quantitative assessment. IORPs may therefore develop their own simplified approaches consistent with the principles for valuation of sponsor support. EIOPA is also providing IORPs with a number of simplified modelling approaches and spreadsheets – described below. Even where IORPs carry out their own modelling they are requested to use these simplifications in order for EIOPA to further analyse the results.

HBS.7.61   These simplifications which are described in detail below, are:

    1. Simplification 1 – Simplified distribution approach

    2. Simplification 2 – Deterministic cash flow approach

    3. Simplification 3 - Alternative Simplified Approach

HBS.7.62   The first two of these approaches requires the ability of the sponsor to afford those payments to be taken into account through the use of Maximum Sponsor Support as an input. IORPs should therefore ensure that the payments modelled are affordable to avoid overstating the valuation of sponsor support. To enable IORPs to calculate Maximum Sponsor Support see paragraphs HBS.7.26.ff.

HBS.7.63   The Alternative Simplified Approach does not require the use of Maximum Sponsor Support since it takes into account the affordability position of the sponsor implicitly in the model.

HBS.7.64   EIOPA recognises that these simplifications represent a standard methodology for valuing sponsor support for the purpose of this quantitative assessment exercise and the individual circumstances of employers and IORPs can differ. If the IORP considers that these simplifications will lead to a significant misestimating of the value of sponsor support, due to a particular characteristic of the sponsor support arrangement or the sponsor itself that are not appropriately reflected, the

IORP should carry out its own valuation of sponsor support, which should be consistent with the general principles set out in this section.

HBS.7.65 IORPs are requested to apply the simplifications on a voluntary basis as well, using the provided spreadsheets - that require only a few data inputs.

HBS.7.66 In order for EIOPA to collect the necessary data to analyse the six examples of supervisory frameworks, EIOPA is requesting that IORPs carry out two calculations of sponsor support with regards to the required level of funding. Firstly using the full value of the Level A technical provisions and secondly the full Level B technical provisions. In both cases including the risk margin and without a possible adjustment for a reduction in benefits in case of sponsor default (see HBS.5.60). The spreadsheets provided mean only the relevant inputs are requested from IORPs.

Simplification 1 - Valuation of sponsor support (Simplified distribution approach)

HBS.7.67 This specification used the best estimates for the assets and technical provisions and the maximum sponsor support to derive an estimate for sponsor support allowing for assumptions (within the Simplification model) for the modeled volatility of the results. In carrying out this calculation a spreadsheet is provided by EIOPA meaning that only the inputs will be required from IORPs.

HBS.7.68 This method implements the following calculations (see Annex 1 for a more elaborate description):

- Step 1: calculation of the estimated probability distribution of the eventual need for sponsor support in a run-off situation (= the final value of all payments made to the beneficiaries – the final value of all assets used to pay the pensions)

- Step 2: calculation of the estimated probability distribution of the actual support provided by the sponsor to the IORP, conditional on an absence of default of the sponsor. This distribution is obtained from the distribution in step 1 by applying:

  o a cap equal to the maximum sponsor support as calculated above

  o a floor equal to 0, if and only if the sponsor is never able to reduce its future contributions nor to take some assets back from the IORP, even in overfunding situations

- Step 3: calculation of the expected value of support received from the sponsor, without accounting for the default probability of the sponsor

- Step 4: the value obtained in step 3 is adjusted for the default risk of the sponsor, taking into account the expected timeframe of payment of the sponsor support (under the assumption that annual payments are all equal), the annual probability of default of the sponsor, and the

recovery rate in case of default of the sponsor.

<u>Input</u>

HBS.7.69   This method requires the following input:

- TP: the value of technical provisions, calculated according to sections 2.3-2.6.

- A : the market value of investment assets, valued according to section 2.11

- σ_A : the relative standard deviation of assets

This factor corresponds to the ratio between the standard deviation of the value of assets and the value itself. The relative standard deviation (RSD) value shall be positive. The relative standard deviation depends on the actual composition of the portfolio of assets:

o for a pure risk free asset, the RSD is 0

o for a fixed income bond, it might be between 0 and 25%, depending on the rating of the bond

o for equity, it might be between 40% and 60%

IORPs are asked to derive the appropriate value depending on their asset portfolio. Alternatively, for the purposes of this quantitative assessment, IORPs can use a value of 30%.

- σ_{TP}: the relative standard deviation of technical provisions

This factor corresponds to the ratio between the standard deviation of technical provisions and technical provisions itself. The RSD value shall be positive. The relative standard deviation should take into account all elements of uncertainty in technical provisions, including:

o actual mortality rates vs. assumed rates used for the TP calculation

o sampling error

o actual rates of expense vs. assumed rates used for the TP calculation

o loss sharing and conditional benefits

For the purposes of this quantitative assessment, IORPs can use a value of 10%.

- σ_{ss} : the relative standard deviation of support needed (support needed defined as the difference between the assumed target level and the level of assets, this is calculated automatically by the provided spreadsheet)

- ρ : the expected correlation between assets and liabilities

This factor, between -100% and 100%, aims at capturing how the value of assets and pension liabilities vary together.

- o For a DB scheme without any possibility of reduction of benefits, this parameter should be 0.

- o For a pure DC scheme, this value should be 100%.

- o For DB schemes with some conditional or discretionary benefits, the value should be in-between, depending on the part of variance of technical provisions explained by financial profit sharing within the global variance of technical provisions. For the purposes of this quantitative assessment, these IORPs can use a default value of 30%.

- M_{ss} : the maximum value of sponsor support, calculated without default risk

- d : the expected duration of settlement of the sponsor support (when needed)

This duration should correspond to the time (in years) the sponsor will need to pay to the IORP the full amount of required support. It should be the same as the one used in the calculation of the "maximum possible sponsor support". For the purpose of this quantitative assessment, this should be equal to the value of the average duration of the expected outgoing cash flows of the IORP relating to obligations as at the valuation date.

- p_{def} : the annual probability of default of the sponsor.

- RR : the expected recovery rate of sponsor support in case of default of the sponsor, which should not exceed 50%. For the purpose of this assessment, 50% can be assumed, but IORPs may use other figures if appropriate stating the reasons why.

Calculation

HBS.7.70   If the sponsor cannot, in any case, withdraw any assets from the IORP, nor suspend its contribution to the IORP in case of overfunding, then the market consistent value of the sponsor support to the IORP is given by the following formula. In carrying out this calculation a spreadsheet is provided by EIOPA meaning that only the inputs for this calculation will be required from IORPs.

$$SS_{fv} = SS_{exp}.Adj_{def}$$

where

$$SS_{exp} = \mu_{ss} + Adj_{exp}$$

$$\mu_{ss} = TP - A$$

$$\sigma_{ss} = \sqrt{(\sigma_A.A)^2 + (\sigma_{TP}.TP)^2 - 2\rho.A.TP.\sigma_A.\sigma_{TP}}$$

$$Adj_{exp} = -\left[(\mu_{ss} - M_{ss}).\left(1 - \phi\left(\frac{M_{ss} - \mu_{ss}}{\sigma_{ss}}\right)\right) + \sigma_{ss}.\varphi\left(\frac{M_{ss} - \mu_{ss}}{\sigma_{ss}}\right)\right]$$
$$-\left[\mu_{ss}.\phi\left(-\frac{\mu_{ss}}{\sigma_{ss}}\right) - \sigma_{ss}.\varphi\left(\frac{\mu_{ss}}{\sigma_{ss}}\right)\right]$$

and

$$Adj_{def} = \frac{1}{d}\left[(1 - RR)(1 - p_{def})\left(\frac{1 - (1 - p_{def})^d}{p_{def}}\right) + d.RR\right]$$

ϕ and φ are respectively the cumulative and non-cumulative Gaussian distribution functions with average 0 and variance 1.

HBS.7.71   If the sponsor can, in some cases, withdraw assets from the IORP, or suspend its contribution to the IORP (for instance in cases of overfunding), the same formula as above should be used, but using the following value for Adj_{exp}. Again, in carrying out this calculation a spreadsheet is provided by EIOPA meaning that only the inputs will be required from IORPs.

$$Adj_{exp} = -\left[(\mu_{ss} - M_{ss}).\left(1 - \phi\left(\frac{M_{ss} - \mu_{ss}}{\sigma_{ss}}\right)\right) + \sigma_{ss}.\varphi\left(\frac{M_{ss} - \mu_{ss}}{\sigma_{ss}}\right)\right]$$

Simplification 2 – Valuation of sponsor support (Deterministic cash flow with credit haircut)

HBS.7.72   This simplification is designed to provide a methodology for valuing sponsor support by taking the probability weighted average of future cash flows, where the only source of uncertainty is the default risk of the sponsor. This generates a probability tree in which each year the sponsor may default or not default.

HBS.7.73   For the valuation using Level A, returns on all assets are assumed to be equal to the risk-free interest rate. For Level B, the expected return on assets should be used.

HBS.7.74   Sponsor contribution and receipts are assumed to be symmetric, i.e. the sponsor contributes to recover shortfalls, but also receives any surpluses. This does not necessarily mean that the sponsor should be able to claim surpluses at any given time. A sufficient condition is that surpluses are ultimately reimbursed.

Input

HBS.7.75   Required inputs:

- *TP* : the value of technical provisions, calculated according to sections 2.3-2.6.

- *A*:   the market value of investment assets, valued according to section 2.11.

- *d*: the expected duration of settlement of the sponsor support

This duration should correspond to the time (in years) the sponsor will need to pay to the IORP the full amount of required support. It should be the same as the one used in the calculation of the "maximum possible sponsor support". For the purpose of this quantitative assessment, this should be equal to the value of the average duration of the expected outgoing cash flows of the IORP relating to obligations as at the valuation date.

- *i*: interest rate which should reflect the appropriate risk free rate for the duration d. i can also be based on/taken from the risk free interest rate curve.

- p_{def} : the annual probability of default of the sponsor.

- *RR* : the expected recovery rate of sponsor support in case of default of the sponsor, which should not exceed 50%. For the purpose of this quantitative assessment, 50% can be assumed, but IORPs may use other figures if appropriate stating the reasons why. In case of limited sponsor support, the recovery rate should be assumed to be zero.

- M_{SS} : the maximum value of sponsor support, calculated without credit risk

Output

HBS.7.76 This simplification yields the following output:

- SS_{FV}: market value of sponsor support

Calculation

HBS.7.77 In carrying out this calculation a spreadsheet is provided by EIOPA meaning that only the inputs to the calculation will be required from IORPs.

HBS.7.78 The market value of sponsor support is determined by the following formula:

$$SS_{FV} = (TP - A) \sum_{t=1}^{d} (1 - p_{def})^t \frac{1}{d} + (1 - p_{def})^{t-1} p_{def} \, RR \left[1 - \frac{t-1}{d}\right]$$

HBS.7.79 Accordingly, the value of sponsor support equals the gap between technical provisions and financial assets multiplied by a factor (smaller than one) that takes into account sponsor default risk during the time period of closing the gap. The left-hand side of the summation represents the (cumulative) probability that the sponsor will not default, i.e. the sponsor continues to make annual payments to the IORP. The right-hand side represents the part of the gap that is recovered in the event the sponsor defaults. This will depend on the current gap between technical provisions and financial assets and the payments made by the sponsor in

the years prior to defaulting.

HBS.7.80   If the calculated value of unlimited sponsor support exceeds the maximum value of sponsor support then the market value should be set equal to the maximum value.

HBS.7.81   The formula for the market value of sponsor support can be derived by taking the probability weighted average of the discounted value of payments to the IORP during the duration of the settlement in the event the sponsor does and does not default. The figure below shows the probability tree for a period of three years, but this can be extended to cover longer periods.

HBS.7.82   The annual payment to the IORP is assumed to be a constant annuity in present value terms to recover the shortfall in assets given the discount rate and the duration of the settlement:

$$CF_t = \frac{(TP-A)}{d}(1+i)^t$$

HBS.7.83   Figure: Probability tree sponsor support

Cumulative probability: $(1-p_{def}) \times (1-p_{def}) \times (1-p_{def})$
Cash flow: CF_3

Cumulative probability: $(1-p_{def}) \times (1-p_{def})$
Cash flow: CF_2

Cumulative probability: $(1-p_{def})$
Cash flow: CF_1

Cumulative probability: $(1-p_{def}) \times (1-p_{def}) \times p_{def}$
Cash flow (REC_3): $RR \times [(TP \times (1+i)^3 - A \times (1+i)^3 - CF_1 \times (1+i)^2 - CF_2 \times (1+i)]$

Cumulative probability: $(1-p_{def}) \times p_{def}$
Cash flow (REC_2): $RR \times [(TP \times (1+i)^2 - A \times (1+i)^2 - CF_1 \times (1+i)]$

Cumulative probability: p_{def}
Cash flow (REC_1): $RR \times [(TP \times (1+i) - A \times (1+i)]$
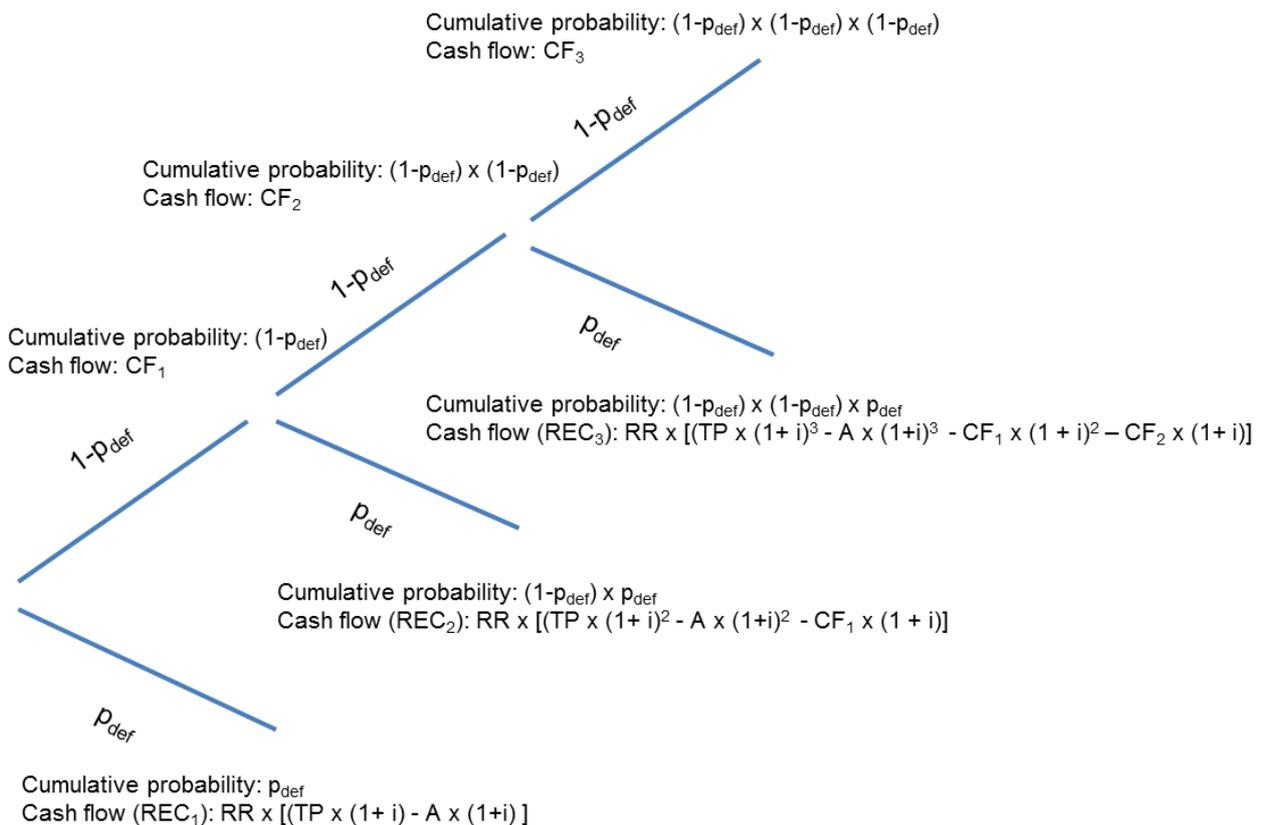
Simplification 3 – Valuation of sponsor support (ASA)

HBS.7.84   This simplification is designed to provide a methodology for valuing sponsor support based on an alternative approach to assessing the

adjustment to be made for sponsor credit risk using sponsor credit ratios. The aim of this simplified approach is to provide IORPs – in particular small and medium-sized ones – with a practical and proportionate tool to do a sponsor support valuation for the HBS.

HBS.7.85 The method as set out is applicable to IORPs with unlimited sponsor support, since the calculation is based on the shortfall between the financial assets and the technical provisions. However it could be adapted by IORPs who have limited sponsor support by reducing the value of the shortfall to be met by the sponsor support in the light of any legal limit.

HBS.7.86 To carry out this calculation, EIOPA has provided a helper tab spreadsheet, so IORPs only have to insert the required inputs

HBS.7.87 This simplification consists of the following stages. IORPs need only provide the input data as in HBS.8.96 below.

HBS.7.88 Stage 1. IORPs should use financial credit ratio techniques to assess the strength of the sponsor support relative to their financial obligations (including pension shortfalls using the Level A technical provisions) on a 6 step credit quality scale from "very strong" to "very weak".

HBS.7.89 The helper tab spreadsheet sets out a simplified way of doing this, using only 4 data input items which then are used to calculate the required 2 ratios and from these then derive the assessment on the 1-6 scale.

HBS.7.90 IORPs may consider that the specific ratios do not lead to a suitable assessment of their sponsor. The helper tab allows IORPs to choose and insert a scale value themselves.

Sponsor Strength – Credit ratio matrix							
		Income cover					
		<1	1x	3x	5x	7x	9x+
Asset Cover	9x+	Strong	Strong	Strong	Very Strong	Very Strong	Very Strong
	7x	Medium strong	Medium strong	Strong	Strong	Very Strong	Very Strong
	5x	Medium	Medium strong	Medium strong	Strong	Strong	Very Strong
	3x	Weak	Medium	Medium strong	Medium strong	Strong	Strong
	1x	Very Weak	Weak	Medium	Medium strong	Medium strong	Strong
	<1x	Very Weak	Very Weak	Weak	Medium	Medium strong	Strong

HBS.7.91 Stage 2. Based on that scale value for the strength of the sponsor, the spreadsheet calculates a factor which can be applied to the shortfall in the HBS to allow for the credit risk of the sponsor. This is done by:

1. Setting the period over which the sponsor could reasonably afford to make the payments to meet the required funding level. For very strong sponsors, this is a very short period. For very weak sponsors, this is assumed to be a longer period.

2. Setting the assumed annual probability of default for the sponsor i.e. the probability that the sponsor will not pay the contributions to the IORP.

3. Calculating the level of annual contributions required to meet the required funding level. If this gives rise to an inappropriate level of annual contributions (e.g. because local regulations do not allow contributions above or below pre-defined limits) then the assumed period for these contributions can be adjusted

4. Calculating the value of sponsor support as the present value of these contributions, adjusted to allow for the default risk of the sponsor.

HBS.7.92   The table above summarised these factors and the resulting reduction in the sponsor support to allow for credit risk.

HBS.7.93   Under this simplification, there is no need to:

- Calculate a maximum value of sponsor support; or

- Use external credit ratings to determine probabilities of default.

HBS.7.94   The helper tab also calculates the value of sponsor support required for the calculation of the loss absorbing capacity of security mechanisms in the solvency capital requirement (SCR) calculations. It also calculates the corresponding sponsor support values for the Level B based HBS.

HBS.7.95   The same helper tab can in principle be used to assess any extra value of support available from any other entities that the legal sponsor may be associated with (e.g. parent companies), by changing the shortfall in the HBS to the amount not covered by the legally enforceable sponsor and assessing the value which may be available from such other sources.

Input

HBS.7.96   Required inputs:

To assess the strength of the sponsor the following data input items are required (IORPs may use expert judgement in selecting the most suitable metrics for this purpose). When using metrics from the sponsor's accounts, there may be a time lag between reporting and the date of this exercise. IORPs may ignore this unless there is evidence that the metrics require significant adjustment to allow for events since the data was reported. IORPs will need to use expert judgement in these scenarios as to how to adjust the data.

(a) Net cash flow (PBT may be used or another equivalent measure of cash flow depending on the nature of the IORPs sponsor);

(b) Annual service cost (including interest on debt, rental payments, and the IORP deficit reduction contributions);

(c) Net Asset value of the sponsor (e.g. shareholder funds);

(d) Deficit – IORPs are asked to do two calculations. Firstly based on the

Level A deficit and secondly based on and Level B deficit.

Output

HBS.7.97   The simplification produces the following four values:

- The HBS value of sponsor support based on Level A;

- The value of sponsor support to be used to input into the [net SCR calculation] to assess the net SCR using the Level A value for technical provisions;

- The HBS value of sponsor support based on Level B;

- The value of sponsor support to be used to input into the [net SCR calculation] to assess the net SCR using the Level B value for technical provisions.

Calculation

HBS.7.98   As stated above, the helper tab spreadsheet uses the accounting and IORP funding data to calculate the strength of the sponsor on a scale from 1 to 6 (i.e. from "Strong" to "Very Weak").

HBS.7.99   That scale score then defines the other key assumptions for the assumed default probability for the sponsor and the recovery plan period. Those assumptions are then used, together with the discount rates from the yield curve to calculate the haircut to be applied to the implied recover plan needed to meet the level of underfunding on the A and B bases, and for the balance sheet excluding and including the SCR.

HBS.7.100 The table below shows the assumptions used and the level of the haircut based on assuming a discount rate of 3%. The relevant yield curve will be used in the helper tab so the haircuts for the quantitative assessment may differ slightly from those shown in this Table.

Allowance for the credit risk in valuation of sponsor support using Simplification 3					
Credit step	Definition	Broadly equivalent credit rating	Recovery Plan period (years)	Annual probability of insolvency (%)	Value of Sponsor Support as % of HBS financial shortfall (%)
1	Very strong	AAA/AA	3	0.1	99.9
2	Strong	A	3	0.2	99.7
3	Medium strong	BBB	5	0.5	98.8
4	Medium	BB	10	1.6	92.9
5	Weak	B	20	4.5	68.34
6	Very Weak	CCC	30	26.8	14.7

2.8.   Pension protection schemes

HBS.8.1   Where a pension protection scheme does not cover maximum members' benefits it cannot provide certainty that the maximum benefits will be paid, but only provides for certainty that a defined minimum level (the

protected level) of benefits will be paid. Benefits above those payable by the pension protection scheme are then only payable based on the availability and limitation of the IORPs other assets and security mechanisms.

HBS.8.2   This would mean that the members' benefits between those covered by the pension protection scheme and those that would be paid if the pension protection scheme was not required, are conditional on the availability of other security mechanisms, including assets of the IORP and a solvent sponsor being consistent with the definition of 'conditional benefits' as set out by EIOPA.

HBS.8.3   The overall confidence level is therefore still satisfied since assets are sufficient to meet the technical provisions. The pension protection scheme can therefore be seen to 'satisfy' requirements for a level of security (or confidence) that may be required under the holistic balance sheet approach.

HBS.8.4   The value of future benefits guaranteed by the pension protection scheme at the time of default can be approximated by reference to the value of technical provisions. For example, if the pension protection scheme guarantees benefits for a full 100% then the present value equals the value of technical provisions. If the pension protection scheme guarantees benefits for (say) 90% then the present value equals 90% of the value of technical provisions at that time. In the valuation of technical provisions, the scenarios in which benefits below the maximum value are paid are taken into account in the best estimate of the liabilities (see HBS.5.60-62).

Valuation as an asset on the holistic balance sheet

HBS.8.5   IORPs should value pension protection schemes on a market consistent basis by taking the probability weighted average of discounted future cash flows to be paid by the pension protection scheme to support the protected level of benefits.

HBS.8.6   In principle, the valuation should take into account:

- The probability of default of the sponsor, as derived for the valuation of sponsor support (see HBS.7.19-23);

- The level of benefits the pension protection schemes guarantees in the event of default of the sponsor;

- The level of funding of the IORP at the time of default of the sponsor, i.e. financial assets plus recoverables from the sponsor, as derived for the valuation of sponsor support (see HBS.7.24).

Balancing item approach

HBS.8.7   If a pension protection scheme guarantees 100% of benefits (or where the pension protection scheme guarantees <100% but the reduction in

benefits is accounted for on the holistic balance sheet) and has negligible default risk, the benefits promised to members and beneficiaries will always be paid with a sufficient level of security.

HBS.8.8   The baseline approach chosen for this assessment requires that the values of pension protection schemes and of benefit reductions in case of sponsor default are calculated separately. Application of the balancing item approach for pension protection schemes that guarantee < 100% is therefore not possible in this assessment.

HBS.8.9   Therefore, for the purpose of this quantitative assessment, a pension protection scheme that guarantees 100% of benefits should be recognised as a balancing item on the holistic balance sheet, provided if fulfils the following criteria with regard to the certainty and permanence of the legal arrangement and the financial strength of the pension protection scheme:

- Certainty and permanence of the legal arrangement of the pension protection scheme: The legal arrangement could be considered certain, if it is based on national law and if the protection provided by the pension protection scheme is legally enforceable. The payment of contributions/levies to the pension protection scheme should be legally enforceable by the pension protection scheme, with no possibility of those required to pay those contributions/levies to "opt out" of the protection provided by the pension protection scheme and the obligation to pay contributions/levies. If the legal arrangement is based on national law then it should also be considered sufficiently permanent, because national law cannot be changed by the parties involved in the arrangement, but only by the appropriate national body (usually parliament), which will consider possible effects on members and beneficiaries, IORPs, and sponsors;

- Financial strength of the pension protection scheme: A pension protection scheme should be considered financially strong, if the pension protection scheme can enforce the payment of levies/contributions and if the financial strength of the sponsors obliged to pay those levies/contributions is considered high (e.g. because those sponsors represent a large part of a national economy, which is considered itself as strong).

HBS.8.10   For the purpose of this quantitative assessment, respective national supervisors will decide, whether those criteria are met and consequently the balancing item approach can be used.

HBS.8.11   For other types of pension protection schemes, where the balancing item approach is not applicable, IORPs may use the following simplification to determine the value of the pension protection scheme.

Simplification –Value of pension protection scheme

HBS.8.12   This valuation follows the principles used in the deterministic valuation of

sponsor support (Simplification 2) and a spreadsheet is provided meaning that only the inputs are required from IORPs.

<u>Input</u>

HBS.8.13   There is one input required in addition to the inputs needed in the second simplification for a deterministic valuation of sponsor support.

CR : the coverage rate of the pension protection scheme.

For example, if the pension protection scheme guarantees 90% then the coverage rate equals 90%. If the amount payable from the pension protection scheme changes over time, IORPs can allow for this using a suitable approximation method.

<u>Calculation</u>

HBS.8.14   The market value of the pension protection scheme is determined by the following formula:

$$PPF_{FV} = \sum_{t=1}^{d} (1 - p_{def})^{t-1} p_{def} \cdot max \left[CR\ TP \right.$$
$$\left. - \left\{ A + \frac{t-1}{d}(TP - A) + RR(TP - A)(1 - \frac{t-1}{d}) \right\} ; 0 \right]$$

HBS.8.15   According to this formula, the value of the pension protection scheme equals the sum over time of the (cumulative) probability of sponsor default multiplied by the value of payments to be made by the pension protection scheme if that occurs. The value of these payments is equal to the value of benefits covered – approximated by the coverage rate multiplied by the value of technical provisions – minus the initial value of financial assets, the sponsor payments made prior to default and the funds recovered from the sponsor after default. The value of payments to be made by the pension protection scheme cannot be negative. If the total value of financial assets after default exceeds the value of benefits covered then no payments have to be made by the pension protection scheme.

HBS.8.16   If the IORP has limited the market value of sponsor support to the maximum amount of sponsor support as provided for in HBS.7.26-42 then the calculated value of the value of the pension protection scheme should be increased by that amount.

HBS.8.17   The simplification can be derived by taking the probability weighted average of the discounted value of payments made by the pension protection scheme in the event of sponsor default. The figure below illustrates the probability tree for a period of three years. The annual sponsor payments (CFt) and amounts recovered from the sponsor in the event of default (RECt) are defined as in the probability tree for sponsor support (see HBS.7.83).

HBS.8.18   Figure: Probability tree pension protection scheme

Cumulative probability: $(1-p_{def}) \times (1-p_{def}) \times (1-p_{def})$
Cash flow: 0

$1-p_{def}$

Cumulative probability: $(1-p_{def}) \times (1-p_{def})$
Cash flow: 0

$1-p_{def}$

p_{def}

Cumulative probability: $(1-p_{def})$
Cash flow: 0

Cumulative probability: $(1-p_{def}) \times (1-p_{def}) \times p_{def}$
Cash flow: $\max [CR \times TP \times (1+i)^3 - \{ A \times (1+i)^3 + CF_1 \times (1+i)^2 + CF_2 \times (1+i) + REC_3 \};0]$

$1-p_{def}$

p_{def}

Cumulative probability: $(1-p_{def}) \times (p_{def})$
Cash flow: $\max [CR \times TP \times (1+i)^2 - \{ A \times (1+i)^2 + CF_1 \times (1+i) + REC_2 \};0]$

p_{def}

Cumulative probability: p_{def}
Cash flow: $\max [CR \times TP \times (1+i) - \{ A \times (1+i) + REC_1 \};0]$

2.9.   Recoverables from (re)insurance contracts and special purpose vehicles (SPVs)

HBS.9.1   IORPs should include the value of recoverables from (re)insurance contracts and special purpose vehicles as an asset on the holistic balance sheet.

HBS.9.2   The calculation by IORPs of amounts recoverable from (re)insurance contracts and special purpose vehicles should follow the same principles and methodology for the calculation of technical provisions.

HBS.9.3   There is no need however to calculate a risk margin for amounts recoverable from (re)insurance contracts and special purpose vehicles because the single net calculation of the risk margin should be performed, rather than two separate calculations (i.e. one for the risk margin of the technical provisions and one for the risk margin of recoverables from (re)insurance contracts and special purpose vehicles).

HBS.9.4   When calculating amounts recoverable from (re)insurance contracts and special purpose vehicles, IORPs should take account of the time difference between recoveries and direct payments.

HBS.9.5   Where for certain types of (re)insurance and special purpose vehicles, the timing of recoveries and that for direct payments of IORP markedly

diverge, this should be taken into account in the projection of cash-flows. Where such timing is sufficiently similar to that for direct payments, the IORP should have the possibility of using the timing of direct payments.

HBS.9.6   The amounts recoverable from (re)insurance contracts and special purpose vehicles should be calculated consistently with the boundaries of the contracts to which the amounts recoverable from (re)insurance contracts and special purpose vehicle relate.

HBS.9.7   For the purpose of calculating the amounts recoverable from (re)insurance contracts and special purpose vehicles, the cash-flows should only include payments in relation to compensation of pension obligations. Other payments should not be accounted as amounts recoverable from (re)insurance contracts and special purpose vehicles. Where a deposit has been made for the mentioned cash-flows, the amounts recoverable should be adjusted accordingly to avoid a double counting of the assets and liabilities relating to the deposit.

HBS.9.8   Debtors and creditors that relate to settled claims of members or beneficiaries should not be included in the recoverable.

HBS.9.9   A compensation for past and future benefits should only be taken into account to the extent it can be verified in a deliberate, reliable and objective manner.

HBS.9.10   Expenses which the IORP incurs in relation to the management and administration of (re)insurance and special purpose vehicle contracts should be allowed for in the best estimate, calculated gross, without deduction of the amounts recoverable from (re)insurance contracts and special purpose vehicles. But no allowance for expenses relate to the internal processes should be made in the recoverables.

Counterparty default adjustment

Definition of the adjustment

HBS.9.11   The result from the calculation of the previous section should be adjusted to take account of expected losses due to default of the counterparty. That adjustment should be calculated separately and should be based on an assessment of the probability of default of the counterparty, whether this arises from insolvency or dispute, and the average loss resulting there from (loss-given-default). For this purpose, the change in cash-flows should not take into account the effect of any risk mitigating technique that mitigates the credit risk of the counterparty, other than risk mitigating techniques based on collateral holdings. The risk mitigating techniques that are not taken into account should be separately recognised without increasing the amount recoverable from (re)insurance contracts and special purpose vehicles.

HBS.9.12   The adjustment should be calculated as the expected present value of the change in cash-flows underlying the amounts recoverable from that

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counterparty, resulting from a default of the counterparty at a certain point in time

HBS.9.13 This calculation should take into account possible default events over the lifetime of the rights arising from the corresponding (re)insurance contract or special purpose vehicle and the dependence on time of the probability of default.

HBS.9.14 For example, let the recoverables towards a counterparty correspond to deterministic payments of C1, C2, C3 in one, two and three years respectively. Let PDt be the probability that the counterparty defaults during year t. Furthermore, we assume that the counterparty will only be able to make 40% of the further payments in case of default (i.e. its recovery rate is 40%). For the sake of simplicity, this example does not consider the time value of money (However, its allowance, would not change the fundamental conclusions of the example). Then the losses-given-default are as follows:

Default during year	Loss-given-default
1	$-60\% \cdot (C_1 + C_2 + C_3)$
2	$-60\% \cdot (C_2 + C_3)$
3	$-60\% \cdot C_3$

For instance, in year two the value of the recoverables is equal to C2 + C3. If the counterparty defaults in year two the value of the recoverables changes from C2 + C3 to 40%·(C2 + C3). As 60% of the recoveries are lost, the loss-given-default is -60%·(C2+ C3).

HBS.9.15 The adjustment for counterparty default in this example is the following sum:

$$AdjCD = PD1 \cdot (-60\% \cdot (C1 + C2 + C3))$$

$$+ PD2 \cdot (-60\% \cdot (C2 + C3))$$

$$+ PD3 \cdot (-60\% \cdot C3).$$

HBS.9.16 This calculation should be carried out separately by counterparty and each line of business.

Probability of default (PD)

HBS.9.17 The determination of the adjustment for counterparty default should take into account possible default events during the whole run-off period of the recoverables.

HBS.9.18 In particular, if the run-off period of the recoverables is longer than one year, then it is not sufficient to multiply the expected loss in case of

immediate default of the counterparty with the probability of default over the following year in order to determine the adjustment. In the above example, this approach would lead to an adjustment of

$$PD1 \cdot (-60\% \cdot (C1 + C2 + C3)).$$

HBS.9.19 Such an approach is not appropriate because it ignores the risk that the counterparty may – after surviving the first year – default at a later stage during the run-off of the recoverables.

HBS.9.20 The assessment of the probability of default and the loss-given-default of the counterparty should be based upon current, reliable and credible information. Among the possible sources of information are: credit spreads, credit quality steps, information relating to the supervisory solvency assessment, and the financial reporting of the counterparty. The applied methods should guarantee market consistency. The IORP should not rely on information of a third party without assessing that the information is current, reliable and credible.

HBS.9.21 In particular, the assessment of the probability of default should be based on methods that guarantee the market consistency of the estimates of PD.

HBS.9.22 Some criteria to assess the reliability of the information might be, e.g., neutrality, prudency and completeness in all material aspects.

HBS.9.23 The IORP may consider for this purpose methods generally accepted and applied in financial markets (i.e., based on CDS markets), provided the financial information used in the calculations is sufficiently reliable and relevant for the purposes of the adjustment of the recoverables from (re)insurance.

HBS.9.24 In the case of (re)insurance recoverables from a SPV, the probability of default of special purpose vehicles should be calculated according to the average credit quality step of assets held by the special purpose vehicle, unless there is a reliable basis for an alternative calculation. When the IORP has no reliable source to estimate its probability of default, (i.e. there is a lack of credit quality step) the following rules should apply:

- SPV authorised under EU regulations: the probability of default should be calculated according to the average rating of assets and derivatives held by the SPV in guarantee of the recoverable.

- Other SPV where they are recognised as equivalent to those authorized under EU regulations: same treatment as in the case referred above.

- Others SPV: They should be considered as unrated.

HBS.9.25 Where possible in a reliable, objective and prudent manner, point-in-time estimates of the probability of default should be used for the calculation of the adjustment. In this case, the assessment should take the possible time-dependence of the probability of default into account. If point-in-time estimates are not possible to calculate in a reliable, objective and prudent

manner or their application would not be proportionate, through-the-cycle estimates of the probability of default might be used.

HBS.9.26 A usual assumption about probabilities of default is that they are not constant over time. In this regard it is possible to distinguish between point-in-time estimates which try to determine the current default probability and through-the-cycle estimates which try to determine a long-time average of the default probability.

HBS.9.27 In many cases only through-the-cycle estimates may be available. For example, the credit quality steps of rating agencies are usually based on through-the-cycle assessments. Moreover, the sophisticated analysis of the time dependence of the probability of default may be disproportionate in most cases. Hence, through-the-cycle estimates might be used if point-in-time estimates cannot be derived in a reliable, objective and prudent manner or their application would not be in line with the proportionality principle. If through-the-cycle estimates are applied, it can usually be assumed that the probability of default does not change during the run-off of the recoverables.

HBS.9.28 The assessment of the probability of default should take into account the fact that the cumulative probability increases with the time horizon of the assessment.

HBS.9.29 For example, the probability that the counterparty defaults during the next two years is higher than the probability of default during the next year.

HBS.9.30 Often, only the probability of default estimate PD during the following year is known. For example, if this probability is expected to be constant over time, then the probability PDt that the counterparty defaults during year t can be calculated as

$$PD_t = PD \cdot (1 - PD)^{t-1}.$$

HBS.9.31 This does not preclude the use of simplifications where their effect is not is not material at this aspect (see below).

Recovery rate (RR)

HBS.9.32 The recovery rate is the share of the debts that the counterparty will still be able to honour in case of default.

HBS.9.33 If no reliable estimate of the recovery rate of a counterparty is available, no rate higher than 50% should be used.

HBS.9.34 The degree of judgement that can be used in the estimation of the recovery rate should be restricted, especially where owing to a low number of defaults, little empirical data about this figure in relation to reinsurers is available, and hence, estimations of recovery rates are unlikely to be reliable.

HBS.9.35 The average loss resulting from a default of a counterparty should include

an estimation of the credit risk of any risk-mitigating instruments that the counterparty provided to the IORP ceding risks to the counterparty.

HBS.9.36 However, IORPs should consider the adjustment for the expected default losses of these mitigating instruments, i.e. the credit risk of the instruments as well as any other risk connected to them should also be allowed for. This allowance may be omitted where the impact is not material. To assess this materiality it is necessary to take into account the relevant features, such as the period of effect of the risk mitigating instrument.

Simplification for the counterparty default adjustment

HBS.9.37 IORPs may calculate the adjustment for expected losses due to default of the counterparty for a specific counterparty and homogeneous risk group to be equal as follows:

$$Adj_{CD} = -\max\left(0.5 \cdot \frac{PD}{1-PD} \cdot Dur_{mod} \cdot BE_{rec}; 0\right)$$

where:

(a) PD denotes the probability of default of that counterparty during the following 12 months;

(b) Dur_{mod} denotes the modified duration of the amounts recoverable from (re)insurance contracts with that counterparty in relation to that homogeneous risk group;

(c) BE_{rec} denotes the amounts recoverable from (re)insurance contracts with that counterparty in relation to that homogeneous risk group.

HBS.9.38 It is allowed to calculate the adjustment for recoverables by using an alternative method but in this case, a clear description of this alternative method should be provided.

2.10.   Discount rates

HBS.10.1. IORPs are requested to value the holistic balance sheet with two different discount rates (level A and level B).

HBS.10.2. In addition, IORPs are requested to make a separate calculation (sensitivity analysis) of the value of the best estimate of technical provisions on the basis of the basic risk free interest rates (level A) with a volatility adjustment and/or a matching adjustment.

HBS.10.3. Under this sensitivity analysis, IORPs should calculate the impact of a volatility adjustment and/or matching adjustment on the best estimate of technical provisions on a stand-alone basis only by adjusting the discount rate used for the liability cash flows. No recalculation of the cash flows is required and any possible impact of a volatility adjustment and/or matching adjustment on other items of the holistic balance sheet or the SCR should be ignored. No volatility adjustment and/or matching adjustment are to be included in calculations except for this sensitivity analysis.

HBS.10.4. IORPs can apply both volatility adjustment and matching adjustment but not with respect to the same pension obligations. This means that the matching adjustment should not be applied with respect to pension obligations where the relevant risk-free interest rate term structure to calculate the best estimate for those obligations includes a volatility adjustment and vice-versa.

HBS.10.5. If the matching adjustment is not applied (because it is not applicable or the IORP chooses not to use it), the entire portfolio of pension obligations should be subject to the volatility adjustment for the purpose of the sensitivity analysis.

HBS.10.6. EIOPA will provide IORPs with a spreadsheet containing the basic risk-free interest rate term structures for the currencies in participating member states per 31 December 2014 as well as the relevant risk-free rates including the volatility adjustment. The fundamental spreads for each relevant duration, credit quality and asset class for the calculation of the matching adjustment are included in a separate spreadsheet.

HBS.10.7. The risk-free interest rate term structure data correspond to the technical information that EIOPA publishes on a monthly basis in accordance with Article 77e of the Solvency II Directive. Technical documentation is available on EIOPA's website[25], which allows IORPs to apply the Smith-

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[25] EIOPA, Technical document regarding the risk-free interest rate term structure, EIOPA-BoS-15/035, 23 February 2015: https://eiopa.europa.eu/regulation-supervision/insurance/solvency-ii-technical-information/risk-free-interest-rate-term-structures

Wilson procedure themselves for the purpose of generating stochastic scenarios of the basic risk-free interest rate.

Basic risk-free interest rate ("Level A")

HBS.10.8. The table below summarises the approach used for deriving the basic risk-free term structures for the relevant countries:

Country	Currency	Instrument	Credit risk adjustment (bps)	LLP	Convergence period	UFR
Euro area	EUR	Swap	10	20	40	4.2%
Denmark	EUR	Swap	11	20	40	4.2%
Norway	NOK	Swap	10	10	50	4.2%
Sweden	SEK	Swap	10	10	10	4.2%
UK	GBP	Swap	10	50	40	4.2%

Reference instruments

HBS.10.9. The basic risk-free interest rates have been derived on the basis of interest rate swap rates for the relevant currencies, adjusted to take account of credit risk. Swap prices are mid prices. For Denmark the EUR curve has been used because the Danish currency is considered to be pegged to the Euro.

Credit risk adjustment

HBS.10.10. The credit risk adjustment is applied as a parallel downward shift of the observed market yields for those maturities up to the last liquid point. The credit risk adjustment is applied to the observed swap rates before deriving zero-coupon rates.

HBS.10.11. The adjustment takes into account the credit risk that is embedded in the determination of the floating rate leg of the swap contract, i.e. the credit risk pertaining to uncollateralised interbank market. Thus, the credit risk adjustment depends on the credit quality of the banks that, via interbank transactions, determine the basis for the floating leg in swap contracts.

HBS.10.12. The adjustment has been determined on the basis of the difference between rates capturing the credit risk reflected in the floating rate of interest rate swaps and overnight indexed swap rates of the same maturity, where both rates are available from deep, liquid and transparent financial markets. The calculation of the adjustment has been based on 50 percent of the average of that difference over a time period of one year, subject to a cap and a floor to ensure that it is not lower than 10 basis points or higher than 35 basis points.

HBS.10.13. For Norway the credit risk adjustment for the Swedish currency applies. The adjustment for Denmark includes a 1 basis point adjustment for currency risk for currencies pegged to the Euro.

Last liquid point and extrapolation methodology

HBS.10.14. The basic risk-free interest rate term structure for each currency is constructed from a finite number of data points, corresponding to swap rates that can be observed in deep, liquid and transparent markets. Both the interpolation between these data points, where necessary, and the extrapolation beyond the last liquid point (LLP) has been done using the Smith-Wilson method.

Ultimate forward rate (UFR)

HBS.10.15. The ultimate forward rate (UFR) is the percentage rate that the forward curve converges to at the convergence point, i.e. LLP plus convergence period. The UFR is based on estimates of expected inflation and the long-term average of short-term real rates.

HBS.10.16. The UFR for each of the five currencies is assumed to be equal to 4.2% (2.2% long-term average of short real rate and 2% inflation rate assumption).

Convergence period

HBS.10.17. The convergence point is the maximum of (LLP+40) and 60 years or the convergence period is the maximum of 40 years and (60-LLP). The convergence period for the SEK equals 10 years, considering the characteristics of the Swedish bond market.

HBS.10.18. The alpha parameter in the Smith-Wilson method, which controls the convergence speed, is set at the lowest value that produces a curve reaching the convergence tolerance of the UFR by the convergence point. The convergence tolerance is set at 1 basis point.

Adjustments to the risk free discount rate curve

Volatility adjustment

HBS.10.19. EIOPA will provide participating IORPs with the relevant risk free curves including volatility adjustment for relevant currencies. For the purpose of this quantitative assessment, the volatility adjustment will be based on the volatility adjustment that is used in Solvency II.

Matching adjustment

HBS.10.20. In the context of this quantitative assessment, the matching adjustment is to be applied as a parallel shift to the entire basic risk-free term structure as provided by EIOPA, i.e. it is not varying by maturity. It should be noted that different matching adjustment amounts might apply to different portfolios of liabilities.

Requirements for applying a matching adjustment

HBS.10.21. IORPs may apply a matching adjustment to the relevant risk-free interest rate term structure to calculate the best estimate of a portfolio of pension obligations where the following conditions are met:

(a) the IORP has assigned a portfolio of assets, consisting of bonds and other assets with similar cash-flow characteristics, to cover the best estimate of the portfolio of pension obligations and maintains that assignment over the lifetime of the obligations, except for the purpose of maintaining the replication of expected cash-flows between assets and liabilities where the cash-flows have materially changed;

(b) the portfolio of pension obligations to which the matching adjustment is applied and the assigned portfolio of assets are identified, organised and managed separately from other activities of the IORP, and the assigned portfolio of assets cannot be used to cover losses arising from other activities of the IORP;

(c) the expected cash-flows of the assigned portfolio of assets replicate each of the expected cash-flows of the portfolio of pension obligations in the same currency and any mismatch does not give rise to risks which are material in relation to the risks inherent in the pension business to which the matching adjustment is applied;

(d) the pension schemes/contracts underlying the portfolio of pension obligations do not give rise to future contribution payments;

(e) the only pension liability risks connected to the portfolio of pension obligations are longevity risk, expense risk, revision risk and mortality risk;

(f) where the pension liability risk connected to the portfolio of pension obligations includes mortality, the best estimate of the portfolio of pension obligations does not increase by more than 5% under a mortality risk shock that is calculated in accordance with HBS.10.24.

(g) the contracts underlying the pension obligations include no options for the members and beneficiaries or sponsors or only a surrender option where the surrender value does not exceed the value of the assets covering the pension obligations at the time the surrender option is exercised;

(h) the cash-flows of the assigned portfolio of assets are fixed and cannot be changed by the issuers of the assets or any third parties;

(j) the pension obligations of an pension scheme/contract are not split into different parts when composing the portfolio of pension obligations for the purpose of this paragraph.

HBS.10.22. Notwithstanding point (h) of HBS.10.21, IORPs may use assets where the cash-flows are fixed except for a dependence on inflation, provided that those assets replicate the cash-flows of the portfolio of pension obligations that depend on inflation.

HBS.10.23. In the event that issuers or third parties have the right to change the cash-flows of an asset in such a manner that the investor receives sufficient compensation to allow it to obtain the same cash-flows by re-investing in assets of an equivalent or better credit quality, the right to change the cash-flows shall not disqualify the asset for admissibility to the assigned portfolio in accordance with point (h).

Mortality risk shock for matching adjustment

HBS.10.24. The mortality risk shock referred to in HBS.10.21. (f) should be the more adverse of the following two shocks:

(i) an instantaneous permanent increase of 15% in the mortality rates used for the calculation of the best estimate;

(ii) an instantaneous increase of 0.15 percentage points to the mortality rates (expressed as percentages) which are used in the calculation of technical provisions to reflect the mortality experience in the following 12 months.

HBS.10.25. For each of these shocks the increase in mortality rates should only apply to those pension obligations for which the increase in mortality rates leads to an increase in technical provisions.

Calculation of the matching adjustment

HBS.10.26. For each currency the matching adjustment should be calculated in accordance with the following principles:

(a) the matching adjustment should be equal to the difference of the following:

(i) the annual effective rate, calculated as the single discount rate that, where applied to the cash-flows of the portfolio of pension obligations, results in a value that is equal to the value of the portfolio of assigned assets;

(ii) the annual effective rate, calculated as the single discount rate that, where applied to the cash-flows of the portfolio of pension obligations, results in a value that is equal to the value of the best estimate of the portfolio of pension obligations where the time value is taken into account using the basic risk-free interest rate term structure;

(b) the matching adjustment should not include the fundamental spread reflecting the risks retained by the IORP;

(c) notwithstanding point (a), the fundamental spread should be increased where necessary to ensure that the matching adjustment for assets with sub investment grade credit quality does not exceed the matching adjustments for assets of investment grade credit quality and the same duration and asset class;

(d) the use of external credit assessments in the calculation of the matching adjustment should be in line with the specifications referred to in Article 111(1)(n) of the Directive 2009/138/EC.

HBS.10.27. For the purpose of HBS.10.26.(b) the fundamental spread should be:

(a) equal to the sum of the following:

(i) the credit spread corresponding to the probability of default of the assets;

(ii) the credit spread corresponding to the expected loss resulting from downgrading of the assets;

(b) for exposures to Member States' central governments and central banks, no lower than 30% of the long term average of the spread over the risk-free interest rate of assets of the same duration, credit quality and asset class, as observed in financial markets;

(c) for assets other than exposures to Member States' central governments and central banks, no lower than 35% of the long term average of the spread over the risk-free interest rate of assets of the same duration, credit quality and asset class, as observed in financial markets.

The probability of default referred to in point (a) (i) shall be based on long-term default statistics that are relevant for the asset in relation to its duration, credit quality and asset class.

HBS.10.28. Where no reliable credit spread can be derived from the default statistics referred to in point HSB.10.27 the fundamental spread shall be equal to the portion of the long term average of the spread over the risk-free interest rate set out in points (b) and (c).

HBS.10.29. For the purpose of calculating the annual effective rate in HBS.10.26.(a)(i), IORPs should only consider the assigned assets whose expected cash-flows are required to replicate the cash-flows of the portfolio of pension obligations, excluding any assets in excess of that.

HBS.10.30. The 'expected cash-flow' of an asset means the cash-flow of the asset adjusted to allow for:

(a) the probability of default of the asset that corresponds to the element of the fundamental spread set out in HBS.10.27.(a)(i) , or

(b) where no reliable credit spread can be derived from the default statistics, the portion of the long-term average of the spread over the risk-free interest rate set out in HBS.10.27.(b) and (c).

HBS.10.31. The deduction of the fundamental spread, referred to in HBS.10.26.(b), from the result of the calculation set out in HBS.10.26.(a), should include only the portion of the fundamental spread that has not already been allowed for by adjusting the cash-flows of the assigned portfolio of assets in accordance with paragraph HBS.10.30.

HBS.10.32. The fundamental spreads for each asset class, rating and duration are provided by EIOPA, distinguishing:

- The long-term average spreads (LTAS) on corporate and government bonds;

- The probability of default (PD) of corporate bonds, expressed as a de-risking probability and in basis points;

- The cost of downgrade (CoD) in basis points on corporate bonds.

HBS.10.33. IORPs need to produce de-risked cash flows for their sovereign exposures. To do this, IORPs have to calculate the FS from the LTAS (30% of LTAS for exposures to Member States' central governments and central banks and 35% of LTAS for other exposures). Subsequently, the FS in basis points will need to be converted into an appropriate set of de-risking probabilities.

HBS.10.34. For corporate bonds, the PD component should be used to de-risk asset cash flows for the purpose of assessing cash flow matching within the matching adjustment portfolio. Once the IORP has computed the difference of the two annual effective rates in accordance with HBS.10.26.(a), any residual part of the fundamental spread must be deducted. This residual part could be either the CoD component where PD+CoD is equal to the FS (i.e. where PD + CoD is higher than 35% of the LTAS) or FS-PD where PD+CoD is smaller than the FS (i.e. 35% of the LTAS is higher than PD+CoD).

Expected return ("Level B")

HBS.10.35. IORPs are requested to derive a discount rate based on the expected return on the assets held by the IORP (Level B) which consists of the basic risk free interest rate curve with an allowance for the risk premium on assets.

HBS.10.36. Where relevant and possible, the expected risk premium should take into account the IORPs plans for changes to their investment strategy – and so expected returns - over time. For example, if the IORP intends to increase the proportion of assets invested in bonds and reduce those in equities, perhaps in view of changes to the maturity of the IORP's technical provisions, this should be reflected in the assumed best estimates for the discount rates.

HBS.10.37. For the purposes of this quantitative assessment, and to ensure comparability and consistency in the results, IORPs are requested to use a simplified strategic asset mix with no account given to any tactical deviations, and the below risk premiums over the risk fee rate are assumed for the simplified asset classes.

HBS.10.38. The simplified strategic asset mix is to be determined by categorising all investments in either fixed income or non-fixed income. The fixed income

assets consist of all bonds (including inflation-linked bonds, variable rate bonds etc.), deposits and loans and receivables which yield a current interest. Any other investment is to be considered non fixed income for the purpose of this classification.

HBS.10.39. The expected risk premium for fixed income assets should be equal to the average weighted return of the strategic fixed income portfolio of the IORP. This risk premium is determined based on the part of the fixed income portfolio which consists of government bonds, financial corporate bonds and non-financial corporate bonds, which should be assumed to include any residual fixed-income securities. The different classes of bonds will be assumed to yield the following returns:

a. Government bonds: 0.3% based on the long-term average spread on a basket of government bonds in the EU and after correcting for the expected costs of default/downgrade.

b. Non-financial corporate bonds: 0.6% based on the long-term average spread on A-rated euro denominated non-financial corporate bonds and after correcting for the expected costs of default/downgrade.

c. Financial corporate bonds: 1.1% based on the long-term average spread on A-rated euro denominated financial corporate bonds and after correcting for the expected costs of default/downgrade

The average of these risk premiums (weighted according to the strategic composition of the bonds portfolio of the IORP) shall be used as the risk premiums for fixed income investments. For the purpose of this quantitative assessment this approach is deemed to serve well as a simplified approximation for the yield on a diversified portfolio of fixed income assets.

HBS.10.40. Non fixed income investments will be assumed to yield a risk premium of 3.0% over the risk free interest rate curve.

HBS.10.41. The weighted average (weighed according to the simplified strategic asset mix) of the fixed income and non-fixed income risk premiums shall be used as the risk premium on the overall investment portfolio. The effective annual risk premium over the coming t years shall be added to the zero-coupon risk free interest rate for maturity t of the relevant member state and used as the discount rate for level B technical provisions. The spreadsheet with yield curves included in the quantitative assessment package will calculate the Level B discount curve based on the relevant portfolio shares provided by the IORP.

Expected inflation and salary increases

HBS.10.42. For some IORPs, sponsor contributions and benefits may be linked to price inflation and wage growth. This is the case for the best estimate of unconditional benefits (such as in the case of guaranteed indexation), but also in the case of conditional or discretionary benefits (such as in the case

of conditional indexation granting based on the solvency position of the IORP). HBS.5.8 ff. defines whether future inflation or salary increases should be taken into account in the best estimate of technical provisions. Whenever expected inflation rates or salary increases are needed, IORPs should use the following:

HBS.10.43. The inflation rates curve to be used is provided together with these specifications.

HBS.10.44. Expected inflation rates used are market zero-coupon break-even inflation swap rates on 31 December 2014 for the EUR, DKK, GBP and SEK.

HBS.10.45. The zero-coupon break-even inflation swap rates will be interpolated and extrapolated using the Smith-Wilson method. The UFR is set at 2% for all currencies. The LLP and the convergence period are assumed to be the same as for the basic risk-free interest rate curve. No credit risk adjustment is applied.

HBS.10.46. The inflation curve for NOK is set equal to 2% for all maturities as insufficient zero-coupon inflation swap rate data are available.

HBS.10.47. IORPs may apply an appropriate adjustment to the inflation rate curve if the inflation measure implied by the provided curve does not adequately reflect the inflation measure to which pension obligations are linked.

HBS.10.48. No readily available market indices exist for wage inflation. Where an estimate of salary growth is required, IORPs are to increase the price inflation curve with a best estimate of real wage growth that adequately reflects the situation for their company, sector or member state.

2.11. Valuation of other assets and other liabilities

HBS.11.1. IORPs shall value other assets and other liabilities on a market consistent basis, in line with EIOPA's Advice to the European Commission on the review of the IORP Directive.

No subsequent adjustment should be made to take account of the change in the own credit standing of the IORP when valuing financial liabilities.

HBS.11.2. For the assessment of other assets and other liabilities IORPs should apply the provisions stated in paragraphs HBS.11.3 to HBS.11.11 to the extent possible and necessary for the general purpose of this quantitative assessment. Based on the concept of materiality IORPs can deviate from these provisions for the valuation of assets and liabilities for items which are, individually or collectively, not material for the purpose of this quantitative assessment, e.g. by using values based on national accounting standards.

HBS.11.3. Valuation assumptions: IORPs shall value other assets and other liabilities based on the assumption that the institution will provide occupational retirement benefits as a going concern.

HBS.11.4. Paragraphs HBS.11.5 to HBS.11.11 shall apply to the recognition and valuation of assets and liabilities other than technical provisions and security mechanisms.

HBS.11.5. Valuation methodology – general principles

(1) IORPs shall recognise assets and liabilities other than technical provisions and security mechanisms in conformity with the international accounting standards endorsed by the Commission in accordance with Regulation (EC) No 1606/2002.

(2) IORPs shall value assets and liabilities other than technical provisions and security mechanisms in conformity with international accounting standards endorsed by the Commission in accordance with Regulation (EC) No 1606/2002 provided that those standards include valuation methods that are consistent with the valuation approach set out in HBS.11.1. Where those standards allow for the use of more than one valuation method, only valuation methods that are consistent with HBS.11.1 can be used.

(3) Where the valuation methods included in international accounting standards endorsed by the Commission in accordance with Regulation (EC) No 1606/2002 are either temporarily or permanently not consistent with the valuation approach set out in HBS.11.1, IORPs shall use the other valuation methods that have been deemed to be consistent with HBS.11.1.

(4) By way of derogation from paragraphs 1 and 2, and in particular by respecting the principle of proportionality, IORPs 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 HBS.11.1;

(b) the valuation method is proportionate with respect to the nature, scale and complexity of the risks inherent in the business of the IORP;

(c) the IORP does not value that asset or liability using international accounting standards endorsed 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 IORP that would be disproportionate with respect to the total administrative expenses.

(5) IORPs shall value individual assets separately.

(6) IORPs shall value individual liabilities separately.

HBS.11.6. Valuation methodology – valuation hierarchy

(1) IORPs shall, when valuing assets and liabilities in accordance with HBS.11.5 (1), (2) and (3), follow the valuation hierarchy set out in paragraphs (2) to (7) below, taking into account the characteristics of the asset or liability where market participants would take those characteristics into account when pricing the asset or liability at the valuation date, including the condition and location of the asset or liability and restrictions, if any, on the sale or use of the asset.

(2) As the default valuation method IORPs shall value assets and liabilities using quoted market prices in active markets for the same assets or liabilities.

(3) Where the use of quoted market prices in active markets for the same assets or liabilities is not possible, IORPs shall value assets and liabilities using quoted market prices in active markets for similar assets and liabilities with adjustments to reflect differences. Those adjustments shall reflect factors specific to the asset or liability including all of the following:

(a) the condition or location of the asset or liability;

(b) the extent to which inputs relate to items that are comparable to the asset or liability; and

(c) the volume or level of activity in the markets within which the inputs are observed.

(4) The use of quoted market prices shall be based on the criteria for active markets, as defined in international accounting standards

endorsed by the Commission in accordance with Regulation (EC) No 1606/2002.

(5) Where the criteria referred to in paragraph 4 are not satisfied, IORPs shall, unless otherwise stated, use alternative valuation methods.

(6) When using alternative valuation methods, IORPs shall rely as little as possible on IORP-specific inputs and make maximum use of relevant market inputs including the following:

(a) quoted prices for identical or similar assets or liabilities in markets that are not active;

(b) inputs other than quoted prices that are observable for the asset or liability, including interest rates and yield curves observable at commonly quoted intervals, implied volatilities and credit spreads;

(c) market-corroborated inputs, which may not be directly observable, but are based on or supported by observable market data.

All those markets inputs shall be adjusted for the factors referred to in paragraph 3.

To the extent that relevant observable inputs are not available including in circumstances where there is little, if any, market activity for the asset or liability at the valuation date, IORPs shall use unobservable inputs reflecting the assumptions that market participants would use when pricing the asset or liability, including assumptions about risk. Where unobservable inputs are used, IORPs shall adjust IORP-specific data if reasonable available information indicates that other market participants would use different data or there is something particular to the IORP that is not available to other market participants.

When assessing the assumptions about risk referred to in this paragraph IORPs shall take into account the risk inherent in the specific valuation technique used to measure fair value and the risk inherent in the inputs of that valuation technique.

(7) IORPs shall use valuation techniques that are consistent with one or more of the following approaches when using alternative valuation methods:

(a) market approach, which uses prices and other relevant information generated by market transactions involving identical or similar assets, liabilities or group of assets and liabilities. Valuation techniques consistent with the market approach include matrix pricing.

(b) income approach, which converts future amounts, such as cash flows or income or expenses, to a single current amount. The fair value shall reflect current market expectations about those future

amounts. Valuation techniques consistent with the income approach include present value techniques, option pricing models and the multi-period excess earnings method;

(c) cost approach or current replacement cost approach reflects the amount that would be required currently to replace the service capacity of an asset. From the perspective of a market participant seller, the price that would be received for the asset is based on the cost to a market participant buyer to acquire or construct a substitute asset of comparable quality adjusted for obsolescence.

HBS.11.7. Recognition of contingent liabilities

(1) IORPs shall recognise contingent liabilities in accordance with the general principles outlined in HBS.11.5 if they are material.

(2) Contingent liabilities are material if information about the current or potential size or nature of those liabilities could influence the decision-making or judgement of the intended user of that information, including the supervisory authorities.

HBS.11.8. Valuation methods for goodwill and intangible assets: IORPs shall value the following assets at zero:

(1) goodwill;

(2) intangible assets, other than goodwill, unless the intangible asset can be sold separately and the IORP can demonstrate that there is a value for the same or similar assets that has been derived in accordance with paragraph HBS.11.6(2), in which case the asset shall be valued in accordance with paragraph HBS.11.6.

HBS.11.9. Valuation methods for specific liabilities: IORPs shall value:

(1) Financial liabilities, as referred to in international accounting standards endorsed by the Commission in accordance with Regulation (EC) No 1606/2002, in accordance with HBS.11.5 upon initial recognition. There shall be no subsequent adjustment to take account of the change in own credit standing of the IORP after initial recognition.

(2) Contingent liabilities, recognised in accordance with paragraph HBS.11.7. The value of contingent liabilities shall be equal to the expected present value of future cash-flows required to settle the contingent liability over the lifetime of that contingent liability, using the basic risk-free interest rate term structure.

(3) Deferred tax liabilities in accordance with paragraph HBS.11.10.

HBS.11.10. Deferred taxes

(1) IORPs 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 conformity with HBS.11.5.

(2) Notwithstanding paragraph 1, IORPs shall value deferred taxes, other than deferred tax assets arising from the carryforward of unused tax credits and the carryforward of unused tax losses, on the basis of the difference between the values ascribed to assets and liabilities including technical provisions, recognised and valued in accordance with HBS.11.1 and the values ascribed to assets and liabilities as recognised and valued for tax purposes.

(3) IORP 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 carryforward of unused tax losses or the carryforward of unused tax credits.

HBS.11.11. Exclusion of valuation methods

(1) IORPs shall not value financial assets or financial liabilities at cost or amortized cost.

(2) IORPs shall not apply valuation models that value at the lower of the carrying amount and fair value less costs to sell.

(3) IORPs shall not value property, investment property, plant and equipment with cost models where the asset value is determined as cost less depreciation and impairment.

(4) IORPs which are lessees in a financial lease or lessors shall comply with all of the following when valuing assets and liabilities in a lease arrangement:

(a) lease assets shall be valued at fair value;

(b) for the purposes of determining the present value of the minimum lease payments market consistent inputs shall be used and no subsequent adjustments to take account of the own credit standing of the undertaking shall be made;

(c) valuation at depreciated cost shall not be applied.

(5) IORPs shall adjust the net realisable value for inventories by the estimated cost of completion and the estimated costs necessary to make the sale where those costs are material. Those costs shall be considered to be material where their non-inclusion could influence the decision-making or the judgement of the users of the balance sheet, including the supervisory authorities. Valuation at cost shall not be applied.

(6) IORPs shall not value non-monetary grants at a nominal amount.

(7) When valuing biological assets, IORPs shall adjust the value by adding the estimated costs to sell if the estimated costs to sell are material.

3.   SCR

3.1.   Overall structure of the SCR

SCR General remarks

Overview

SCR.1.1.   This section provides guidance for the calculation of the Solvency Capital Requirement (SCR) in the two baseline scenarios. In addition, it describes how the SCR for the examples of a supervisory framework presented in the consultation paper is derived from the two baseline scenarios.

SCR.1.2.   The calculation of the SCR is divided into modules and sub-modules as follows:
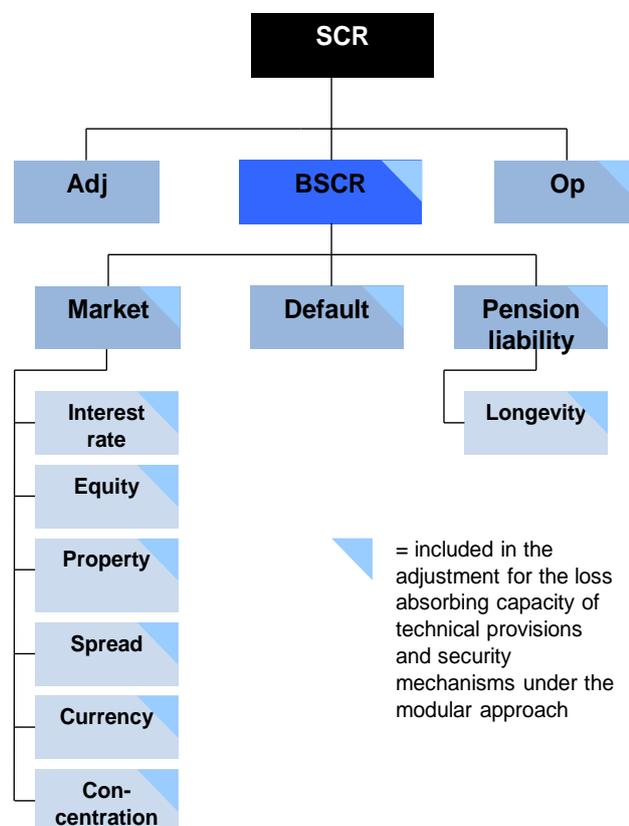
SCR.1.3.   The SCR module for intangible asset risk is not part of the SCR in this assessment. However, IORPs that consider that intangible assets represent an important/material risk may include the module in the SCR calculation. The intangible asset sub-module and its impact on the overall SCR are described in Annex 5.

SCR.1.4.   For each module and sub-module, the specifications are split into the

following subsections:

- Description: this defines the scope of the module or sub-module, and gives a definition of the relevant sub-risk;

- Input: this lists the input data requirements;

- Output: this describes the output data generated by the module;

- Calculation: this sets out how the output is derived from the input;

- Simplification: this sets out how the calculation can be simplified under certain conditions. Further simplifications can be made by IORPs, if appropriate.

Technical provisions in the SCR calculations

SCR.1.5. For the purposes of the SCR calculations, technical provisions should be valued in accordance with the specifications laid out in the section on valuation. To avoid circularity in the calculation, any reference to technical provisions within the calculations for the individual SCR modules is to be understood to exclude the risk margin.

SCR.1.6. The SCR calculations are to be based on the technical provisions in the respective baseline scenario as described in the section on valuation.

Scenario-based calculations

SCR.1.7. For several sub-modules the calculation of the capital requirement is scenario-based: The capital requirement is determined as the impact of a specified scenario on the net asset value of the IORP (NAV).

SCR.1.8. The net asset value is defined as the difference between assets and liabilities. As explained above, for the purpose of the SCR calculations, the liabilities should not include the risk margin of technical provisions. Furthermore, the liabilities should not include subordinated liabilities.[26] The change of NAV resulting from the scenario is referred to as ΔNAV. ΔNAV is defined to be positive where the scenario results in a loss of NAV.

SCR.1.9. The scenarios should be interpreted in the following manner:

- The recalculation of technical provisions to determine the change in NAV should allow for any relevant adverse changes in option take-up behaviour of members and beneficiaries or sponsors under the scenario, if applicable.

- Where risk mitigation techniques meet the requirements set out in sections 3.8 and 3.9, their risk-mitigating effect should be taken into account in the analysis of the scenario.

- Where the scenario results in an increase of NAV, and therefore does not

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[26] NAV = assets – liabilities whereby subordinated liabilities are excluded from liabilities. This ensures that NAV corresponds to basic own funds, i.e. the excess of assets over liabilities plus subordinated liabilities. For the purpose of this QIS "subordinated liabilities" should be understood as "subordinated loans".

reflect a risk for the IORP, this should not lead to a "negative capital requirement". The corresponding capital requirement in such a situation is nil.

SCR.1.10. Future management actions of the management of the IORP should be taken into account in the scenario calculations in the following manner:

- To the extent that the scenario stress under consideration is considered to be an instantaneous stress, no management actions may be assumed to occur during the stress.

- However it may be necessary to reassess the value of the technical provisions after the stress. Assumptions about future management actions may be taken into account at this stage. The approach taken for the recalculation of the best estimate to assess the impact of the stress should be consistent with the approach taken in the initial valuation of the best estimate.

- Any assumptions regarding future management actions for the assessment of the SCR should be objective, realistic and verifiable. Guidance on these requirements can be found in the section on valuation.

Calibration

SCR.1.11. The SCR calculations defined in this assessment correspond to those used in articles 100 to 111 of Directive 2009/138/EC (Solvency II) and articles 83 to 221 of the related Delegated Acts. These were designed for a Value-at-Risk of the basic own funds (i.e. the excess of assets over liabilities plus subordinated liabilities) subject to a confidence level of 99.5% over a one-year period.

SCR.1.12. To ensure that the different modules of the SCR calculation are calibrated in a consistent manner, the 99.5% Value-at-Risk calibration objective applies to each individual module.

SCR.1.13. For the aggregation of the individual risk modules to an overall SCR, linear correlation techniques are applied. The setting of the correlation coefficients is intended to reflect potential dependencies in the tail of the distributions, as well as the stability of any correlation assumptions under stress conditions.

Proportionality and simplifications

SCR.1.14. The principle of proportionality is intended to support the consistent application of the principles-based solvency requirements to   all IORPs.

SCR.1.15. In this assessment, as described in the introduction to these technical specifications, IORPs may apply to several parts of the SCR calculation specified simplifications or further simplifications, if appropriate, provided that the simplified calculation is proportionate to the nature, scale and complexity of the risks.

SCR Calculation Structure

Overall SCR calculation

Description

SCR.1.16. The SCR is the end result of the following calculation.

Input

SCR.1.17. The following input information is required:

$BSCR$ = Basic Solvency Capital Requirement

SCR_{op} = The capital requirement for operational risk

Adj = Adjustment for the loss absorbing capacity of technical provisions, security mechanisms and deferred taxes

Output

SCR.1.18. This module delivers the following output information:

SCR = The overall solvency capital requirement

Calculation

SCR.1.19. The SCR is determined as follows:

$$SCR = BSCR + SCR_{Op} + Adj$$

Description

SCR.1.20. The Basic Solvency Capital Requirement (BSCR) is the Solvency Capital Requirement before any adjustments, combining capital requirements for three major risk categories.

Input

SCR.1.21. The following input information is required:

SCR_{mkt} = Capital requirement for market risk

SCR_{def} = Capital requirement for counterparty default risk

$SCR_{pension}$ = Capital requirement for pension liability risk

Output

SCR.1.22. The module delivers the following output:

$BSCR$ = Basic Solvency Capital Requirement

Calculation

SCR.1.23. The BSCR is determined as follows:

$$BSCR = \sqrt{\sum_{ij} Corr_{ij} \times SCR_i \times SCR_j}$$

where

$Corr_{i,j}$ = the entries of the correlation matrix *Corr*

SCR_i, SCR_j = Capital requirements for the individual SCR risks according to the rows and columns of the correlation matrix *Corr*.

SCR.1.24. The factor $Corr_{i,j}$ denotes the item set out in row i and in column j of the following correlation matrix *Corr*:

j i	Market	Default	Pension liability
Market	1		
Default	0.25	1	
Pension liability	0.25	0.25	1

3.2. Loss absorbing capacity of technical provisions, security mechanisms and deferred taxes

Technical provisions and security mechanisms

SCR.2.1. Technical provisions for pure conditional, pure discretionary or mixed benefits, as defined in section on valuation, may have the ability to absorb losses in a stress situation, meaning that their value is reduced in such a situation and such partly or fully compensates the effect of the stress situation on the holistic balance sheet of the IORP. This effect can only be considered, if the respective types of benefits are included on the holistic balance sheet.

SCR.2.2. All types of pure conditional benefits, whether based on comprehensive benefit adjustment mechanisms, indexation mechanisms or other, may have a loss absorbing capacity. Determining the extent of the loss absorbing capacity may not be easy in all cases. In general, the more complex the conditions are, under which the conditional benefits are paid, the more difficult this will be.

SCR.2.3. In general, pure discretionary and mixed benefits will have full loss absorbing capacity, i.e. the maximum loss absorbing capacity is equal to their value.

SCR.2.4. Ex post benefit reductions may have a loss absorbing capacity, depending on the conditions for reducing benefits in a stress situation.

SCR.2.5. Security mechanisms refer to all types of sponsor support and pension

protection schemes (see section on valuation).

SCR.2.6. The loss absorbing capacity of sponsor support will depend on the type of sponsor support (unlimited, limited, etc.), but also on the financial capacity of the sponsor to make additional contributions to the IORP or pay directly to members and beneficiaries (in the case of Form B of sponsor support).

SCR.2.7. The loss absorbing capacity of pension protection schemes will be the overall value of the level of pension benefits covered by the pension protection scheme. IORPs can use as the maximum value of pension protection schemes to be used in the SCR calculation the product of the average coverage rate of the pension protection scheme and the value of technical provisions for benefits protected by the pension protection scheme. However, these assumptions do not prejudge the way EIOPA's advice to the Commission will recommend to assess the financial strength of pension protection schemes in order to calculate their loss absorbing capacity.

Calculation of the adjustment for loss absorbing capacity of technical provisions, security mechanisms and deferred taxes

SCR.2.8. The adjustment Adj for the loss absorbing capacity of technical provisions, security mechanisms and deferred taxes reflects the potential compensation of unexpected losses through a decrease in technical provisions or deferred taxes, or an increase in the value of security mechanisms. In relation to technical provisions the adjustment takes account of the risk mitigating effect provided by pure conditional, pure discretionary and mixed benefits to the extent IORPs can establish that a reduction in such benefits may be used to cover unexpected losses when they occur.

SCR.2.9. In this assessment, the method for calculating Adj is dependent on the scope of existing security and adjustment mechanisms of an IORP.

SCR.2.10. There are IORPs where adjustment and security mechanisms are restricted to the absorption of specific risks.[27] This means that the loss absorbing capacity of those mechanisms is triggered by losses of the IORP from specific risks (e.g. market risk), but not by losses of the IORP from other risks (e.g. longevity), or of the IORP as a whole. For these IORPs, the calculation of the loss absorbing capacity is done, in general, on the level of every sub-module of the SCR calculation, using the methodology already applied in the IORP QIS. This is described below in further detail.

SCR.2.11. There are other IORPs where the loss absorbing capacity of technical provisions and security mechanisms is triggered by losses of the IORP as a whole, irrespective of the risk(s) that crystalized to create the loss. It was pointed out by participants in the IORP QIS, that the method used there

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[27] See par. 10.58 on page 132 of EIOPA Report on QIS on IORPs, EIOPA-BoS-13/124, 4 July 2013.

for calculation of the loss absorbing capacity is not always appropriate in those cases. Therefore, for those IORPs, the calculation of the loss absorbing capacity is done using a different method in this assessment. This also makes the calculation easier and less burdensome for those IORPs.

Calculation of the adjustment Adj in case the loss absorbing capacity of technical provisions and/or security mechanisms is triggered by losses of the IORP as a whole

SCR.2.12. In cases where the loss absorbing capacity of technical provisions and/or security mechanisms is triggered by losses of the IORP as a whole, it is not required to perform net SCR calculations at the level of sub-modules, because it is not relevant for determining the loss absorbing capacity which risk(s) caused the losses.

SCR.2.13. It may be that the loss absorbing capacity of technical provisions and/or security mechanisms is only triggered after part of the losses have been absorbed by a certain part of the NAV.[28] This leads to the following definition:

NAV* = the part of the NAV which has to be used up to absorb losses before the loss absorbing capacity of technical provisions and/or security mechanisms is triggered.

SCR.2.14. E.g., benefits may only be adjusted after an IORP has lost its NAV due to a specified shock, or after it has lost its NAV with the exemption of subordinated loans.

SCR.2.15. In such cases, and if $BSCR + SCR_{Op}$ is larger than NAV*, Adj will not reduce the SCR further than to the amount of NAV*.

SCR.2.16. Therefore, the calculation of Adj is depending on the situation as follows:

If $BSCR + SCR_{Op} \leq NAV^*$, then Adj = 0;

If $BSCR + SCR_{Op} > NAV^*$ and $BSCR + SCR_{Op} + (Adj_{TS} + Adj_{DT}) < NAV^*$, then $Adj = -(BSCR + SCR_{Op} - NAV^*)$;

If $BSCR + SCR_{Op} > NAV^*$ and $BSCR + SCR_{Op} + (Adj_{TS} + Adj_{DT}) \geq NAV^*$, then $Adj = Adj_{TS} + Adj_{DT}$.

where

Adj_{TS} = adjustment for loss absorbing capacity of technical provisions and security mechanisms

Adj_{DT} = adjustment for loss absorbing capacity of deferred taxes

SCR.2.17. Note that sponsor support can generally not absorb losses of the IORP as a whole unless the IORP fulfils the conditions to apply the balancing item approach to the valuation of sponsor support (see SCR.2.18 ff.). The reason is that the sponsor cannot cover losses resulting from its own

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[28] The "certain part" could also be the complete NAV.

default.

Calculation of the adjustment Adj in case the balancing item approach is used for determining the value of sponsor support

SCR.2.18. In case the IORP has access to sponsor support and the balancing item approach can be used for determining the value of sponsor support, the calculation of Adj can be further simplified. The values of Adj_{TS} and Adj_{DT} do not have to be calculated, when this simplification is possible.

SCR.2.19. If $\text{BSCR} + \text{SCR}_{Op} \leq \text{NAV}^*$, then $\text{Adj} = 0$.

SCR.2.20. If $\text{BSCR} + \text{SCR}_{Op} > \text{NAV}^*$, then the value of Adj depends on the conditions outlined in the section on valuation which the IORP fulfils to justify the use of the balancing item approach:

SCR.2.21. In case condition 1 (based on one-year survival rate of the sponsor) is fulfilled, then $\text{Adj} = -(\text{BSCR} + \text{SCR}_{Op} - \text{NAV}^*)$.

SCR.2.22. In case condition 2 (based on the value of the sponsor being larger than a certain multiple M) is fulfilled in the unstressed and stressed holistic balance sheet, then $\text{Adj} = -(\text{BSCR} + \text{SCR}_{Op} - \text{NAV}^*)$.

SCR.2.23. In case condition 2 is fulfilled in the unstressed, but not in the stressed holistic balance sheet, then the calculation of Adj has to be done in the same way as in the case when the balancing item approach is not used for determining the value of sponsor support.

Adjustment for loss absorbing capacity of technical provisions and security mechanisms (Adj$_{TS}$)

SCR.2.24. The absolute amount of Adj_{TS} should take into account the sum of (1) the total value DCL[29] of pure conditional, pure discretionary and mixed benefits and benefits subject to ex post reductions and reductions in case of sponsor default for the purpose of calculating the technical provisions, (2) $MSS_{available}$ = maximum value of sponsor support (MSS) as determined according to section on valuation minus the value of sponsor support already included in the holistic balance sheet, and (3) $MPP_{available}$ = the maximum value of the pension protection scheme as determined according to SCR.2.7 minus the value of the pension protection scheme already included in the holistic balance sheet, but not exceed the value of the sum of BSCR and SCR_{Op}:

$$\text{Adj}_{TS} = -\max(\min(\text{BSCR} + \text{SCR}_{Op}; \text{DCL} + \text{MSS}_{available} + \text{MPP}_{available}); 0)$$

Adjustment for loss absorbing capacity of deferred taxes (Adj$_{DT}$)

SCR.2.25. Adj_{DT} should be equal to the change in the value of deferred taxes of IORPs that would result from an instantaneous loss of an amount that is equal to the following amount:

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[29] "DCL" derived from Discretionary/Conditional Liabilities.

$$SCRshock = BSCR + SCR_{Op} + Adj_{TS}$$

SCR.2.26. For the purpose of this calculation, the value of deferred taxes should be calculated as set out in the section on valuation. Where a loss of *SCRshock* would result in the setting up of deferred tax assets IORPs should take into account the magnitude of the loss and its impact on the IORP's financial situation when assessing whether the realisation of that deferred tax asset is probable within a reasonable timeframe.

SCR.2.27. For the purpose of this calculation, a decrease in deferred tax liabilities or an increase in deferred tax assets should result in a negative adjustment for the loss absorbing capacity of deferred taxes.

Calculation of the adjustment Adj in case the loss absorbing capacity of technical provisions and/or security mechanisms is restricted to the absorption of specific risks

SCR.2.28. In this case, the solvency capital requirement for market, pension liability and counterparty default risk should be derived under a gross calculation and a net calculation reflecting the loss absorbing capacity of technical provisions and security mechanisms.

SCR.2.29. The gross calculation should be used to determine the Basic Solvency Capital Requirement and in the calculation of the adjustment for the loss absorbing capacity of technical provisions. In the calculation of the adjustment, the result of the gross calculation is used to prevent double counting of risk mitigating effects in the modular approach. Moreover it is an additional source of information about the risk profile of the IORP. The gross calculation does not reflect all aspects of the economic reality as it ignores the loss absorbing capacity of technical provisions, security mechanisms and deferred taxes.

SCR.2.30. The net calculation of the solvency capital requirement with respect to loss absorbing capacity of technical provisions and security mechanisms should be defined as follows:

SCR.2.31. An IORP may be able to vary its assumptions on the payment of pure conditional benefits (e. g. future bonus rates in the case of profit-sharing, conditional indexation of pension accruals and benefits, benefit reductions in the event of sponsor default), pure discretionary and mixed benefits, and may reduce benefits in response to the shock being tested, based on reasonable expectations and having regard to realistic management actions.

SCR.2.32. An IORP may be backed up by a sponsor that is able to increase its support and/or by a pension protection scheme guaranteeing a certain level of benefits. The pension protection scheme increases in value in response to the shock being tested, based on reasonable expectations and having regard to realistic contributions by the sponsor.

SCR.2.33. The establishment of the total net SCR for each (sub-)module involves the

calculation of a stressed balance sheet and comparing it to the unstressed balance sheet that was used to calculate the excess of assets over liabilities. Therefore, for each (sub-)module IORPs can derive the best estimate value of the technical provisions relating to pure conditional, pure discretionary and mixed benefits and benefits subject to benefit adjustment mechanisms as well as the value of sponsor support and pension protection schemes from both balance sheets.

SCR.2.34. The gross calculation should be defined as follows:

SCR.2.35. The gross SCR can be derived by assuming that both the value of technical provisions and security mechanisms has not changed as a result of the scenario. This means that the direct effect (meaning the effect without considering loss absorbing capacities) of the respective scenario on the value of technical provisions and security mechanisms should be taken into account in the calculation of the gross SCR, but not the change in the value of technical provisions and security mechanisms which is a consequence of their respective loss absorbing capacity.

SCR.2.36. The adjustment Adj for loss absorbing capacity of technical provisions, security mechanisms and deferred taxes is the sum of Adj1 and Adj2, which are determined as follows:

SCR.2.37. Adj1 is the adjustment for the loss absorbing capacity of technical provisions, security mechanisms and deferred taxes in the market risk, pension liability risk and counterparty default risk sub-modules.

SCR.2.38. Adj2 is the adjustment for the loss absorbing capacity of technical provisions and security mechanisms in the operational risk sub-module.[30]

SCR.2.39. Adj1 is split into two parts as follows:

$Adj1 = Adj_{TS} + Adj_{DT}$

where

Adj_{TS} = adjustment for loss absorbing capacity of technical provisions and security mechanisms

Adj_{DT} = adjustment for loss absorbing capacity of deferred taxes

SCR.2.40. The adjustment for loss absorbing capacity of technical provisions, security mechanisms and deferred taxes should not be positive.

Adjustment for loss absorbing capacity of technical provisions and security mechanisms (Adj$_{TS}$)

SCR.2.41. The solvency capital requirement for each risk should be calculated both gross and net of the loss absorbing capacity of both technical provisions and security mechanisms.

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[30] If the IORP decides to include the intangible asset risk sub-module then Adj2 should also include the adjustment for the loss-absorbing capacity of technical provisions and security mechanisms in the intangible assets risk sub-module (see Annex 5).

SCR.2.42. The Basic Solvency Capital Requirement (*BSCR*) should be calculated by aggregating the gross capital requirements (for example Mkt_{int}) using the relevant correlation matrices.

SCR.2.43. The net Basic Solvency Capital Requirements with respect to technical provisions and security mechanisms (*nBSCR*) should be calculated by aggregating the net capital requirements (for example $nMkt_{int}$) using again the relevant correlation matrices.

SCR.2.44. The adjustment to BSCR for the loss absorbing capacity of technical provisions should then be determined by comparing *BSCR* with *nBSCR*. The absolute amount of the adjustment should not exceed the sum of (1) the total value DCL of pure conditional, pure discretionary and mixed benefits and benefits subject to ex post reductions and reductions in case of sponsor default for the purpose of calculating the technical provisions, (2) $MSS_{available}$ = maximum value of sponsor support (*MSS*) as determined according to section on valuation minus the value of sponsor support already included in the holistic balance sheet, and (3) $MPP_{available}$ = the maximum value of the pension protection scheme as determined according to SCR.2.7 minus the value of the pension protection scheme already included in the holistic balance sheet:

$$Adj_{TS} = -\max(\min(BSCR - nBSCR;\ DCL + MSS_{available} + MPP_{available});0)$$

SCR.2.45. The adjustment Adj_{TS} for loss absorbing capacity of technical provisions and security mechanisms under the modular approach does account for risk mitigating effects in relation the following risks:

- market risk;

- pension liability risk;

- counterparty default risk.

Determination of Adj2

SCR.2.46. The operational risk sub-module does not contain specific scenarios.[31] This makes it difficult to determine the loss absorbing capacity of technical provisions and security mechanisms in this sub-module.

SCR.2.47. To avoid this difficulty, the possible loss absorbing effects of technical provisions and security mechanisms should be taken into account by reducing the combined SCR of this sub-module up to the difference between (DCL + $MSS_{available}$ + $MPP_{available}$) and -Adj_{TS}.[32]

SCR.2.48. Adj2 equals the sum of the adjustments made in these two sub-modules for the loss absorbing capacity of technical provisions and security

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[31] This also holds true for the intangible asset risk sub-module if the IORP decides to include this sub-module in the SCR calculation (see Annex 5).

[32] If the IORP decides to include the intangible asset risk sub-module, then the possible loss-absorbing capacity of technical provisions and security mechanisms should be taken into account by reducing the combined SCR of two sub-modules, i.e. including the intangible asset risk sub-module (see Annex 5).

mechanisms.[33]

SCR.2.49. If an IORP wishes to simplify the calculation for a sub-module – particularly in cases where the loss absorbing capacity is not expected to be material – it may assume that the result of the calculation including the loss absorbing effects of technical provisions and security mechanisms is equal to the result of the calculation excluding the loss absorbing effects of technical provisions and security mechanisms (i.e., it may put $nMkt_{int} = Mkt_{int}$).

Adjustment for loss absorbing capacity of deferred taxes (Adj$_{DT}$)

SCR.2.50. The adjustment Adj$_{DT}$ for the loss absorbing capacity of deferred taxes should be equal to the change in the value of deferred taxes of IORPs that would result from an instantaneous loss of an amount that is equal to the following amount:

$$SCRshock = BSCR + Adj_{TS} + Adj2 + SCR_{Op}$$

where $BSCR$ is the Basic SCR, Adj_{TS}, $Adj2$ are the adjustments for the loss absorbing capacity of security mechanisms and technical provisions as defined above and SCR_{Op} denotes the capital requirement for operational risk.

SCR.2.51. For the purpose of this calculation, the value of deferred taxes should be calculated as set out in the section on valuation. Where a loss of $SCRshock$ would result in the setting up of deferred tax assets IORPs should take into account the magnitude of the loss and its impact on the IORP's financial situation when assessing whether the realisation of that deferred tax asset is probable within a reasonable timeframe.

SCR.2.52. For the purpose of this calculation, a decrease in deferred tax liabilities or an increase in deferred tax assets should result in a negative adjustment for the loss absorbing capacity of deferred taxes.

SCR.2.53. Where it is necessary to allocate the loss $SCRshock$ to its causes in order to calculate the adjustment for the loss absorbing capacity of deferred taxes, IORPs should allocate the loss to the risks that are captured by the Basic Solvency Capital Requirement and the capital requirement for operational risk. The allocation should be consistent with the contribution of the modules and sub-modules to the Basic SCR.

3.3. Deriving the SCR for examples of a supervisory framework from the baseline scenarios

SCR.3.1 The reporting spreadsheet automatically derives the examples of supervisory frameworks which were presented in the consultation paper from the results of the two baseline scenarios. The balance sheets as well

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[33] If the IORP decides to include the intangible asset risk sub-module then Adj2 equals the sum of the adjustments made for the loss absorbing capacity of technical provisions and security mechanisms in two sub-modules, i.e. including the intangible asset risk sub-module (see Annex 5).

as the stressed balance sheets for the SCR calculations in the examples can be constructed by excluding the relevant items from the holistic balance sheets.

SCR.3.2   In order to enable the automatic calculation of the SCRs for the examples of a supervisory framework, the following additional information is required:

SCR.3.3   IORPs are asked to provide the values of all items on the stressed holistic balance sheets for the market and pension liability risk (sub-)modules of the SCR calculation without including the loss absorbing capacity. In the case where the loss absorbing capacity of technical provisions and/or security mechanisms is restricted to the absorption of specific risks, IORPs should in addition provide the values of all items on the stressed holistic balance sheets for each of those (sub-)modules of the SCR calculation including the loss absorbing capacity. This information is needed, because the effects on the SCR of excluding a mechanism with a loss absorbing capacity which is restricted to the absorption of specific risks will have to be determined based on the respective individual SCR (sub-)modules. IORPs using stochastic valuation can assume that market volatilities used in this valuation do not change when the stress applied in the calculation of the SCR impacts on the holistic balance sheet.

SCR.3.4   In the calculation of the loss absorbing capacity for the (sub-)modules for counterparty default risk and operational risk[34] as well as in the case where the loss absorbing capacity of technical provisions and/or security mechanisms is triggered by losses of the IORP as a whole it is necessary to allocate the loss absorbing capacity to items on the holistic balance sheet, in order to be able to do the necessary calculations when items are excluded in an example of a supervisory framework. The allocation should be based on the actual expected loss absorbing capacity of those items. In examples of supervisory frameworks where items are excluded, the loss absorbing capacity will be reduced by the share allocated to those items.

SCR.3.5   In addition to the information above, IORPs are asked to provide an allocation of the loss absorbing capacity to the items on the holistic balance sheet in the counterparty default risk module assuming that non-legally enforceable sponsor support has no loss absorbing capacity and at the same time setting the value of non-legally enforceable sponsor support to zero for the purpose of the calculation of the gross SCR in the counterparty default risk module. This information is needed to be able to calculate the SCR in examples of a supervisory framework which exclude legally enforceable sponsor support.

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[34] If the IORP decides to include the intangible asset risk sub-module then the allocation of the adjustment for loss absorbing capacity to items on the holistic balance sheet also has to be done for this sub-module.

3.4.   SCR Operational risk

SCR.4.1   Operational risk is the risk of loss arising from inadequate or failed internal processes, or from personnel and systems, or from external events. Operational risk should include legal risks, and exclude risks arising from strategic decisions, as well as reputation risks. The operational risk module is designed to address operational risks to the extent that these have not been explicitly covered in other risk modules.

SCR.4.2   For the purpose of this section, reference to technical provisions is to be understood as technical provisions excluding the risk margin, to avoid circularity issues.

Input

SCR.4.3   The inputs for this module are:

$pEarn_{pension}$ = Contributions received during the 12 months prior to the previous 12 months for pension obligations, without deducting premium ceded to (re)insurance

$pEarn_{pension-ul}$ = Contributions received during the 12 months prior to the previous 12 months for pension obligations where the investment risk is borne by members and beneficiaries, without deducting premium ceded to (re)insurance

$Earn_{pension}$ = Contributions received during the previous 12 months for pension obligations, without deducting premium ceded to (re)insurance

$Earn_{pension-ul}$ = Contributions received during the previous 12 months for pension obligations where the investment risk is borne by members and beneficiaries without deducting premium ceded to (re)insurance

$TP_{pension}$ = Technical provisions for pension obligations. For the purpose of this calculation, technical provisions should not include the risk margin, should be without deduction of recoverables from (re)insurance contracts and special purpose vehicles

$TP_{pension-ul}$ = Technical provisions for pension obligations where the investment risk is borne by members and beneficiaries. For the purpose of

this calculation, technical provisions should not include the risk margin, should be without deduction of recoverables from (re)insurance contracts and special purpose vehicles

Exp_{ul} = Amount of annual expenses incurred during the previous 12 months in respect of pension obligation where the investment risk is borne by members and beneficiaries.

$BSCR$ = Basic SCR

Output

SCR.4.4 This module delivers the following output information:

SCR_{Op} = Capital requirement for operational risk

Calculation

SCR.4.5 The capital requirement for operational risk is determined as follows:

$$SCR_{Op} = \min(0.3 \cdot BSCR; Op) + 0.25 \cdot Exp_{ul}$$

where

Op = Basic capital requirement for operational risk for all business other than such where the investment risk is borne by members and beneficiaries

is determined as follows:

$Op = \max(Op_{premiums}; Op_{provisions})$

where

$Op_{premiums} = 0.04 \cdot (Earn_{pension} - Earn_{pension-ul}) + \max(0; 0.04 \cdot (Earn_{pension} - 1.2 \cdot pEarn_{pension} - (Earn_{pension-ul} - 1.2 \cdot pEarn_{pension-ul})))$

and

$Op_{provisions} = 0.0045 \cdot \max(0; TP_{pension} - TP_{pension-ul})$

3.5. SCR market risk module

Introduction

Description

SCR.5.1. Market risk arises from the level or volatility of market prices of financial instruments. Exposure to market risk is measured by the impact of movements in the level of financial variables such as stock prices, interest rates, real estate prices and exchange rates.

Input

SCR.5.2.   The following input information is required:

Mkt_{int}^{Up} = Capital requirement for interest rate risk for the "up" shock

Mkt_{int}^{Down} = Capital requirement for interest rate risk for the "down" shock

Mkt_{int} = Capital requirement for interest rate risk

Mkt_{eq} = Capital requirement for equity risk

Mkt_{prop} = Capital requirement for property risk

Mkt_{sp} = Capital requirement for spread risk

Mkt_{conc} = Capital requirement for risk concentrations

Mkt_{fx} = Capital requirement for currency risk

$nMkt_{int}^{Up}$ = Capital requirement for interest rate risk for the "up" shock including the loss absorbing capacity of technical provisions and security mechanisms

$nMkt_{int}^{Down}$ = Capital requirement for interest rate risk for the "down" shock including the loss absorbing capacity of technical provisions and security mechanisms

$nMkt_{int}$ = Capital requirement for interest rate risk including the loss absorbing capacity of technical provisions and security mechanisms

$nMkt_{prop}$ = Capital requirement for property risk including the loss absorbing capacity of technical provisions and security mechanisms

$nMkt_{sp}$ = Capital requirement for spread risk including the loss absorbing capacity of technical provisions and security mechanisms

$nMkt_{conc}$ = Capital requirement for concentration risk including the loss absorbing capacity of technical provisions and security mechanisms

$nMkt_{fx}$ = Capital requirement for currency risk including the loss absorbing capacity of technical provisions and security mechanisms

$nMkt_{eq}$ = Capital requirement for equity risk including the

> loss absorbing capacity of technical provisions and security mechanisms

<u>Output</u>

SCR.5.3.   The module delivers the following output:

SCR_{mkt}	=	Capital requirement for market risk
$nSCR_{mkt}$	=	Capital requirement for market risk including the loss absorbing capacity of technical provisions and security mechanisms

<u>Calculation</u>

SCR.5.4.   The market sub-risks should be combined to an overall capital requirement SCR_{mkt} for market risk using a correlation matrix as follows:

$$SCR_{mkt} = \sqrt{\sum_{ij} CorrMkt_{ij} \times Mkt_i \times Mkt_j}$$

where

$CorrMkt_{ij}$	=	The respective entries of the correlation matrix $CorrMkt$
Mkt_i, Mkt_j	=	Capital requirements for sub-modules i and j respectively of the market risk module

and the correlation matrix CorrMkt defined as:

CorrMkt	Interest	Equity	Property	Spread	Concentration	Currency
Interest	1					
Equity	A	1				
Property	A	0.75	1			
Spread	A	0.75	0.5	1		
Concentration	0	0	0	0	1	
Currency	0.25	0.25	0.25	0.25	0	1

SCR.5.5.   The parameter A shall be equal to 0 when the capital requirement for interest rate risk as determined below is derived from the capital requirement for the risk of an increase in the interest rate term structure including the loss absorbing capacity of technical provisions. Otherwise the

parameter A shall be equal to 0.5.

SCR.5.6.   The capital requirement for $nSCR_{mkt}$ is determined as follows:

$$nSCR_{mkt} = \sqrt{\sum_{ij} CorrMkt_{ij} \times nMkt_i \times nMkt_j}$$

Scenario-based calculations

SCR.5.7.   The calculations of capital requirements in the market risk module are based on specified scenarios. General guidance about the interpretation of the scenarios can be found in section 3.1.

Look-through approach

SCR.5.8.   In order to properly assess the market risk inherent in collective investment funds, it will be necessary to examine their economic substance. Wherever possible, this should be achieved by applying a look-through approach in order to assess the risks applying to the assets underlying the investment vehicle. Each of the underlying assets would then be subjected to the relevant sub-modules.

SCR.5.9.   The same look-through approach should also be applied for other indirect exposures.

SCR.5.10. Where a number of iterations of the look-through approach is required (e.g. where an investment fund is invested in other investment funds), the number of iterations should be sufficient to ensure that all material market risk is captured.

SCR.5.11. The look through approach should be applied to both passively and actively managed funds.

SCR.5.12. 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 IORP at the level of granularity necessary for calculating all relevant sub-modules and scenarios, and the underlying assets are managed strictly according to this target allocation. For the purpose 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 IORP.

SCR.5.13. Where a look-through approach is not possible and methods based on the target underlying asset allocation are not applied, IORPs should consider the collective investment fund in the equity risk sub-module, as described there.

Mkt$_{int}$ interest rate risk

Description

SCR.5.14. Interest rate risk exists for all assets and liabilities for which the net asset value is sensitive to changes in the term structure of interest rates or interest rate volatility. This refers in particular to technical provisions, which have a different value in the two baseline scenarios.

IORPs which do not dispose of inflation linked obligations

SCR.5.15. IORPs which do not dispose of inflation linked obligations[35] should do the calculations for the interest rate risk sub-module as follows:

SCR.5.16. IORPs should include all interest rate sensitive assets and liabilities in the calculation of the capital requirement for the interest rate risk sub-module. Assets sensitive to interest rate movements will include fixed-income investments, financing instruments (for example loan capital), policy loans, interest rate derivatives and any insurance assets. IORPs should ensure that the value of assets before the stresses obtained by using a mark-to-model valuation are consistent with the quoted market prices of relevant assets in active markets.

SCR.5.17. The discounted value of future cash-flows, in particular in the valuation of technical provisions, will be sensitive to a change in the rate at which those cash-flows are discounted.

SCR.5.18. The technical provisions should be recalculated under the shock scenarios. In baseline scenario 1 (which uses a risk free discount rate curve for calculating technical provisions) the shock scenarios should be applied to this risk free discount rate curve (the basic risk free discount rate curve). In baseline scenario 2 (which uses a discount rate curve based on the expected return on assets for calculating technical provisions) the discount rate curve after the shock is determined by stressing the basic risk free discount rate curve and adding back the risk premium as determined according to the section on valuation.

SCR.5.19. The assets value should be recalculated under the shock scenarios by stressing only the basic risk free discount rate curve and any spreads over the basic risk free discount rate curve should remain unchanged. This may involve using a mark to model valuation for determining the value of the assets under the stresses.

Input

SCR.5.20. The following input information is required:

NAV = Net value of assets minus liabilities

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[35] There may be cases where benefits resulting from inflation adjustment are recognised on the holistic balance sheet as mixed benefits. In such cases, in those examples of a supervisory framework where mixed benefits are excluded from the holistic balance sheet, IORPs should do the calculations in the interest rate risk sub-module as if they would not dispose of those inflation linked benefits.

SCR.5.21. The module delivers the following output:

Mkt_{int}^{Up}	=	Capital requirement for interest rate risk after upward shocks
Mkt_{int}^{Down}	=	Capital requirement for interest rate risk after downward shocks
Mkt_{int}	=	Capital requirement for interest rate risk
$nMkt_{int}^{Up}$	=	Capital requirement for interest rate risk after upward shock including the loss absorbing capacity of technical provisions and security mechanisms
$nMkt_{int}^{Down}$	=	Capital requirement for interest rate risk after downward shock including the loss absorbing capacity of technical provisions and security mechanisms
$nMkt_{int}$	=	Capital requirement for interest rate risk including the loss absorbing capacity of technical provisions and security mechanisms

Calculation

SCR.5.22. The capital requirement for interest rate risk in the respective baseline scenarios is determined based on the results of two pre-defined scenarios:

$$Mkt_{int}^{Up} = \Delta NAV|_{up}$$

$$Mkt_{int}^{Down} = \Delta NAV|_{down}$$

where $\Delta NAV|_{up}$ and $\Delta NAV|_{down}$ are the changes in the net value of asset minus liabilities due to re-valuing all interest rate sensitive items using altered term structures upward and downward. The stress causing the revaluations is instantaneous.

SCR.5.23. Where an IORP is exposed to interest rate movements in more than one currency, the capital requirement for interest rate risk should be calculated as the sum of capital requirements calculated separately for each currency.

SCR.5.24. The altered term structures are derived by multiplying the current interest rate curve by $(1+s^{up})$ and $(1+s^{down})$, where both the upward stress $s^{up}(t)$ and the downward stress $s^{down}(t)$ for individual maturities t are specified as follows:

Maturity t (years)	relative change $s^{up}(t)$	relative change $s^{down}(t)$
1	70%	-75%
2	70%	-65%
3	64%	-56%
4	59%	-50%
5	55%	-46%
6	52%	-42%
7	49%	-39%
8	47%	-36%
9	44%	-33%
10	42%	-31%
11	39%	-30%
12	37%	-29%
13	35%	-28%
14	34%	-28%
15	33%	-27%
16	31%	-28%
17	30%	-28%
18	29%	-28%
19	27%	-29%
20	26%	-29%
90	20%	-20%

SCR.5.25. For example, the "stressed" 15-year interest rate $R_1(15)$ in the upward stress scenario is determined as

$$R_1(15) = R_0(15) \bullet (1 + 0.33)$$

where $R_0(15)$ is the 15-year interest rate based on the current term structure.

SCR.5.26. For maturities not specified in the table above, the value of the relative changes shall be linearly interpolated. For all maturities shorter than 1 year, the relative changes shall be equal to the relative change for the maturity of 1 year. For maturities longer than 90 years the relative change shall be 20% or -20% respectively.

SCR.5.27. Irrespective of the above stress factors, the increase of interest rates at any maturity should at least be one percentage point, and the decrease should be nil for negative interest rates.

SCR.5.28. The interest rate scenarios should be calculated under the condition that the scenario does not change the value of technical provisions and security mechanisms as a consequence of their loss absorbing capacity.

SCR.5.29. Additionally, the result of the scenarios should be determined under the

condition that the value of technical provisions and security mechanisms can change in response to the shock being tested.

SCR.5.30. The capital requirement for interest rate risk is derived from the type of shock that gives rise to the highest capital requirement including the loss absorbing capacity of technical provisions and security mechanisms:[36]

$$\text{If } nMkt_{int}^{Up} > nMkt_{int}^{Down} \text{ then } nMkt_{int} = \max(nMkt_{int}^{Up},0) \text{ and } Mkt_{int} = \max(Mkt_{int}^{Up},0).$$

$$\text{If } nMkt_{int}^{Up} \leq nMkt_{int}^{Down} \text{ then } nMkt_{int} = \max(nMkt_{int}^{Down},0) \text{ and } Mkt_{int} = \max(Mkt_{int}^{Down},0).$$

IORPs which dispose of inflation linked obligations

Description

SCR.5.31. For IORPs which dispose of inflation linked obligations[37], the calculation distinguishes explicitly between the two sources of (nominal) interest rate risk: real interest rate risk and inflation risk. This allows IORPs which dispose of inflation linked obligations to include inflation risk in the calculation of the solvency capital requirement.

SCR.5.32. It is assumed that real interest rate and inflation shocks are uncorrelated and that each accounts for half of the variance of the nominal interest rate. As a result, the standard deviation of both the real interest rate and inflation amount to 70% of the standard deviation of the nominal interest rate.

Input and output

SCR.5.33. The input information and output are the same as under the calculation for IORPs which don't dispose of inflation linked obligations.

Calculation

SCR.5.34. The capital requirement for real interest rate risk in the respective baseline scenarios is determined as the result of two pre-defined scenarios:

$$Mkt_{int,real}^{Up} = \Delta NAV|_{up,real}$$

$$Mkt_{int,real}^{Down} = \Delta NAV|_{down,real}$$

where $\Delta NAV|_{up,real}$ and $\Delta NAV|_{down,real}$ are the changes in the net value of assets and liabilities due to re-valuing all interest rate sensitive items using altered term structures upward and downward. The stress causing the revaluations is instantaneous.

SCR.5.35. The altered term structures are derived by multiplying the current

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[36] Where the loss absorbing capacity is not restricted to the absorption of specific risks, but triggered by losses of the IORP as a whole, the capital requirement for interest rate risk is derived from the type of shock that gives rise to the highest capital requirement excluding the loss absorbing capacity of technical provisions and security mechanisms.

[37] There may be cases where benefits resulting from inflation adjustment are recognised on the holistic balance sheet as mixed benefits. In such cases, in those examples of a supervisory framework where mixed benefits are excluded from the holistic balance sheet, IORPs should do the calculations in the interest rate risk sub-module as if they would not dispose of those inflation linked benefits.

(nominal) risk free interest rate curve by $(1+70\%\cdot s^{up})$ and $(1+70\%\cdot s^{down})$, with both the upward stress $s^{up}(t)$ and the downward stress $s^{down}(t)$ for individual maturities t as defined in SCR.5.24. In baseline scenario 2, the risk premium as determined according to the section on valuation has to be added to this altered term structures.

SCR.5.36. The capital requirement for inflation risk is determined as the result of two pre-defined scenarios:

$$Mkt_{int,infl}{}^{Up} = \Delta NAV|_{up,infl}$$

$$Mkt_{int,infl}{}^{Down} = \Delta NAV|_{down,infl}$$

where $\Delta NAV_{up,infl}$ and $\Delta NAV|_{down,infl}$ are the changes in the net value of assets and liabilities due to re-valuing all interest rate as well as inflation sensitive items using altered term structures and inflation curves upward and downward. The stress causing the revaluations is instantaneous.

SCR.5.37. The altered interest rate term structures are derived by multiplying the current (nominal) risk free interest rate curve by $(1+70\%\cdot s^{up})$ and $(1+70\%\cdot s^{down})$, with both the upward stress $s^{up}(t)$ and the downward stress $s^{down}(t)$ for individual maturities t as defined in SCR.5.24. The altered inflation curves are derived by adding the change in the term structure $(R_1(t) - R_0(t))$ to the inflation curve for each maturity t and both the upward and downward stress. In baseline scenario 2, the risk premium as determined according to the section on valuation has to be added to this altered term structures.

SCR.5.38. Irrespective of the above stress factors, the increase of interest rates at any maturity should at least be 0.7 percentage point, and the decrease should be nil for negative interest rates.

SCR.5.39. The total capital requirements for interest rate risk in the upward and downward scenario is derived by combining the capital requirements for real interest rate and inflation risk using a correlation matrix as follows:

$$Mkt_{int}^{Up} = \sqrt{\sum_{rxc} CorrIndex^{rxc} \cdot Mkt_r^{Up} \cdot Mkt_c^{Up}} \text{ and}$$

$$Mkt_{int}^{Down} = \sqrt{\sum_{rxc} CorrIndex^{rxc} \cdot Mkt_r^{Down} \cdot Mkt_c^{Down}}$$

where

$CorrIndex^{rxc}$	=	The entries of the correlation matrix $CorrIndex$
Mkt_r^{Up}, Mkt_c^{Up}, Mkt_r^{Down}, Mkt_c^{Down}	=	Capital requirements for interest rate risk in the upward and downward stress per individual category according to the rows and columns of correlation matrix $CorrIndex$

and where the correlation matrix *CorrIndex* is defined as:

CorrIndex	Real rate	Inflation
Real rate	1	
Inflation	0	1

SCR.5.40. The real interest and inflation rate scenarios should be calculated under the condition that the scenario does not change the value of technical provisions and security mechanisms as a consequence of their loss absorbing capacity.

SCR.5.41. Additionally, the result of the scenarios should be determined under the condition that the value of technical provisions and security mechanisms can change in response to the shocks being tested.

SCR.5.42. The capital requirement for interest rate risk is derived from the type of shock that gives rise to the highest capital requirement including the loss absorbing capacity of technical provisions and security mechanisms:

If $nMkt_{int}^{Up} > nMkt_{int}^{Down}$ then $nMkt_{int} = \max(nMkt_{int}^{Up},0)$ and $Mkt_{int} = \max(Mkt_{int}^{Up},0)$.

If $nMkt_{int}^{Up} \leq nMkt_{int}^{Down}$ then $nMkt_{int} = \max(nMkt_{int}^{Down},0)$ and $Mkt_{int} = \max(Mkt_{int}^{Down},0)$.

Simplification

SCR.5.43. In cases where cash-flows related to (certain) assets and/or liabilities are not available or a calculation based on those cash-flows is considered to be too burdensome, the table above of upward and downward stresses can't be applied directly.

SCR.5.44. Therefore a simplification can be used to determine the SCR for interest rate risk. For example the SCR for interest rate risk for a (non-zero) bond can be determined based on the duration of the bond and an interest rate stress from the table above appropriate for that duration (For a zero bond this is also possible, but not a simplification). In the same way the SCR for interest rate risk for the best estimate of technical provisions can be determined.

Mkt$_{eq}$ equity risk

<u>Description</u>

SCR.5.45. Equity risk arises from the level or volatility of market prices for equities. Exposure to equity risk refers to all assets and liabilities whose value is sensitive to changes in equity prices. IORPs should assume that the stresses applied in this module don't impact on the interest rate curve used for valuing technical provisions.

SCR.5.46. For the calculation of the equity risk capital requirement, hedging and risk

transfer mechanisms should be taken into account according to the principles of section 3.8. However, as a general rule, hedging instruments should only be allowed with the average protection level over the next year unless they are part of a rolling hedging program that meets the requirements set out in SCR.8.16 ff. For example, where an equity option not part of such a rolling hedge program provides protection for the next six months, as a simplification, IORPs should assume that the option only covers half of the current exposure.

Input

SCR.5.47. The following input information is required:

NAV = The net value of assets minus liabilities

Output

SCR.5.48. The module delivers the following output:

Mkt_{eq} = Capital requirement for equity risk

$nMkt_{eq}$ = Capital requirement for equity risk including the loss absorbing capacity of technical provisions and security mechanisms

Calculation

SCR.5.49. For the determination of the capital requirement for equity risk, the following split is considered:

a) Type 1 equities should comprise equities listed in regulated markets in the countries which are members of the European Economic Area (EEA) or the Organisation for Economic Cooperation and Development (OECD).

b) Type 2 equities should 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 should also comprise all assets other than those covered in the interest rate risk sub-module, the property risk sub-module or the spread risk sub-module, including the assets and indirect exposures where a look-through approach is not possible and the IORP does not make use of the mandate-based approach.

SCR.5.50. The following equities should in any case be considered as type 1:

a) equities held within collective investment undertakings which are qualifying social entrepreneurship funds as referred to in Article 3(b) of Regulation (EU) No 346/2013 of the European Parliament and of the Council where the look-through approach is possible for all exposures within the collective investment undertaking, or units or shares of those funds where the look through approach is not possible for all

exposures within the collective investment undertaking;

b) equities held within collective investment undertakings which are qualifying venture capital funds as referred to in Article 3(b) of Regulation (EU) No 345/2013 where the look-through approach is possible for all exposures within the collective investment undertaking, or units or shares of those funds where the look through approach is not possible for all exposures within the collective investment undertaking;

c) as regards closed-ended and unleveraged alternative investment funds which are established in the Union or, if they are not established in the Union, which are marketed in the Union in accordance with Articles 35 or 40 of Directive 2011/61/EU:

   i. equities held within such funds where the look-through approach is possible for all exposures within the alternative investment fund;

   ii. units or shares of such funds where the look-through approach is not possible for all exposures within the alternative investment fund.

SCR.5.51. The calculation is carried out as follows:

SCR.5.52. In a first step, for each equity type i a capital requirement is determined as the result of a pre-defined stress scenario for equity type i as follows:

$$Mkt_{eq,i} = \max\left(\Delta NAV \mid equity\ shock_i; 0\right)$$

where

equity shock$_i$	=	Prescribed fall in the value of equities of equity type *i*
Mkt$_{eq,i}$	=	Capital requirement for equity risk with respect to equity type *i*,

and where the equity shock scenarios for the individual types are specified as follows:

	Type 1	Type 2
equity shock$_i$	41.8%	51.8%

SCR.5.53. Note that the stresses above take account of a "symmetric adjustment" of +2.8%. The base levels of the two stresses are 39% and 49%.

SCR.5.54. The capital requirement Mkt$_{eq,i}$ is determined as the immediate effect on the net value of assets and liabilities expected in the event of an immediate decrease of *equity shock$_i$* in value of equities belonging to equity type i taking account of all the IORP's individual direct and indirect exposures to equity prices.

SCR.5.55. In a second step, the capital requirement for equity risk is derived by combining the capital requirements for the individual categories using a correlation matrix as follows:

$$MKT_{eq} = \sqrt{\sum_{rxc} CorrIndex^{rxc} \cdot Mkt_r \cdot Mkt_c}$$

where

$CorrIndex^{rxc}$ = The entries of the correlation matrix *CorrIndex*

Mkt_r, Mkt_c = Capital requirements for equity risk per individual category according to the rows and columns of correlation matrix *CorrIndex*

and where the correlation matrix *CorrIndex* is defined as:

CorrIndex	Type 1	Type 2
Type 1	1	
Type 2	0.75	1

SCR.5.56. The equity scenarios should be calculated under the condition that the scenario does not change the value of technical provisions and security mechanisms as a consequence of their loss absorbing capacity.

SCR.5.57. Additionally, the result of the scenarios should be determined under the condition that the value of technical provisions and security mechanisms can change in response to the shock being tested. The resulting capital requirement is *nMkteq*.

Mkt_prop property risk

Description

SCR.5.58. Property risk arises as a result of sensitivity of the value of assets, liabilities and financial investments to the level or volatility of market prices of property. IORPs should assume that the stresses applied in this module don't impact on the interest rate curve used for valuing technical provisions.

SCR.5.59. The following investments should be treated as property and their risks considered accordingly in the property risk sub-module:

- land, buildings and immovable-property rights;

- direct or indirect participations in real estate companies that generate periodic income or which are otherwise intended for investment purposes;

- property investment for the own use of the IORP.

SCR.5.60. Otherwise, the following investments should be treated as equity and their risks considered accordingly in the equity risk sub-module:

- an investment in a company engaged in real estate management, or
- an investment in a company engaged in real estate project development or similar activities, or

SCR.5.61. Collective real estate investment vehicles should be treated like other collective investment vehicles with a look-through approach. Generally speaking, the look-through approach as described in SCR.5.8 to SCR.5.13 should also apply to all types of indirect exposures in property.

Input

SCR.5.62. The following input information is required:

NAV = Net value of assets minus liabilities

Output

SCR.5.63. The module delivers the following output:

Mkt_{prop} = Capital requirement for property risk

$nMkt_{prop}$ = Capital requirement for property risk including the loss absorbing capacity of technical provisions and security mechanisms

Calculation

SCR.5.64. The capital requirement for property risk is determined as the result of a pre-defined scenario:

$$Mkt_{prop} = \max(\Delta NAV \mid property\ shock;0)$$

SCR.5.65. The property shock is the immediate effect on the net value of asset and liabilities expected in the event of an instantaneous decrease of 25% in the value of investments in real estate, taking account of all the participant's individual direct and indirect exposures to property prices. The property shock takes account of the specific investment policy including e.g. hedging arrangements, gearing etc.

SCR.5.66. The property scenario should be calculated under the condition that the scenario does not change the value of technical provisions and security mechanisms as a consequence of their loss absorbing capacity.

SCR.5.67. Additionally, the result of the scenario should be determined under the condition that the value of technical provisions and security mechanisms can change in response to the shock being tested. The resulting capital requirement is *nMktprop*.

Mkt$_{fx}$ currency risk

<u>Description</u>

SCR.5.68. Currency risk arises from changes in the level or volatility of currency exchange rates. IORPs should assume that the stresses applied in this module do not impact on the interest rate curve used for valuing technical provisions.

SCR.5.69. IORPs may be exposed to currency risk arising from various sources, including their investment portfolios, liabilities, investments in related undertakings and other assets. The design of the currency risk sub-module is intended to take into account currency risk for an IORP arising from all possible sources.

SCR.5.70. The *local currency* is the currency in which the IORP prepares its financial statements. All other currencies are referred to as *foreign currencies*. A foreign currency is *relevant* for the scenario calculations if the amount of basic own funds depends on the exchange rate between the foreign currency and the local currency.

SCR.5.71. Note that for each relevant foreign currency, the currency position should include any investment in foreign instruments where the currency risk is not hedged. This is because the stresses for interest rate, equity, spread and property risks have not been designed to incorporate currency risk.

SCR.5.72. Investments in type 1 equities and type 2 equities as defined in the equity risk sub-module which are listed in stock exchanges operating with different currencies should be assumed to be sensitive to the currency of its main listing. Type 2 equities which are not-listed should be assumed to be sensitive to the currency of the country in which the issuer has its main operations. Immovable property should be assumed to be sensitive to the currency of the country in which it is located.

<u>Input</u>

SCR.5.73. The following input information is required:

NAV = Net value of assets minus liabilities

<u>Output</u>

SCR.5.74. The module delivers the following output:

Mkt_{fx} = Capital requirement for currency risk

Mkt_{fx}^{Up} = Capital requirement for currency risk after an upward shock

Mkt_{fx}^{Down} = Capital requirement for currency risk after a downward shock

$nMkt_{fx}$ = Capital requirement for currency risk including

		the loss absorbing capacity of technical provisions and security mechanisms
$nMkt_{fx}^{Up}$	=	Capital requirement for currency risk after an upward shock including the loss absorbing capacity of technical provisions and security mechanisms
$nMkt_{fx}^{Down}$	=	Capital requirement for currency risk after a downward shock including the loss absorbing capacity of technical provisions and security mechanisms

Calculation

SCR.5.75. The capital requirement for currency risk is determined as the result of two pre-defined scenarios:

$$Mkt_{fx,C}^{Up} = \max\left(\Delta NAV \mid fxupward\ shock; 0\right)$$

$$Mkt_{fx,C}^{Down} = \max\left(\Delta NAV \mid fxdownward\ shock; 0\right)$$

SCR.5.76. The scenario *fxupward* shock is an instantaneous rise in the value of 25% of the currency C against the local currency. The scenario *fxdownward* shock is an instantaneous fall of 25% in the value of the currency C against the local currency.

SCR.5.77. All of the IORP's individual currency positions and its investment policy (e.g. hedging arrangements, gearing etc.) should be taken into account.

SCR.5.78. The currency scenarios should be calculated under the condition that the scenario does not change the value of technical provisions and security mechanisms as a consequence of their loss absorbing capacity.

SCR.5.79. Additionally, the result of the scenarios should be determined under the condition that the value of technical provisions and security mechanisms can change in response to the shock being tested. The resulting capital requirements are $nMkt_{fx,C}^{Up}$ and $nMkt_{fx,C}^{Down}$.

SCR.5.80. For each currency, the capital requirement for currency risk is derived from the type of shock that gives rise to the highest capital requirement including the loss absorbing capacity of technical provisions and security mechanisms: $nMkt_{fx,C}$ should be determined as the maximum of the values $nMkt_{fx,C}^{Up}$ and $nMkt_{fx,C}^{Down}$.

If $nMkt_{fx,C}^{Up} > nMkt_{fx,C}^{Down}$ then $nMkt_{fx,C} = \max(nMkt_{fx,C}^{Up}, 0)$.

If $nMkt_{fx,C}^{Up} \leq nMkt_{fx,C}^{Down}$ then $nMkt_{fx,C} = \max(nMkt_{fx,C}^{Down}, 0)$.

SCR.5.81. The total capital requirement $nMkt_{fx}$ will be the sum over all currencies of

$nMkt_{fx,C}$.

SCR.5.82. For each currency, $Mkt_{fx,C}$ should be equal to $Mkt_{fx,C}^{Up}$, if $nMkt_{fx,C} = nMkt_{fx,C}^{Up}$ and otherwise equal to $Mkt_{fx,C}^{Down}$. The total capital requirement Mkt_{fx} will be the sum over all currencies of $Mkt_{fx,C}$.[38]

Simplified calculation for currency risk

SCR.5.83. This simplification may be used if foreign currency exposure on the liability side is immaterial.

SCR.5.84. The capital requirement is calculated directly for the total foreign currency exposure using the *fxdownward shock*:

$$Mkt_{fx} = \max(\Delta NAV \mid fxdownward\ shock; 0)$$

Mkt$_{sp}$ spread risk

<u>Description</u>

SCR.5.85. Spread risk results from the sensitivity of the value of assets, liabilities and financial instruments to changes in the level or in the volatility of credit spreads over the risk-free interest rate term structure. IORPs should assume that the stresses applied in this module do not impact on the interest rate curve used for valuing technical provisions.

SCR.5.86. The spread risk module applies in particular to the following classes of bonds:

- Corporate bonds;

- Subordinated debt investments, depending on the contractual terms;

- Investment instruments with equity and bond features;

- Covered bonds;

- Loans other than retail loans secured by a residential mortgage;

- Securitisation positions;

- Credit derivatives other than for hedging purposes;

<u>Input</u>

SCR.5.87. The following input information is required:

MV_i	=	the value of the asset i subject to capital requirement for spread risk according to the section on valuation
$rating_i$	=	the external rating (credit quality step) of the

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[38] Where the loss absorbing capacity is not restricted to the absorption of specific risks, but triggered by losses of the IORP as a whole, the capital requirement for currency risk is derived from the type of shock that gives rise to the highest capital requirement excluding the loss absorbing capacity of technical provisions and security mechanisms.

		asset i subject to capital requirement for spread risk
duration$_i$	=	the modified duration in years of the asset i subject to capital requirement for spread risk. Duration shall never be lower than 1 or higher than the maximum duration specified below

SCR.5.88. In cases where several ratings are available for a given asset, the second-best rating should be applied.

Output

SCR.5.89. The module delivers the following output:

Mkt$_{sp}$	=	Capital requirement for spread risk
nMkt$_{sp}$	=	Capital requirement for spread risk including the loss absorbing capacity of technical provisions and security mechanisms

SCR.5.90.   The capital requirement for spread risk shall be equal to the following:

$$Mkt_{sp} = SCR_{bonds} + SCR_{securitisation} + SCR_{cd}$$

where

a) *SCR$_{bonds}$* denotes the capital requirement for spread risk on bonds and loans;

b) *SCR$_{securitisation}$* denotes the capital requirement for spread risk on securitisation positions;

c) *SCR$_{cd}$* denotes the capital requirement for spread risk on credit derivatives;

Spread risk on bonds and loans

SCR.5.91. The capital requirement for spread risk on bonds and loans *SCR$_{bonds}$* shall be equal to the loss in the net asset value that would result from an instantaneous relative decrease of *stress$_i$* in the value of each bond or loan *i* other than mortgage loans that meet the requirements in SCR.6.15 ff., including bank deposits other than cash at bank.

SCR.5.92. The risk factor *stress$_i$* shall depend on the modified duration of the bond or loan *i* denominated in years (*dur$_i$*). *dur$_i$* shall never be lower than 1. For variable interest rate bonds or loans, *dur$_i$* shall be equivalent to the modified duration of a fixed interest rate bond or loan of the same maturity and with coupon payments equal to the forward interest rate.

SCR.5.93. Bonds or loans for which a rating by a rating agency is available shall be assigned a risk factor *stress$_i$* depending on the credit quality step and the modified duration *dur$_i$* of the bond or loan *i* according to the following table.

Credit quality step		0		1		2		3		4		5 and 6	
Duration (dur_i)	$stress_i$	a_i (%)	b_i (%)	a_i (%)	b_i (%)	a_i (%)	b_i (%)	a_i (%)	b_i (%)	a_i (%)	b_i (%)	a_i (%)	b_i (%)
up to 5	$b_i \cdot dur_i$	-	0.9	-	1.1	-	1.4	-	2.5	-	4.5	-	7.5
More than 5 and up to 10	$a_i + b_i * (dur_i - 5)$	4.5	0.5	5.5	0.6	7.0	0.7	12.5	1.5	22.5	2.5	37.5	4.2
More than 10 and up to 15	$a_i + b_i * (dur_i - 10)$	7.0	0.5	8.4	0.5	10.5	0.5	20.0	1.0	35.0	1.8	58.5	0.5
More than 15 and up to 20	$a_i + b_i * (dur_i - 15)$	9.5	0.5	10.9	0.5	13.0	0.5	25.0	1.0	44.0	0.5	61.0	0.5
More than 20	$\min[a_i + b_i * (dur_i - 0); 1]$	12.0	0.5	13.4	0.5	15.5	0.5	30.0	0.5	46.5	0.5	63.5	0.5

SCR.5.94. Bonds and loans for which a rating by a rating agency is not available and for which debtors have not posted collateral that meets the criteria set out in section 3.8 shall be assigned a risk factor $stress_i$ depending on the duration dur_i of the bond or loan i according to the following table:

Duration (dur_i)	$stress_i$
up to 5	$3\% \cdot dur_i$
More than 5 and up to 10	$15 + 1.7\% \cdot (dur_i - 5)$
More than 10 and up to 20	$23.5\% + 1.2\% \cdot (dur_i - 10)$
More than 20	$\min(35.5\% + 0.5\% \cdot (dur_i - 20); 1)$

SCR.5.95. Bonds and loans for which a rating by a rating agency is not available and for which debtors have posted collateral, where the collateral of those bonds and loans meet the criteria set out in section 3.8, shall be assigned a risk factor $stress_i$ according to the following:

a) where the risk-adjusted value of collateral is higher than or equal to the value of the bond or loan i, $stress_i$ shall be equal to half of the risk factor that would be determined in accordance with SCR.5.94;

b) where the risk-adjusted value of collateral is lower than the value of the bond or loan i, and where the risk factor determined in accordance with SCR.5.94 would result in a value of the bond or loan i that is lower than the risk-adjusted value of the collateral, $stress_i$ shall be equal to the average of the following:

   (i) the risk factor determined in accordance with SCR.5.94;

   (ii) the difference between the value of the bond or loan i and the risk-adjusted value of the collateral, divided by the value of the bond or loan i;

c) where the risk-adjusted value of collateral is lower than the value of the bond or loan i, and where the risk factor determined in accordance with SCR.5.94 would result in a value of the bond or loan i that is higher than or equal to the risk-adjusted value of the collateral, $stress_i$ shall be determined in accordance with SCR.5.94.

The risk-adjusted value of the collateral shall be calculated in accordance with SCR.6.33 ff., SCR.6.40 ff.

Spread risk on securitisation positions: general provisions

SCR.5.96. The capital requirement $SCR_{securitisation}$ for spread risk on securitisation positions shall be the sum of a capital requirement for type 1 securitisation positions, a capital requirement for type 2 securitisation positions and a capital requirement for resecuritisation positions.

SCR.5.97. Type 1 securitisation positions shall include securitisation positions that meet all of the following criteria:

   (a) the position has been assigned to credit quality step 3 or better;

   (b) the securitisation is listed in a regulated market of a country which is a member of the EEA or the OECD, or is admitted to trading in an organised trading venue providing for an active and sizable market for outright sales which has the following features:

      (i) historical evidence of market breadth and depth as proven by low bid-ask spreads, high trading volume and a large number of market participants;

      (ii) the presence of a robust market infrastructure;

   (c) the position is in the most senior tranche or tranches of the securitisation and possesses the highest level of seniority at all times during the ongoing life of the transaction; for these purposes, a tranche shall be deemed the most senior where after the delivery of an enforcement notice and where applicable an acceleration notice, the tranche is not subordinated to other tranches of the same securitisation transaction or scheme in respect of receiving principal and interest payments, without taking into account amounts due under interest rate or currency derivative contracts, fees or other similar

payments;

(d) the underlying exposures have been acquired by the securitisation special purpose entity (SSPE) within the meaning of Article 4(1)(66) of Regulation (EU) No 575/2013 in a manner that is enforceable against any third party and are beyond the reach of the seller (originator, sponsor or original lender) and its creditors including in the event of the seller's insolvency;

(e) the transfer of the underlying exposures to the SSPE may not be subject to any severe clawback provisions in the jurisdiction where the seller (originator, sponsor or original lender) is incorporated; this includes but is not limited to provisions under which the sale of the underlying exposures can be invalidated by the liquidator of the seller (originator, sponsor or original lender) solely on the basis that it was concluded within a certain period before the declaration of the seller's insolvency or provisions where the SSPE can prevent such invalidation only if it can prove that it was not aware of the insolvency of the seller at the time of sale;

(f) the underlying exposures have their administration governed by a servicing agreement which includes servicing continuity provisions to ensure, at a minimum, that a default or insolvency of the servicer does not result in a termination of servicing;

(g) the documentation governing the securitisation includes continuity provisions to ensure, at a minimum, the replacement of derivative counterparties and of liquidity providers upon their default or insolvency, where applicable;

(h) the securitisation position is backed by a pool of homogeneous underlying exposures, which all belong to only one of the following categories, or by a pool of homogeneous underlying exposures which combines residential loans referred to in points (i) and (ii):

(i) residential loans secured with a first-ranking mortgage granted to individuals for the acquisition of their main residence, provided that one of the two following conditions is met:

- the loans in the pool meet on average the loan-to-value requirement laid down in point (i) of Article 129(1)(d) of Regulation (EU) No 575/2013;

- the national law of the Member State where the loans were originated provides for a loan-to-income limit on the amount that an obligor may borrow in a residential loan. The loan-to-income limit shall be calculated on the gross annual income of the obligor, taking into account the tax obligations and other commitments of the obligor and the risk of changes in the interest rates over the term of the loan. For each residential loan in the pool, the percentage of the obligor's gross income that

may be spent to service the loan, including interest, principal and fee payments, does not exceed 45%.

(ii) fully guaranteed residential loans referred to in Article 129(1)(e) of Regulation (EU) No 575/2013, provided that the loans meet the collateralisation requirements laid down in that paragraph and meet on average the loan-to-value requirement laid down in point (i) of Article 129(1)(d) of Regulation (EU) No 575/2013;

(iii) commercial loans, leases and credit facilities to undertakings to finance capital expenditures or business operations other than the acquisition or development of commercial real estate, provided that at least 80 % of the borrowers in the pool in terms of portfolio balance are small and medium-sized enterprises at the time of issuance of the securitisation, and none of the borrowers is an institution as defined in Article 4(1)(3) of Regulation (EU) No 575/2013;

(iv) auto loans and leases for the financing of motor vehicles or trailers as defined in points (11) and (12) of Article 3 of Directive 2007/46/EC of the European Parliament and of the Council[39], agricultural or forestry tractors as referred to in Directive 2003/37/EC of the European Parliament and of the Council[40], motorcycles or motor tricycles as defined in points (b) and (c) of Article 1(2) of Directive 2002/24/EC of the European Parliament and of the Council[41] or tracked vehicles as referred to in point (c) of Article 2(2) of Directive 2007/46/EC. Such loans or leases may include ancillary insurance and service products or additional vehicle parts, and in the case of leases, the residual value of leased vehicles. All loans and leases in the pool shall be secured with a first-ranking charge or security over the vehicle or an appropriate guarantee in favour of the SSPE, such as a retention of title provision;

(v) loans and credit facilities to individuals for personal, family or household consumption purposes.

(i) the position is not in a resecuritisation or a synthetic securitisation as referred to in Article 242(11) of Regulation (EU) No 575/2013;

(j) the underlying exposures do not include transferable financial

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[39] Directive 2007/46/EC of the European Parliament and of the Council of 5 September 2007 establishing a framework for the approval of motor vehicles and their trailers, and of systems, components and separate technical units intended for such vehicles (Framework Directive) (OJ L 263, 9.10.2007, p. 1).

[40] Directive 2003/37/EC of the European Parliament and of the Council of 26 May 2003 on type-approval of agricultural or forestry tractors, their trailers and interchangeable towed machinery, together with their systems, components and separate technical units and repealing Directive 74/150/EEC (OJ L 171, 9.7.2003, p. 1–80).

[41] Directive 2002/24/EC of the European Parliament and of the Council of 18 March 2002 relating to the Type-approval of two or three-wheel motor vehicles and repealing Council Directive 92/61/EEC (OJ L 124, 9.5.2002, p. 1–44).

instruments or derivatives, except financial instruments issued by the SSPE itself or other parties within the securitisation structure and derivatives used to hedge currency risk and interest rate risk;

(k) at the time of issuance of the securitisation or when incorporated in the pool of underlying exposures at any time after issuance, the underlying exposures do not include exposures to credit-impaired obligors (or where applicable, credit-impaired guarantors), where a credit-impaired obligor (or credit-impaired guarantor) is a borrower (or guarantor) who:

  (i) has declared bankruptcy, agreed with his creditors to a debt dismissal or reschedule or had a court grant his creditors a right of enforcement or material damages as a result of a missed payment within three years prior to the date of origination;

  (ii) is on an official registry of persons with adverse credit history;

  (iii) has a credit assessment by a rating agency or has a credit score indicating a significant risk that contractually agreed payments will not be made compared to the average obligor for this type of loans in the relevant jurisdiction.

(l) at the time of issuance of the securitisation or when incorporated in the pool of underlying exposures at any time after issuance, the underlying exposures do not include exposures in default within the meaning of Article 178(1) of Regulation (EU) No 575/2013;

(m) the repayment of the securitisation position is not structured to depend predominantly on the sale of assets securing the underlying exposures; however, this shall not prevent such exposures from being subsequently rolled-over or refinanced;

(n) where the securitisation has been set up without a revolving period or the revolving period has terminated and where an enforcement or an acceleration notice has been delivered, principal receipts from the underlying exposures are passed to the holders of the securitisation positions via sequential amortisation of the securitisation positions and no substantial amount of cash is trapped in the SSPE on each payment date;

(o) where the securitisation has been set up with a revolving period, the transaction documentation provides for appropriate early amortisation events, which shall include at a minimum all of the following:

  (i) a deterioration in the credit quality of the underlying exposures;

  (ii) a failure to generate sufficient new underlying exposures of at least similar credit quality;

  (iii) the occurrence of an insolvency-related event with regard to the originator or the servicer;

(p) at the time of issuance of the securitisation, the borrowers (or, where applicable, the guarantors) have made at least one payment, except where the securitisation is backed by credit facilities referred to in point (h)(v);

(q) in the case of securitisations where the underlying exposures are residential loans referred to in point (h)(i) or (ii), the pool of loans does not include any loan that was marketed and underwritten on the premise that the loan applicant or, where applicable intermediaries, were made aware that the information provided might not be verified by the lender;

(r) in the case of securitisations where the underlying exposures are residential loans referred to in point (h)(i) or (ii), the assessment of the borrower's creditworthiness meets the requirements set out in paragraphs 1 to 4, 5(a), and 6 of Article 18 of Directive 2014/17/EU of the European Parliament and of the Council[42] or equivalent requirements in countries that are not members of the Union;

(s) in the case of securitisations where the underlying exposures are auto loans and leases and consumer loans and credit facilities referred to in point (h)(v), the assessment of the borrower's creditworthiness meets the requirements set out in Article 8 of Directive 2008/48/EC of the European Parliament and of the Council[43] or equivalent requirements in countries that are not members of the Union;

(t) where the issuer, originator or sponsor of the securitisation is established in the Union, it complies with the requirements laid down in Part Five of Regulation (EU) No. 575/2013 and discloses information, in accordance with Article 8b of Regulation (EU) No 1060/2009, on the credit quality and performance of the underlying exposures, the structure of the transaction, the cash flows and any collateral supporting the exposures as well as any information that is necessary for investors to conduct comprehensive and well-informed stress tests; where the issuer, originator and sponsors are established outside the Union, comprehensive loan-level data in compliance with standards generally accepted by market participants is made available to existing and potential investors and regulators at issuance and on a regular basis.

SCR.5.98. Type 2 securitisation positions shall include all securitisation positions that do not qualify as type 1 securitisation positions.

Spread risk on securitisation positions: calculation of the capital requirement

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[42] Directive 2014/17/EU of the European Parliament and of the Council of 4 February 2014 on credit agreements for consumers relating to residential immovable property and amending Directives 2008/48/EC and 2013/36/EU and Regulation (EU) No 1093/2014, OJ L 60, 28.2.2014, p. 34.
[43] Directive 2008/48/EC of the European Parliament and of the Council of 23 April 2008 on credit agreements for consumers and repealing Council Directive 87/102/EEC, OJ L 133, 22.5.2008, p. 66.

SCR.5.99. The capital requirement for spread risk on type 1 securitisation positions shall be equal to the loss in the net asset value that would result from an instantaneous relative decrease of *stress*$_i$ in the value of each type 1 securitisation position *i*. The risk factor *stress*$_i$ shall be equal to the following:

$$stress_i = \min(b_i \cdot dur_i; 1)$$

where:

(a) dur$_i$ denotes the modified duration of securitisation position *i* denominated in years;

(b) b$_i$ shall be assigned depending on the credit quality step of securitisation position *i* according to the following table:

Credit quality step	0	1	2	3
b$_i$	2.1%	3%	3%	3%

SCR.5.100. The capital requirement for spread risk on type 2 securitisation positions shall be equal to the loss in the net asset value that would result from an instantaneous relative decrease of *stress*$_i$ in the value of each type 2 securitisation position *i*. The risk factor *stress*$_i$ shall be equal to the following

$$stress_i = \min(b_i \cdot dur_i; 1)$$

where:

(a) dur$_i$ denotes the modified duration of securitisation position *i* denominated in years;

(b) b$_i$ shall be assigned depending on the credit quality step of securitisation position *i* according to the following table:

Credit quality step	0	1	2	3	4	5	6
b$_i$	12.5%	13.4%	16.6%	19.7%	82%	100%	100%

SCR.5.101. The capital requirement for spread risk on resecuritisation positions shall be equal to the loss in the net asset value that would result from an instantaneous relative decrease of *stress*$_i$ in the value of each resecuritisation position *i*. The risk factor *stress*$_i$ shall be equal to the following

$$stress_i = \min(b_i \cdot dur_i; 1)$$

where:

a) dur$_i$ denotes the modified duration of resecuritisation position i denominated in years;

b) b$_i$ shall be assigned depending on the credit quality step of resecuritisation position i according to the following table:

Credit quality step	0	1	2	3	4	5	6
b_i	33%	40%	51%	91%	100%	100%	100%

SCR.5.102. The modified duration dur$_i$ referred to in the two paragraphs above shall not be lower than 1 year.

SCR.5.103. Securitisation positions for which a rating by a rating agency is not available shall be assigned a risk factor *stress$_i$* of 100 %.

Spread risk on credit derivatives

SCR.5.104. The capital requirement *SCR$_{cd}$* for spread risk on credit derivatives shall be equal to the higher of the following capital requirements:

(a) the loss in the basic own funds that would result from an instantaneous increase in absolute terms of the credit spread of the instruments underlying the credit derivatives, as set out in the following two paragraphs;

(b) the loss in the net asset value that would result from an instantaneous relative decrease of the credit spread of the instruments underlying the credit derivatives by 75%.

SCR.5.105. For the purposes of point (a) above, the instantaneous increase of the credit spread of the instruments underlying the credit derivatives for which a rating by a rating agency is available shall be calculated according to the following table.

Credit quality step	0	1	2	3	4	5	6
Instantaneous increase in spread (in percentage points)	1.3	1.5	2.6	4.5	8.4	16.20	16.20

SCR.5.106. For the purposes of point (a) above, the instantaneous increase of the credit spread of the instruments underlying the credit derivatives for which a rating by a rating agency is not available shall be 5 percentage points.

SCR.5.107. Credit derivatives which are part of the IORP's risk mitigation policy shall not be subject to a capital requirement for spread risk, as long as the IORP

holds either the instruments underlying the credit derivative or another exposure with respect to which the basis risk between that exposure and the instruments underlying the credit derivative is not material in any circumstances.

SCR.5.108. Where the larger of the capital requirements referred to in points (a) and (b) above and the larger of the corresponding capital requirements calculated including the loss absorbing capacity of technical provisions and security mechanisms are not based on the same scenario, the capital requirement for spread risk on credit derivatives shall be the capital requirement for which the underlying scenario results in the largest corresponding capital requirement calculated including the loss absorbing capacity of technical provisions and security mechanisms.[44]

Specific exposures

SCR.5.109. Exposures in the form of bonds referred to Article 52(4) of Directive 2009/65/EC (covered bonds) which have been assigned to credit quality step 0 or 1 shall be assigned a risk factor $stress_i$ according to the following table.

Credit quality step / Duration (dur_i)	0	1
Up to 5	0.7%. dur_i	0.9%. dur_i
More than 5 years	$\min\left(3.5\% + 0.5\% \cdot \left(dur_i - 5\right); 1\right)$	$\min\left(4.5\% + 0.5\% \cdot \left(dur_i - 5\right); 1\right)$

SCR.5.110. Exposures in the form of bonds and loans to the following shall be assigned a risk factor $stress_i$ of 0%:

a) the European Central Bank;

b) Member States' central government and central banks denominated and funded in the domestic currency of that central government and the central bank;

c) multilateral development banks referred to in paragraph 2 of Article 117 of Regulation (EU) No 575/2013;

d) international organisations referred to in Article 118 of Regulation (EU) No 575/2013;

SCR.5.111. Exposures in the form of bonds and loans that are fully, unconditionally and irrevocably guaranteed by one of the counterparties mentioned in

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[44] Where the loss absorbing capacity is not restricted to the absorption of specific risks, but triggered by losses of the IORP as a whole, the capital requirement for spread risk on credit derivatives shall be the capital requirement for which the underlying scenario results in the largest corresponding capital requirement calculated excluding the loss absorbing capacity of technical provisions and security mechanisms.

points (a) to (d) above, where the guarantee meets the requirements set out in section 3.8, should also be assigned a risk factor $stress_i$ of 0%.

SCR.5.112. Exposures in the form of bonds and loans to central governments and central banks other than those referred to in point (b) above, denominated and funded in the domestic currency of that central government and central bank, and for which a rating by a rating agency is available should be assigned a risk factor $stress_i$ depending on the credit quality step and the duration of the exposure according to the following table:

Credit quality step		0 and 1		2		3		4		5 and 6	
Duration (dur_i)	$stress_i$	a_i (%)	b_i (%)	a_i (%)	b_i (%)	a_i (%)	b_i (%)	a_i (%)	b_i (%)	a_i (%)	b_i (%)
up to 5	$b_i \cdot dur_i$	-	0.0	-	1.1	-	1.4	-	2.5	-	4.5
More than 5 and up to 10	$a_i + b_i \cdot (dur_i - 5)$	0.0	0.0	5.5	0.6	7.0	0.7	12.5	1.5	22.5	2.5
More than 10 and up to 15	$a_i + b_i \cdot (dur_i - 10)$	0.0	0.0	8.4	0.5	10.5	0.5	20.0	1.0	35.0	1.8
More than 15 and up to 20	$a_i + b_i \cdot (dur_i - 15)$	0.0	0.0	10.9	0.5	13.0	0.5	25.0	1.0	44.0	0.5
More than 20	$\min[a_i + b_i \cdot (dur_i - 20); 1]$	0.0	0.0	13.4	0.5	15.5	0.5	30.0	0.5	46.5	0.5

SCR.5.113. The capital requirement for spread risk on credit derivatives where the underlying financial instrument is a bond or a loan to any exposure listed in (a) to (d) above shall be nil.

SCR.5.114. Type 1 securitisation positions which are fully, unconditionally and irrevocably guaranteed by the European Investment Fund or the European Investment Bank, where the guarantee meets the requirements set out in section 3.8, shall be assigned a risk factor $stress_i$ of 0 %.

Simplified calculations for spread risk on bonds and loans

SCR.5.115. The following simplification may be used provided that it is proportionate to the nature, scale and complexity of the risks that the IORP faces.

SCR.5.116. The simplification is defined as follows:

$$Mkt_{sp}^{bonds} = MV^{bonds} \cdot \left(\sum_i \% MV_i^{bonds} \cdot stress_i + \% MV_{norating}^{bonds} \cdot \min\left[dur_{norating} \cdot 0.03; 1\right] \right) + \Delta Liab_{ul}$$

where:

MV^{bonds} = Total market value of assets subject to capital requirements for spread risk on bonds and spread loans

$\% MV_i^{bonds}$ = Proportion of the portfolio of assets subject to a capital requirement for spread risk on bonds and loans with credit quality step i, where a rating by a rating agency is available for those assets

$stress_i$ = a function of the credit quality step I and of the modified duration in years of the assets subject to a capital requirement for spread risk on bonds and loans with credit quality step i.

$dur_{norating}$ = modified duration in years of the assets subject to a capital requirement for spread risk on bonds and loans where no rating by a rating agency is available; $dur_{norating}$ should not be lower than one year.

$\Delta Liab_{ul}$ = Increase in the technical provisions less risk margin for contracts where members and beneficiaries bear the investment risk with embedded options and guarantees that would result from an instantaneous decrease in the value of the assets subject to the capital requirement for spread risk on bonds and loans of:

$$MV^{bonds} \cdot \left(\sum_i \% MV_i^{bonds} \cdot stress_i + \% MV_{norating}^{bonds} \cdot \min\left[dur_{norating} \cdot 0.03; 1\right] \right) + \Delta Liab_{ul}$$

SCR.5.117. Stress$_i$ as referred to above, for each credit quality step i, shall be equal to $dur_i \cdot b_i$, where dur$_i$ is the modified duration in years of the assets subject to a capital requirement for spread risk on bonds and loans with credit quality step i (but shall not be lower than one year), and b$_i$ is determined in accordance with the following table:

Credit quality step i	0	1	2	3	4	5	6
b$_i$	0.9%	1.1%	1.4%	2.5%	4.5%	7.5%	7.5%

Mkt$_{conc}$ market risk concentrations

Description

SCR.5.118. The scope of the concentration risk sub-module excludes the following

types of assets:

a) assets covered by the counterparty default risk module;

b) assets where the investment risk is not borne by the IORP, but by members and beneficiaries;

c) deferred tax assets;

d) intangible assets.

SCR.5.119. As an example, risks derived from concentration in cash held at a bank are captured in the counterparty default risk module, while risks corresponding to concentration in other bank assets should be reflected in the concentration risk sub-module.

SCR.5.120. An appropriate assessment of concentration risks needs to consider both the direct and indirect exposures derived from the investments included in the scope of this sub-module.

SCR.5.121. For the sake of simplicity and consistency, the definition of market risk concentrations regarding financial investments is restricted to the risk regarding the accumulation of exposures with the same counterparty. It does not include other types of concentrations (e.g. geographical area, industry sector, etc.).

SCR.5.122. The capital requirement for market risk concentration should be calculated on the basis of single name exposures. For this purpose, exposures to counterparties which belong to the same corporate group should be treated as a single name exposure. Immovable properties which are located in the same building shall be considered as a single immovable property.

SCR.5.123. The exposure at default to counterparty is the sum of the exposures to this counterparty. The exposure at default to a single name exposure is the sum of the exposures at default to all counterparties that belong to the single name exposure.

Input

SCR.5.124. Risk exposures in assets need to be grouped according to the counterparties involved.

E_i = Exposure at default to a single name exposure i that is included in the calculation base of the market risk concentration sub-module

$Assets_{xl}$ = Total amount of assets considered in this sub-module.

$rating_i$ = External credit quality step of the counterparty i

SCR.5.125. Where an IORP has more than one exposure to a counterparty, E_i is the

aggregate of those exposures at default to this counterparty considered as a single name exposure. The exposure at default on a single name exposure i shall be reduced by the amount of the exposure at default to counterparties belonging to that single name exposure and for which the risk factor g_i for market risk concentration is 0%. *Rating$_i$* should be a weighted average credit quality step on this single name exposure, determined as the whole number nearest to the average of the credit quality steps of the individual exposures to this counterparty, weighted by the net exposure at default in respect of that exposure to this counterparty.

SCR.5.126. The exposure at default to an individual counterparty i should comprise assets covered by the concentration risk sub-module, including hybrid instruments, e.g. junior debt, mezzanine CDO tranches.

SCR.5.127. Exposures via investment funds or such entities whose activity is mainly the holding and management of an IORP's own investment need to be considered on a look-through basis. The same holds for CDO tranches and similar investments embedded in 'structured products'. Where in accordance with SCR.5.12, any grouping is applied to the single name exposures of the underlying assets of collective funds for calculating the market risk concentration charge and it cannot be demonstrated that the groups into which the fund is split do not contain any of the same single name exposures, undertakings should assume that all assets for which the actual single name exposure is not identified belong to the same single name exposure.

SCR.5.128. The above paragraph is not applicable where exposure limits to single name exposures exist according to which the fund is managed.

SCR.5.129. Undertakings should aggregate exposures to groups referred to in paragraph SCR.5.127 across all collective funds in which they are invested and reconcile the exposures to each group with the exposures of the known single names in their asset portfolio.

Output

SCR.5.130. The module delivers the following outputs:

Mkt_{conc}	=	Capital requirement concentration risk sub-module
$nMkt_{conc}$	=	Capital requirement for concentration risk including loss absorbing capacity of technical provisions and security mechanisms

Calculation

SCR.5.131. The calculation is performed in three steps: (a) relative excess exposure per single name exposure, (b) risk concentration capital requirement per

single name exposure, (c) aggregation across single name exposures.

SCR.5.132. The relative excess exposure per single name exposure is calculated as:

$$XS_i = \max\left(0; E_i - CT_i \cdot Assets_{xl}\right),$$

where the relative excess exposure threshold CT_i, depending on the weighted average credit quality step of the single name exposure = i, is set as follows:

Rating provided by rating agency		Weighted average credit quality step of single name exposure i	Relative excess exposure threshold (CT_i)
Standard Poors / Fitch	Moody's		
AAA	Aaa	0	3%
AA	Aa	1	3%
A	A	2	3%
BBB	Baa	3	1.5%
BB	Ba	4	1.5%
Lower than BB, unrated	Lower than Ba, unrated	5-6, -	1.5%

and where $Assets_{xl}$ is the total amount of assets considered in the concentration risk sub-module, including government bonds.

SCR.5.133. The capital requirement for market risk concentration on a single name exposure i $Conc_i$ is calculated as the result of a pre-defined scenario:

$Conc_i = \Delta NAV | concentration\ shock$

The concentration risk shock on a single name exposure 'i' is the immediate effect on the net value of assets and liabilities expected in the event of an instantaneous relative decrease in the value of the assets corresponding to the single name exposure i equal to $XS_i \bullet g_i$, where the parameter g_i, depending on the credit rating of the counterparty, is determined as follows:

Rating provided by rating agency		Credit quality step	Risk factor g_i
Standard Poors / Fitch	Moody's		
AAA	Aaa	0	12 %
AA	Aa	1	12 %
A	A	2	21 %

BBB	Baa	3	27 %
BB	Ba	4	73 %
Lower than BB, unrated	Lower than Ba, unrated	5-6, -	73 %

Single name exposure to an insurance or reinsurance undertaking for which a rating by a rating agency is not available and where the undertaking meets its Minimum Capital Requirement, should be assigned a risk factor g_i for market risk concentration depending on the undertaking's solvency ratio (eligible amount of own funds/SCR) in accordance with the following table:

Solvency ratio	Risk factor g_i
196%	12 %
175%	21 %
122%	27 %
100%	64.5 %
95%	73 %

SCR.5.134. Where the solvency ratio falls in between the solvency ratios set out in the table above, the value of g_i shall be linearly interpolated from the closest values of gi corresponding to the closest solvency ratios set out in the table above. Where the solvency ratio is lower than 95%, the risk factor gi shall be equal to 73%. Where the solvency ratio is higher than 196%, the risk factor g_i shall be equal to 12%.

SCR.5.135. Single name exposures to third country insurance or reinsurance undertaking, for which a rating by a rating agency is not available, situated in the country whose solvency regime is deemed equivalent pursuant to Article 227 of Directive 2009/138/EC, and which complies with the solvency requirements of that third country, shall be assigned a risk factor g_i of 64.5%.

SCR.5.136. Single name exposures to credit institutions and financial institutions within the meaning of points (1) and (26) of Article 4(1) of Regulation EU No 575/2013 and which comply with the solvency requirements set out in Directive 2013/36/EU and Regulation (EU) No 575/2013, for which a rating by a rating is not available, shall be assigned a risk factor g_i of 64.5%.

SCR.5.137. For other unrated counterparties, the parameter g_i should be 73%.

SCR.5.138. The capital requirement for concentration risk is determined assuming no correlation among the requirements for each single name exposure *i*, and it should be equal to the following:

$$Mkt_{conc} = \sqrt{\sum_i \left(Conc_i^2\right)}$$

SCR.5.139. This sub-module (as for the whole of the market risk module) is in the scope of the approach for the loss absorbency of technical provisions and security mechanisms.

Special reference to mortgage covered bonds and public sector covered bonds

SCR.5.140. In order to provide mortgage covered bonds and public sector covered bonds with a treatment in concentration risk sub-module according their specific risk features, the excess exposure threshold applicable should be 15% provided that all the following requirements are met:

- the corresponding exposures in the form of covered bonds have been assigned to credit quality step 0 or 1;

- the covered bond meets the requirements defined in Article 52(4) of the UCITS directive 2009/65/EC.

Concentration risk capital in case of immovable properties

SCR.5.141. IORPs should identify the exposures in a single immovable property higher than 10% of 'total assets' (relative excess exposure threshold) considered in this sub-module according to paragraphs above (subsection description).

SCR.5.142. For this purpose IORPs should take into account both immovable properties directly owned and those indirectly owned (i.e. funds of properties), and both ownership and any other real exposure (mortgages or any other legal right regarding properties).

SCR.5.143. The risk concentration capital requirement per property *i* is calculated as the result of a pre-defined scenario:

Conc$_i$ = ΔNAV|concentration shock

Exposures to a single immovable property should be assigned a risk factor g$_i$ for market risk concentration of 12%

Special reference to exposures to governments, central banks, multilateral development banks and international organisations

SCR.5.144. No capital requirement should apply for the purposes of this sub-module to borrowings by or demonstrably guaranteed by a national government of an EEA state, issued in the currency of the government, or issued by a multilateral development bank as referred to in Article 117(2) of Regulation (EU) No 575/2013, or issued by an international organisation as referred to in Article 118 of Regulation (EU) No 575/2013, or issued by the European Central Bank or an EEA national central bank.

SCR.5.145. To determine the concentrations risk capital requirement for exposures to governments or central banks denominated and funded in the domestic

currency, other than those mentioned in the previous paragraph, the following parameters $g*_i$ should be used:

Concentration risk factors for exposures to non-EEA governments and central banks denominated and funded in the domestic currency

Credit quality step	$g*_i$
0	12%
1	12%
2	21%
3	27%
4	73%
5-6, -	73%

Special reference to exposures to bank deposits

SCR.5.146. Bank deposits considered in the concentration risk sub-module[45] can be exempted to the extent their full value is covered by a government guarantee scheme in the EEA area, the guarantee is applicable unconditionally to the IORP and provided there is no double-counting of such guarantee with any other element of the SCR calculation.

Treatment of risks associated to SPV notes held by an IORP

SCR.5.147. SPV notes should be treated as follows:

1) SPV notes having mostly the features of fixed-income bonds, authorized, where the SPV is defined as in point (26) of Article 13 of Directive 2009/138/EC[46] and meet the requirements set out in Article 211 of Directive 2009/138/EC and has credit quality step 3 or better. Their risks should be considered in the 'spread risk', 'interest rate risk' and concentration sub-modules according its credit quality step.

2) Others SPV notes, including those having significant features of equities (i.e. equity tranche notes): Their risks should be considered in the 'equity risk' sub-module. For this purpose the SPV notes should be considered as non-traded equities, unless they are traded actively in a financial market.

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[45] Risks derived from concentration in cash held at a bank are captured in the counterparty default risk module and are therefore not subject to the concentration risk sub-module.

[46] "Special purpose vehicle" means any undertaking, whether incorporated or not, other than an existing insurance or reinsurance undertaking, which assumes risks from IORPs and which fully funds its exposure to such risks through the proceeds of a debt issuance or any other financing mechanism where the repayment rights of the providers of such debt or financing mechanism are subordinated to the (re)insurance obligations of such an undertaking.

3.6.   SCR Counterparty default risk module

Introduction

<u>Description</u>

SCR.6.1.   The counterparty default risk module should reflect possible losses due to unexpected default or deterioration in the credit standing of the counterparties and debtors of IORPs over the forthcoming twelve months. The scope of the counterparty default risk module includes risk-mitigating contracts, such as (re)insurance arrangements, securitisations and derivatives, and receivables from intermediaries, as well as any other credit exposures which are not covered in the spread risk sub-module. The scope also includes sponsor support.

SCR.6.2.   For each counterparty, the counterparty default risk module should take account of the overall counterparty risk exposure of the IORP concerned to that counterparty, irrespective of the legal form of its contractual obligations to that IORP.

SCR.6.3.   A differentiation of two kinds of exposures, in the following denoted by type 1 and type 2 exposures, and a different treatment according to their characteristics has to be applied.

SCR.6.4.   Type 1 exposures shall consist of exposures in relation to the following:

(a) Sponsor support. Sponsor support shall not be taken into account as a type 1 exposure where IORPs are eligible to the balancing item approach in the valuation of legally enforceable unlimited sponsor support.

(b) Risk-mitigation contracts including reinsurance arrangements, special purpose vehicles, insurance securitisations and derivatives;

(c) Cash at bank as defined in Article 6 item F of Council Directive 91/674/EEC[47];

(d) Deposits with ceding undertakings, where the number of single name exposures does not exceed 15;

(e) Commitments received by an insurance or reinsurance undertaking which have been called up but are unpaid, where the number of single name exposures does not exceed 15, including called up but unpaid ordinary share capital and preference shares, called up but unpaid legally binding commitments to subscribe and pay for subordinated liabilities, called up but unpaid initial funds, members' contributions or the equivalent basic own-fund item for mutual and mutual-type undertakings, called up but unpaid guarantees, called up but unpaid letters of credit, called up but unpaid claims which mutual or mutual-type associations may have against their members by way of a call for

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[47] Council Directive 91/674/EEC of 19 December 1991 on the annual accounts and consolidated accounts of insurance undertakings, OJ L 374, 31.12.1991, p. 7.

supplementary contributions;

(f) Legally binding commitments which the undertaking has provided or arranged and which may create payment obligations depending on the credit standing or default on a counterparty including guarantees, letters of credit, letters of comfort which the undertaking has provided.

SCR.6.5. Type 2 exposures shall consist of all credit exposures which are not covered in the spread risk sub-module and which are not type 1 exposures, including the following:

(a) Receivables from intermediaries;

(b) Members and beneficiaries debtors, including mortgage loans;

(c) Other mortgage loans;

(d) Deposits with ceding institutions, where the number of single name exposures exceeds 15;

(e) Commitments received by an insurance or reinsurance undertaking which have been called up but are unpaid as referred to in SCR.6.4 (e), where the number of single name exposures exceeds 15.

SCR.6.6. The capital requirement for counterparty default risk shall be calculated on the basis of single name exposures (independent counterparties). For determining the number of independent counterparties, counterparties which belong to the same corporate group, in particular a group as defined in Article 212 of the Solvency II Framework Directive, or to the same financial conglomerate as defined in Article 2(14) of the Financial Conglomerate Directive (2002/87/EC) should not be treated as independent counterparties.

SCR.6.7. IORPs are allowed to classify deposits with ceding institutions and called up but unpaid commitments as type 1 exposures even if the number of independent counterparties exceeds 15. However, IORPs must then classify all such exposures as type 1 or as type 2.

SCR.6.8. Where a letter of credit, a guarantee or an equivalent risk mitigation technique has been provided to fully secure an exposure and this risk mitigation technique complies with the requirements of sections 3.8 and 3.9, then the provider of that letter of credit, guarantee or equivalent risk mitigation technique may be considered as the counterparty on the secured exposure for the purposes of assessing the number of single name exposures.

SCR.6.9. Investment guarantees on insurance contracts provided to members and beneficiaries by a third party and for which the IORP would be liable should the third party default shall be treated as derivatives in the counterparty default risk module.

Input

SCR.6.10. The following input information is required in relation to type 1 exposures:

SponsorSupport	=	Value of sponsor support on holistic balance sheet
Recoverables$_i$	=	Best estimate recoverables from the (re)insurance contract (or SPV) *i* plus any other debtors arising out of the (re)insurance arrangement or SPV securitisation
MarketValue$_i$	=	Value of the derivative *i* according to section on valuation
Collateral$_i$	=	Risk-adjusted value of collateral in relation to the (re)insurance arrangement or SPV securitisation *i* or in relation to derivative *i*
Guarantee$_i$	=	Nominal value of the guarantee, letter of credit, letter of comfort or similar commitment *i*
MVGuarantee$_i$	=	Value according to section on valuation of the guarantee, letter of credit, letter of comfort or similar commitment *i*
Rating$_i$	=	Rating of counterparty in relation (re)insurance, SPV, derivative, guarantee, letter of credit, letter of comfort or similar commitment *i*

SCR.6.11. The following input information is required in relation to type 2 exposures:

E	=	Sum of the values of type 2 exposures, except for receivables from intermediaries which are due for more than 3 months.
E$_{past-due}$	=	Sum of the values of receivables from intermediaries which are due for more than 3 months.

<u>Output</u>

SCR.6.12. The module delivers the following output:

SCR$_{def}$	=	Capital requirement for counterparty default risk
nSCR$_{def}$	=	Capital requirement for counterparty default risk including the loss absorbing capacity of

Calculation

SCR.6.13. The capital requirements for type 1 and type 2 exposures should be calculated separately. A diversification effect should be allowed in the aggregation of the requirements as follows:

$$SCR_{def} = \sqrt{SCR_{def,1}^2 + 1.5 \cdot SCR_{def,1} \cdot SCR_{def,2} + SCR_{def,2}^2},$$

where

SCR_{def} = Capital requirement for counterparty default risk

$SCR_{def,1}$ = Capital requirement for counterparty default risk of type 1 exposures

$SCR_{def,2}$ = Capital requirement for counterparty default risk of type 2 exposures

SCR.6.14. Additionally, IORPs should determine the capital requirement for counterparty default risk including the loss absorbing capacity of technical provisions and security mechanisms nSCR$_{def}$ as the loss in net asset value resulting from a counterparty default loss of the amount SCR_{def}.

Mortgage loans

SCR.6.15. Retail loans secured by mortgages on residential property (mortgage loans) shall be treated as type 2 exposures under the counterparty default risk provided the requirements in the following paragraphs are met.

SCR.6.16. The exposure shall be either to a natural person or persons or to a small or medium sized enterprise.

SCR.6.17. The exposure shall be one of a significant number of exposures with similar characteristics such that the risks associated with such lending are substantially reduced.

SCR.6.18. The total amount owed to the IORP and, where relevant, to all related undertakings within the meaning of Article 212(1)(b) and (2) of Directive 2009/138/EC, including any exposure in default, by the counterparty or other connected third party, shall not, to the knowledge of the IORP, exceed EUR 1 million. The IORP shall take reasonable steps to acquire this knowledge.

SCR.6.19. The residential property is or will be occupied or let by the owner.

SCR.6.20. The value of the property does not materially depend upon the credit quality of the borrower.

SCR.6.21. The risk of the borrower does not materially depend upon the performance of the underlying property, but on the underlying capacity of the borrower to repay the debt from other sources, and as a consequence, the repayment of the facility does not materially depend on any cash flow

generated by the underlying property serving as collateral. For those other sources, the IORP shall determine maximum loan-to-income ratio as part of its lending policy and obtain suitable evidence of the relevant income when granting the loan.

SCR.6.22. All of the following requirements on legal certainty shall be met:

(a) a mortgage or charge is enforceable in all jurisdictions which are relevant at the time of the conclusion of the credit agreement and shall be properly filed on a timely basis;

(b) all legal requirements for establishing the pledge have been fulfilled;

(c) the protection agreement and the legal process underpinning it enable the insurance or reinsurance undertaking to realise the value of the protection within a reasonable timeframe.

SCR.6.23. All of the following requirements on the monitoring of property values and on property valuation shall be met:

(a) The IORP monitors the value of the property on a frequent basis and at a minimum once every three years. The IORP carries out more frequent monitoring where the market is subject to significant changes in conditions;

(b) the property valuation is reviewed when information available to the IORP indicates that the value of the property may have declined materially relative to general market prices and that review is external and independent and carried out by a valuer who possesses the necessary qualifications, ability and experience to execute a valuation and who is independent from the credit decision process.

SCR.6.24. For the purposes of the paragraph above, IORPs may use statistical methods to monitor the value of the property and to identify property that needs revaluation.

Loss-given-default

SCR.6.25. The loss-given-default on a single name exposure shall be equal to the sum of the loss-given-default on each of the exposures to counterparties belonging to the single name exposure. The loss-given-default shall be net of the liabilities towards counterparties belonging to the single name exposure provided that those liabilities and exposures are set off in the case of default of the counterparties and provided that SCR.8.6 ff. and SCR.8.13 ff. are complied with in relation to that right of set-off. No offsetting shall be allowed for if the liabilities are expected to be met before the credit exposure is cleared.

SCR.6.26. The loss-given-default on a reinsurance arrangement or insurance securitisation shall be equal to the following:

$$LGD = \max\left[50\% \cdot \left(RE\operatorname{cov}erables + 50\% \cdot RM_{re}\right) - F \cdot Collateral\,;0\right]$$

where:

(a) *Recoverables* denotes the best estimate of amounts recoverable from the reinsurance arrangement or insurance securitisation and the corresponding debtors;

(b) RM_{re} denotes the risk mitigating effect on underwriting risk of the reinsurance arrangement or securitisation;

(c) *Collateral* denotes the risk-adjusted value of collateral in relation to the reinsurance arrangement or securitisation;

(d) *F* denotes a factor to take into account the economic effect of the collateral arrangement in relation to the reinsurance arrangement or securitisation in case of any credit event related to the counterparty.

Where the reinsurance arrangement is with an insurance or reinsurance undertaking or a third country insurance or reinsurance undertaking and 60 % or more of that counterparty's assets are subject to collateral arrangements, the loss-given-default shall be equal to the following:

$$LGD = \max\left[90\% \cdot \left(RE\cov erables + 50\% \cdot RM_{re}\right) - F \cdot Collateral; 0\right]$$

where:

F denotes a factor to take into account the economic effect of the collateral arrangement in relation to the reinsurance arrangement or securitisation in the case of a credit event related to the counterparty.

SCR.6.27. The loss-given-default on a derivative shall be equal to the following:

$$LGD = \max(90\%(Derivative + RM_{fin}) - F' \cdot Collateral; 0)$$

where

(a) Derivative denotes the value of the derivative in accordance with the section on valuation;

(b) RM_{fin} denotes the risk mitigating effect on market risk of the derivative;

(c) Collateral denotes the risk-adjusted value of collateral in relation to the derivative;

(d) F' denotes a factor to take into account the economic effect of the collateral arrangement in relation to the derivative in case of a credit event related to the counterparty.

SCR.6.28. The loss-given-default on a mortgage loan shall be equal to the following:

$$LGD = \max\left(Loan - 80\% \cdot Mortgage; 0\right)$$

where:

(a) *Loan* denotes the value of the mortgage loan in accordance with the section on valuation;

(b) *Mortgage* denotes the risk-adjusted value of the mortgage.

SCR.6.29. The loss-given-default on a legally binding commitment as referred to in SCR.6.4 shall be equal to the difference between its nominal value and its value in accordance with the section on valuation.

SCR.6.30. The loss-given-default on cash at bank as defined in Article 6 item F of Council Directive 91/674/EEC, of a deposit with a ceding undertaking, of an item listed in SCR.6.4 or SCR.6.5, or of a receivable from an intermediary or member/beneficiary debtor, as well as any other exposure not listed here elsewhere shall be equal to its value in accordance with the section on valuation.

Loss-given-default on the sponsor

SCR.6.31. The loss given default on the sponsor should be 95% of the sum of the value of sponsor support shown in the holistic balance sheet and the absolute amount of the loss absorbing capacity of sponsor support, which is included in the formula to take into account that a sponsor cannot absorb the loss resulting from its own default:

$$LGD = 95\% \, (SponsorSupport + LAC_{SpS})$$

where LAC_{SpS} denotes the absolute amount of the relevant loss absorbing capacity of sponsor support. For this purpose, LAC_{SpS} should not be larger than the gross SCR calculated without taking into account the counterparty default risk of the sponsor. This value can also be used for an approximation of LAC_{SpS} for the purpose of calculating the loss given default on the sponsor.

Risk mitigating effect

SCR.6.32. The risk-mitigating effect on underwriting or market risks of a reinsurance arrangement, securitisation or derivative shall be the difference between the following capital requirements:

(a) the hypothetical capital requirement for underwriting or market risk of the IORP that would apply if the reinsurance arrangement, securitisation or derivative did not exist;

(b) the capital requirement for underwriting or market risk of the IORP.

Risk-adjusted value of collateral

SCR.6.33. The risk-adjusted value of collateral provided by way of security, as referred to in SCR.8.28(b), shall be equal to the difference between the value of the assets held as collateral, valued in accordance with the section on valuation, and the adjustment for market risk, as referred to in SCR.6.37, provided both of the following requirements are fulfilled:

(a) the IORP has (or is a beneficiary under a trust where the trustee has) the right to liquidate or retain, in a timely manner, the collateral in the event of a default, insolvency or bankruptcy or other credit event relating to the counterparty (the counterparty requirement)

(b) the IORP has (or is a beneficiary under a trust where the trustee has) the right to liquidate or retain, in a timely manner, the collateral in the event of a default, insolvency or bankruptcy or other credit event relating to the custodian or other third party holding the collateral on behalf of the counterparty (the third party requirement).

SCR.6.34. Where the counterparty requirement is met and the criteria set out in SCR.8.30 are met and the third party requirement is not met, the risk-adjusted value of a collateral provided by way of security, as referred to in SCR.8.28(b), shall be equal to 90 % of the difference between the value of the assets held as collateral in accordance with the section on valuation and the adjustment for market risk, as referred to in SCR.6.37.

SCR.6.35. Where either the counterparty requirement is not met or the requirements in SCR.8.30 are not met, the risk-adjusted value of collateral provided by way of security, as referred to in SCR.8.28(b), shall be zero.

SCR.6.36. The risk-adjusted value of a collateral of which full ownership is transferred, as referred to in SCR.8.28(a), shall be equal to the difference between the value of the assets held as collateral, valued in accordance with the section on valuation, and the adjustment for market risk, as referred to in SCR.6.37, provided the requirements in SCR.8.30 are fulfilled.

SCR.6.37. The adjustment for market risk is the difference between the following capital requirements:

(a) the hypothetical capital requirement for market risk of the IORP that would apply if the assets held as collateral were not included in the calculation;

(b) the hypothetical capital requirement for market risk of the IORP that would apply if the assets held as collateral were included in the calculation.

SCR.6.38. For the purposes of the paragraph above, the currency risk of the assets held as collateral shall be calculated by comparing the currency of the assets held as collateral against the currency of the corresponding exposure.

SCR.6.39. Where in case of insolvency of the counterparty, the determination of the IORP's proportional share of the counterparty's insolvency estate in excess of the collateral does not take into account that the IORP receives the collateral, the factors F and F' referred to in SCR.6.26 and SCR.6.27 shall both be 100%. In all other cases these factors shall be 50% and 90% respectively.

Risk-adjusted value of mortgage

SCR.6.40. The risk-adjusted value of mortgage shall be equal to the difference between the value of the residential property held as mortgage, valued in accordance with the following, and the adjustment for market risk, as

referred to in the paragraph after the following paragraph.

SCR.6.41. The value of the residential property held as mortgage shall be the market value reduced as appropriate to reflect the results of the monitoring required in SCR.6.23 and to take account of any prior claims on the property. The external, independent valuation of the property shall be the same or less than the market value calculated in accordance with the section on valuation.

SCR.6.42. For the purposes of the paragraph right above, the currency risk of the residential property held as mortgage shall be calculated by comparing the currency of the residential property against the currency of the corresponding loan.

SCR.6.43. The adjustment for market risk referred to above shall be the difference between the following capital requirements:

(a) the hypothetical capital requirement for market risk of the IORP that would apply if the residential property held as mortgage were not included in the calculation;

(b) the hypothetical capital requirement for market risk of the IORP that would apply if the residential property held as mortgage were included in the calculation.

Calculation of capital requirement for type 1 exposures

SCR.6.44. The main inputs of the counterparty default risk module are the estimated loss-given-default (LGD) of an exposure and the probability of default (PD) of the counterparty. Given probabilities of default and losses-given-default (LGD) of the counterparties in the portfolio of type 1 exposures, the capital requirement for type 1 exposures is calculated as follows:

(1) Where the standard deviation of the loss distribution of type 1 exposures is lower than or equal to 7 % 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:

$$SCR_{def,1} = 3 \cdot \sigma$$

where σ denotes the standard deviation of the loss distribution of type 1 exposures.

(2) Where the standard deviation of the loss distribution of type 1 exposures is higher than 7 % of the total losses-given-default on all type 1 exposures and 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.

(3) 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.

(4) The standard deviation of the loss distribution of type 1 exposures shall be equal to the following:

$$\sigma = \sqrt{V}$$

where *V* denotes the variance of the loss distribution of type 1 exposures.

SCR.6.45. Variance of the loss distribution of type 1 exposures

(1) The variance of the loss distribution of type 1 exposures as referred to above shall be equal to the sum of V_{inter} and V_{intra}.

(2) V_{inter} shall be equal to the following:

$$V_{inter} = \sum_{(j,k)} \frac{PD_k \cdot (1 - PD_k) \cdot PD_j \cdot (1 - PD_j)}{1.25 \cdot (PD_k + PD_j) - PD_k \cdot PD_j} \cdot TLGD_j \cdot TLGD_k$$

where:

(a) the sum covers all possible combinations (*j,k*) of different probabilities of default on independent counterparties in accordance with (3) below;

(b) TLGD$_j$ and $TLGD_k$ denote the sum of losses-given-default on type 1 exposures from counterparties bearing a probability of default *PDj* and PD_k respectively .

(3) V$_{intra}$ shall be equal to the following:

$$V_{intra} = \sum_{j} \frac{1.5 \cdot PD_j \cdot (1 - PD_j)}{2.5 - PD_j} \cdot \sum_{PD_j} LGD_i^2$$

where:

(a) the first sum covers all different probabilities of default on independent counterparties in accordance with the table below

(b) the second sum covers all independent counterparties that have a probability of default equal to PD_j.

(c) LGD_i denotes the loss-given-default on the independent counterparty *i*.

(d) PD_i denotes the probability of default.

Probability of default

SCR.6.46. The probability of default on a single name exposure/independent counterparty shall be equal to the average of the probabilities of default on each of the exposures to counterparties that belong to the single name exposure, weighted by the loss-given-default in respect of those exposures.

SCR.6.47. Single name exposure i for which a rating by a rating agency is available shall be assigned a probability of default PD_i in accordance with the following table.

Credit quality step	0	1	2	3	4	5	6
Probability of default PD_i	0.002 %	0.01 %	0.05 %	0.24 %	1.20 %	4.2 %	4.2 %

SCR.6.48. Single name exposures i to an insurance or reinsurance undertaking for which a rating by a rating agency is not available and where this undertaking meets its Minimum Capital Requirement, shall be assigned a probability of default PD_i depending on the undertaking's solvency ratio, in accordance with the following table:

Solvency ratio	196%	175%	150%	125%	122%	100%	95%	75%
Probability of default	0.01%	0.05%	0.1%	0.2%	0.24%	0.5%	1.2%	4.2%

Where the solvency ratio falls in between the solvency ratios specified in the table above, the value of the probability of default shall be linearly interpolated from the closest values of probabilities of default corresponding to the closest solvency ratios specified in the table above. Where the solvency ratio is lower than 75%, the probability of default shall be 4.2 %. Where the solvency ratio is higher than 196%, the probability of default shall be 0.01 %.

For the purposes of this paragraph, 'solvency ratio' denotes the ratio of the eligible amount of own funds to cover the Solvency Capital Requirement and the Solvency Capital Requirement, using the latest available values.

SCR.6.49. Exposures to an insurance or reinsurance undertaking that do not meet its Minimum Capital Requirement shall be assigned a probability of default equal to 4.2%.

SCR.6.50. SCR.6.48 and SCR.6.49 shall only apply as of the first date of public disclosure, by the undertaking corresponding to the exposure, of the

report on its solvency and financial condition referred to in Article 51 of Directive 2009/138/EC. Before that date, if a rating by a rating agency is available for the exposures, SCR.6.47 shall apply. Otherwise, the exposures shall be assigned the same risk factor as the ones that would result from the application of SCR.6.48 to exposures to an insurance or reinsurance undertaking whose solvency ratio is 100%.

SCR.6.51. Exposures to a third country insurance or reinsurance undertaking for which a rating by a rating agency is not available, situated in a country whose solvency regime is deemed equivalent to that laid down in Directive 2009/138/EC in accordance with Article 227 of Directive 2009/138/EC, and which complies with the solvency requirements of that third-country, shall be assigned a probability of default equal to 0.5 %.

SCR.6.52. Exposures to credit institutions and financial institutions within the meaning of points (1) and (26) of Article 4(1) of Regulation (EU) No 575/2013 which comply with the solvency requirements set out in Directive 2013/36/EU and Regulation (EU) No 575/2013, for which a rating by a rating agency is not available, shall be assigned a probability of default equal to 0.5%.

SCR.6.53. Exposures to counterparties referred to in SCR.5.110 shall be assigned a probability of default equal to 0%.

SCR.6.54. The probability of default on single name exposures other than those identified in SCR.6.47 to SCR.6.53 shall be equal to 4.2%.

SCR.6.55. Where a letter of credit, a guarantee or an equivalent arrangement is provided to fully secure an exposure and this arrangement complies with sections 3.8 and 3.9, the provider of that letter of credit, guarantee or equivalent arrangement may be considered as the counterparty on the secured exposure for the purposes of assessing the probability of default of a single name exposure.

SCR.6.56. For the purposes of the paragraph right above, exposures fully, unconditionally and irrevocably guaranteed by regional governments and local authorities shall be treated as exposures to the central government provided that there is no difference in risk between such exposures.

Probability of default of the sponsor

SCR.6.57. For calculating the SCR for a possible default of the sponsor the same rules for determining the probabilities of default as described above for other counterparties shall be applied.

Calculation of capital requirement for type 2 exposures

SCR.6.58. The capital requirement for counterparty default risk of type 2 exposures is determined as the result of a pre-defined scenario:

$$SCR_{def,2} = \Delta NAV \mid type\ 2\ counterparty\ default\ shock$$

SCR.6.59. The capital requirement for counterparty default risk on type 2 exposures

shall be equal to the loss in the basic own funds that would result from an instantaneous decrease in value of type 2 exposures by the following amount:

$$90\% \cdot LGD_{receivables>3months} + \sum_i 15\% \cdot LGD_i$$

where:

a) $LGD_{receivables>3months}$ denote the total losses-given-default on all receivables from intermediaries which have been due for more than three months

b) the sum is taken on all type 2 exposures other than receivables from intermediaries which have been due for more than three months;

c) LGD_i denotes the loss-given-default on the type 2 exposure *i*.

Simplification

SCR.6.60. Simplified calculation of the risk adjusted value of collateral to take into account the economic effect of the collateral:

If it is proportionate to the nature, scale and complexity of the risks inherent in the collateral arrangement that meets both the counterparty and the third party requirements (see SCR.6.33) a simplification as follows can be applied:

$$Collateral = 85\% \cdot MarketValue_{Collateral}$$

Where the collateral is held by or deposited with a third party custodian and the collateral only meets the counterparty requirement, a simplification as follows can be applied:

$$Collateral = 75\% \cdot MarketValue_{Collateral}$$

3.7. Pension liability risk

Structure of the pension liability risk module

SCR.7.1. This module covers the risk arising from the underwriting or taking over of pension liabilities.

SCR.7.2. The scope of the pension liability risk module includes all pension obligations.

SCR.7.3. The pension liability module in this assessment only consists of the sub-module for longevity risk. IORPs are not required to calculate the sub-modules for mortality risk, disability-morbidity risk, expenses risk, revision risk, benefit option risk and CAT risk, which are described in Annex 6. However, IORPs that consider, in consultation with their respective NSA, that all or part of these sub-modules represent important/material risk may include them in the calculations.

SCR.7.4. The calculations of capital requirements in the pension liability risk module are based on a specified shock scenario. General guidance about the interpretation of shock scenarios can be found in section 3.1.

SCR.7.5. Results of calculations in this sub-module will be different in the two baseline scenarios, because of a different level of technical provisions.

Description

SCR.7.6. The pension liability risk module consists of one sub-module for longevity risk.

Input

SCR.7.7. The following input information is required:

$Pension_{long}$ = Capital requirement for longevity risk

$nPension_{long}$ = Capital requirement for longevity risk including the loss absorbing capacity of technical provisions and security mechanisms

Output

SCR.7.8. The module delivers the following output:

$SCR_{Pension}$ = Capital requirement for pension liability risk

$nSCR_{Pension}$ = Capital requirement for pension liability risk including the loss absorbing capacity of technical provisions and security mechanisms

Calculation

SCR.7.9. The capital requirement for pension liability risk is derived as follows:

$$SCR_{Pension} = Pension_{Long}$$

where

$Pension_{Long}$ = Capital requirement for longevity risk

SCR.7.10. The net capital requirement nSCR$_{Pension}$ is determined as follows:

$$nSCR_{Pension} = nPension_{Long}$$

Pension$_{long}$ longevity risk

Description

SCR.7.11. Longevity risk is associated with pension obligations (such as annuities) where an IORP guarantees to make recurring series of payments until the death of the member or beneficiary and where a decrease in mortality rates leads to an increase in the technical provisions without the risk margin, or with pension obligations where an IORP guarantees to make a single payment in the event of the survival of the member of beneficiary for the duration of the policy term.

SCR.7.12. It is applicable for pension obligations contingent on longevity risk i.e. where there is no death benefit or the amount currently payable on death is less than the technical provisions held and, as a result, a decrease in mortality rates is likely to lead to an increase in the technical provisions. The decrease in mortality rates should be applied irrespective of the time unit of the rates (annual, monthly, etc.) and where the decrease in mortality rates leads to an increase in technical provisions without the risk margin.

SCR.7.13. The capital requirement should be calculated as the change in net asset value (assets minus liabilities) following a permanent decrease in mortality rates.

SCR.7.14. Where pension obligations provide benefits both in case of death and survival and the death and survival benefits are contingent on the life of the same person(s), these obligations do not need to be unbundled. For these contracts the longevity scenario can be applied fully allowing for the netting effect provided by the 'natural' hedge between the death benefits component and the survival benefits component (note that a floor of zero applies at the level of contract if the net result of the scenario is favourable to the IORP).

SCR.7.15. The identification of contracts for which a decrease in mortality rates leads to an increase in technical provision without the risk margin may be based on the following assumptions:

a) Multiple contracts in respect of the same person may be treated as if they were one contract.

b) Where the calculation of technical provisions is based on groups of contracts, the identification of the contracts for which technical provisions increase under an increase of mortality rates may also be based on those groups of contracts instead of single contracts, provided that it yields a result which is not materially different.

Input

SCR.7.16. No specific input data is required for this module.

Output

SCR.7.17. The module delivers the following output:

$Pension_{long}$ = Capital requirement for longevity risk

$nPension_{long}$ = Capital requirement for longevity risk including the loss absorbing capacity of technical provisions and security mechanisms

Calculation

SCR.7.18. The capital requirement for longevity risk is defined as a result of a longevity scenario as follows:

$$Pension_{long} = \left(\Delta NAV \,\middle|\, longevity\,shock \right)$$

where

ΔNAV = The change in the net value of assets minus liabilities

$longevity\,shock$ = An instantaneous permanent decrease of 20% in mortality rates for each age and each member or beneficiary where the payment of benefits (either lump sum or multiple payments) is contingent on longevity risk

SCR.7.19. The longevity scenario should be calculated under the condition that the scenario does not change the value of technical provisions and security mechanisms as a consequence of their loss-absorbing capacity.

SCR.7.20. Additionally, the result of the scenario should be determined under the condition that the value of technical provisions and security mechanisms can change in response to the shock being tested. The resulting capital requirement is $nPension_{long}$.

Simplification

SCR.7.21. The following simplification may be used provided the following conditions are met:

- The simplification is proportionate to the nature, scale and complexity of the risks that the IORP faces.

- The standard calculation of the longevity risk sub-module is an undue burden for the IORP.

SCR.7.22. The capital requirement for longevity risk according to the simplified calculation can be taken as the following:

$$\text{Pension}_{long} = 0.2 \cdot q \cdot n \cdot 1.1^{(n-1)/2} \cdot \text{BE}_{long}$$

where

- q denotes an IORP-specific expected average mortality rate over the next year (weighted by the sum assured);

- n denotes the modified duration in years of the payments o members and beneficiaries included in the best estimate;

- BE_{long} is the best estimate of technical provisions for obligations subject to longevity risk.

3.8. Financial Risk mitigation

Scope

SCR.8.1.   This subsection covers financial risk mitigation techniques. For the purposes of this assessment, financial risk mitigation techniques include the purchase or issuance of financial instruments (such as financial derivatives) which transfer risk to the financial markets.

SCR.8.2.   The use of special purpose vehicles and (re)insurance to mitigate pension liability risk are not considered to be financial risk mitigation techniques and are covered in section 3.9.

SCR.8.3.   The following are examples of financial risk mitigation techniques covered by this subsection:

- Interest rate swaps to cover the risk of lower interest rates;

- Currency swaps and forwards to cover currency risk in relation to assets or liabilities;

- Put options bought to cover the risk of falls in assets;

- Protection bought through credit derivatives or collateral to cover the risk of failure or downgrade in the credit quality of certain exposures;

- Swaptions acquired to cover variable/fixed risks.

SCR.8.4.   The allowance of the above financial risk mitigation techniques is subject to the requirements in this subsection and the principles in Annex 3 being met.

SCR.8.5.   Financial risk mitigation techniques do not include the risk mitigating effect provided by pure conditional, pure discretionary and mixed benefits. Processes and controls that an IORP has in place to manage the investment risk are also excluded. This does not preclude the allowance for future management actions in the calculation of technical provisions subject to the requirements in the section on valuation.

Conditions for using financial risk mitigation techniques

SCR.8.6.   The risk mitigation technique must be legally effective and enforceable in all relevant jurisdictions and there must be an effective transfer of risk to a third party.

SCR.8.7.   IORPs should have a direct claim on the protection provider and there should be an explicit reference to specific exposures or a pool of exposures, so that the extent of the cover is clearly defined and incontrovertible.

SCR.8.8.   The calculation of the SCR should allow for the effects of financial risk mitigation techniques through a reduction in requirements commensurate with the extent of risk mitigation and an appropriate treatment of any corresponding risks embedded in the use of financial risk mitigation

techniques. These two effects should be separated.

SCR.8.9.   There should be no double counting of mitigation effects.

SCR.8.10.   All material risks arising from the use of the financial risk mitigation techniques should be reflected in the SCR, regardless of whether that financial risk mitigation technique is considered admissible.

SCR.8.11.   The calculation should be made on the basis of assets and liabilities existing at the date of reference of the solvency assessment.

SCR.8.12.   With the exception of rolling hedging programmes, see below, risk mitigation techniques (for example financial stop-loss processes) not in place at the date of reference of the solvency assessment should not be allowed to reduce the calculation of the SCR.

Basis Risk

SCR.8.13.   Where the underlying assets or references of the financial mitigation instrument do not perfectly match the exposures of the IORP, the financial risk mitigation technique should only be allowed in the calculation of the SCR if the IORP can demonstrate that the basis risk is either not material compared to the mitigation effect or, if the risk is material, that the basis risk can be appropriately reflected in the SCR.

SCR.8.14.   The following 'financial risk mitigation techniques' should be considered to involve material basis risk:

- equity derivatives whose underlying equities or indexes have not a correlation nearby 1 with the hedged asset or liability, especially in case of stressed situations.

- CDS referred to names different than the hedged name, or with a correlation not nearby 1, with a different tenor or a different nominal.

Shared financial risk mitigation

SCR.8.15.   Shared financial risk mitigation techniques which provide simultaneous protection to various parties and where the activation of one of them means the loss of protection (totally or partially) for the rest of parties should not be treated as a financial risk mitigation technique in this assessment.

Rolling and dynamic hedging

SCR.8.16.   Where a risk mitigation technique covers just a part of the next twelve months it should only be allowed with the average protection level over the next year (i.e. pro rata temporis).

For example, where an equity option provides protection for the next six months, IORPs should assume that the option only provides half of the risk mitigating effect that it does if the shock takes place immediately.

Where the exposure to the risk that is being hedged will cease before the

end of the next year with objective certainty, the same principle should be applied but in relation to the full term of the exposure.

SCR.8.17. Where a risk mitigation technique covers only a part of the next twelve months, but a rolling hedge programme exists, this should be permitted as a risk mitigation technique if the following conditions are met:

a. There is well-documented and established process for the rolling forward of hedges;

b. The risk that the hedge cannot be rolled over due to an absence of liquidity in the market is not material (no material liquidity risk);

c. The costs of renewing the same hedge over a one year period are reflected in the SCR calculation by reducing the level of protection of the hedge; and

d. Any additional counterparty risk that arises from the rolling over of the hedge is reflected in the SCR.

SCR.8.18. Dynamic hedging should not be treated as a risk mitigation technique.

Credit quality of the counterparty

SCR.8.19. For purposes of this assessment, only financial protection provided by counterparties with a credit rating equal or equivalent to at least BBB should be allowed in the assessment of the SCR. For unrated counterparties, the IORP should be able to demonstrate that the counterparty meets at least the standard of a BBB rated company.

SCR.8.20. In the event of default, insolvency or bankruptcy of the provider of the financial risk mitigation instrument – or other credit events set out in the transaction document – the financial risk mitigation instrument should be capable of liquidation in a timely manner or retention.

SCR.8.21. Where a provider of protection was downgraded below BBB or became unrated at the end of 2011, but its rating was restored in 2012, the financial mitigation technique may be considered admissible for this assessment purposes.

SCR.8.22. If the financial risk mitigation technique is collateralized, the assessment of the credit quality of the protection should consider the collateral if the requirements set out below are met and the risks arising from the collateral are appropriately captured in the SCR (i.e. the counterparty default risk module).

Credit derivatives

SCR.8.23. The reduction of the SCR based on the mitigation of credit exposures by using credit derivatives should only be allowed where IORPs have in force generally applied procedures for this purpose and consider generally admitted criteria. Requirements set out in other financial sectors for the same mitigation techniques may be considered as generally applied

procedures and admitted criteria.

SCR.8.24. In order for a credit derivative contract to be recognised, the credit events specified by the contracting parties must at least cover:

- Failure to pay the amounts due under the terms of the underlying obligation that are in effect at the time of such failure (with a grace period that is closely in line with the grace period in the underlying obligation);

- Bankruptcy, insolvency or inability of the obligor to pay its debts, or its failure or admission in writing of its inability generally to pay its debts as they fall due, and analogous events; and

- Restructuring of the underlying obligation, involving forgiveness or postponement of principal, interest or fees that results in a credit loss event.

SCR.8.25. In the event that the credit events specified under the credit derivative do not include restructuring of the underlying obligation, the protection offered by the risk-mitigation technique may be partially recognised as follows:

- where the amount that the protection provider has undertaken to pay is not higher than the exposure value, the value of the credit protection should be reduced by 40%; or

- where the amount that the protection provider has undertaken to pay is higher than the exposure value, the value of the credit protection should be no higher than 60% of the exposure value.

SCR.8.26. Where the amount that the protection provider has undertaken to pay is higher than the exposure value then IORP should provide further information on the nature of the risk mitigation technique.

SCR.8.27. A mismatch between the underlying obligation and the reference obligation under the credit derivative or between the underlying obligation and the obligation used for purposes of determining whether a credit event has occurred is permissible only if the following conditions are met:

- the reference obligation or the obligation used for the purposes of determining whether a credit event has occurred, as the case may be, ranks pari passu with or is junior to the underlying obligation; and

- the underlying obligation and the reference obligation or the obligation used for the purposes of determining whether a credit event has occurred, as the case may be, share the same obligor (i.e. the same legal entity) and there are in place legally enforceable cross-default or cross-acceleration clauses.

Collateral

SCR.8.28. 'Collateral arrangements' means arrangements under which collateral providers do one of the following:

(a) transfer full ownership of the collateral to the collateral taker for the purposes of securing or otherwise covering the performance of a relevant obligation;

(b) provide collateral by way of security in favour of, or to, a collateral taker, and the legal ownership of the collateral remains with the collateral provider or a custodian when the security right is established;

SCR.8.29. A collateral arrangement is used to hedge a credit exposure or potential credit exposure of an IORP in whole or in part.

SCR.8.30. In the calculation of the Basic Solvency Capital Requirement, collateral arrangements should only be recognised where, in addition to the qualitative criteria in SCR.8.6 ff. and SCR.8.13 ff., the following criteria are met:

(a) the IORP should have the right to liquidate or retain, in a timely manner, the collateral in the event of a default, insolvency or bankruptcy or other credit event of the counterparty;

(b) there is sufficient certainty as to the protection achieved by the collateral because of either of the following:

(i) it is of sufficient credit quality, is of sufficient liquidity and is sufficiently stable in value;

(ii) it is guaranteed by a counterparty which has been assigned a risk factor for concentration risk of 0 %;

(c) there is no material positive correlation between the credit quality of the counterparty and the value of the collateral;

(d) the collateral is not securities issued by the counterparty or a related undertaking of that counterparty.

SCR.8.31. Where a collateral arrangement meets the definition in SCR.8.28 (b) and involves collateral being held by a custodian or other third party, the IORP shall ensure that all of the following criteria are met:

(a) the relevant custodian or other third party segregates the assets held as collateral from its own assets;

(b) the segregated assets are held by a deposit-taking institution that has a credit quality which has been assigned to credit quality step 3 or better;

(c) the segregated assets are individually identifiable and can only be changed or substituted with the consent of the IORP or a person acting as a trustee in relation to the IORP's interest in such assets;

(d) the IORP has (or is a beneficiary under a trust where the trustee has) the right to liquidate or retain, in a timely manner, the segregated assets in the event of a default, insolvency or bankruptcy or other

credit event relating to the custodian or other third party holding the collateral on behalf of the counterparty;

(e) the segregated assets shall not be used to pay, or to provide collateral in favour of, any person other than the IORP or as directed by the IORP.

Segregation of assets

SCR.8.32. Where the liabilities of the counterparty are covered by strictly segregated assets under arrangements that ensure the same degree of protection as collateral arrangements then the segregated assets should be treated as if they were collateral with an independent custodian.

SCR.8.33. The segregated assets should be held with a deposit-taking institution with a credit rating equal or equivalent to at least BBB.

SCR.8.34. The segregated assets should be individually identifiable and should only be changed subject to the consent of the IORP.

SCR.8.35. The IORP should have a right in rem on the segregated assets and the right to directly obtain ownership of the assets without any restriction, delay or impediment in the event of the default, insolvency or bankruptcy of the counterparty or other credit event set out in the transaction documentation.

3.9. Insurance risk mitigation

Scope

SCR.9.1. This subsection covers insurance risk mitigation techniques. For the purpose of this assessment, insurance risk mitigation techniques include the use of insurance and reinsurance contracts or special purpose vehicles to transfer pension liability risk.

Conditions for using insurance risk mitigation techniques

SCR.9.2. The risk mitigation technique must be legally effective and enforceable in all relevant jurisdictions and there must be an effective transfer of risk to a third party.

SCR.9.3. The mere fact that the probability of a significant variation in either the amount or timing of payments by the reinsurer is remote does not by itself mean that the reinsurer has not assumed risk.

SCR.9.4. The calculation of the SCR should allow for the effects of insurance risk mitigation techniques through a reduction in requirements commensurate with the extent of risk mitigation and an appropriate treatment of any corresponding risks embedded in the use of insurance risk mitigation techniques. These two effects should be separated.

SCR.9.5. There should be no double counting of risk mitigation effects.

SCR.9.6. All material risks arising from the use of the insurance risk mitigation should be reflected in the SCR, regardless of whether that insurance risk mitigation technique is considered admissible.

SCR.9.7. The allowance of insurance risk mitigation techniques is subject to the requirements in this subsection and the principles in Annex 3 being met.

Basis Risk

SCR.9.8. When an insurance risk mitigation technique includes basis risk (for example as might happen where payments are made according to external indicators rather than directly related to losses) the insurance risk mitigation instruments should only be allowed in the calculation of the SCR if the IORP can demonstrate that the basis risk is either not material compared to the mitigation effect or if the risk is material that the basis risk can be appropriately reflected in the SCR.

Credit quality of the counterparty

SCR.9.9. For the purposes of this assessment, providers of insurance risk mitigation should meet the following requirements:

- (Re)insurance entities should meet their current capital requirements or have a credit rating equal or equivalent to at least BBB

- EEA SPVs that are currently authorised should meet the requirements set out in the national law of the Member States in which they are

authorised

- Non-EEA SPVs should fully fund their exposure to the risks assumed from the IORP through the proceeds of a debt issuance or other financing mechanism and the repayments rights of the providers of such debt or financing mechanism should be subordinated to the (re)insurance obligations of the IORP

The assessment of the above should be based on the latest available information, which should be no more than 12 months old.

SCR.9.10. Notwithstanding the above, to the extent that collateral, meeting the requirements in section 3.8 has been provided, the (re)insurance should be recognised up to the amount of the collateral.

SCR.9.11. Risk mitigation may be used to mitigate the credit risk arising from (re)insurance counterparties, subject to the requirements in section 3.8 being met.

4.   Minimum Capital Requirement

MCR.1.1   For the purpose of this assessment the MCR will be determined using a simplified calculation and assumed to be 35 % of SCR.

Annex 1 – Simplification 1 for valuation of sponsor support

This annex explains and derives the formulas for Simplification 1 –valuation of sponsor support in Section 2.7.

Step 1: calculation of the estimated probability distribution of the eventual need for sponsor support in a run-off situation (= the final value of all payments made to the beneficiaries – the final value of all assets sold to pay the pensions).

This probability distribution is supposed to be Gaussian, with a mean value which is equal to the current estimated underfunding (technical provisions – "hard" assets), and a standard deviation derived from the standard deviation of assets, the standard deviation of liabilities, and the linear correlation between assets and liabilities.

Step 2: calculation of the estimated probability distribution of the actual support provided by the sponsor to the IORP, conditional on an absence of default of the sponsor. This distribution is derived from the distribution in step 1 by applying:

- a cap equal to the maximum sponsor support as calculated above;
- a floor equal to 0, if and only if the sponsor is never able to reduce its future contributions nor to take some assets back from the IORP, even in overfunding situations.

These cap and floor result in an adjustment to the mean value of the probability distribution; in the formulas below this adjustment is referred to as Adj_{exp}. It can be noted that this adjustment will differ according to the application or not of the 0 floor.

Step 3: calculation of the expected value of support received from the sponsor, without accounting for the default probability of the sponsor.

This expected value (referred to as SS_{exp} in the formulas) is obtained by adding the adjustment Adj_{exp} to the mean value of the underfunding probability distribution derived in Step 1.

Step 4: the value obtained in step 3 is adjusted for the default risk of the sponsor, taking into account the expected timeframe of payment of the sponsor support (under the assumption that annual payments are all equal), the annual probability of default of the sponsor, and the recovery rate in case of default of the sponsor.

The basic assumption here is the following: if the expected global amount of sponsor support is SS_{exp}, the sponsor will pay each year an additional contribution of $\frac{SS_{exp}}{d}$, for d years.

Moreover, we consider that:

o The sponsor has a constant probability of default p_{def} each year;
o If the sponsor defaults at time t, the IORP will get 100% of the payments due before t, and x% of the payments due after t, where x denotes the recovery rate on the sponsor.

Under such assumptions, we can derive an adjustment factor Adj_{def} (equal to 1 if the default probability of the sponsor is 0, or the recovery rate is 100%) to be applied to SS_{exp} in order to derive the final expected value of sponsor support.

Implementation of the method

If the sponsor cannot, in any case, withdraw any assets from the IORP, nor suspend its contribution to the IORP in case of overfunding, then the market consistent value of the sponsor support to the IORP is given by the following formula.

$$SS_{fv} = SS_{exp}.Adj_{def}$$

where

$$SS_{exp} = \mu_{ss} + Adj_{exp}$$

$$\mu_{ss} = TP - A$$

$$\sigma_{ss} = \sqrt{(\sigma_A.A)^2 + (\sigma_{TP}.TP)^2 - 2\rho.A.TP.\sigma_A.\sigma_{TP}}$$

$$Adj_{exp} = -\left[(\mu_{ss} - M_{ss}).\left(1 - \phi\left(\frac{M_{ss} - \mu_{ss}}{\sigma_{ss}}\right)\right) + \sigma_{ss}.\varphi\left(\frac{M_{ss} - \mu_{ss}}{\sigma_{ss}}\right)\right] - \left[\mu_{ss}.\phi\left(-\frac{\mu_{ss}}{\sigma_{ss}}\right) - \sigma_{ss}.\varphi\left(\frac{\mu_{ss}}{\sigma_{ss}}\right)\right]$$

and

$$Adj_{def} = \frac{1}{d}\left[(1 - RR)(1 - p_{def})\left(\frac{1 - (1 - p_{def})^d}{p_{def}}\right) + d.RR\right]$$

ϕ and φ respectively denote the cumulative and non-cumulative Gaussian distribution functions with average 0 and variance 1.

If the sponsor can, in some cases, withdraw assets from the IORP, or suspend its contribution to the IORP (for instance in cases of overfunding), the same formula as above should be used, but using the following value for Adj_{exp}:

$$Adj_{exp} = -\left[(\mu_{ss} - M_{ss}).\left(1 - \phi\left(\frac{M_{ss} - \mu_{ss}}{\sigma_{ss}}\right)\right) + \sigma_{ss}.\varphi\left(\frac{M_{ss} - \mu_{ss}}{\sigma_{ss}}\right)\right]$$

Calculation of Adj_{exp}

N.B.: unless otherwise stated, the symbols have the same meaning as in the draft technical specifications.

Basic assumption: the vector (A, TP) is normally distributed, with mean $\begin{pmatrix} \mu_A \\ \mu_{TP} \end{pmatrix}$ and

covariance matrix $\begin{pmatrix} \mu_A^2 \sigma_A^2 & \rho \mu_A \mu_{TP} \sigma_A \sigma_{TP} \\ \rho \mu_A \mu_{TP} \sigma_A \sigma_{TP} & \mu_{TP}^2 \sigma_{TP}^2 \end{pmatrix}$

Under this assumption, the underfunding $SS = TP - A$ is normally distributed, with:

- mean $\mu_{SS} = \mu_{TP} - \mu_A$
- standard deviation $\sigma_{SS} = \sqrt{\mu_A^2 \sigma_A^2 + \mu_{TP}^2 \sigma_{TP}^2 + 2\rho \mu_A \mu_{TP} \sigma_A \sigma_{TP}}$

N.B.: in all the following equations, the terms μ_{SS} and σ_{SS} will be respectively denoted μ and σ, in order to alleviate the formulas.

Let's consider the following random variables:

- $\overline{SS} = min(M_{SS}, max(0, SS))$
- $\widehat{SS} = min(M_{SS}, SS)$

The variable $\overline{SS}$ corresponds to the case where the sponsor cannot withdraw assets nor reduce contributions to the IORP in case of overfunding, and the variable $\widehat{SS}$ corresponds to the case where the sponsor can withdraw assets or reduce contributions to the IORP.

In each case, we define Adj_{exp} as the difference between $E[\overline{SS}]$ (resp. $E[\widehat{SS}]$) and μ_{SS}.

Let's calculate the value of $E[\overline{SS}] - \mu_{SS}$.

The density function of $\overline{SS}$ is:

$$f_{\overline{SS}}(x) = P[SS \leq 0]\delta_0 + I_{]0,M_{SS}[}\varphi_{\mu,\sigma}(x) + P[SS \geq M_{SS}]\delta_{M_{SS}}$$

where δ is the Dirac function, I is an indicator function, and $\varphi_{\mu,\sigma}(x)$ is the density of a Gaussian variable with mean μ and standard deviation σ.

Therefore we have:

$$E[\overline{SS}] = \int_0^{M_{SS}} x\, \varphi_{\mu,\sigma}(x)dx + M_{SS}\left(1 - \phi\left(\frac{M_{SS} - \mu}{\sigma}\right)\right)$$

$$= \mu_{SS} - \int_{-\infty}^0 x\, \varphi_{\mu,\sigma}(x)dx - \int_{M_{SS}}^{+\infty} x\, \varphi_{\mu,\sigma}(x)dx + M_{SS}\left(1 - \phi\left(\frac{M_{SS} - \mu}{\sigma}\right)\right)$$

where ϕ is the cumulative distribution function of a gaussian of mean 0 and variance 1.

Using the following result:

$$\int_a^b x\, \varphi_{\mu,\sigma}(x)dx = \mu\left[\phi\left(\frac{b - \mu}{\sigma}\right) - \phi\left(\frac{a - \mu}{\sigma}\right)\right] - \sigma\left[\varphi\left(\frac{b - \mu}{\sigma}\right) - \varphi\left(\frac{a - \mu}{\sigma}\right)\right]$$

we show that:

$$\int_{-\infty}^{0} x\, \varphi_{\mu,\sigma}(x)dx = \mu\phi\left(-\frac{\mu}{\sigma}\right) - \sigma\varphi\left(-\frac{\mu}{\sigma}\right)$$

and

$$\int_{M_{SS}}^{+\infty} x\, \varphi_{\mu,\sigma}(x)dx = \mu\left(1 - \phi\left(\frac{M_{SS} - \mu}{\sigma}\right)\right) + \sigma\varphi\left(\frac{M_{SS} - \mu}{\sigma}\right)$$

Hence we finally have:

$$Adj_{exp} = E[\overline{SS}] - \mu_{SS} = -\left[\mu\phi\left(-\frac{\mu}{\sigma}\right) - \sigma\varphi\left(-\frac{\mu}{\sigma}\right)\right] - \left[(\mu - M_{SS})\left(1 - \phi\left(\frac{M_{SS} - \mu}{\sigma}\right)\right) + \sigma\varphi\left(\frac{M_{SS} - \mu}{\sigma}\right)\right]$$

The first term of this sum corresponds to the left-hand adjustment of the distribution due to the floor at 0, and the second term corresponds to the right-hand adjustment due to the cap at M_{SS}.

The reasoning for $E[\widehat{SS}] - \mu_{SS}$ is exactly similar, but considering only the right-hand adjustment.

Calculation of Adj_{def}

Basic assumptions:

- The sponsor has a constant annual probability of default p
- The sponsor will provide to the IORP constant payments of $\frac{E[\overline{SS}]}{d}$ each year for d years
- In case of default of the sponsor at date t, the IORP will recover α (recovery rate) times the payments still to me made on t and after.

Considering that, under these assumptions, the probability that in year t the sponsor has not yet defaulted is $(1 - p)^t$, we have the following formula for the probability weighted cash flow in year t:

$$CF_t = \frac{E[\overline{SS}]}{d}(1 - p)^t + \alpha\frac{E[\overline{SS}]}{d}(1 - (1 - p)^t)$$

Hence the value of sponsor support, adjusted for the probability of default of the sponsor in the future, is:

$$\sum_{t=1}^{d} CF_t = (1 - p)\frac{E[\overline{SS}]}{d}\frac{1 - (1 - p)^d}{p}(1 - \alpha) + \alpha E[\overline{SS}]$$

$$= E[\overline{SS}].\frac{1}{d}\left[d\alpha + (1 - \alpha)(1 - p)\frac{1 - (1 - p)^d}{p}\right]$$

The multiplicative adjustment to be applied to $E[\overline{SS}]$ in order to capture the effect of possible default of the sponsor is finally:

$$Adj_{def} = \frac{1}{d}\left[d\alpha + (1 - \alpha)(1 - p)\frac{1 - (1 - p)^d}{p}\right]$$

Annex 2 – Credit quality steps and ratings

Different external credit assessment institutions (rating agencies) present their ratings using different rating scales. IORPs may use ratings produced by different rating agencies. Therefore it is necessary to describe how these ratings should be mapped to the "credit quality steps" referred to in these technical specifications. The following table presents such a mapping. This table is for information purposes only and only for application in this assessment.

Rating		Credit Quality Step associated
Standard & Poor's Fitch	Moody's	
AAA	Aaa	0
AA	Aa	1
A	A	2
BBB	Baa	3
BB	Ba	4
lower than BB, unrated	Lower than Ba, unrated	5-6, -

Annex 3 – Principles for recognising risk mitigation techniques in the SCR calculation

Principle 1: Economic effect over legal form

- Risk mitigation techniques should be recognised and treated consistently, regardless of their legal form or accounting treatment, provided that their economic or legal features meet the requirements for such recognition.

- Where risk mitigation techniques are recognised in the SCR calculation, any material new risks shall be identified, quantified and included within the SCR. Where the risk mitigation technique actually increases risk, then the SCR should be increased.

- The calculation of the SCR should recognise risk mitigation techniques in such a way that there is no double counting of mitigation effects.

Principle 2: Legal certainty, effectiveness and enforceability

- The transfer of risk from the IORP to the third party shall be effective in all circumstances in which the IORP may wish to rely upon the transfer. Examples of factors which the IORP shall take into account in assessing whether the transaction effectively transfers risk and the extent of that transfer include:

  o whether the relevant documentation reflects the economic substance of the transaction;

  o whether the extent of the risk transfer is clearly defined and beyond dispute;

  o whether the transaction contains any terms or conditions the fulfilment of which is outside the direct control of the IORP. Such terms or conditions may include those which:

    ➢ would allow the third party unilaterally to cancel the transaction, except for the non-payment of monies due from the IORP to the third party under the contract;

    ➢ would increase the effective cost of the transaction to the IORP in response to an increased likelihood of the third party experiencing losses under the transaction;

    ➢ would oblige the IORP to alter the risk that had been transferred with the purpose of reducing the likelihood of the third party experiencing losses under the transaction;

    ➢ would allow for the termination of the transaction due to an increased likelihood of the third party experiencing losses under the transaction;

    ➢ could prevent the third party from being obliged to pay out in a timely manner any monies due under the transaction; or

    ➢ could allow the maturity of the transaction to be reduced.

- An IORP shall also take into account circumstances in which the benefit to the

IORP of the transfer of risk could be undermined. For instance, where the IORP, with a view to reducing potential or actual losses to third parties, provides support to the transaction, including support beyond its contractual obligations.

- In determining whether there is a transfer of risk, the entire contract shall be considered. Further, where the contract is one of several related contracts the entire chain of contracts, including contracts between third parties, shall be considered in determining whether there is a transfer of risk. In the case of (re)insurance, the entire legal relationship between the cedant and (re)insurer shall be taken into account in this determination.

- The IORP shall take all appropriate steps, for example a sufficient legal review, to ensure and confirm the effectiveness and ongoing enforceability of the risk mitigation arrangement and to address related risks. 'Ongoing enforceability' refers to any legal or practical constraint that may impede the IORP from receiving the expected protection. In the case of financial risk mitigation, the allowance in the SCR of the 'counterparty default risk' derived from the 'financial risk mitigation technique' does not preclude the necessity of satisfying the 'ongoing enforceability'.

- In the case of financial risk mitigation, instruments used to provide the risk mitigation together with the action and steps taken and procedures and policies implemented by the IORP shall be such as to result in risk mitigation arrangements which are legally effective and enforceable in all jurisdictions relevant to the arrangement and, where appropriate, relevant to the hedged asset or liability.

- Procedures and processes not materialized in already existing financial contracts providing protection at the date of reference of the solvency assessment, shall not be allowed to reduce the calculation of the SCR.

Principle 3: Liquidity and certainty of value

- To be eligible for recognition, the risk mitigation techniques shall be valued in line with the principles laid down for valuation of assets and liabilities, other than technical provisions. This value shall be sufficiently reliable and appropriate to provide certainty as to the risk mitigation achieved.

- Regarding the liquidity of the financial risk mitigation techniques, the following applies:

  o the IORP should have written internal policy regarding the liquidity requirements that financial risk mitigation techniques should meet, according to the objectives of the IORP's risk management policy;

  o financial risk mitigation techniques considered to reduce the SCR have to meet the liquidity requirements established by the IORP; and

  o the liquidity requirements shall guarantee an appropriate coordination of the liquidity features of the hedged assets or liabilities, the liquidity of the financial risk mitigation technique, and the overall policy of the IORP regarding liquidity risk management.

Principle 4: Credit quality of the provider of risk mitigation

- Providers of risk mitigation instruments should have an adequate credit quality to guarantee with appropriate certainty that the IORP will receive the protection in the cases specified by the contracting parties.

- Credit quality should be assessed using objective techniques according to generally accepted practices.

- The assessment of the credit quality of the provider of protection shall be based on a joint and overall assessment of all the features or contracts directly and explicitly linked to the financial risk mitigation technique. This assessment shall be carried out in a prudent manner, in order to avoid any overstatement of the credit quality.

- The correlation between the values of the instruments relied upon for risk mitigation and the credit quality of their provider shall not be unduly adverse, i.e. it should not be materially positive (known in the banking sector as 'wrong way risk'). As an example, exposures in a company belonging to a group should not be mitigated with CDS provided by entities of the same group, since it is very likely that a failure of the group will lead to falls in the value of the exposure and simultaneous downgrade or failure of the provider of protection. This requirement does not refer to the systemic correlation existing between all financial markets as a whole in times of crisis.

Principle 5: Direct, explicit, irrevocable and unconditional features

- Financial risk mitigating techniques can only reduce the capital requirements if:

  o they provide the IORP with a direct claim on the protection provider;

  o they contain an explicit reference to specific exposures or a pool of exposures, so that the extent of the cover is clearly defined and incontrovertible;

  o they are not subject to any clause, the fulfilment of which is outside the direct control of the IORP, that would allow the protection provider to unilaterally cancel the cover or that would increase the effective cost of protection as a result of certain developments in the hedged exposure; and

  o they are not subject to any clause outside the direct control of the IORP that could prevent the protection provider from its obligation to pay out in a timely manner in the event that a loss occurs on the underlying exposure.

Annex 4 – Possible simplifications

Best estimate of technical provisions

Biometric risk factors

Biometric risk factors are underwriting risks covering any of the risks related to human life conditions, e.g.:

- mortality/longevity rate,

- morbidity rate,

- disability rate.

The list of possible simplifications for obtaining biometric risk factors, which does not include all simplifications allowed and which could be used in combination, includes:

- assume that biometric risk factors are independent from any other variable (i.e. mortality is independent of future changes of morbidity status of policyholder);

- use cohort or period data to analyse biometric risk factors;

- apply current tables in use adjusted by a suitable multiplier function. The construction of reliable mortality, morbidity/ disability tables and the modelling of trends could be based on current (industry standard or other) tables in use, adjusted by a suitable multiplier function. Industry-wide and other public data and forecasts should provide useful benchmarks for suitable multiplier functions.

Financial options and guarantees

The possible simplification for financial options and guarantees is to approximate them by assuming a Black-Scholes type of environment, although its scope should be carefully limited to those cases where the underlying assumptions of such model are tested. Additionally, even stochastic modelling may require some simplifications when facing extremely complex features.

Investment guarantees

The non-exhaustive list of possible simplifications for calculating the values of investment guarantees includes:

- assume non-path dependency in relation to management actions, regular contributions, cost deductions (e.g., management charges,...);

- use representative deterministic assumptions of the possible outcomes for determining the intrinsic values of extra benefits;

- assume deterministic scenarios for future contributions (when applicable), mortality rates, expenses,...;

- apply formulaic simplified approach for the time values if they are not considered to be material.

Other options and guarantees

The possible simplifications for other options and guarantees are:

- ignore options and guarantees which are not material;

- group, for instance, guaranteed expense charge and/or guaranteed mortality charge with investment guarantee and approximate them as one single investment guarantee;

- use the process outlined in the previous paragraph in the absence of other valuation approaches, if appropriate.

Distribution of future pure conditional, pure discretionary and mixed benefits

Possible simplifications for determining the future pure conditional, pure discretionary and mixed benefits may include, where appropriate, the assumption that economic conditions will follow a certain pattern, not necessarily stochastic, appropriately assessed.

Expenses and other charges

A) Expenses

The possible simplification for expenses is to use an assumption built on simple models, using information from current and past expense loadings, to project future expense loadings, including inflation.

B) Other charges

The possible simplification for other charges is to assume that:

- other charges are a constant share of?; or

- a constant charge (in relative terms) from the …?.

Cash-flows and term structure

As a simplification to applying the risk free curve to each maturity, an average maturity can be calculated and the relevant risk free point used.

Other issues

Having in mind the wide range of assumptions and features taken into account to calculate best estimates, there are other areas not mentioned previously where it might be possible to find methods meeting the requirements set out in these specifications to apply simplifications.

As an example, other possible simplification is to assume that:

- cash-flows to/from the beneficiaries occur either at the end of the year or in the middle of the year.

Another possible simplification for the payments of contributions which also include lapses and contribution waivers (e.g. contribution waivers in case of disability of the member) is to assume that future contributions are paid independently of the financial markets and IORPs' specific information.

As a further example, possible simplifications in relation to fund/account value projections (which is important for valuing financial options and guarantees) are to:

- group assets with similar features/use representative assets or indexes;

- assume independency between assets, for instance, between equity rate of return and interest rate.

Security mechanisms

For the calculation of the probability-weighted average cash-flows from the sponsor or pension protection schemes, a deterministic approach could be chosen that only takes into account uncertainty resulting from the default risk of the sponsor.

Recoverables from (re)insurance contracts

For the calculation of the probability-weighted average cash-flows of the recoverables or net payments to the beneficiaries the same simplifications as for the calculation of best estimate could be applied.

The result from the calculation should be adjusted to take account of the expected losses due to the default of the counterparty.

SCR calculation

Possible simplifications in the calculation of the solvency capital requirement include:

- The specific simplifications proposed in the technical specifications with regard to spread risk on bonds, counterparty default risk and longevity risk.

- Further simplifications, if appropriate, which includes not calculating a stress for a particular risk when the exposure to that risk is considered to be negligible by the IORP.

Annex 5: SCR Intangible asset risk module and impact on overall SCR calculation

The SCR module for intangible asset risk is not part of the basic assessment. However, IORPs may include this module in the calculation of the SCR where intangible assets are recognised on the balance sheet according to the specifications set out in section 2.11 on valuation.

Description

Intangible assets are exposed to two types of risks:

- Market risks, as for other balance sheet items, derived from the decrease of prices in the active market, and also from unexpected lack of liquidity of the relevant active market, that may result in an additional impact on prices, even impeding any transaction.

- Internal risks, inherent to the specific nature of these elements (e.g. linked to either failures or unfavourable deviations in the process of finalization of the intangible asset, or any other features in such a manner that future benefits are no longer expected from the intangible asset or its amount is reduced; risks linked to the commercialization of the intangible asset, triggered by a deterioration of the public image of the IORP).

Input

The input for this module is:

IA = value of intangible assets according to section on valuation

Output

The output for this module is the capital requirement for intangible assets, denoted as $SCR_{intangible}$.

Calculation

$SCR_{intangible} = 0.8 \cdot IA$

Impact on Basic Solvency Capital Requirement (BSCR)

The inclusion of the SCR intangible asset risk module means that the specification of the Basic Solvency Capital Requirement (BSCR) in SCR.1.20-SCR.1.23 should be replaced by the following paragraphs:

SCR*.1.20. The Basic Solvency Capital Requirement (BSCR) is the Solvency Capital Requirement before any adjustments, combining capital requirements for four major risk categories.

Input

SCR*.1.21. The following input information is required:

SCR_{mkt} = Capital requirement for market risk

SCR_{def} =   Capital requirement for counterparty default risk

$SCR_{pension}$ =   Capital requirement for pension liability risk

$SCR_{intangibles}$ =   Capital requirement for intangible assets risk

Output

SCR*.1.22. The module delivers the following output:

BSCR = Basic Solvency Capital Requirement

Calculation

SCR*.1.23. The BSCR is determined as follows:

$$BSCR = \sqrt{\sum_{ij} Corr_{ij} \times SCR_i \times SCR_j} + SCR_{intangibles}$$

where

$Corr_{i,j}$ = the entries of the correlation matrix *Corr*

SCR_i, SCR_j = Capital requirements for the individual SCR risks according to the rows and columns of the correlation matrix *Corr*.

$SCR_{intangibles}$ = the capital requirement for intangible asset risk

Impact on determination of Adj2

The inclusion of the SCR intangible asset risk module means that the specification of the determination of Adj2 in SCR.2.38 and SCR.2.46-SCR.2.48 should be replaced by the following paragraphs:

SCR*.2.38. Adj2 is the adjustment for the loss absorbing capacity of technical provisions and security mechanisms in the operational risk, counterparty default risk and intangible asset risk sub-modules.

SCR*.2.46. The operational risk and intangible asset risk sub-modules do not contain specific scenarios. This makes it difficult to determine the loss absorbing capacity of technical provisions and security mechanisms in these sub-modules.

SCR*.2.47. To avoid this difficulty, the possible loss absorbing effects of technical provisions and security mechanisms should be taken into account by reducing the combined SCR of these three sub-modules up to the difference between (DCL + MSS$_{available}$ + MPP$_{available}$) and Adj$_{TS}$. If a reduction to zero of the SCR from all three sub-modules combined is not possible, then the available loss absorbing capacity (which is the difference described before) should be distributed to these sub-modules in an appropriate way.

SCR*.2.48. Adj2 equals the sum of the adjustments made in these three sub-modules for the loss absorbing capacity of technical provisions and security

mechanisms.

Annex 6 – SCR Pension liability risk sub-modules not part of the basic assessment

The following sub-risks are not part of the basic SCR pension liability risk sub-module:

- Mortality risk;
- Disability-morbidity risk;
- Expenses risk;
- Revision risk;
- Benefit option risk;
- CAT risk.

IORPs may include part or all of these sub-modules if the IORP considers them to represent important/material risks. This annex describes the amended calculation of the SCR for pension liability risk if – besides the sub-module for longevity risk - all or part of these sub-modules are included in the calculation.

Description

The pension liability risk module consists of seven sub-modules for mortality risk, longevity risk, disability/morbidity risk, benefit option risk, expense risk, revision risk and catastrophe risk.

Input

The following input information is required:

$Pension_{rev}$	=	Capital requirement for revision risk
$Pension_{mort}$	=	Capital requirement for mortality risk
$Pension_{long}$	=	Capital requirement for longevity risk
$Pension_{dis}$	=	Capital requirement for disability-morbidity risk
$Pension_{lapse}$	=	Capital requirement for benefit option risk
$Pension_{exp}$	=	Capital requirement for expense risk
$Pension_{CAT}$	=	Capital requirement for catastrophe risk
$nPension_{rev}$	=	Capital requirement for revision risk including the loss absorbing capacity of technical provisions and security mechanisms
$nPension_{mort}$	=	Capital requirement for mortality risk including the loss absorbing capacity of

technical provisions and security mechanisms

$nPension_{long}$	=	Capital requirement for longevity risk including the loss absorbing capacity of technical provisions and security mechanisms
$nPension_{dis}$	=	Capital requirement for disability-morbidity risk including the loss absorbing capacity of technical provisions and security mechanisms
$nPension_{lapse}$	=	Capital requirement for benefit option risk including the loss absorbing capacity of technical provisions and security mechanisms
$nPension_{exp}$	=	Capital requirement for expense risk including the loss absorbing capacity of technical provisions and security mechanisms
$nPension_{CAT}$	=	Capital requirement for catastrophe risk including the loss absorbing capacity of technical provisions and security mechanisms

Output

The module delivers the following output:

$SCR_{Pension}$	=	Capital requirement for pension liability risk
$nSCR_{Pension}$	=	Capital requirement for pension liability risk including the loss absorbing capacity of technical provisions and security mechanisms

Calculation

The capital requirement for pension liability risk is derived by combining the capital requirements for the pension sub-risks using a correlation matrix as follows:

$$SCR_{Pension} = \sqrt{\sum_{rxc} CorrPension_{r,c} \cdot Pension_r \cdot Pension_c}$$

where

$CorrPension_{r,c}$	=	The entries of the correlation matrix *CorrPension*
$Pension_r$, $Pension_c$	=	Capital requirements for individual pension liability sub-risks according to the rows and columns of correlation matrix *CorrPension*

and where the correlation matrix *CorrPension* is defined as follows:

	Mortality	Longevity	Disability-Morbidity	Expenses	Revision	Benefit option	CAT
Mortality	1						
Longevity	-0.25	1					
Disability-Morbidity	0.25	0	1				
Expenses	0.25	0.25	0.5	1			
Revision	0	0.25	0	0.5	1		
Benefit option	0	0.25	0	0.5	0	1	
CAT	0.25	0	0.25	0.25	0	0.25	1

The net capital requirement nSCR$_{Pension}$ is determined as follows:

$$nSCR_{Pension} = \sqrt{\sum_{rxc} CorrPension_{r,c} \cdot nPension_{r} \cdot nPension_{c}}$$

Pension$_{mort}$ mortality risk

Description

Mortality risk is associated with pension obligations where an IORP guarantees to make a single or recurring series of payments in the event of the death of the member or beneficiary during the policy term.

It is applicable for pension obligations contingent on mortality risk i.e. where the amount currently payable on death exceeds the technical provisions held and, as a result, an increase in mortality rates leads to an increase in technical provisions without the risk margin.

The capital requirement should be calculated as the change in net asset value (assets minus liabilities) following an instantaneous permanent increase in mortality rates used for the calculation of technical provisions. The increase in mortality rates should be applied irrespective of the time unit of the rates (annual, monthly, etc.) and where the increase in mortality rates leads to an increase in technical provisions without the risk margin. After the increase, rates should not exceed a value of 1.

Where pension obligations provide benefits both in case of death and survival and the death and survival benefits are contingent on the life of the same person, these

obligations do not need to be unbundled. For these contracts the mortality scenario can be applied fully allowing for the netting effect provided by the 'natural' hedge between the death benefits component and the survival benefits component (note that a floor of zero applies at the level of a contract if the net result of the scenario is favourable to the IORP).

The identification of contracts for which an increase in mortality rates leads to an increase in technical provision without the risk margin may be based on the following assumptions:

a) Multiple contracts in respect of the same person may be treated as if they were one contract.

b) Where the calculation of technical provisions is based on groups of contracts, the identification of the contracts for which technical provisions increase under an increase of mortality rates may also be based on those groups of contracts instead of single contracts, provided that it yields a result which is not materially different.

<u>Input</u>

No specific input data is required for this module.

<u>Output</u>

The module delivers the following output:

$Pension_{mort}$	= Capital requirement for mortality risk
$nPension_{mort}$	= Capital requirement for mortality risk including the loss absorbing capacity of technical provisions and security mechanisms

<u>Calculation</u>

The capital requirement for mortality risk is defined as the result of a mortality scenario defined as follows:

$$Pension_{mort} = (\Delta NAV \mid mortshock)$$

where

ΔNAV	The change in the net value of assets minus liabilities
$mortshock$	An instantaneous permanent increase of 15% in the mortality rates used for the calculation of technical provisions, for each age and each member or beneficiary where the payment of benefits (either lump sum or multiple payments) is contingent on mortality risk

The mortality scenario should be calculated under the condition that the scenario does not change the value of technical provisions and security mechanisms as a consequence of their loss absorbing capacity.

Additionally, the result of the scenario should be determined under the condition that the value of technical provisions and security mechanisms can change in response to the shock being tested. The resulting capital requirement is *nPension*_{*mort*}. (*nPension$_{mort}$*).

Simplification

The following simplification may be used provided the following conditions are met:

- The simplification is proportionate to the nature, scale and complexity of the risks that the IORP faces;

- The calculation of the mortality risk sub-module is an undue burden for the IORP.

The capital requirement for mortality risk according to the simplified calculation is

$$Pension_{mort} = 0.15 \cdot CAR \cdot q \cdot \sum_{k=1-0,5}^{n-0,5} \left(\frac{1-q}{1+i_k} \right)^k ,$$

where,

- CAR denotes the total positive capital at risk;

- q is an IORP-specific expected average mortality rate over the next year (weighted by the sum assured);

- n denotes the modified duration in years of payments payable on death included in the best estimate projection;

- i_k the annualized spot rate for maturity *k* of the relevant interest rate term structure.

Pension_{dis} disability-morbidity risk

Description

Disability-morbidity risk is the risk of loss, or of adverse changes in the value of liabilities, resulting from changes in the level, trend or volatility of disability and morbidity rates.

It is applicable for obligations contingent on a definition of disability.

The obligations may be structured such that, upon the diagnosis of a disease or the member being unable to work as a result of sickness or disability, recurring payments are triggered. These payments may continue until the expiry of some defined period of time or until either the recovery or death of the member/beneficiary. In the latter case, the IORP is also exposed to the risk that the member/beneficiary receives the payments for longer than anticipated i.e. that claim termination rates are lower than anticipated (recovery risk).

Input

No specific input data is required for this module.

Output

The module delivers the following output:

$Pension_{dis}$ = Capital requirement for disability-morbidity risk

$nPension_{dis}$ = Capital requirement for disability-morbidity risk including the loss absorbing capacity of technical provisions and security mechanisms

Calculation

The capital requirement for disability-morbidity risk is defined as the result of a disability scenario as follows:

$$Pension_{dis} = (\Delta NAV \mid disshock)$$

where

ΔNAV = Change in the net value of assets minus liabilities

disshock = A combination of the following instantaneous permanent changes applied to each contract where the payment of benefits (either lump sum or multiple payments) is contingent on disability-morbidity risk:

- An increase of 35% in the disability and morbidity rates which are used in the calculation of technical provisions to reflect the disability and morbidity experience in the following 12 months.

- an increase of 25% in the disability and morbidity rates which are used in the calculation of technical provisions to reflect the disability and morbidity experience for all months after the following 12 months.

- a decrease of 20% in the disability and morbidity recovery rates which are used in the calculation of technical provisions in respect of the following 12 months and for all months thereafter.

The changes in disability and morbidity rates should be applied irrespective of the time unit of the rate (annual, monthly, etc.). After an increase, the disability and morbidity rates should not exceed a value of 1. IORPs should not apply a decrease to recovery rates with a value of 1, which merely reflects the fact that the benefit

payments end after a contractually fixed period.

Where rates of transition between several health statuses enter into the calculation of technical provisions, IORPs should consider all rates of transition from one status to a more severe one as disability and morbidity rates and all rates of transition from one status to a less severe one (including the status "healthy") as disability and morbidity recovery rates for the purpose of calculating the capital requirement for disability-morbidity risk, irrespective of the current status of the member or beneficiary for which a technical provision is calculated. Only the persistency rates should be adjusted to ensure that after the shock, the sum of transition rates from one state to others still adds up to 1.

The disability-morbidity scenario should be calculated under the condition that the scenario does not change the value of technical provisions and security mechanisms as a consequence of their loss absorbing capacity.

Additionally, the result of the scenario should be determined under the condition that the value of technical provisions and security mechanisms can change in response to the shock being tested. The resulting capital requirement is *nPension_{dis}*.

Simplification

The following simplification may be used provided the following conditions are met :

- The simplification is proportionate to the nature, scale and complexity of the risks that the IORP faces.

- The standard calculation of the sub-module is an undue burden for the IORP.

The capital requirement for disability risk according to the simplified calculation is:

$$Pension_{dis} = \begin{cases} 0.35 \cdot CAR_1 \cdot d_1 \\ + 0.25 \cdot 1.1^{(n-3)/2} \cdot (n-1) \cdot CAR_2 \cdot d_2 \\ + 0.2 \cdot 1.1^{(n-1)/2} \cdot t \cdot n \cdot BE_{dis} \end{cases}$$

where with respect to contracts with a positive capital at risk:

a) CAR_1 denotes the total capital at risk, meaning the sum over all contract, of the higher of zero and the difference between the following amounts:

   i. the sum of:

   - the amount that the IORP would currently pay in the event of the death or disability of the persons covered by the contract after deduction of the amounts recoverable from (re)insurance contracts and special purpose vehicles; and

   - the expected present value of amounts not covered in the previous indent that the IORP would pay in the future in the event of the immediate death or disability of the persons covered by the contract after deduction of the amounts recoverable from (re)insurance contracts and special purpose vehicles;

   ii. the best estimate of the corresponding obligations after deduction of the

amounts recoverable form (re)insurance contracts and special purpose vehicles;

b) CAR_2 denotes the total capital at risk as defined in letter a) after 12 months;

c) d_1 denotes the expected average disability-morbidity rate during the following 12 months weighted by the sum insured;

d) d_2 denotes the expected average disability-morbidity rate in the 12 months after the following 12 months weighted by the sum insured;

e) n denotes the modified duration of the payments on disability-morbidity included in the best estimate;

f) t denotes the expected termination rates during the following 12 months;

g) BE_{dis} denotes the best estimate of technical provisions for obligations subject to disability-morbidity risk.

Pension$_{option}$ benefit option risk

<u>Description</u>

Benefit option risk is the risk of loss or change in liabilities due to a change in the expected exercise rates of certain options of members and beneficiaries or sponsors. In relation to members', beneficiaries' or sponsors' options that the benefit option sub-module covers, a comprehensive approach is taken. The module takes account of certain legal or contractual options of members, beneficiaries or sponsors which can significantly change the value of the future cash-flows. The options to be taken into account in this module are those to fully or partly terminate, decrease, restrict or suspend the cover provided by the IORP as well as options which allow the full or partial establishment, renewal, increase, extension or resumption of this cover.

This module should not take into account a legal or contractual option of the sponsor to terminate a pension promise as a whole/for all entitled members and beneficiaries, in a way that would lead to a windup of the scheme or IORP.

<u>Input</u>

No specific input data is required for this module.

<u>Output</u>

The module delivers the following output:

Pension$_{option}$	=	Capital requirement for benefit option risk (not including the loss absorbing capacity of technical provisions)
nPension$_{option}$	=	Capital requirement for benefit option risk including the loss absorbing capacity of technical

provisions and security mechanisms

Calculation

The capital requirement for benefit option risk should be calculated as follows[48]:

If $\max(nOption_{down}; nOption_{up}; nOption_{mass}) = nOption_{down}$ then $Pension_{option} = Option_{down}$ and $nPension_{option} = nOption_{down}$;

otherwise, if $\max(nOption_{down}; nOption_{up}; nOption_{mass}) = nOption_{up}$ then $Pension_{option} = Option_{up}$ and $nPension_{option} = nOption_{up}$;

otherwise $Pension_{option} = Option_{mass}$ and $nPension_{option} = nOption_{mass}$

where

$Pension_{option}$	=	Capital requirement for benefit option risk
$Option_{down}$	=	Capital requirement for the risk of a permanent decrease in option exercise rates
$Option_{up}$	=	Capital requirement for the risk of a permanent increase in option exercise rates
$Option_{mass}$	=	Capital requirement for the risk of a mass option exercise event
$nPension_{option}$	=	Capital requirement for benefit option risk, including the loss absorbing capacity of technical provisions and security mechanisms
$nOption_{down}$	=	Capital requirement for the risk of a permanent decrease in option exercise rates, including the loss absorbing capacity of technical provisions and security mechanisms
$nOption_{up}$	=	Capital requirement for the risk of a permanent increase in option exercise rates, including the loss absorbing capacity of technical provisions and security mechanisms
$nOption_{mass}$	=	Capital requirement for the risk of a mass option exercise event, including the loss absorbing capacity of

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[48] Where the loss absorbing capacity is not restricted to the absorption of specific risks, but triggered by losses of the IORP as a whole, the capital requirement for benefit option risk is derived from the type of shock that gives rise to the highest capital requirement excluding the loss absorbing capacity of technical provisions and security mechanisms.

Capital requirements for the three sub-risks should be calculated based on a member-by-member comparison of surrender value and best estimate provision.

The surrender strain of a member is defined as the difference between the amount currently payable on surrender and the best estimate provision held. The amount payable on surrender should be calculated net of any amounts recoverable from members or agents, e.g. net of any surrender charge that may be applied under the terms of the contract. In this context, the term "surrender" should refer to all kinds of contract terminations irrespective of their name in the terms and conditions of the contract/pension scheme. In particular, the surrender value may be zero if no compensation is paid on termination.

The capital requirement for the risk of a permanent decrease of the option exercise rates should be calculated as follows:

$$Option_{down} = \Delta NAV \mid optionshock_{down},$$

where

ΔNAV	=	Change in the net value of assets minus liabilities
$optionshock_{down}$	=	Instantaneous permanent decrease of 50% in the assumed option exercise rates in all future years for all contracts without a positive surrender strain.
		The reduction in option exercise rates should not exceed 20 percentage points.

The capital requirement for the risk of a permanent increase of the option exercise rates should be calculated as follows:

$$Option_{up} = \Delta NAV \mid optionshock_{up},$$

where

ΔNAV	=	Change in the net value of assets minus liabilities
$optionshock_{up}$	=	Instantaneous permanent increase of 50% in the assumed option exercise rates in all future years for all contracts with a positive surrender strain. The shocked rate should not exceed 100%.

Therefore, the shocked option exercise rates should be restricted as follows:

$$R_{up}(R) = \min(150\% \cdot R; 100\%) \quad \text{and}$$

$$R_{down}(R) = \max(50\% \cdot R; R - 20\%),$$

where

R_{up}	=	shocked option exercise rate in $optionshock_{up}$
R_{down}	=	shocked option exercise rate in $optionshock_{down}$
R	=	option exercise rate before shock

The capital requirement for the risk of a mass option exercise event $Option_{mass}$ should be calculated as follows:

$$Option_{mass} = \Delta NAV \mid optionshock_{mass},$$

where

| ΔNAV | = | Change in the net value of assets minus liabilities |
| $optionshock_{mass}$ | = | The surrender of 40% of all pension contracts with a positive surrender strain |

The benefit option exercise scenarios should be calculated under the condition that the scenario does not change the value of technical provisions and security mechanisms as a consequence of their loss absorbing capacity.

Additionally, the result of the scenarios should be determined under the condition that the value of technical provisions and security mechanisms can change in response to the shock being tested. The resulting capital requirement is $nPension_{option}$.

Simplifications

Factor-based formula for scenario effect

A simplified calculation of $Option_{down}$ and $Option_{up}$ may be made if the following conditions are met:

- The simplification is proportionate to the nature, scale and complexity of the risks that the IORP faces.

- The standard calculation of the sub-module is an undue burden for the IORP.

The simplified calculations are defined as follows:

$$Option_{down} = 50\% \cdot l_{down} \cdot n_{down} \cdot S_{down}$$

and

$$Option_{up} = 50\% \cdot l_{up} \cdot n_{up} \cdot S_{up},$$

where

l_{down} = the lower of the average option exercise rate of the policies with negative surrender strains and 40%;

l_{up} = the lower of the average option exercise rate of the contracts with positive surrender strains and 67%;

n_{down} = the average period in years over which the contracts with a negative surrender strain run off;

n_{up} = the average period in years over which the contracts with a positive surrender strain run off;

S_{down} = the absolute amount of the sum of negative surrender strains;

S_{up} = the sum of positive surrender strains.

Pension$_{exp}$ expense risk

<u>Description</u>

Expense risk arises from the variation in the expenses incurred in servicing pension obligations.

<u>Input</u>

No specific input data is required for this module.

<u>Output</u>

The module delivers the following output:

Pension$_{exp}$	=	Capital requirement for expense risk
nPension$_{exp}$	=	Capital requirement for expense risk including the loss absorbing capacity of technical provisions and security mechanisms

<u>Calculation</u>

The capital requirement for expense risk is determined as follows:

$$Pension_{exp} = \Delta NAV \mid expshock$$

where:

ΔNAV	=	Change in the net value of assets minus liabilities
expshock	=	Combination of the following instantaneous permanent changes: increase of 10% in the amount of expenses taken into account in the calculation of technical provisions, and increase of 1 percentage point to the expense inflation rate (expressed as percentage) used for the calculation of technical provisions.

An expense payment should not be included in the scenario, if its amount is already fixed at the valuation date.

The expense scenario should be calculated under the condition that the scenario does not change the value of technical provisions and security mechanisms as a consequence of their loss absorbing capacity.

Additionally, the result of the scenario should be determined under the condition that the value of technical provisions and security mechanisms can change in response to the shock being tested. The resulting capital requirement is *nPension_exp*.

<u>Simplification</u>

The following simplification may be used provided the following conditions are met:

- The simplification is proportionate to the nature, scale and complexity of the risks that the IORP faces.

- The standard calculation of sub-module is an undue burden for the IORP.

The simplification is defined as follows:

$$Pension_{\exp} = 0.1 \cdot n \cdot E \cdot + \left(\frac{1}{(i+0.01)} * ((1+i+0.01)^n - 1) - \frac{1}{i} * ((1+i)^n - 1) \right) \cdot E$$

where

E = Amount of expenses incurred in servicing pension obligations during the last year.

n = modified duration in years of the cash flows included in the best estimate of technical provisions for those obligations.

i = weighted average inflation rate included in the calculation of the best estimate of technical provisions for pension obligations, where the weights are based on the present value of expenses included in the calculation of the best estimate for servicing existing pension obligations.

Pension_rev revision risk

<u>Description</u>

Revision risk is the risk of loss, or of adverse change in the value of liabilities, resulting from fluctuations in the level, trend, or volatility of revision rates applied to annuities, due to changes in the legal environment or in the state of health of the person insured.

This risk module should be applied only to annuities where the benefits payable under the underlying contracts could increase as a result of changes in the legal environment or in the state of health of the person insured.

<u>Input</u>

No specific input data is required for this module.

<u>Output</u>

The module delivers the following output:

Pension_rev = Capital requirement for revision risk

Capital requirement for revision risk including the

| $nPension_{rev}$ | = | loss absorbing capacity of technical provisions and security mechanisms |

Calculation

The capital requirement for revision risk is determined as follows:

$$Pension_{rev} = \Delta NAV \mid revshock$$

where:

| ΔNAV | = | Change in the net value of assets minus liabilities |
| $revshock$ | = | Instantaneous permanent increase of 3% in the annual amount payable for annuities exposed to revision risk. The impact should be assessed considering the remaining run-off period of the annuities. |

The revision risk scenario should be calculated under the condition that the scenario does not change the value of technical provisions and security mechanisms as a consequence of their loss absorbing capacity.

Additionally, the result of the scenario should be determined under the condition that the value of technical provisions and security mechanisms can change in response to the shock being tested. The resulting capital requirement is $nPenison_{rev}$.

Pension$_{CAT}$ catastrophe risk sub-module

Description

The catastrophe sub-module is restricted to obligations which are contingent on mortality, i.e. where an increase in mortality leads to an increase in technical provisions.

Catastrophe risk stems from extreme or irregular events whose effects are not sufficiently captured in the other pension liability risk sub-modules. Examples could be a pandemic event or a nuclear explosion.

Catastrophe risk is mainly associated with schemes in which an IORP guarantees to make a single or recurring, periodic series of payments when a member or beneficiary dies.

The identification of contracts for which an increase in mortality rates leads to an increase in technical provisions without the risk margin may be based on the following assumptions:

a) Multiple contracts in respect of the same person may be treated as if they were one contract.

b) Where the calculation of technical provisions is based on groups of contracts, the identification of the contracts for which technical provisions increase under an increase of mortality rates may also be based on those groups of contracts instead of single contracts, provided that it yields a result which is not materially different.

Input

No specific input data is required for this module.

Output

The module delivers the following output:

$Pension_{CAT}$	=	Capital requirement for catastrophe risk
$nPension_{CAT}$	=	Capital requirement for catastrophe risk including the loss absorbing capacity of technical provisions and security mechanisms

Calculation

The capital requirement for catastrophe risk component is defined as follows:

$$Pension_{CAT} = \Delta NAV \mid CAT\ shock$$

where:

ΔNAV	=	Change in the net value of assets minus liabilities
$CAT\ shock$	=	Instantaneous increase of 0.15 percentage points to the mortality rates (expressed as percentages) which are used in the calculation of technical provisions to reflect the mortality experience in the following 12 months.

The catastrophe scenario should be calculated under the condition that the scenario does not change the value of technical provisions and security mechanisms as a consequence of their loss absorbing capacity.

Additionally, the result of the scenario should be determined under the condition that the value of technical provisions and security mechanisms can change in response to the shock being tested. The resulting capital requirement is $nPension_{CAT}$.

Simplification

The following simplification may be used provided the following conditions are met :

- The simplification is proportionate to the nature, scale and complexity of the risks that the IORP faces.

- The standard calculation of the sub-module is an undue burden for the IORP.

The following formula may be used as a simplification for the Pension catastrophe risk

sub-module:

$$Pension_{CAT} = \sum_i 0.0015 \cdot Capital\_at\_Risk_i$$

where

the sum includes all contracts where the payment of benefits (either lump sum or multiple payments) is contingent on mortality and with a positive capital at risk,

and

$Capital\_at\_Risk_i = max(0; SA_i + AB_i - BE_i)$

with

BE_i = Best estimate of technical provisions for each contract i after deduction of the amounts recoverable from (re-)insurance contracts and special purpose vehicles

SA_i = For each contract i the amount that would currently be paid in the event of the death of the persons covered by the contract after deduction of the amounts recoverable from (re-)insurance contracts and special purpose vehicles.

AB_i = For each contract i the expected present value of amounts not covered by the cases described in the definition of SA_i that would have to be paid in the future in the event of the immediate death of the persons covered by the contract after deduction of the amounts recoverable from (re-)insurance contracts and special purpose vehicles.