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QIS5 Technical Specifications

Annex to Call for Advice from CEIOPS on QIS5

This document is a working document of the Commission services for testing purposes.

It does not purport to represent or pre-judge the formal proposals of the Commission.

All documents relating to QIS5 produced by CEIOPS will be made available on their website (http://www.ceiops.eu/index.php?option=content&task=view&id=732)

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V.1.   Assets and Other Liabilities

V.1.   The reporting date to be used by all participants should be **end December 2009**

V.1.1.   Valuation approach

V.2.   The primary objective for valuation as set out in Article 75 of the Framework Solvency II Directive (Directive 2009/138/EC) requires an economic, market-consistent approach to the valuation of assets and liabilities. According to the risk-based approach of Solvency II, when valuing balance sheet items on an economic basis, undertakings should consider the risks that arise from holding a balance sheet item, using assumptions that market participants would use in valuing the asset or the liability.

V.3.   According to this approach, insurance and reinsurance undertakings value assets and liabilities as follows:

    i.   Assets should be valued at the amount for which they could be exchanged between knowledgeable willing parties in an arm's length transaction;

    ii.   Liabilities should be valued at the amount for which they could be transferred, or settled, between knowledgeable willing parties in an arm's length transaction.

    When valuing financial liabilities under point (ii) no subsequent adjustment to take account of the change in own credit standing of the insurance or reinsurance undertaking should be made

V.4.   Valuation of all assets and liabilities, other than technical provisions should be carried out, unless otherwise stated in conformity with International Accounting Standards as endorsed by the European Commission. They are therefore considered a suitable proxy to the extent they reflect the economic valuation principles of Solvency II. Therefore the underlying principles (definition of assets and liabilities, recognition and derecognition criteria) stipulated in the IFRS-system are also considered adequate, unless stated otherwise and should therefore be applied to the Solvency II balance sheet.

V.5.   When creating the Solvency II balance sheet for the purpose of the QIS5, unless stated otherwise, it is only those values which are economic and which are consistent with the additional guidance specified in this document which should be used.

V.6.   In particular, in those cases where the proposed valuation approach under IFRS does not result in economic values according to the Framework Solvency II Directive

reference should be made to the additional guidance in subsection V.1.4. onwards where a comprehensive overview of IFRS and Solvency II valuation principles is presented.

V.7.   Furthermore valuation should consider the individual balance sheet item. The assessment whether an item is considered separable and sellable under Solvency II should be made during valuation. The "Going Concern" principle and the principle that no valuation discrimination is created between those insurance and reinsurance undertakings that have grown through acquisition and those which have grown organically should be considered as underlying assumptions.

V.8.   The concept of materiality should be applied as follows:

"Omissions or misstatements of items are material if they could, by their size or nature, individually or collectively; influence the economic decisions of users taken on the basis of the Solvency II financial reports." Materiality depends on the size and nature of the omission or misstatement judged in the surrounding circumstances. The size, nature or potential size of the item, or a combination of those, could be the determining factor."

V.9.   Figures which do not provide for an economic value can only be used within the Solvency II balance sheet under exceptional situations where the balance sheet item is not significant from the point of view of reflecting the financial position or performance of an (re)insurance undertaking or the quantitative difference between the use of accounting and Solvency II valuation rules is not material taking into account the concept stipulated in the previous paragraph.

V.10.   On this basis, the following hierarchy of high level principles for valuation of assets and liabilities under QIS5 should be used:

i.   Undertakings must use a mark to market approach in order to measure the economic value of assets and liabilities, based on readily available prices in orderly transactions that are sourced independently (quoted market prices in active markets). This is considered the default approach.

ii.   Where marking to market is not possible, mark to model techniques should be used (any valuation technique which has to be benchmarked, extrapolated or otherwise calculated as far as possible from a market input). Undertakings will maximise the use of relevant observable inputs and minimise the use of unobservable inputs. Nevertheless the main objective remains, to determine the amount at which the assets and liabilities could be exchanged between knowledgeable willing parties in an arm´s length transaction (an economic value according to Article 75 of the Solvency II Framework Directive).

V.1.2. Guidance for marking to market and marking to model

V.11.　Regarding the application of fair value measurement undertakings might take into account Guidance issued by the IASB (e.g. definition of active markets, characteristics of inactive markets), when following the principles and definitions stipulated, as long as no deviation from the "economic valuation" principle results out of the application of this guidance.

V.12.　It is understood that, when marking to market or marking to model, undertakings will verify market prices or model inputs for accuracy and relevance and have in place appropriate processes for collecting and treating information and for considering valuation adjustments. Where an existing market value is not considered appropriate for the purpose of an economic valuation, with the result that valuation models are used, undertakings should provide a comparison of the impact of the valuation using models and the valuations using market value

V.13.　Subsection V.1.4 includes tentative views on the extent to which IFRS figures could be used as a reasonable proxy for economic valuations under Solvency II.

V.14.　These tentative views are developed in the tables included below in this subsection (see V.1.4: IFRS solvency adjustment for valuation of assets and other liabilities under QIS5). These tables identify items where IFRS valuation rules might be considered consistent with economic valuation, and where adjustments to IFRS are needed which are intended to bring the IFRS treatment closer to an economic valuation approach because the IFRS rules in a particular area are not considered consistent.

V.15.　As a starting point for the valuation under Solvency II accounting values that have not been determined in accordance with IFRS could be used, provided that either they represent an economic valuation or they are adjusted accordingly. Undertakings have to be aware that the treatment stipulated within the international accounting standards, as endorsed by the European Commission in accordance with Regulation (EC) No 1606/2002 in combination with the tentative views included in subsection V.1.4 represent the basis for deciding which adjustments should be necessary to arrive at an economic valuation according to V.3. Undertakings should disclose the rationale for using accounting figures not based on IFRS (when they provide for an economic valuation in line with V.3 and the corresponding guidance). In such cases undertakings should explain how the values were calculated and set out the resulting difference in value.

V.1.3. Requirements for the QIS5 valuation process

V.16.　Undertakings should have a clear picture and reconcile any major differences from the usage of figures for QIS5 and values for general purpose accounting. In particular, undertakings should be aware of the way those figures were derived and which level of reliability (e.g. nature of inputs, external verification of figures) can be attributed to them. If, in the process of performing the QIS5, undertakings

identify other adjustments necessary for an economic valuation, those have to be documented and explained.

V.17.   It is expected that undertakings:

   i.   Identify assets and liabilities marked to market and assets and liabilities marked to model;

   ii.   Assess assets and liabilities where an existing market value was not considered appropriate for the purpose of an economic valuation, which meant that a valuation model was used and disclose the impact of using such a model.

   iii.   Give where relevant, the characteristics of the models used and the nature of input used when marking to model. These should be documented and disclosed in a transparent manner;

   iv.   Assess differences between economic values obtained and accounting figures (in aggregate, by category of assets and liabilities);

V.18.   As part of QIS5 outputs, undertakings should highlight any particular problem areas in the application of IFRS valuation requirements for Solvency II purposes, and in particular bring to supervisors' attention any material effects on capital figures/calculations.

V.1.4. IFRS Solvency adjustments for valuation of assets and other liabilities under QIS5

Balance Sheet Item, Applicable IFRS, (Definition/treatment), Solvency II, SEG

Balance sheet item	Applicable IFRS	Current approach under IFRS		Recommended Treatment and solvency adjustments for QIS5
		Definition	Treatment	
ASSETS				
INTANGIBLE ASSETS				
Goodwill on acquisition	IFRS 3, IFRS 4 Insurance DP Phase II	Goodwill acquired in a business combination represents a payment made by the acquirer in anticipation of future economic benefits from assets that are not capable of being individually identified and separately recognised. Insurance Contracts acquired in a business combination	**Initial Measurement:** at its cost, being the excess of the cost of the business combination over the acquirer's interest in the net fair value of the identifiable assets, liabilities and contingent liabilities. **Subsequent Measurement:** at cost less any impairment loss. If the acquirer's interest exceeds the cost of the business combination, the acquirer should reassess identification and measurement done and recognise immediately in profit or loss any excess remaining after that reassessment	Goodwill is not considered an identifiable and separable asset in the market place. Furthermore the consequence of inclusion of goodwill would be that two undertakings with similar tangible assets and liabilities could have different basic own funds because one of them has grown through business combinations and the other through organic growth without any business combination. It would be inappropriate if both undertakings were treated differently for regulatory purposes. The economic value of goodwill for solvency purposes is nil. Nevertheless in order to quantify the issue, participants are requested, for information only to provide, when possible, the treatment under IFRS 3 and IFRS 4.

		An intangible asset needs to be identifiable and fulfil the criteria of control as stipulated in the standard. An Intangible asset is identifiable if it is separable (deviation from Goodwill) or if it arises from contractual or other legal rights. The control criteria is fulfilled if an entity has the power to obtain the future economic benefits flowing from the underlying resource and to restrict the access of others to those benefits. Fair Value Measurement is not possible when it is not separable or it is separable but there is no history or evidence of exchange transactions for the same or similar assets.	**Recognised:** - it is probable that the expected future economic benefits will flow to the entity; and - the cost of the assets can be measured reliably. Initial Measurement: at cost Subsequent Measurement: Cost Model or Revaluation Model (Fair Value)	The IFRS on Intangible assets is considered to be a good proxy if and only if the intangible assets can be recognised and measured at fair value as per the requirements set out in that standard. The intangibles must be separable and there should be an evidence of exchange transactions for the same or similar assets, indicating it is saleable in the market place. If a fair value measurement of an intangible asset is not possible, or when its value is only observable on a business combination as per the applicable international standard, such assets should be valued at nil for solvency purposes.
Intangible Assets	IAS 38			

TANGIBLE ASSETS				
Property plant and Equipment	IAS 16	Tangible items that: **(a)** are held for use in the production or supply of goods or services; and **(b)** are expected to be used during more than one period. Recognised if, and only if: **(a)** it is probable that future economic benefits associated with the item will flow to the entity; and **(b)** the cost of the item can be measured reliably	**Initial Measurement:** at cost **Subsequent Measurement:** - cost model : cost less any depreciation and impairment loss; -revaluation model; fair value at date of revaluation less any subsequent accumulated depreciation or impairment	Property, plant and equipment that are not measured at economic values should be re-measured at fair value for solvency purposes. The revaluation model under the IFRS on Property, Plant and Equipment could be considered as a reasonable proxy for solvency purposes.. If a different valuation basis is used full explanation must be provided
Inventories	IAS 2	Assets that are: (a) held for sale in the ordinary course of business; (b) in the process of production for such sale; or (c) in the form of materials or supplies to be consumed in the production process or in the rendering of services.	At the lower of cost and net realisable value	Consistently with the valuation principle set out in V.3, Inventories should be valued at fair value.

Finance Leases	IAS 17	Classification of leases is based on the extent to which risks and rewards incidental to ownership of a leased asset lie with the lessor or the lessee.	Initially at the lower of fair value or the present value of the minimum lease payment	Consistently with the valuation principle set out in V.3, Financial Leases should be valued at fair value.
INVESTMENTS				
Investment Property	IAS 40	IAS 40.5 Property held to earn rentals or for capital appreciation or both.	Initially at cost; then either fair value model or cost model	Investment properties that are measured at cost in general purpose financial statements should be re-measured at fair value for solvency purposes. The fair value model under the IFRS on Investment Property is considered a good proxy.
Participations in subsidiaries, associates and joint ventures	IAS 27 and IAS 28	Definition in IAS 27, IAS 28 and IAS 31	According to IAS 27,IAS 28 and IAS 31	- Holdings in related undertakings within the meaning of Article 212 of the Framework Solvency II Directive should be valued using quoted market prices in active markets. - In the case of a subsidiary undertaking where the requirements set for a market consistent valuation are not satisfied an adjusted equity method should be applied. - All other undertakings (not subsidiaries) should wherever possible use an adjusted equity method. As a last option mark to model can be used, based on maximizing observable market inputs and avoiding entity specific inputs. The adjusted equity method should require undertakings to value its holding in a related undertaking based on the

			participating undertaking's share of the excess of assets over liabilities of the related undertaking. When calculating the excess of assets over liabilities of the related undertaking, the participating undertaking must value the related undertaking's assets and liabilities in accordance with Section V (Valuation).
Financial assets under IAS 39	IAS 39	See IAS 39	Either at cost, at fair value with valuation adjustments through other comprehensive income or at fair value with valuation adjustment through profit and loss account-	Financial assets as defined in the relevant IAS/IFRS on Financial Instruments should be measured at fair value for solvency purposes even when they are measured at cost in an IFRS balance sheet.
OTHER ASSETS				
Non-Current Assets held for sale or discontinued operations	IFRS 5	Assets whose carrying amount will be recovered principally through a sale transaction	Lower of carrying amount and fair value less costs to sell	Consistently with the valuation principle set out in V.3, Non-Current Assets held for sale or discontinued operations should be valued at fair value less cost to sell.

Deferred Tax Assets	IAS 12	Deferred tax assets are the amounts of income taxes recoverable in future periods in respect of: (a) deductible temporary differences; (b) the carry forward of unused tax losses; and (c) the carry forward of unused tax credits.	A deferred tax asset can be recognised only insofar as it is probable that taxable profit will be available against which a deductible temporary difference can be utilised when there are sufficient taxable temporary differences relating to the same taxation authority and the same taxable entity which are expected to reverse:	Deferred Taxes, other than the carry forward of unused tax credits and the carry forward of unused tax losses, should be calculated based on the difference between the values ascribed to assets and liabilities in accordance with V.3 and the values ascribed to the same assets and liabilities for tax purposes. The carry forward of unused tax credits and the carry forward of unused tax losses should be calculated in conformity with international accounting standards as endorsed by the EC. The (re)insurance undertaking should be able to demonstrate to the supervisory authority that future taxable profits are probable and that the realisation of that deferred tax asset is probable within a reasonable timeframe.
Current Tax Assets	IAS 12	Income taxes include all domestic and foreign taxes based on taxable profits and withholding taxes payable by a group entity	Current tax assets are measured at the amount expected to be recovered	Consistently with the valuation principle set out in V.3 Current Tax Assets should be valued at the amount expected to be recovered.
Cash and cash equivalents	IAS 7, IAS 39	Cash comprises cash on hand and demand deposits	Not less than the amount payable on demand, discounted from the first date that the amount could be required to be paid.	Consistently with the valuation principle set out in V.3, Cash and Cash equivalent should be valued at an amount not less than the amount payable on demand.

LIABILITIES				
Provisions	IAS 37	A provision is a liability of uncertain timing or amount.A provision should be recognised when, and only when: (a) an entity has a present obligation (legal or constructive) as a result ofa past event;(b) it is probable (ie more likely thannot) that an outflow of resources willbe required to settle the obligation;and(c) a reliable estimate can be madeof the amount of the obligation.	The amount recognised is the best estimate of the expenditure required to settle the present obligation at the balance sheet date.The best estimate is the amount anentity would rationally pay to settlethe obligation or to transfer it to at third party at the balance sheetdate.	Consistently with the valuation principle set out in V.3, Provisions should be valued at the amount recognised is the best estimate of the expenditure required to settle the present obligation at the balance sheet date.
Financial Liabilities	IAS 39	Only recognized when an entity becomes a party to the contractual provisions of the instrument	Either at Fair Value or at amortised cost.	Financial liabilities should be valued in conformity with international accounting standards as endorsed by the EC upon initial recognition for solvency purpose. Subsequent valuation has to be consistent with the requirements of V.3, therefore no subsequent adjustments to take account of the change in own credit standing should take place. However adjustments for changes in the risk free rate have to be accounted for subsequently.

Contingent Liabilities	IAS 37	A contingent liability is either: (a) a possible obligation that arises from past events and whose existence will be confirmed only by the occurrence or non occurrence of one or more uncertain future events not wholly within the control of the entity; or (b) a present obligation that arises from past events but is not recognised because: (i) it is not probable that an outflow of resources embodying economic benefits will be required to settle the obligation; or (ii) the amount of the obligation cannot be measured with sufficient reliability.	Should not be recognised under IFRS. Nevertheless contingent liabilities should be disclosed and continuously assessed under the requirements set in IAS 37.	Insurance and reinsurance undertakings should recognise as a liability contingent liabilities, as defined in international accounting standards, as endorsed by the Commission in Accordance with Regulation (EC) No 1606/2002, that are material. Valuation should be based on the probability-weighted average of future cash flows required to settle the contingent liability over their lifetime of that contingent liability, discounted at the relevant risk-free interest rate term structure.

Deferred Tax liabilities	IAS 12	Income taxes include all domestic and foreign taxes based on taxable profits and withholding taxes payable by a group entity.	A deferred tax liability should be recognised for all taxable temporary differences, except to the extent that the deferred tax liability arises from: (a) the initial recognition of goodwill; (b) the initial recognition of an asset or liability in a transaction which at the time of the transaction, affects neither accounting profit nor taxable profit(loss).	Deferred Taxes , other than the carry forward of unused tax credits and the carry forward of unused tax losses, should be calculated based on the difference between the values ascribed to assets and liabilities in accordance with V.3 and the values ascribed to the same assets and liabilities for tax purposes. The carry forward of unused tax credits and the carry forward of unused tax losses should be calculated in conformity with international accounting standards as endorsed by the EC.
Current Tax liabilities	IAS 12	Income taxes include all domestic and foreign taxes based on taxable profits and withholding taxes payable by a group entity.	Unpaid tax for current and prior periods is recognised as a liability. Current tax liabilities are measured at the amount expected to be paid.	Consistently with the valuation principle set out in V.3, Current Tax liabilities should be valued at the amount expected to be paid.

| Employee Benefits + Termination Benefits | IAS 19 | As defined in IAS 19 | As defined in IAS 19 | Considering the complex task of preparing separate valuation rules on pension liabilities and from a cost benefit perspective, the application of the applicable IFRS on post-employment benefits is recommended. Elimination of smoothing (corridor) is required to prohibit undertakings coming out with different results based on the treatment selected for actuarial gains and losses. Undertakings should not be prevented from using their internal economic models for post-employment benefits calculation, provided the models are based on Solvency II valuation principles applied to insurance liabilities, taking into account the specificities of post employment benefits. When using an Internal Model for the valuation of items following under IAS 19 documentation should be provided by the undertaking. |

V.2.   Technical Provisions

Introduction

TP.1.1.   The reporting date to be used by all participants should be **end December 2009**.

TP.1.2.   Solvency 2 requires undertakings to set up technical provisions which correspond to the current amount undertakings would have to pay if they were to transfer their (re)insurance obligations immediately to another undertaking. The value of technical provisions should be equal to the sum of a best estimate (see subsection V.2.2) and a risk margin (see subsection V.2.5). However, under certain conditions that relate to the replicability of the cash flows underlying the (re)insurance obligations, best estimate and risk margin should not be valued separately but technical provisions should be calculated as a whole (see subsection V.2.4).

TP.1.3.   Undertakings should segment their (re)insurance obligations into homogeneous risk groups, and as a minimum by line of business, when calculating technical provisions. Subsection V.2.1 specifies the segmentation of the obligations for QIS5.

TP.1.4.   The best estimate should be calculated gross, without deduction of the amounts recoverable from reinsurance contracts and SPVs. Those amounts should be calculated separately. The valuation of recoverables is set out in subsection V.2.2.3.

TP.1.5.   The calculation of the technical provisions should take account of the time value of money by using the relevant risk-free interest rate term structure. Subsection V.2.3 specifies the relevant risk-free interest rate term structure.

TP.1.6.   The actuarial and statistical methods to calculate technical provisions should be proportionate to the nature, scale and complexity of the risks supported by the undertaking. Guidance on the application of the proportionality principle and the specification of simplified methods can be found in subsection V.2.6. Simplified methods for the calculation of the risk margin are included in subsection V.2.5.

V.2.1.   Segmentation
General principles

TP.1.7.   Insurance and reinsurance obligations should be segmented as a minimum by line of business (LoB) in order to calculate technical provisions.

TP.1.8.   The purpose of segmentation of (re)insurance 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 based on homogenous data to avoid introducing distortions which might arise from combining dissimilar business. Therefore, business is usually managed in more granular homogeneous risk groups than the proposed minimum segmentation where it allows for a more accurate valuation of technical provisions.

TP.1.9.   Undertakings in different Member States and even undertakings in the same Member State offer insurance products covering different sets of risks. Therefore it is appropriate for each undertaking to define the homogenous risk group and the

level of granularity most appropriate for their business and in the manner needed to derive appropriate assumptions for the calculation of the best estimate.

TP.1.10. (Re)insurance obligations should be allocated to the line of business 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 contract (substance), rather than the legal form of the contract (form).

TP.1.11. Therefore, the segmentation into lines of business does not follow the legal classes of non-life and life insurance activities used for the authorisation of insurance business or accounting classifications.

TP.1.12. The segmentation into lines of business distinguishes between **life** and **non-life** insurance obligations. This distinction does not coincide with the legal distinction between life and non-life insurance activities or the legal distinction between life and non-life insurance contracts. Instead, the distinction between life and non-life insurance obligations should be based on the nature of the underlying risk:

- Insurance obligations of business that is pursued on a similar technical basis to that of life insurance should be considered as life insurance obligations, even if they are non-life insurance from a legal perspective.

- Insurance obligations of business that is not pursued on a similar technical basis to that of life insurance should be considered as non-life insurance obligations, even if they are life insurance from a legal perspective.

TP.1.13. In particular, annuities stemming from non-life insurance contracts (for example for motor vehicle liability insurance) are life insurance obligations.

TP.1.14. The segmentation should be applied to both components of the technical provisions (best estimate and risk margin). It should also be applied where technical provisions are calculated as a whole.

Segmentation of non-life insurance and reinsurance obligations.

TP.1.15. Non-life insurance obligations should be segmented into the following 12 lines of business:

Medical expenses
This line of business includes obligations which cover the provision of preventive or curative medical treatment or care including medical treatment or care due to illness, accident, disability and infirmity, or financial compensation for such treatment or care, other than obligations considered as workers' compensation insurance;

Income protection
This line of business includes obligations which cover financial compensation in consequence of illness, accident, disability or infirmity other than obligations considered as medical expenses or workers' compensation insurance;

Workers' compensation
This line of business includes obligations which cover

- the provision of preventive or curative medical treatment or care relating to accident at work, industrial injury or occupational diseases; or

- financial compensation for such treatment;

- or financial compensation for accident at work, industrial injury or occupational diseases;

Motor vehicle liability
This line of business includes obligations which cover all liabilities arising out of the use of motor vehicles operating on the land including carrier's liability;

Motor, other classes
This line of business includes obligations which cover all damage to or loss of land motor vehicles, land vehicles other than motor vehicles and railway rolling stock;

Marine, aviation and transport
This line of business includes obligations which cover all damage or loss to river, canal, lake and sea vessels, aircraft, and damage to or loss of goods in transit or baggage irrespective of the form of transport. This line of business also includes all liabilities arising out of use of aircraft, ships, vessels or boats on the sea, lakes, rivers or canals including carrier's liability irrespective of the form of transport.

Fire and other damage
This line of business includes obligations which cover all damage to or loss of property other than motor, marine aviation and transport due to fire, explosion, natural forces including storm, hail or frost, nuclear energy, land subsidence and any event such as theft;

General liability
This line of business includes obligations which cover all liabilities other than those included in motor vehicle liability and marine, aviation and transport;

Credit and suretyship
This line of business includes obligations which cover insolvency, export credit, instalment credit, mortgages, agricultural credit and direct and indirect suretyship;

Legal expenses
This line of business includes obligations which cover legal expenses and cost of litigation;

Assistance
This line of business includes obligations which cover assistance for persons who get into difficulties while travelling, while away from home or while away from their habitual residence;

Miscellaneous non-life insurance
This line of business includes obligations which cover employment risk, insufficiency of income, bad weather, loss of benefits, continuing general expenses, unforeseen trading expenses, loss of market value, loss of rent or revenue, indirect trading losses other than those mentioned before, other financial loss (not-trading) as well as any other risk of non-life insurance business not covered by the lines of business already mentioned.

TP.1.16. Obligations relating to accepted proportional reinsurance should be segmented into 12 lines of business in the same way as non-life insurance obligations are segmented.

TP.1.17. Obligations relating to accepted non-proportional reinsurance should be segmented into 4 lines of business as follows:

- Health

- Property

- Casualty (other than health)

- Marine, aviation and transport

Segmentation of life insurance and reinsurance obligations.

TP.1.18. Life insurance and reinsurance obligations should be segmented into 17 lines of business.

TP.1.19. The first 16 lines of business are based on two levels of segmentation as follows:

- Life insurance with profit participation

- Index-linked and unit-linked life insurance

- Other life insurance

- Accepted reinsurance

which should be further segmented into:

- Contracts where the main risk driver is death

- Contract where the main risk driver is survival

- Contracts where the main risk driver is disability/morbidity risk

- Savings contracts, i.e. contracts that resemble financial products providing no or negligible insurance protection

TP.1.20. The 17th line of business is dedicated to annuities stemming from non-life contracts.

TP.1.21. With regard to the first 16 lines of business each insurance contract should be allocated to the line of business that best reflects the underlying risks at the inception of the contract.

TP.1.22. There could be circumstances where, for a particular line of business in the segment "life insurance with profit participation" (participating business), the insurance liabilities can, from the outset, not be calculated in isolation from those of the rest of the business. For example, an undertaking may have management rules such that bonus rates on one line of business can be reduced to recoup guaranteed costs on another line of business and/or where bonus rates depend on the overall solvency position of the undertaking. However, even in this case undertakings should assign a technical provision to each line of business in a practicable manner.

Health insurance obligations

TP.1.23. In relation to their technical nature two types of health insurance can be distinguished:

- Health insurance which is pursued on a similar technical basis to that of life insurance (**SLT Health**); or

- Health insurance which is not pursued on a similar technical basis to that of life insurance (**Non-SLT Health**).

TP.1.24. Health insurance obligations pursued on a similar technical basis to that of life insurance (SLT Health) are the health insurance obligations for which it is appropriate to use life insurance techniques for the calculation of the best estimate.

TP.1.25. SLT health insurance obligations should be allocated to one of the four following lines of business for life insurance obligations defined in subsection V.2.1:

- Insurance contracts with profit participation where the main risk driver is disability/morbidity risk

- Index-linked and unit-linked life insurance contracts where the main risk driver is disability/morbidity risk

- Other insurance contracts where the main risk driver is disability/morbidity risk

- Annuities stemming from non-life contracts

TP.1.26. With regard to the line of business for annuities stemming from non-life contracts, SLT health insurance includes only annuities stemming from Non-SLT health contracts (for example workers' compensation and income protection insurance).

TP.1.27. Non-SLT health obligations should be allocated to one of the three following lines of business for non-life insurance obligations:

- Medical expense

- Income protection

- Workers' compensation

TP.1.28. The definition of health insurance applied in QIS5 may not coincide with national definitions of health insurance used for authorisation or accounting purposes. Annex C includes further guidance on the definition of health insurance.

Unbundling of insurance and reinsurance contracts

TP.1.29. Where a contract includes life and non-life (re)insurance obligations, it should be unbundled into its life and non-life parts.

TP.1.30. Where a contract covers risks across the different lines of business for non-life (re)insurance obligations, these contracts should be unbundled into the appropriate lines of business.

TP.1.31. A contract covering life insurance risks should always be unbundled according to the following top-level segments

- Life insurance with profit participation

- Index-linked and unit-linked life insurance

- Other life insurance

TP.1.32. An unbundling of life insurance contracts according to the second level of segmentation (i.e. according to risk drivers) is not necessary. However, where a contract gives rise to SLT health insurance obligations, it should be unbundled into a health part and a non-health part where it is technically feasible and where both parts are material.

TP.1.33. Notwithstanding the above, unbundling may not be required where only one of the risks covered by a contract is material. In this case, the contract may be allocated according to the main risk.

V.2.2. Best estimate

V.2.2.1. Methodology for the calculation of the best estimate

Appropriate methodologies for the calculation of the best estimate

TP.2.1. The best estimate should correspond to the probability weighted average of future cash-flows taking account of the time value of money.

TP.2.2. 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.

TP.2.3. 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 in closed form solutions in life insurance or the chain-ladder technique in non-life insurance.

TP.2.4. Cash-flow characteristics that should, in principle and where relevant, be taken into consideration in the application of the valuation technique include the following:

a) Uncertainty in the timing, frequency and severity of claim events.

b) Uncertainty in claims amounts and the period needed to settle claims.

c) Uncertainty in the amount of expenses.

d) Uncertainty in the value of an index/market values used to determine claim amounts.

e) Uncertainty in both entity and portfolio-specific factors such as legal, social, or economic environmental factors, where practicable. For example, in some countries, this may include changes as a result of legislation such as Ogden rates in the UK, periodical payments, taxation or cost of care.

f) Uncertainty in policyholder behaviour.

g) Path dependency, where the cash-flows depend not only on circumstances such as economic conditions on the cash-flow date, but also on those circumstances at previous dates.

A cash-flow having no path dependency can be valued by, for example, using an assumed value of the equity market at a future point in time. However, a cash-flow with path-dependency would need additional assumptions as to how the level of the equity market evolved (the equity market's path) over time in order to be valued.

h) Interdependency between two or more causes of uncertainty.

Some risk-drivers may be heavily influenced by or even determined by several other risk-drivers (interdependence). For example, a fall in market values may influence the (re)insurance undertaking's exercise of discretion in future participation, which in turn affects policyholder behaviour. Another example would be a change in the legal environment or the onset of a recession which could increase the frequency or severity of non-life claims.

TP.2.5. Undertakings should use actuarial and statistical techniques for the calculation of the best estimate which appropriately reflect the risks that affect the cash-flows. This may include simulation methods, deterministic techniques and analytical techniques. Examples for these techniques can be found in Annex B.

TP.2.6. For certain life insurance liabilities, in particular the future discretionary benefits relating to participating contracts or other contracts with embedded options and guarantees, simulation may lead to a more appropriate and robust valuation of the best estimate liability.

TP.2.7. For the estimation of non-life best estimate liabilities as well as life insurance liabilities that do not need simulation techniques, deterministic and analytical techniques can be more appropriate.

Cash-flow projections

TP.2.8. The best estimate should be calculated gross, without deduction of the amounts recoverable from reinsurance contracts and special purpose vehicles. Recoverables from reinsurance and Special Purpose Vehicles should be calculated separately. In the case of co-insurance the cash-flows of each co-insurer should be calculated as their proportion of the expected cash-flows without deduction of the amounts recoverable from reinsurance and special purpose vehicles.

TP.2.9. Cash-flow projections should reflect expected realistic future demographic, legal, medical, technological, social or economical developments.

TP.2.10. Appropriate assumptions for future inflation should be built into the cash-flow projection. Care should be taken to identify the type of inflation to which particular cash-flows are exposed (i.e. consumer price index, salary inflation).

TP.2.11. The cash-flow projections, in particular for health insurance business, should take account of claims inflation and any premium adjustment clauses. It may be assumed that the effects of claims inflation and premium adjustment clauses cancel each other out in the cash flow projection, provided this approach undervalues neither the best

estimate, nor the risk involved with the higher cash flows after claims inflation and premium adjustment.

Recognition and derecognition of (re)insurance contracts for solvency purposes

TP.2.12. The calculation of the best estimate should only include future cash-flows associated with existing insurance and reinsurance contracts.

TP.2.13. A reinsurance or insurance contract should be initially recognised by insurance or reinsurance undertakings as an existing contract when the undertaking becomes a party of the contract, and at latest when the insurance or reinsurance cover begins. In particular, tacit renewals which have already taken place at the reporting date should lead to the recognition of the renewed contract.

TP.2.14. A contract should be derecognised as an existing contract only when the obligation specified in the contract is discharged or cancelled or expires.

The boundary of an existing (re)insurance contract

TP.2.15. For the purpose of determining which insurance and reinsurance obligations arise in relation to a contract, the boundaries of an insurance or reinsurance contract should be defined in the following manner:

(a) Where the insurance or reinsurance undertaking has a unilateral right to terminate the contract, a unilateral right to reject the premiums payable under the contract or an unlimited ability to amend the premiums or the benefits payable under the contract at some point in the future, any obligations which relate to insurance or reinsurance cover which would have been provided by the insurance or reinsurance undertaking after that date do not belong to the existing contract.

(b) Where the undertaking's unilateral right to terminate the contract or to unilaterally reject the premiums or its unlimited ability to amend the premiums or the benefits relates only to a part of the contract, the same principle as defined above should be applied to this part.

(c) All other obligations relating to the terms and conditions of the contract belong to the contract.

TP.2.16. The term "unlimited ability" should be interpreted from an economic perspective. In particular, a formal restriction of the ability to amend premiums may not always constitute a restriction in substance. For example, the terms and conditions of the contract may allow premium increases only up to a rate of 1000 %. Although this is formally a restriction, it may not have any economic relevance. In this case the ability to amend premiums should be considered to be unlimited.

TP.2.17. There are insurance contracts where premium amendments are linked to the premiums for new business. For example the terms and conditions of the contract may specify that premiums will be adjusted to premiums requested from new policyholders. Provided that the undertaking is free to choose the premium for new policyholders, its ability to amend the premiums of the contract should not be considered to be limited.

TP.2.18. Annex D includes several examples that illustrate the application of the definition of the contract boundary.

TP.2.19. The definition of the contract boundary should be applied in particular to decide whether options to renew the contract, to extend the insurance coverage to another person, to extend the insurance period, to increase the insurance cover or to establish additional insurance cover gives rise to a new contract or belongs to the existing contract. Where the option belongs to the existing contract the provisions for policyholder options should be taken into account.

Time horizon

TP.2.20. 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 insurance and reinsurance contracts on the date of the valuation, unless an accurate valuation can be achieved otherwise.

TP.2.21. The determination of the lifetime of insurance and reinsurance obligations should be based on up-to-date and credible information and realistic assumptions about when the existing insurance and reinsurance obligations will be discharged or cancelled or expired.

Gross cash in-flows

TP.2.22. To determine the best estimate the following non-exhaustive list of cash in-flows should be included:

- Future premiums; and

- Receivables for salvage and subrogation.

TP.2.23. The cash in-flows should not take into account investment returns (i.e. interests earned, dividends…).

Gross cash out-flows

TP.2.24. The cash out-flows could be divided between benefits to the policyholders or beneficiaries, expenses that will be incurred in servicing insurance and reinsurance obligations, and other cash-flow items such as taxation payments which are charged to policyholders.

Benefits

TP.2.25. The benefit cash out-flows (non-exhaustive list) should include:

- Claims payments

- Maturity benefits

- Death benefits

- Disability benefits

- Surrender benefits

- Annuity payments

- Profit sharing bonuses

Expenses

TP.2.26. In determining the best estimate, the undertaking should take into account all cash-flows arising from expenses that will be incurred in servicing all obligations related to existing insurance and reinsurance contracts over the lifetime thereof. This should include (non-exhaustive list):

- Administrative expenses

- Investment management expenses

- Claims management expenses / handling expenses

- Acquisition expenses including commissions which are expected to be incurred in the future

TP.2.27. Expenses should include both overhead expenses and expenses which are directly assignable to individual claims, policies or transactions.

TP.2.28. Overhead expenses include, for example, expenses which are related to general management and service departments which are not directly involved in new business or policy maintenance activities and which are insensitive to either the volume of new business or the level of in-force business.The allocation of overhead expenses to lines of business, homogeneous risk groups or any other segments of the best estimate should be done on an economic basis following realistic and objective principles.

TP.2.29. For non-life insurance obligations, the undertaking should allocate expenses between premium provisions and claims provisions on an economic basis.

TP.2.30. To the extent that future premiums from existing insurance and reinsurance contracts are taken into account in the valuation of the best estimate, expenses relating to these future premiums should be taken into consideration.

TP.2.31. Undertaking should consider their own analysis of expenses and any relevant market data. Expense assumptions should include an allowance for the expected future cost increase. These should take into account the types of cost involved. The allowance for inflation should be consistent with the economic assumptions made.

TP.2.32. For the assessment of the future expenses, undertakings should take into account all the expenses that are directly related to the ongoing administration of obligations related to existing insurance and reinsurance contracts, together with a share of the relevant overhead expenses. The share of overheads should be assessed on the basis that the undertaking continues to write further new business.

TP.2.33. Any assumptions about the expected cost reduction should be realistic, objective and based on verifiable data and information.

Tax payments

TP.2.34. In determining the best estimate, undertakings should take into account taxation payments which are charged to policyholders. Only those taxation payments which are settled by the undertaking need to be taken into account. A gross calculation of the amounts due to policyholders suffices where tax payments are settled by the policyholders;

TP.2.35. Different taxation regimes exist across Member States giving rise to a broad variety of tax rules in relation to insurance contracts. The assessment of the expected cash-

flows underlying the technical provisions should take into account any taxation payments which are charged to policyholders, or which would be required to be made by the undertaking to settle the insurance obligations. All other tax payments should be taken into account under other balance sheet items.

TP.2.36. The following tax payments should be included in the best estimate: transaction-based taxes (such as premium taxes, value added taxes and goods and services taxes) and levies (such as fire service levies and guarantee fund assessments) that arise directly from existing insurance contracts, or that can be attributed to the contracts on a reasonable and consistent basis. Contributions which were already included in companies' expense assumptions (i.e. levies paid by insurance companies to industry protection schemes) should not be included.

TP.2.37. The allowance for tax payments in the best estimate should be consistent with the amount and timing of the taxable profits and losses that are expected to be incurred in the future. In cases where changes to taxation requirements are substantially enacted, the pending adjustments should be reflected.

Life insurance obligations

TP.2.38. As a starting point, the cash-flow projection should be based on a policy-by-policy approach, but reasonable actuarial methods and approximations may be used.

TP.2.39. In particular, to reduce undue burden on the undertaking the projection of future cash-flows based on suitable model points can be permitted if the following conditions are met:

    a) The grouping of policies and their representation by model points is acceptable provided that it can be demonstrated by the undertaking that the grouping does not misrepresent the underlying risk and does not significantly misstate the costs.

    b) The grouping of policies should not distort the valuation of technical provisions, by for example, forming groups containing life policies with guarantees that are "in the money" and life policies with guarantees that are "out of the money".

    c) Sufficient validation should be performed by the undertaking to be reasonably sure that the grouping of life policies has not resulted in the loss of any significant attributes of the portfolio being valued. Special attention should be given to the amount of guaranteed benefits and any possible restrictions (legislative or otherwise) for an undertaking to treat different groups of policyholders fairly (e.g. no or restricted subvention between homogeneous groups).

TP.2.40. In certain specific circumstances, the best estimate element of technical provisions may be negative (e.g. for some individual contracts). This is acceptable and undertakings should not set to zero the value of the best estimate with respect to those individual contracts.

TP.2.41. No implicit or explicit surrender value floor should be assumed for the amount of the market consistent value of liabilities for a contract. This means that if the sum of a best estimate and a risk margin of a contract is lower than the surrender value of that

contract there is no need to increase the value of insurance liabilities to the surrender value of the contract.

Non-life insurance obligations

TP.2.42. The valuation of the best estimate for provisions for claims outstanding and for premium provisions should be carried out separately.

TP.2.43. With respect to the best estimate for premium provisions, the cash-flow projections relate to claim events occurring after the valuation date and during the remaining in-force period (coverage period) of the policies held by the undertaking (existing policies). The cash-flow projections should comprise all future claim payments and claims administration expenses arising from these events, cash-flows arising from the ongoing administration of the in-force policies and expected future premiums stemming from existing policies.

TP.2.44. The best estimate of premium provisions from existing insurance and reinsurance contracts should be given as the expected present value of future in- and out-going cash-flows, being a combination of, inter alia:

- cash-flows from future premiums;

- cash-flows resulting from future claims events;

- cash-flows arising from allocated and unallocated claims administration expenses;

- cash-flows arising from ongoing administration of the in-force policies.

There is no need for the listed items to be calculated separately.

TP.2.45. With regard to premium provisions, the cash in-flows could exceed the cash out-flows leading to a negative best estimate. This is acceptable and undertakings are not required to set to zero the value of the best estimate. The valuation should take account of the time value of money where risks in the remaining period would give rise to claims settlements into the future.

TP.2.46. Additionally, the valuation of premium provisions should take account of future policyholder behaviour such as likelihood of policy lapse during the remaining period.

TP.2.47. With respect to the best estimate for provisions for claims outstanding, the cash-flow projections relate to claim events having occurred before or at the valuation date – whether the claims arising from these events have been reported or not (i.e. all incurred but not settled claims). The cash-flow projections should comprise all future claim payments as well as claims administration expenses arising from these events.

TP.2.48. Where non-life insurance policies give rise to the payment of annuities, the approach laid down in the following subsection on substance over form should be followed. Consistent with this, for premium provisions, its assessment should include an appropriate calculation of annuity obligations if a material amount of incurred claims is expected to give rise to the payment of annuities.

Principle of substance over form

TP.2.49. When discussing valuation techniques for calculating technical provisions, it is common to refer to a distinction between a valuation based on life techniques and a valuation based on non-life techniques. The distinctions between life and non-life techniques are aimed towards the nature of the liabilities (substance), which may not necessarily match the legal form (form) of the contract that originated the liability. The choice between life or non-life actuarial methodologies should be based on the nature of the liabilities being valued and from the identification of risks which materially affect the underlying cash-flows. This is the essence of the principle of substance over form.

TP.2.50. Traditional life actuarial techniques to calculate the best estimate can be described as techniques that are based on discounted cash-flow models, generally applied on a policy-by-policy basis, which take into account in an explicit manner risk factors such as mortality, survival and changes in the health status of the insured person(s).

TP.2.51. On the other hand, traditional non-life actuarial techniques include a number of different approaches. For example some of the most common being:

- Methodologies based on the projection of run-off triangles, usually constructed on an aggregate basis;

- Frequency/severity models, where the number of claims and the severity of each claim is assessed separately;

- Methodologies based on the estimation of the expected loss ratio or other relevant ratios;

- Combinations of the previous methodologies;

TP.2.52. There is one key difference between life and non-life actuarial methodologies: life actuarial methodologies consider explicitly the probabilities of death, survival, disability and/or morbidity of the insured persons as key parameters in the model, while non-life actuarial methodologies do not.

TP.2.53. The choice between life or non-life actuarial methodologies should be based on the nature of the liabilities valued and on the identification of risks which materially affect the underlying cash-flows.

TP.2.54. In practice, in the majority of cases the form will correspond to the substance. However, for example for certain supplementary covers included in life contracts (e.g. accident) may be better suited for an estimation based on non-life actuarial methodologies.

TP.2.55. The following provides additional guidance for the treatment of annuities arising in non-life insurance. The application of the principle of substance over form implies that such liabilities should be valued using methodologies usually applicable to the valuation of life technical provisions, Specifically, guidance is provided in relation to:

- the recognition and segmentation of insurance obligations for the purpose of calculating technical provisions (i.e. the allocation of obligations to the individual lines of business);

- the valuation of technical provisions for such annuities; and

- possible methods for the valuation of technical provisions for the remaining non-life obligations

TP.2.56. The treatment proposed in these specifications for annuities should be extended to other types of liabilities stemming from non-life and health insurance whose nature is deemed similar to life liabilities (such as life assistance benefits), taking into consideration the principle mentioned in the previous paragraph.

Allocation to the individual lines of business

TP.2.57. Where non-life and Non-SLT health insurance policies give rise to the payment of annuities such liabilities should be valued using techniques commonly used to value life insurance obligations. Such liabilities should be assigned to the line of business for annuities stemming from non-life contracts.

Valuation of annuities arising from non-life and Non-SLT health insurance contracts

TP.2.58. Undertakings should value the technical provisions related to such annuities separately from the technical provisions related to the remaining non-life and health obligations. They should apply appropriate life insurance valuation techniques. The valuation should be consistent with the valuation of life insurance annuities with comparable technical features.

Valuation of the remaining non-life and health insurance obligations

TP.2.59. The remaining obligations in the undertaking's non-life and Non-SLT health business (which are similar in nature to non-life insurance obligations) have to be valued separately from the relevant block of annuities.

TP.2.60. Where provisions for claims outstanding according to national accounting rules are compared to provisions for claims outstanding as calculated above, it should be taken into account that the latter do not include the annuity obligations.

TP.2.61. Undertakings may use, where appropriate, one of the following approaches to determine the best estimate of claims provisions for the remaining non-life or health obligations in a given non-life or Non-SLT health insurance line of business where annuities are valued separately.

Separate calculation of non-life liabilities

TP.2.62. Under this approach, the run-off triangle which is used as a basis for the determination of the technical provisions should not include any cash-flows relating to the annuities. An additional estimate of the amount of annuities not yet reported and for reported but not yet agreed annuities needs to be added.

Allowance of agreed annuities as single lump-sum payments in the run-off triangle

TP.2.63. This approach also foresees a separate calculation of the best estimate, where the split is between annuities in payment and the remaining obligations.

TP.2.64. Under this approach, the run-off triangle which is used as a basis for the determination of the technical provisions of the remaining non-life or health obligations in a line of business does not include any cash-flows relating to the

annuities in payment. This means that claims payments for annuities in payment are excluded from the run-off triangle.

TP.2.65. However, payments on claims before annuitisation[1] and payments at the time of annuitisation remain included in the run-off triangle. At the time of annuitisation, the best estimate of the annuity (valued separately according to life principles) is shown as a single lump-sum payment in the run-off triangle, calculated as at the date of the annuitisation. Where proportionate, approximations of the lump sums could be used.

TP.2.66. Where the analysis is based on run-off triangles of incurred claims, the lump sum payment should reduce the case reserves at the date of annuitisation.

TP.2.67. On basis of run-off triangles adjusted as described above, the participant may apply an appropriate actuarial reserving method to derive a best estimate of the claims provision of the portfolio. Due to the construction of the run-off triangle, this best estimate would not include the best estimate related to the annuities in payment which would be valued separately using life principles (i.e. there would be no "double counting" in relation to the separate life insurance valuation), but it includes a best estimate for not yet reported and for reported but not yet agreed annuities.

Expert judgement

TP.2.68. 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 undertaking's features or the characteristics of the relevant portfolio,

- 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 undertakings have to run its business

Obligations in different currencies

TP.2.69. The probability-weighted average cash-flows should take into account the time value of money. The time value of money of future cash-flows in different currencies is calculated using risk-free term structure for relevant currency. Therefore the best estimate should be calculated separately for obligations of different currencies.

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[1] The term "annuitisation" denotes the point in time where the undertaking becomes obligated to pay the annuity.

Valuation of options and guarantees embedded in insurance contracts

TP.2.70. Undertakings should identify all material contractual options and financial guarantees embedded in their contracts. They should take account of the value of financial guarantees and any contractual options included in the contracts when they calculate technical provisions.

Definition of contractual options and financial guarantees

TP.2.71. A contractual option is defined as a right to change the benefits[2], to be taken at the choice of its holder (generally the policyholder), on terms that are established in advance. Thus, in order to trigger an option, a deliberate decision of its holder is necessary.

TP.2.72. Some (non-exhaustive) examples of contractual options which are pre-determined in contract and do not require again the consent of the parties to renew or modify the contract include the following:

- Surrender value option, where the policyholder has the right to fully or partially surrender the policy and receive a pre-defined lump sum amount;

- Paid-up policy option, where the policyholder has the right to stop paying premiums and change the policy to a paid-up status;

- Annuity conversion option, where the policyholder has the right to convert a lump survival benefit into an annuity at a pre-defined minimum rate of conversion;

- Policy conversion option, where the policyholder has the right to convert from one policy to another at pre-specific terms and conditions;

- Extended coverage option, where the policyholder has the right to extend the coverage period at the expiry of the original contract without producing further evidence of health.

TP.2.73. A financial guarantee is present when there is the possibility to pass losses to the undertaking or to receive additional benefits[3] as a result of the evolution of financial variables (solely or in conjunction with non-financial variables) (e.g. investment return of the underlying asset portfolio, performance of indices, etc.). In the case of guarantees, the trigger is generally automatic (the mechanism would be set in the policy's terms and conditions) and thus not dependent on a deliberate decision of the policyholder / beneficiary. In financial terms, a guarantee is linked to option valuation.

TP.2.74. The following is a non-exhaustive list of examples of common financial guarantees embedded in life insurance contracts:

- Guaranteed invested capital;

- Guaranteed minimum investment return;

- Profit sharing.

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[2] This should be interpreted as also including the potential for reduction of the level of premiums that would be charged in the future.
[3] This should be interpreted as also including the potential for reduction of the level of premiums that would be charged in the future.

TP.2.75. There are also non-financial guarantees, where the benefits provided would be driven by the evolution of non-financial variables, such as reinstatement premiums in reinsurance, experience adjustments to future premiums following a favourable underwriting history (e.g. guaranteed no-claims discount). Where these guarantees are material, the calculation of technical provisions should also take into account their value.

Valuation requirements

TP.2.76. For each type of contractual option insurers 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.

TP.2.77. 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.

TP.2.78. The best estimate of contractual options and financial guarantees should reflect both the intrinsic value and the time value.

TP.2.79. 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 series of deterministic projections with attributed probabilities; and

- 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.

TP.2.80. 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.

TP.2.81. For the purposes of the deterministic 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. These probabilities of occurrence should be weighted towards adverse scenarios to reflect market pricing for risk. The series of deterministic projections should be numerous enough to capture a wide range of possible out-comes (and, in particular, it should include very adverse yet possible scenarios) and take into account the probability of each outcome's likelihood (which may, in practice, need to incorporate judgement). The costs will be understated if only relatively benign or limited economic scenarios are considered.

TP.2.82. When the valuation of the best estimate of contractual options and financial guarantees is not being done on a policy-by-policy basis, the segmentation considered should not distort the valuation of technical provisions by, for example,

forming groups containing policies which are "in the money" and policies which are "out of the money".

TP.2.83. Regarding contractual options, the assumptions on policyholder behaviour should be appropriately founded in statistical and empirical evidence, to the extent that it is deemed representative of the future expected behaviour. However, when assessing the experience of policyholders' behaviour appropriate attention based on expert judgements should be given to the fact that when an option is out of or barely in the money, the behaviour of policyholders should not be considered to be a reliable indication of likely policyholders' behaviour when the options are heavily in-the-money.

TP.2.84. Appropriate consideration should also be given to an increasing future awareness of policy options as well as policyholders' possible reactions to a changed financial position of an undertaking. In general, policyholders' 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.

TP.2.85. Where material, non-financial guarantees should be treated like financial guarantees.

Valuation of future discretionary benefits

TP.2.86. In calculating the best estimate, undertakings should take into account future discretionary benefits which are expected to be made, whether or not those payments are contractually guaranteed. Undertakings should not take into account payments that relate to surplus funds which possess the characteristics of Tier 1 basic own funds. Surplus funds are accumulated profits which have not been made available for distribution to policyholders and beneficiaries. (Cf. Article 91 of the Solvency II Framework Directive.)

TP.2.87. When undertakings calculate the best estimate of technical provisions, the value of future discretionary benefits should be calculated separately.

TP.2.88. Future discretionary benefits means benefits of insurance or reinsurance contracts which have one of the following characteristics:

- the benefits are legally or contractually based on one or several of the following results:

    - the performance of a specified pool of contracts or a specified type of contract or a single contract;

    - realised or unrealised investment return on a specified pool of assets held by the insurance or reinsurance undertaking;

    - the profit or loss of the insurance or reinsurance undertaking or fund that issues the contract that gives rise to the benefits;

- the benefits are based on a declaration of the insurance or reinsurance undertaking and the timing or the amount of the benefits is at its discretion.

TP.2.89. Index-linked and unit-linked benefits should not be considered as discretionary benefits.

TP.2.90. The distribution of future discretionary benefits is a management action and assumptions about it should be objective, realistic and verifiable. In particular assumptions about the distribution of future discretionary benefits should take the relevant and material characteristics of the mechanism for their distribution into account.

TP.2.91. Some examples of characteristics of mechanisms for distributing discretionary benefits are the following. Undertakings should consider whether they are relevant and material for the valuation of future discretionary benefits and take them into account accordingly, applying the principle of proportionality.

- What constitutes a homogenous group of policyholders and what are the key drivers for the grouping?

- How is a profit divided between owners of the undertaking and the policyholders and furthermore between different policyholders?

- How is a deficit divided between owners of the undertaking and the policyholders and furthermore between different policyholders?

- How will the mechanism for discretionary benefits be affected by a large profit or loss?

- How will policyholders be affected by profits and losses from other activities?

- What is the target return level set by the firm's owners on their invested capital?

- What are the key drivers affecting the level of discretionary benefits?

- What is an expected level (inclusive of any distribution of excess capital, unrealised gains etc.) of discretionary benefits?

- How are the discretionary benefits made available for policyholders and what are the key drivers affecting for example the split between reversionary and terminal discretionary benefits, conditionality, changes in smoothing practice, level of discretionary by the undertaking, etc.

- How will the experience from current and previous years affect the level of discretionary benefits?

- When is an undertaking's solvency position so weak that declaring discretionary benefits is considered by the undertaking to jeopardize a shareholder's or/and policyholders' interest?

- What other restrictions are in place for determining the level of discretionary benefits?

- What is an undertaking's investment strategy?

- What is the asset mix driving the investment return?

- What is the smoothing mechanism if used and what is the interplay with a large profit or loss?

- What kind of restrictions are in place in smoothing extra benefits?

- Under what circumstances would one expect significant changes in the crediting mechanism for discretionary benefits?

- To what extent is the crediting mechanism for discretionary benefits sensitive to policyholders' actions?

TP.2.92. Where the future discretionary benefits depend on the assets held by the undertaking, the calculation of the best estimate should be based on the current assets held by the undertaking. Future changes of the asset allocation should be taken into account according to the requirements on future management actions.

TP.2.93. The assumptions on the future returns of these assets, valued according to the subsection V.1, should be consistent with the relevant risk-free interest term structure for QIS5. Where a risk neutral approach for the valuation is used, the set of assumptions on returns of future investments underlying the valuation of discretionary benefits should be consistent with the principle that they should not exceed the level given by the forward rates derived from the risk-free interest rates.

V.2.2.2. Assumptions underlying the calculation of the best estimate

Assumptions consistent with information provided by financial markets

TP.2.94. Assumptions consistent with information about or provided by financial markets include (non exhaustive list):

- relevant risk-free interest rate term structure,

- currency exchange rates,

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

- economic scenario files (ESF).

TP.2.95. When undertakings 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 V.1;

TP.2.96. Where the undertaking 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 [4];

    ii. it assumes no arbitrage opportunity;

TP.2.97. The following principles should be taken into account in determining the appropriate calibration of a market consistent asset model:

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[4] See section V.2.4 on technical provisions as a whole for a definition of "deep, liquid and transparent"

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[5].

TP.2.98. 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.

TP.2.99. A financial market is deep, liquid and transparent, if it meets the requirements specified in the subsection of these specifications regarding circumstances in which technical provisions should be calculated as a whole.

TP.2.100. 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 inform the appropriate correlations between different asset returns.

b) To determine probabilities of transitions between rating classes 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 insurance and reinsurance technical risks

TP.2.101. Generally available data refers to a combination of:

- Internal data

- External data sources such as industry or market data.

TP.2.102. Internal data refers to all data which is available from internal sources. Internal data may be either:

- Undertaking-specific data:

- Portfolio-specific data:

TP.2.103. All relevant available data whether external or internal data, should be taken into account in order to arrive at the assumption which best reflects the characteristics of

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[5] The comparative merits of implied and historic volatilise are discussed in Annex G. Undertakings are invited to disclose which choice they made.

the underlying insurance portfolio. In the case of using external data, only that which the undertaking can reasonably be expected to have access too should be considered.

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.

TP.2.104.   Where insurance and reinsurance undertakings use data from an external source, they should derive assumptions on underwriting risks that are based on that data according to the following requirements:

(a) undertakings are able to demonstrate that the sole use of data which are available from an internal source are not more suitable than external data; and

(b)   the origin of the data and assumptions or methodologies used to process them is known to the undertaking and the undertaking is able to demonstrate that these assumptions and methodologies appropriately reflect the characteristics of the portfolio.

Policyholders' behaviour

TP.2.105.   Undertakings are required to identify policyholders' behaviour.

TP.2.106.   Any assumptions made by insurance and reinsurance undertakings with respect to the likelihood that policyholders will exercise contractual options, including lapses and surrenders, 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.

TP.2.107.   Assumptions about the likelihood that policy holders will exercise contractual options should be based on analysis of past policyholder behaviour. The analysis should take into account the following:

(a) how beneficial the exercise of the options was or would have been to the policyholders under past circumstances (whether the option is out of or barely in the money or is in the money),

(b) the influence of past economic conditions,

(c) the impact of past management actions,

(d) where relevant, how past projections compared to the actual outcome,

(e) any other circumstances that are likely to influence a decision whether to exercise the option.

TP.2.108.   The likelihood that policyholders will exercise contractual options, including lapses and surrenders, should not be assumed to be independent of the elements mentioned in points (a) to (e) in the previous paragraph, unless proper evidence to support such an assumption can be observed or where the impact would not be material.

TP.2.109. In general policyholders' behaviour should not be assumed to be independent of financial markets, of undertaking's treatment of customers or publicly available information unless proper evidence to support the assumption can be observed.

TP.2.110. Policyholder options to surrender are often dependent on financial markets and undertaking-specific information, in particular the financial position of the undertaking.

TP.2.111. Policyholders' option to lapse and also in certain cases to surrender are mainly dependent on the change of policyholders' status such as the ability to further pay the premium, employment, divorce, etc.

Management actions

TP.2.112. The methods and techniques for the estimation of future cash-flows, and hence the assessment of the provisions for insurance liabilities, should take account of potential future actions by the management of the undertaking.

TP.2.113. As examples, the following should be considered:

- changes in asset allocation, as management of gains/losses for different asset classes in order to gain the target segregated fund return; management of cash balance and equity backing ratio with the aim of maintaining a defined target asset mix in the projection period; management of liquidity according to the asset mix and duration strategy; actions to maintain a stable allocation of the portfolio assets in term of duration and product type, actions for the dynamic rebalancing of the assets portfolio according to movements in liabilities and changes in market conditions;

- changes in bonus rates or product changes, for example on policies with profit participation to mitigate market risks;

- changes in expense charge, for example related to guarantee charge, or related to an increased charging on unit-linked or index-linked business;

TP.2.114. The assumptions on future management actions used in the calculation of the technical provisions should be determined in an objective manner.

TP.2.115. Assumed future management actions should be realistic and consistent with the insurance or reinsurance undertaking's current business practice and business strategy unless there is sufficient current evidence that the undertaking will change its practices.

TP.2.116. Assumed future management actions should be consistent with each other.

TP.2.117. Insurance and reinsurance undertakings should not assume that future management actions would be taken that would be contrary to their obligations towards policyholders and beneficiaries or to legal provisions applicable to the insurance and reinsurance undertakings. The assumed future management actions should take account of any public indications by the insurance or reinsurance undertaking as to the actions that it would expect to take, or not take in the circumstances being considered.

TP.2.118. Assumptions about future management actions should take account of the time needed to implement the management actions and any expenses caused by them.

TP.2.119. Insurance and reinsurance undertakings should be able to verify that assumptions about future management actions are realistic through a comparison of assumed

future management actions with management actions actually taken previously by the insurance or reinsurance undertaking.

V.2.2.3.   Recoverables

Recoverables from reinsurance contracts and special purpose vehicles

TP.2.120.   The best estimate should be calculated gross, without deduction of amounts recoverable from reinsurance contracts and special purpose vehicles. Those amounts should be calculated separately

TP.2.121.   The calculation by insurance and reinsurance undertakings of amounts recoverable from reinsurance contracts and special purpose vehicles should follow the same principles and methodology as presented in this section for the calculation of other parts of the technical provisions.

TP.2.122.   There is no need however to calculate a risk margin for amounts recoverable from reinsurance 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 reinsurance contracts and special purpose vehicles). Where undertakings calculate a risk margin using an internal model, they can either perform one single net calculation or two separate calculations.

TP.2.123.   When calculating amounts recoverable from reinsurance contracts and special purpose vehicles, insurance and reinsurance undertakings should take account of the time difference between recoveries and direct payments.

Where for certain types of reinsurance and special purpose vehicles, the timing of recoveries and that for direct payments of undertaking 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 undertaking should have the possibility of using the timing of direct payments.

TP.2.124.   The result from that calculation 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, dispute or another reason, and the average loss resulting there from (loss-given-default).

TP.2.125.   The amounts recoverable from special purpose vehicles, the amounts recoverable from finite reinsurance[6] contracts and the amounts recoverable from other reinsurance contracts should each be calculated separately. The amounts recoverable from a special purpose vehicle should not exceed the value of the assets recoverable from this special purpose vehicle that the insurance or reinsurance undertaking would be able to receive.

TP.2.126.   For the purpose of calculating the amounts recoverable from reinsurance contracts and special purpose vehicles, the cash-flows should only include payments in relation to compensation of insurance events and unsettled insurance claims. Payments in relation to other events or settled insurance claims should not be

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[6] as referred to in Article 210 of the Solvency 2 Framework Directive (Directive 2009/138/EC)

accounted as amounts recoverable from reinsurance 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.

TP.2.127.   Debtors and creditors that relate to settled claims of policyholders or beneficiaries should not be included in the recoverable.

TP.2.128.   The best estimate of amounts recoverable from reinsurance contracts and special purpose vehicles for non-life insurance obligations should be calculated separately for premium provisions and provisions for claims outstanding:

> (a) the cash-flows relating to provisions for claims outstanding should include the compensation payments relating to the claims accounted for in the gross provisions for claims outstanding of the insurance or reinsurance undertaking ceding risks;

> (b) the cash-flows relating to premium provisions should include all other payments.

TP.2.129.   If payments from the special purpose vehicles to the insurance or reinsurance undertaking do not directly depend on the claims against the insurance or reinsurance undertaking ceding risks (for example if payments are made according to certain external indicators, such as an earthquake index or general population mortality), the amounts recoverable from these special purpose vehicles for future claims should only be taken into account to the extent it is possible for the structural mismatch between claims and amounts recoverable (basis risk) to be measured in a prudent, reliable and objective manner and where the underlying risks are adequately reflected in the calculation of the Solvency Capital Requirement.

TP.2.130.   A compensation for past and future policyholder claims should only be taken into account to the extent it can be verified in a deliberate, reliable and objective manner.

TP.2.131.   Expenses which the undertaking incurs in relation to the management and administration of reinsurance and special purpose vehicle contracts should be allowed for in the best estimate, calculated gross, without deduction of the amounts recoverable from reinsurance contracts and special purpose vehicles. But no allowance for expenses relate to the internal processes should be made in the recoverables.

Adjustment of recoverables due to expected default

Definition of the adjustment

TP.2.132.   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, dispute or another reason, and the average loss resulting there from (loss-given-default).

TP.2.133.   The adjustment should be calculated as the expected present value of the change in cash-flows underlying the amounts recoverable from that counterparty, resulting

from a default of the counterparty at a certain point in time and after allowing for the effect of any additional risk mitigating instrument.

TP.2.134.   This calculation should take into account possible default events over the lifetime of the rights arising from the corresponding reinsurance contract or special purpose vehicle and the dependence on time of the probability of default.

TP.2.135.   For example, let the recoverables towards a counterparty correspond to deterministic payments of C_1, C_2, C_3 in one, two and three years respectively. Let PD_t 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%·($C_1 + C_2 + C_3$)
2	-60%·($C_2 + C_3$)
3	-60%·C_3

For instance, in year two the value of the recoverables is equal to $C_2 + C_3$. If the counterparty defaults in year two the value of the recoverables changes from $C_2 + C_3$ to 40%·($C_2 + C_3$). As 60% of the recoveries are lost, the loss-given-default is -60%·($C_2 + C_3$).

TP.2.136.   The adjustment for counterparty default in this example is the following sum:

$$Adj_{CD} = \quad PD_1 \cdot (-60\% \cdot (C_1 + C_2 + C_3))$$
$$+ PD_2 \cdot (-60\% \cdot (C_2 + C_3))$$
$$+ PD_3 \cdot (-60\% \cdot C_3).$$

TP.2.137. This calculation should be carried out separately by counterparty and each line of business, and in non-life insurance for premium provisions and provisions for claims outstanding.

Probability of default (PD)

TP.2.138.   The probability of default of special purpose vehicles should be calculated according to the average rating of assets held by the special purpose vehicle, unless there is a reliable basis for an alternative calculation.

TP.2.139.   The determination of the adjustment for counterparty default should take into account possible default events during the whole run-off period of the recoverables.

TP.2.140.   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

$$PD_1 \cdot (-60\% \cdot (C_1 + C_2 + C_3)).$$

TP.2.141. 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.

TP.2.142. 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, rating judgements, information relating to the supervisory solvency assessment, and the financial reporting of the counterparty. The applied methods should guarantee market consistency. The undertaking should not rely on information of a third party without assessing that the information is current, reliable and credible.

TP.2.143. In particular, the assessment of the probability of default should be based on methods that guarantee the market consistency of the estimates of PD.

TP.2.144. Some criteria to assess the reliability of the information might be, e.g., neutrality, prudency and completeness in all material aspects.

TP.2.145. The undertaking 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 reinsurance.

TP.2.146. In the case of reinsurance recoverables from a SPV, when the undertaking has no reliable source to estimate its probability of default, (i.e. there is a lack of rating) 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 authorised under CP36: Same treatment as in the case referred above.

- Others SPV: They should be considered as unrated.

TP.2.147. 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.

TP.2.148. 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.

TP.2.149. In many cases only through-the-cycle estimates may be available. For example, the credit ratings 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.

TP.2.150.   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.

TP.2.151.   For example, the probability that the counterparty defaults during the next two years is higher than the probability of default during the next year.

TP.2.152.   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 PD_t that the counterparty defaults during year t can be calculated as

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

TP.2.153.   This does not preclude the use of simplifications where the effect of them is not material at this aspect (see item D below).

Recovery rate (RR)

TP.2.154.   The recovery rate is the share of the debts that the counterparty will still be able to honour in case of default

TP.2.155.   If no reliable estimate of the recovery rate of a counterparty is available, no rate higher than 50% should be used.

TP.2.156.   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.

TP.2.157.   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 insurance or reinsurance undertaking ceding risks to the counterparty[7].

TP.2.158.   However, undertakings 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.

Simplifications

TP.2.159.   Recoverables from reinsurance contracts or special purpose vehicles should take account of expected losses due to default of the counterparty. This should be done in two steps. Firstly, the recoverables are calculated without an allowance for

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[7] See Section SCR12 on financial risk mitigation.

counterparty default. Secondly, an adjustment for counterparty default is applied to the result of the first step.

TP.2.160. In many cases, in particular if the counterparty is of good credit quality, the adjustment for counterparty default will be rather small compared to the reinsurance recoverables. In these cases, the following simplified calculation can be applied provided the undertaking meets the general framework to apply simplifications in respect technical provisions:

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

where

Adj_{CD}	=	Adjustment for counterparty default
RR	=	Recovery rate of the counterparty
BE_{Rec}	=	Best estimate of recoverables taking not account of expected loss due to default of the counterparty
Dur_{mod}	=	Modified duration of the recoverables
PD	=	Probability of default of the counterparty for the time horizon of one year

TP.2.161. The simplification should only be applied if the adjustment can be expected to be smaller than 5 per cent and there are no indications that the simplification formula leads to a significant underestimation.

TP.2.162. Since the simplification above described depends to a certain extent on the values estimated for the parameters RR and PD, for the sake of harmonization and comparability, the following table provides default values for these parameters, values which would apply those undertakings with insufficient resources to derive reliably RR and PD according a market consistent methodology.

	Recovery rate	Probability of default(1)	Adjustment of best estimate of reinsurance recoverables and SPVs, acoording the duration of expected cash flows. Expressed as a percentage of the best estimate. ((1-RR) * PD / (1 – PD) * Dur)				
			1 year	2 year	3 year	4 year	5 year
AAA	50%	0,05%	0,03%	0,05%	0,08%	0,10%	0,13%
AA	45%	0,10%	0,06%	0,11%	0,17%	0,22%	0,28%
A	40%	0,20%	0,12%	0,24%	0,36%	0,48%	0,60%
BBB	35%	0,50%	0,33%	0,65%	0,98%	1,31%	1,63%
BB	20%	2,00%	1,63%	3,27%	4,90%	Non applicable	

Others	10%	10.0%	Simplification non applicable according 5 per cent threshold set out in these specificayions

(1) Simplification non applicable according the 5 per cent threshold.

TP.2.163.   Premium provisions of annual insurance contracts may be considered as having a duration equivalent to that of the claims provision corresponding the claims occurred during the last year, plus one year.

V.2.3. Discount rates

Currencies where the relevant risk-free interest rate term structures are provided in the spreadsheet included in the QIS5 package

TP.3.1. For liabilities expressed in any of the EEA currencies, Japanese yen, Swiss franc, Turkish lira, USA dollar, Canadian Dollar, South African Rand, Australian Dollar, Singapore Dollar, Mexican Peso, Malaysian Ringgit, South Korean Won, Thai Baht, Hong-Kong Dollar, Taiwan Dollar, Chinese Yuan, Indian Rupee and Brazilian Real, these specifications provide participants with four complete risk-free interest rate term structures. One of the curves includes a 100% illiquidity premium, a second one 75% illiquidity premium, a third one 50% illiquidity premium and the last one does not allow for such premium[8]. Below participants will find appropriate specifications to identify the liabilities that should be discounted with each curve[9]. Undertakings should indicate which liabilities they discount with the different curves and fill in the relevant questions in the questionnaire.

TP.3.2. For durations less than one year, the discount rate is the same as the one year rate.

TP.3.3. For a given currency and valuation date, each insurance and reinsurance undertaking should use the same relevant risk-free interest rate term structures (without prejudice to the allowance, where relevant, for the illiquidity premium).

TP.3.4. Investment expenses should be allowed for in the cash-flows underlying the calculation of technical provisions and not in the risk-free interest rates used to discount technical provisions.

TP.3.5. For the purposes of QIS5, participants should identify the liabilities that may be discounted with the risk-free interest rate term structures that includes a 100% illiquidity premium by assessing that they meet all of the following criteria:

1. the only underwriting risks connected to the contracts are longevity risk and expense risk;

2. the undertaking does not bear any risk in case of any form of surrender

3. the premiums have already been paid and no incoming cash-flows are allowed for in the technical provisions of the contracts;

   The assessment of these requirements should be carried out at the level of each contract, with all the cash flows of a contract receiving the same treatment.

TP.3.6. For the purposes of QIS5, participants should identify the liabilities that should be discounted with the risk-free interest rate term structures that includes a 75% illiquidity premium as the following ones:

   - life insurance contracts with profit participation other than those specified in the previous paragraph.

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[8] Each of these curves is provided on annual basis. All curves expand to 135 years term. It is specified in Annex E how these curves have been extrapolated.
[9] The curve that does not allow for an illiquidity premium is used in the calculation of the risk margin.

TP.3.7. All liabilities not falling under one of the two previous paragraphs should be discounted with the risk-free interest rate term structures with a 50% illiquidity premium[10].

Currencies where the relevant risk-free interest rate term structure is not provided.

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TP.3.8. Where for a certain currency the risk-free interest rate term structures are not provided, insurance and reinsurance undertakings should determine the relevant term structure according to the method described in Annex F

TP.3.9. For the sake of efficiency and comparability, undertakings deriving the interest rate term structures for each relevant currency, are invited to inform CEIOPS of the complete structures they have derived, so that it is possible that CEIOPS makes the term structure available for all undertakings.

Transitional provisions on the discount rate

TP.3.10. Transitional provisions are necessary in the case of discount rates to ensure a smooth transition to Solvency II and avoid market disruption. QIS5 will test the impact on the basis that Solvency II is fully implemented and also what the position would be on initial implementation i.e. with the benefit of grandfathering. For this purpose the QIS5 participants are asked to complete the attached questionnaire in respect of each liability for which a grandfathering treatment is adopted. The quantitative results plus the feedback on the questionnaire will then form a basis for assessing the need for grandfathering and detailing the grandfathering criteria. The grandfathering criterion set out below aim to make grandfathering practicable for the purposes of QIS 5 only and is not indicative of the content of the final transitional provisions.

TP.3.11. For the purpose of assessing the impact of transitional provisions, technical provisions currently discounted at the interest rate referred to in Article 20.B.a.ii of Directive 2002/83/EC may also be discounted at this level. Undertakings using this option should indicate it and fill in the relevant questions in the questionnaire. For the purpose of running all other calculations in QIS5, the technical provisions currently discounted at the interest rate referred to in Article 20.B.a.ii of Directive 2002/83/EC should be discounted according to the two previous subsection of this section V.2.3.

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[10] Unit-linked contracts are usually valued as a whole (see section V.2.4) and discount curves are therefore not relevant for them. The part of the obligations that would not be valued as a whole and the unit-linked contracts that are not valued as a whole should be considered as discounted with the risk-free interest rate term structures with a 50% illiquidity premium.

V.2.4. Calculation of technical provisions as a whole

General approach

TP.4.1. Where future cash flows associated with insurance or reinsurance obligations can be replicated reliably using financial instruments for which a reliable market value is observable, the value of technical provisions associated with those future cash flows should be determined on the basis of the market value of those financial instruments. In this case, separate calculations of the best estimate and the risk margin should not be required.

TP.4.2. For the purpose of determining the circumstances where some or all future cash flows associated with insurance or reinsurance obligations can be replicated reliably using financial instruments for which a reliable market value is observable, undertakings should assess whether all the criteria set out in both the following two paragraphs are met. In this case, the value of technical provisions associated with those future cash-flows should be equal to the market value of the financial instruments used in the replication.

TP.4.3. The cash-flows of the financial instruments used in the replications should replicate the uncertainty in amount and timing of the cash-flows associated with the insurance or reinsurance obligations, in relation to the risks underlying the cash-flows associated with the insurance and reinsurance obligations in all possible scenarios) (i.e. the cash-flows of the financial instruments must not provide only the same expected amount as the cash-flows associated with insurance or reinsurance obligations, but also the same patterns of variability).

TP.4.4. To be used in the replications, the financial instruments should be traded in active markets, as defined in international accounting as endorsed by the Commission in accordance with Regulation (EC) N°1606/2002, which also meet all of the following criteria:

> (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).

TP.4.5. Where under the same contract a number of future cash-flows exist, which meet all the conditions mentioned above, in order to calculate the technical provision as a whole and other future cash-flows which do not meet some of those conditions, both sets of cash-flows should be unbundled.

For the first set of cash-flows, no separate calculation of the best estimate and the risk margin should be required but a separate calculation should be required for the second set of cash-flows.

If the proposed unbundling is not feasible, for instance when there is significant interdependency between the two sets of cash flows, separate calculations of the best estimate and the risk margin should be required for the whole contract.

Concrete applications

TP.4.6. The main case where insurance or reinsurance obligations can be replicated reliably using financial instruments for which a reliable market value is observable is where the benefit cash-flows of the insurance or reinsurance obligation, according to the clauses of the contract, consist in the delivery of a portfolio of financial instruments for which a reliable market value is observable or are based only on the market value of the portfolio at the time that the benefit is paid.

TP.4.7. Residually, there could be very limited other cases where cash-flows of (re)insurance obligations can be replicated reliably. An example of such cases could be where there is a fixed benefit and the policyholder cannot lapse the contract.

TP.4.8. On the contrary, the following cash-flows associated with insurance or reinsurance obligations cannot be reliably replicated:

(a) cash-flows associated with insurance or reinsurance obligations that depend on the likelihood that policyholders will exercise contractual options, including lapses and surrenders;

(b) cash-flows associated with insurance or reinsurance obligations that depend on the level, trend, or volatility of mortality, disability, sickness and morbidity rates;

(c) all expenses that will be incurred in servicing insurance and reinsurance obligations.

Examples

Example	Can the obligations be replicated reliably using financial instruments for which a reliable market value is observable?	Technical provisions should be calculated:
The insurance undertaking should pay the market value of an equity portfolio or should deliver an equity portfolio (matching an index or not) at the payment date.	<u>Yes</u>, but only under one condition: • a reliable market value for every asset within the portfolio is observable. However there are, for example, fixed expense cash-flows associated with this contract which should be excluded because they depend on the development of magnitudes internal to the undertaking.	• as a whole (if the condition is met). This also applies when the contract pays the market value of the units at the earlier of maturity, death or surrender. • Best Estimate + Risk Margin (if not and for the expense cash-flows)
An insurance undertaking investing	<u>No</u>:	Best Estimate + Risk Margin

in assets replicating its future cash-flows provided by a third party (e.g. investment bank).	This case introduces counterparty and concentration risks with regard to the issuer of the replicating asset.	
Term-assurance contracts and with-profits contracts.	<u>No</u>: In these cases the expected value, the volatility and other features of the future cash-flows associated with insurance obligations depend on the biometric development as well as on the behaviour of the policyholder.	Best Estimate + Risk Margin
An insurance undertaking signs a contract with a reinsurer to replicate the insurance undertaking's future cash-flows.	<u>No</u>: a reinsurance contract is not a financial instrument. See also comments to the third example.	Best Estimate + Risk Margin
Pure Unit-linked contract (without any additional guarantees)[11]	<u>YES</u>: regarding to the number of units guaranteed, and <u>No</u>: expense cash-flows associated with the fact that the contract will be managed until it ends.	For the calculation of the technical provision, these two aspects of the contract must be unbundled: As a whole / Best Estimate + Risk Margin (for the expenses)[12]

V.2.5.   Risk margin

TP.5.1. This chapter covers the following aspects of the risk margin calculation:

- The definition of the risk margin and the general methodology for its calculation

- The Cost-of-Capital rate to be applied in the risk margin calculations

- The level of granularity regarding the risk margin calculations

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[11] Unit-linked contract is « a contract, under which benefits are determined based on the fair value of units of a mutual fund. The benefit reflects the fair value of a specific number of units, which is either contractually determined as a fixed number, or derived from other events under the contract, e.g. premium payments associated with a specific additional number of units based on the fair value of the units at the time of premium payment. » *(CEA-Groupe Consultatif Solvency II Glossary)*

[12] The annual expense loading is generally fixed in percentage of the value of technical provisions at a certain date. The amount guaranteed to the policyholder is the market value of a number of units reduced by the expense loading.

The loading is generally at such a level that it covers more than the expenses incurred, thus including future profits. The best estimate of such an obligation would be negative. However, in a stressed situation, the market value of the unit can fall so low that the expense loading is no longer sufficient to cover the expenses incurred. Therefore, a capital requirement and a risk margin need to be calculated.

- Simplifications that may be applied in the risk margin calculations

The definition of the risk margin and the general methodology for its calculation

TP.5.2. Usually, technical provisions consist of the best estimate and the risk margin. (For the calculation of technical provisions as a whole see subsection V.2.4) The risk margin is a part of technical provisions in order to ensure that the value of technical provisions is equivalent to the amount that insurance and reinsurance undertakings would be expected to require in order to take over and meet the insurance and reinsurance obligations.

TP.5.3. The risk margin should be calculated by determining the cost of providing an amount of eligible own funds equal to the SCR necessary to support the insurance and reinsurance obligations over the lifetime thereof. The rate used in the determination of the cost of providing that amount of eligible own funds is called Cost-of-Capital rate.

TP.5.4. The calculation of the risk margin is based on the following transfer scenario:

- the whole portfolio of insurance and reinsurance obligations of the insurance or reinsurance undertaking that calculates the risk margin (original undertaking) is taken over by another insurance or reinsurance undertaking (reference undertaking);

- the transfer of insurance and reinsurance obligations includes any reinsurance contracts and arrangements with special purpose vehicles relating to these obligations;

- the reference undertaking does not have any insurance or reinsurance obligations and any own funds before the transfer takes place;

- after the transfer the reference undertaking raises eligible own funds equal to the SCR necessary to support the insurance and reinsurance obligations over the lifetime thereof;

- after the transfer the reference undertaking has assets to cover its SCR and the technical provisions net of the amounts recoverable from reinsurance contracts and special purpose vehicles;

- the assets should be considered to be selected in such a way that they minimize the SCR for market risk that the reference undertaking is exposed to;

- the SCR of the reference undertaking captures

  - underwriting risk with respect to the transferred business;

  - the unavoidable market risk referred to above;

  - credit risk with respect to reinsurance contracts and special purpose vehicles;

  - operational risk;

- the loss-absorbing capacity of technical provisions in the reference undertaking corresponds to the loss-absorbing capacity of technical provisions in the original undertaking;

- there is no loss-absorbing capacity of deferred taxes for the reference undertaking;

- without prejudice to the transfer scenario, the reference undertakings will adopt the same future management actions as the original undertaking.

TP.5.5. The SCR necessary to support the insurance and reinsurance obligations over the lifetime thereof should be equal to the SCR of the reference undertaking in the scenario set out above.

TP.5.6. As the original scenario transfers its whole portfolio to the reference undertaking, the SCR of the reference undertaking, and consequently the risk margin, reflects the level of diversification of the original undertaking. In particular, it takes into account the diversification between lines of business.

TP.5.7. The calculation of the risk margin should be based on the assumption that the reference undertaking at time $t = 0$ (when the transfer takes place) will capitalise itself to the required level of eligible own funds, i.e.

$$EOF_{RU}(0) = SCR_{RU}(0),$$

where

$EOF_{RU}(0)$ = the amount of eligible own funds raised by the reference undertaking at time $t = 0$ (when the transfer takes place); and

$SCR_{RU}(0)$ = the SCR at time $t = 0$ as calculated for the reference undertaking.

The cost of providing this amount of eligible own funds equals the Cost-of-Capital rate times the amount.

TP.5.8. The assessment referred to in the previous paragraph applies to the eligible own funds to be provided by the reference undertaking in all future years.

TP.5.9. The transfer of (re)insurance obligations is assumed to take place immediately. Hence, the method for calculating the overall risk margin (*CoCM*) can in general terms be expressed in the following manner:

$$CoCM = CoC \cdot \sum_{t \geq 0} EOF_{RU}(t)/(1+r_{t+1})^{t+1} = CoC \cdot \sum_{t \geq 0} SCR_{RU}(t)/(1+r_{t+1})^{t+1},$$

where

$CoCM$ = the risk margin,

$SCR_{RU}(t)$ = the SCR for year t as calculated for the reference undertaking,

r_t = the risk-free rate for maturity t; and

CoC = the Cost-of-Capital rate.

TP.5.10. The risk-free rate r_t for the discounting of the future SCRs should not include an illiquidity premium because the reference undertaking may not be able to earn the illiquidity premium under the conditions of the transfer scenario.

TP.5.11. The rationale for the discount factors used in the above formula can be found in Annex H.

TP.5.12. The general rules for calculating the risk margin referred to above apply to all undertakings irrespective of whether the calculation of the SCR of the (original) undertaking is based on the standard formula or an internal model.

TP.5.13. Undertakings that calculate the SCR only with the standard formula should calculate the risk margin based on the standard formula SCR.

TP.5.14. Undertakings that calculate the SCR both with the internal model and the standard formula should calculate the risk margin based on the internal model SCR. Additionally the undertakings are invited to calculate the risk margin on the basis of the standard formula.

TP.5.15. If the undertaking calculates its SCR by using the standard formula, all SCRs to be used in the risk margin calculation (i.e. all $SCR_{RU}(t)$ for $t \geq 0$) should in principle be calculated as follows:

$$SCR_{RU}(t) = BSCR_{RU}(t) + SCR_{RU,op}(t) - Adj_{RU}(t),$$

where

$BSCR_{RU}(t)$ = the Basic SCR and year t as calculated for the reference undertaking,

$SCR_{RU,op}(t)$ = the partial SCR regarding operational risk and year t as calculated for the reference undertaking; and

$Adj_{RU}(t)$ = the adjustment for the loss absorbing capacity of technical pro-visions and year t as calculated for the reference undertaking.

TP.5.16. It should be ensured that the assumptions made regarding loss absorbing capacity of technical provisions to be taken into account in the SCR-calculations are consistent with the assumptions made for the overall portfolio of the original undertaking (i.e. the undertaking participating in the QIS5 exercise).

TP.5.17. The Basic SCRs ($BSCR_{RU}(t)$ for all $t \geq 0$) should be calculated by using the relevant SCR-modules and sub-modules.

TP.5.18. With respect to market risk only the unavoidable market risk should be taken into account in the risk margin. Undertakings should follow a practicable approach when they assess the unavoidable market risk. It only needs to be taken into account where it is significant. For non-life insurance obligations and short-term and mid-term life insurance obligations the unavoidable market risk can be considered to be nil. For long-term life insurance there might be an unavoidable interest rate risk. It is not likely to be material if the duration of the undertaking's whole portfolio does not exceed the duration of risk-free financial instruments available in financial markets for the currencies of the portfolio. The assessment whether the unavoidable market risk is significant should take into account that it usually decreases over the lifetime of the portfolio.

TP.5.19. With respect to counterparty default risk only the risk for ceded reinsurance should be taken into account in the risk margin.

TP.5.20. With respect to non-life insurance the risk margin should be attached to the overall best estimate. No split of the risk margin between premiums provisions and provisions for claims outstanding should be made.

TP.5.21. The calculation of the risk margin should be carried out on a best effort basis.

The Cost-of-Capital rate

TP.5.22. The Cost-of-Capital rate is the annual rate to be applied to the capital requirement in each period. Because the assets covering the capital requirement themselves are assumed to be held in marketable securities, this rate does not account for the total return but merely for the spread over and above the risk free rate.

TP.5.23. The Cost-of-Capital rate has been calibrated in a manner that is consistent with the assumptions made for the reference undertaking. In practice this means that the Cost-of-Capital rate should be consistent with the capitalisation of the reference undertaking that corresponds to the SCR. The Cost-of-Capital rate does not depend on the actual solvency position of the original undertaking.

TP.5.24. The risk margin should guarantee that sufficient technical provisions for a transfer are available in all scenarios. Hence, the Cost-of-Capital rate has to be a long-term average rate, reflecting both periods of stability and periods of stress.

TP.5.25. The **Cost-of-Capital rate** that should be used in QIS5 is **6%**.

Level of granularity in the risk margin calculations

TP.5.26. The risk margin should be calculated per line of business. A straight forward way to determine the margin per line of business is as follows: First, the risk margin is calculated for the whole business of the undertaking, allowing for diversification between lines of business. In a second step the margin is allocated to the lines of business.

TP.5.27. The risk margin per line of business should take the diversification between lines of business into account. Consequently, the sum of the risk margin per line of business should be equal to the risk margin for the whole business. The allocation of the risk margin to the lines of business should be done according to the contribution of the lines of business to the overall SCR during the lifetime of the business.

TP.5.28. The contribution of a line of business can be analysed by calculating the SCR under the assumption that the undertaking's other business does not exist. Where the relative sizes of the SCRs per line of business do not materially change over the lifetime of the business, undertakings may apply the following simplified approach for the allocation:

$$COCM_{lob} = \frac{SCR_{RU,lob}(0)}{\sum\limits_{lob} SCR_{RU,lob}(0)} \cdot COCM \; ,$$

where

$COCM_{lob}$ = risk margin allocated to line of business lob

$SCR_{RU,lob}(0)$ = SCR of the reference undertaking for line of business lob at t=0

$COCM$ = risk margin for the whole business

Where a line of business consists of obligations where the technical provisions are calculated as a whole, the formula should assign a zero risk margin to this line of business. Because $SCR_{RU,lob}(0)$ of this line of business should be zero.

Simplifications for the calculation of the risk margin of the whole business

TP.5.29. If a full projection of all future SCRs is necessary in order to capture the participating undertaking's risk profile the undertaking is expected to carry out these calculations.

TP.5.30. Participating undertakings should consider whether or not it would be appropriate to apply a simplified valuation technique for the risk margin. As an integral part of this assessment, the undertakings should consider what kind of simplified methods would be most appropriate for the business. The chosen method should be proportionate to the nature, scale and complexity of the risks of the business in question.

TP.5.31. When an undertaking has decided to use a simplified method, it should consider whether the method could be used for the projections of the overall SCR or if the relevant (sub-)risks should be projected separately. In this context, the undertaking should also consider whether it should carry out the simplified projections of future SCRs individually for each future year or if it is possible to calculate all future SCRs in one step.

A hierarchy of simplifications

TP.5.32. Based on the general principles and criteria referred to above, the following hierarchy should be used as a decision basis regarding the choice of (non-simplified an simplified) methods for projecting future SCRs:

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 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.

TP.5.33. In this hierarchy the calculations are getting simpler step by step.

TP.5.34. When choosing the calculation method, it is not required that the complexity of the calculations should go beyond what is necessary in order to capture the material characteristics of the undertaking's risk profile.

TP.5.35. The distinction between the levels in the hierarchy sketched above is not always clear-cut. This is e.g. the case for the distinction between the simplifications on level 2 and level 3. An example may be a proportional method (based on the development of the best estimate technical provisions) applied for an individual module or sub-

module relevant for the calculation of future SCRs for the reference undertaking. Such simplifications can be seen as belonging to either level 2 or level 3.

Specific simplifications

TP.5.36. The simplifications referred to in this subsection are described in the context of the standard formula. The application of simplifications for cases where the SCR is calculated with internal models should follow the general approach proposed in this paper with an appropriate case-by-case assessment.

TP.5.37. With respect to the simplifications allowing for all future SCRs to be estimated "at once" (the duration approach), it will be natural to combine the calculations of the Basic SCR and the SCR related to operational risk.

TP.5.38. Accordingly, in order to simplify the projections to be made if level 3 of the hierarchy is applied, a practical solution could be to allow projections of the future SCRs in one step, instead of making separate projections for the basic SCR, the capital charge for operational risk and the loss absorbing capacity of technical provisions, respectively.

TP.5.39. The simplifications allowed for when calculating the SCR should in general carry over to the calculation of the risk margin.

Simplifications for the overall SCR for each future year (level 3 of the hierarchy)

TP.5.40. Simplifications classified as belonging to level 3 of the hierarchical structure sketched in these specifications are based on an assumption that the future SCRs are proportional to the best estimate technical provisions for the relevant year – the proportionality factor being the ratio of the present SCR to the present best estimate technical provisions (as calculated by the reference undertaking).

TP.5.41. According to (a representative example of) the proportional method, the reference undertaking's SCR year t is fixed in the following manner:

$$SCR_{RU}(t) = (SCR_{RU}(0)/BE_{Net}(0)){\cdot}BE_{Net}(t), \quad t = 1, 2, 3, \dots ,$$

where

$SCR_{RU}(0)$ = the SCR as calculated at time $t = 0$ for the reference undertaking's portfolio of (re)insurance obligations;

$BE_{Net}(0) =$ the best estimate technical provisions net of reinsurance as assessed at time $t = 0$ for the undertaking's portfolio of (re)insurance obligations; and

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

TP.5.42. This simplification takes into account the maturity and the run-off pattern of the obligations net of reinsurance. However, the assumptions on which the risk profile linked to the obligations is considered unchanged over the years, are indicatively the following:

- the composition of the sub-risks in underwriting risk is the same (all under-writing risks),

- the average credit standing of reinsurers and SPVs is the same (counterparty default risk),

- the unavoidable market risk in relation to the net best estimate is the same (market risk),

- the proportion of reinsurers' and SPVs' share of the obligations is the same (operational risk),

- the loss absorbing capacity of the technical provisions in relation to the net best estimate is the same (adjustment).

TP.5.43. An undertaking that intends to use this simplification, should consider to what extent the assumptions referred to above are fulfilled. If some or all of these assumptions do not hold, the undertaking should carry out a qualitative assessment of how material the deviation from the assumptions is. If the impact of the deviation is not material compared to the risk margin as a whole, then the simplification can be used. Otherwise the undertaking is encouraged to use a more sophisticated calculation or method.

TP.5.44. The undertaking may also be able to apply the simplification in a piecewise manner across the years. For instance, if the business can be split into sub-lines having different maturities, then the whole run-off period of the obligations could be divided into periods of consecutive years where a proportional calculation method could be used.

TP.5.45. When using the simplification described in the previous paragraphs some considerations should be given also regarding the manner in which the best estimate technical provisions net of reinsurance has been calculated. In this context it should be noted that even if the applied gross-to-net techniques may lead to a reasonable figure for the best estimate net of reinsurance ($BE_{Net}(t)$) as compared to the best estimate gross of reinsurance ($BE_{Gross}(t)$) at time $t = 0$, this does not necessarily mean that all future estimates of the best estimate net of reinsurance will be equally reliable. In such cases the simplified method sketched above may be biased.

TP.5.46. With respect to operational risk it should be noticed that the capital charge for this risk at $t = 0$ is basically a function of the best estimate technical provisions gross of reinsurance and earned premiums gross of reinsurance, as well as annual expenses (for unit-linked business only). As a consequence it should be assessed to what extent the simplification based on the proportional method which assumes that the SCRs for the operational risk develop pari passu with the best estimate technical provisions net of reinsurance may introduce a bias in the risk margin calculations.

TP.5.47. A similar comment concerns the scenario-based adjustments for the loss absorbing capacity of technical provisions to be taken into account when projecting the future SCRs, since it is likely to be (very) difficult to develop reliable scenarios to be applied to these projections. Accordingly, it may in practise be difficult to find other workable solutions than allowing also this component to develop in line with the best estimate technical provisions net of reinsurance. The participating undertaking

should, however, make some assessments of the potential bias caused by this simplification.

TP.5.48. A simplification as the one sketched in the previous paragraphs may be applied also at a more granular level, i.e. for individual modules and/or sub-modules. However, it should be noted that the number of calculations to be carried out will in general be proportional with the number of modules and/or sub-modules for which this simplification is applied. Moreover, it should be considered whether a more granular calculation as indicated above will lead to a more accurate estimate of the future SCRs to be used in the calculation of the risk margin.

Estimation of all future SCRs "at once" (level 4 of the hierarchy)

TP.5.49. A representative example of a simplification belonging to 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:

$$CoCM = (CoC/(1+r_1)) \cdot Dur_{mod}(0) \cdot SCR_{RU}(0),$$

where

$SCR_{RU}(0)$ = the SCR as calculated at time $t = 0$ for the reference undertaking's portfolio of (re)insurance obligations;

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

CoC = the Cost-of-Capital rate.

TP.5.50. This simplification takes into account the maturity and the run-off pattern of the obligations net of reinsurance. However, it is based on the following simplified assumptions:

- the composition and the proportions of the risks and sub-risks do not change over the years (basic SCR),

- the average credit standing of reinsurers and SPVs remains the same over the years (counterparty default risk),

- the modified duration is the same for obligations net and gross of reinsurance (operational risk, counterparty default risk),

- the unavoidable market risk in relation to the net best estimate remains the same over the years (market risk),

- the loss absorbing capacity of the technical provisions in relation to the net best estimate remains the same over the years (adjustment).

TP.5.51. An undertaking that intends to use this simplification should consider to what extend the assumptions referred to above are fulfilled. If some or all of these assumptions do not hold, the undertaking should carry out a qualitative assessment of how material the deviation from the assumptions is. If the impact of the deviation is not material compared to the risk margin as a whole, then the simplification can be used.

Otherwise the undertaking should either adjust the formula appropriately or is encouraged to use a more sophisticated calculation.

TP.5.52. Where SCR_{RU} (0) includes material sub-risks that will not exist over the whole lifetime of the portfolio, for example non-life premium risk for unexpired contracts or unavoidable market risk, the calculation can often be improved by

- excluding these sub-risks from SCR_{RU} (0) for the above calculation;

- calculating the contribution of these sub-risks to the risk margin separately; and

- aggregating the results (where practicable allowing for diversification).

A simple method based on percentages of the best estimate (level 5 of the hierarchy)

TP.5.53. According to this simplification the risk margin (*CoCM*) should be calculated as a percentage of the best estimate technical provisions net of reinsurance (at $t = 0$), that is

$$CoCM = \alpha_{lob} \cdot BE_{Net}(0),$$

where

$BE_{Net}(0)$ = the best estimate technical provisions net of reinsurance as assessed at time $t = 0$ for the undertaking's portfolio of (re)insurance obligations; and

$\alpha_{lob}=$ a fixed percentage for the given line of business.

TP.5.54. As the fixed percentage α_{lob} depends on the line of business, the method can only be applied if the undertaking's business is restricted to one line of business or if the business outside of one line of business is not material.

TP.5.55. A participating non-life insurance undertaking intending to use the simple method based on percentages of the best estimate, should base the risk margin calculations on the following percentages for the lines of business:

Lines of business	Per cent of the BE
Direct insurance and accepted proportional reinsurance:	
Medical expenses	8.5%
Income protection	12.0%
Workers' compensation	10.0 %
Motor vehicle liability	8.0 %
Motor, other classes	4.0 %
Marine, aviation and transport	7.5 %

Fire and other damage	5.5 %
General liability – Third party liability	10.0 %
Credit and suretyship	9.5 %
Legal expenses	6.0 %
Assistance	7.5 %
Miscellaneous non-life insurance	15.0 %
Accepted non-proportional reinsurance:	
Health business	17.0%
Property business	7.0 %
Casualty business	17.0 %
Marine, aviation and transport business	8.5 %

[Figures for QIS5 based on table 69 of the QIS4 report, Annex of selected tables, pages A-74 to A-76, see http://www.ceiops.eu/media/files/consultations/QIS/CEIOPS-SEC-82-08%20QIS4%20Report%20Table%20Annex.pdf]

Simplifications for individual modules and sub-modules

TP.5.56. A more sophisticated approach to the simplifications would be to focus on the individual modules or sub-modules in order to approximate the individual risks and/or sub-risks covered by the relevant modules.

TP.5.57. In practise, this would require that the participating undertaking look closer at the risks and sub-risks being relevant for the following modules:

- underwriting risk (life, health and non-life, respectively),

- counterparty default risk with respect to ceded reinsurance and SPVs, and

- unavoidable market risk,

in order to investigate to what extent the calculations could be simplified or approximated.

TP.5.58. In the following paragraphs some proposals for such simplifications are put forward and the main aspects of the simplifications are briefly explained.

Life underwriting risk

TP.5.59. The simplifications allowed for the SCR-calculations in respect of mortality, longevity, disability risk, expense risk, revision risk and catastrophe risk carry over to the Cost-of-Capital calculations. For a more detailed description can be found in the subsection on the life underwriting risk module.

Health Underwriting Risk

TP.5.60. The structure of the health underwriting risk module has been substantially changed compared to the version described in the QIS4 Technical Specifications, As a consequence the simplifications used in the context of health underwriting risk in the QIS4 exercise are no longer valid.

TP.5.61. The simplifications applied in the life underwriting module can in general be applied also in the sub-module for SLT health underwriting risk, i.e. for health insurance obligations pursued on a similar basis as life insurance. However, some adjustment should be made regarding revision risk (inflation risk should be included), while no simplifications are proposed for health catastrophe risk.

TP.5.62. With respect to the sub-module for Non-SLT health underwriting risk, the simplifications introduced for the non-life underwriting risk (if any) should be used.

Non-life Underwriting Risk

TP.5.63. Within the context of simplifications for individual modules and sub-modules, there seems to be no obvious manner in which the formula (per se) applied for calculating the capital charges for premium and reserve risk can be simplified.

TP.5.64. However, the calculation of the future SCRs related to premium and reserve risk will be somewhat simplified due to the fact that renewals and future business are not taken into account:

- If the premium volume in year t is small compared to the reserve volume, then the premium volume for year t can be set to 0. An example may be business comprising no multiple-year contracts, where the premium volume can be set to 0 for all future years t where $t \geq 1$.

- If the premium volume is zero, then the capital charge for non-life underwriting can be approximated by the formula:

$$3 \cdot \sigma_{(res,mod)} \cdot PCO_{Net}(t),$$

where $\sigma_{(res,mod)}$ represents the aggregated standard deviation for reserve risk and $PCO_{Net}(t)$ the best estimate provision for claims outstanding net of reinsurance in year t.

TP.5.65. As a further simplification it can be assumed that the undertaking-specific estimate of the standard deviation for premium risk and reserve risk remain unchanged throughout the years.

TP.5.66. Also the underwriting risk charge for catastrophe risk should be taken into account only with respect to the insurance contracts that exist at $t = 0$.

Counterparty Default Risk

TP.5.67. The counterparty default risk charge with respect to reinsurance ceded can be calculated directly from the definition for each segment and each year. If the exposure to the default of the reinsurers does not vary considerably throughout the development years, the risk charge can be approximated by applying reinsurers' share of best estimates to the level of risk charge that is observed in year 0.

TP.5.68. According to the standard formula counterparty default risk for reinsurance ceded is assessed for the whole portfolio instead of separate segments. If the risk of default in

a segment is deemed to be similar to the total default risk or if the default risk in a segment is of negligible importance then the risk charge can be arrived at by applying reinsurers' share of best estimates to the level of the total capital charge for reinsurers' default risk in year 0.

Unavoidable Market Risk

TP.5.69. Undertakings should follow a practicable approach when they assess the unavoidable market risk. It only needs to be taken into account where it is significant. For non-life insurance obligations and short-term and mid-term life insurance obligations the unavoidable market risk can be considered to be nil.

TP.5.70. The main case of unavoidable market risk is an unavoidable mismatch between the cash-flows of the insurance liabilities and the financial instruments available to cover the liabilities. In particular, such a mismatch is unavoidable if the maturity of the available financial instruments is lower than the maturity of the insurance liabilities. If such a mismatch exists, it usually leads to a capital requirement for interest rate risk under the downward scenario. The focus of the simplification is on this particular kind of market risk.

TP.5.71. The contribution of the unavoidable market risk to the risk margin may be approximated as follows:

$$CoCM_{Mkt} \approx CoC \cdot UM_{RU,,\geq 0}$$

where *CoC* is the Cost-of-Capital rate, while the approximated sum of the present and future SCRs covering the unavoidable market risk ($UM_{RU,\geq 0}$) is calculated as follows:

$$UM_{RU,\geq 0} = max\{0.5 \cdot BE_{Net}(0) \cdot (Dur_{mod} - n) \ (Dur_{mod} - n + 1) \cdot \Delta r_n; \ 0\}$$

where

$BE_{Net}(0)$	=	the best estimate net of reinsurance as assessed at time $t = 0$ for the undertaking's portfolio of (re)insurance liabilities;
Dur_{mod}	=	the modified duration of the undertaking's (re)insurance liabilities net of reinsurance at $t = 0$;
n	=	the longest duration of available risk-free financial instruments (or composition of instruments) to cover the (re)insurance liabilities; and
Δr_n	=	the absolute decrease of the risk-free interest rate for maturity n under the downward stress scenario of the interest rate risk sub-module.

TP.5.72. The calculations should be carried out per currency.

TP.5.73. The calculation method sketched may also be applied in the context of a proportional method (level 3 of the hierarchy) or a duration method (level 4 of the hierarchy) – given that the necessary adjustments are made in the relevant formulas.

TP.5.74. It should be noted that in cases where the longest duration of the risk-free financial instruments is low compared to the modified duration of the insurance liabilities, the unavoidable market risk may have a huge impact on the overall risk margin. In such cases the participating undertaking may find it worthwhile to replace the rather crude approximation described in the previous paragraphs with a more accurate simplification, e.g. by taking into account the fact that the best estimate (of technical provisions) to be applied in the calculation of unavoidable market risk in general will decrease over time. Moreover, the calculations may be carried out in a manner that reflects the risk-reducing effect of technical provisions (e.g. future bonuses).

V.2.6. Proportionality

Introduction

TP.7.1. This subsection aims at providing an assessment on the way proportionality should be approached in the context of a valuation of technical provisions, to ensure that actuarial and statistical methodologies applied are proportionate to the nature, scale and complexity of the underlying risks.

Requirements for application of proportionality principle

Selection of valuation methodology

TP.7.2. The principle of proportionality requires that the (re)insurance undertaking should be allowed to choose and apply a valuation method which is:

- suitable to achieve the objective of deriving a market-consistent valuation according to the Solvency II principles (compatible with the Solvency II valuation principles); but

- not more sophisticated than is needed in order to reach this objective (proportionate to the nature, scale and complexity of the risks).

TP.7.3. This does however not mean that an application of the principle of proportionality is restricted to small and medium-sized undertakings, nor does it mean that size is the only relevant factor when the principle is considered. Instead, the individual risk profile should be the primary guide in assessing the need to apply the proportionality principle.

Estimation uncertainty and its link to proportionality

TP.7.4. Due to the uncertainty of future events, any "modelling" of future cash flows (implicitly or explicitly contained in the valuation methodology) will necessarily be imperfect, leading to a certain degree of inaccuracy and imprecision in the measurement. Where simplified approaches are used to value technical provisions, this could potentially introduce additional uncertainty (or model error) [13]. With regard to the principle of proportionality, it is important to assess the model error that results from the use of a given valuation technique.

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[13] In this context, uncertainty does not refer to the randomness of future outcomes (sometimes referred to as *volatility risk* or *process risk*), but to the fact that the nature of this randomness is itself unknown. The uncertainty of the risk in terms of volatility risk or process risk is an inherent quality of the risk (independent of the valuation method applied) and is assessed as part of the nature of the risk.

Simplified methods

TP.7.5. The term "simplified method" would refer to a situation where a specific valuation technique has been simplified, in line with the proportionality principle. In a loose sense, the term "simplified method" (or "simplification") could also be used to refer to a valuation method which is considered to be simpler than a "commonly used" benchmark or reference method.

Approximations

TP.7.6. Where approximation techniques are applied, these would typically be based on a fixed set of assumptions and would tend to be less complex than techniques which carry out explicit cash flow projections based on undertaking-specific data. Therefore, approximations may often be regarded as a specific kind of simplified methods (where the simplification is due to a lack of data). The use of expert judgement plays a key role in this context.

Role of simplified methods in the valuation framework

TP.7.7. The principle of proportionality applies generally when a valuation methodology is chosen, allowing (re)insurance undertakings the flexibility to select a technique which is proportionate to the nature, scale and complexity of the underlying risks:

Assessment of proportionality in the valuation of technical provisions

Choice of method

Nature, scale and complexity of risks
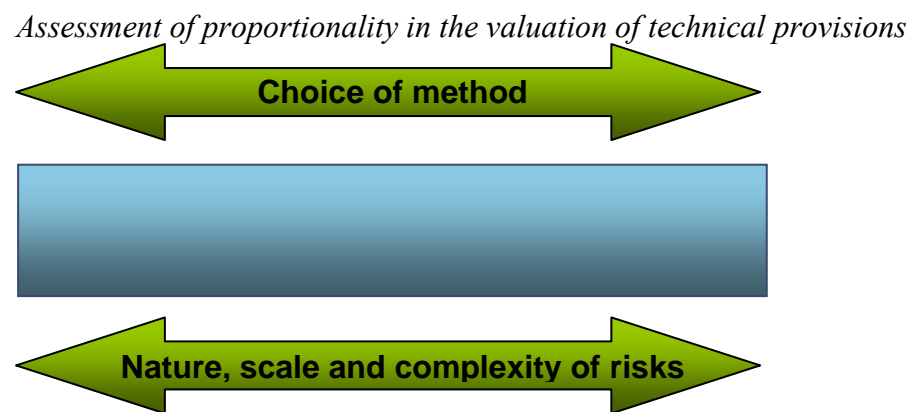
Proportionality assessment – a three step process

TP.7.8. It would be appropriate for such an assessment to include the following three steps:

Step 1: Assess the nature, scale and complexity of underlying risks;

Step 2: Check whether valuation methodology is proportionate to risks as assessed in step 1, having regard to the degree of model error resulting from its application;

Step 3: Back test and validate the assessments carried out in steps 1 and 2.

TP.7.9. However – due to the restricted time frame – Step 3 is omitted for the purpose of the QIS 5 exercise.

Step 1: Assess the nature, scale and complexity of risks

TP.7.10. In this step, (re)insurance undertakings should assess the nature, scale and complexity of the risks underlying the insurance obligations. This is intended to provide a basis for checking the appropriateness of specific valuation methods

carried out in step two and should serve as a guide to identify where simplified methods are likely to be appropriate.

Which risks?

TP.7.11. The scope of risks which should be included in the analysis will depend on the purpose and context of the assessment. For the purpose of calculating technical provisions, the assessment should include all risks which materially affect (directly or indirectly) the amount or timing of cash flows required to settle the insurance and reinsurance obligations arising from the insurance contracts in the portfolio to be valued. Whereas this will generally include all insured risks, it may also include others such as inflation.

Nature and complexity

TP.7.12. Nature and complexity of risks are closely related and, for the purposes of an assessment of proportionality, could best be characterised together. Indeed, complexity could be seen as an integral part of the nature of risks, which is a broader concept.[14]

TP.7.13. In mathematical terms, the nature of the risks underlying the insurance contracts could be described by the probability distribution of the future cash flows arising from the contracts. This encompasses the following characteristics:

- the degree of homogeneity of the risks;

- the variety of different sub-risks or risk components of which the risk is comprised;

- the way in which these sub-risks are interrelated with one another;

- the level of certainty, i.e. the extent to which future cash flows can be predicted;[15]

- the nature of the occurrence or crystallisation of the risk in terms of frequency and severity;

- the type of the development of claims payments over time;

- the extent of potential policyholder loss, especially in the tail of the claims distribution.

TP.7.14. The first three bullet points in the previous paragraph are in particular related to the complexity of risks generated by the contracts, which in general terms can be described as the quality of being intricate (i.e. of being "entwined" in such a way that it is difficult to separate them) and compounded (i.e. comprising a number of different sub-risks or characteristics).

TP.7.15. For example, in non-life insurance travel insurance business typically has relatively stable and narrow ranges for expected future claims, so would tend to be rather predictable. In contrast, credit insurance business would often be "fat tailed", i.e. there would be the risk of occasional large (outlier) losses occurring, leading to a

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[14] I.e. whether or not a risk is complex can be seen as a property of the risk which is part of its nature.

[15] Note that this only refers to the randomness (volatility) of the future cash flows. Uncertainty which is related to the measurement of the risk (model error and parameter error) is not an intrinsic property of the risk, but dependent on the valuation methodology applied, and will be considered in step 2 of the proportionality assessment process.

higher degree of complexity and uncertainty of the risks. Another example in non-life insurance is catastrophe (re)insurance covering losses from hurricanes where there is very considerable uncertainty over expected losses, i.e. how many hurricanes occur, how severe they are and whether they hit heavily insured areas.

TP.7.16.   In life insurance, the nature and complexity of the risks would for example be impacted by the financial options and guarantees embedded into the contracts (such as surrender or other take-up options), particularly those with profit participation features.

TP.7.17.   When assessing the nature and complexity of the insured risks, additional information in relation to the circumstances of the particular portfolio should be taken into account. This could include:

- the type of business from which the risks originate (e.g. direct business or reinsurance business);

- the degree of correlation between different risk types, especially in the tail of the risk distribution;

- any risk mitigation instruments (such as reinsurance or derivatives) applied, and their impact on the underlying risk profile.

TP.7.18.   Undertakings should also seek to identify factors which would indicate the presence of more complex and/or less predictable risks. This would be the case, for example, where:

- the cash-flows are highly path dependent; or

- there are significant non-linear inter-dependencies between several drivers of uncertainty; or

- the cash-flows are materially affected by the potential future management actions; or

- risks have a significant asymmetric impact on the value of the cash-flows, in particular if contracts include material embedded options and guarantees; or

- the value of options and guarantees is affected by the policyholder behaviour assumed in the model; or

- undertakings use a complex risk mitigation instrument, for example a complex non-proportional reinsurance structure; or

- a variety of covers of different nature are bundled in the contracts; or

- the terms of the contracts are complex (e.g. in terms of franchises, participations, or the in- and exclusion criteria of cover).

TP.7.19.   The degree of complexity and/or uncertainty of the risks are/is associated with the level of calculation sophistication and/or level of expertise needed to carry out the valuation. In general, the more complex the risk, the more difficult it will be to model and predict the future cash flows required to settle the obligations arising from the insured portfolio. For example, where losses are the result of interaction of a

larger number of different factors, the degree of complexity of the modelling would also be expected to increase.

Scale

TP.7.20. Assigning a scale introduces a distinction between "small" and "large" risks. Undertakings may use a measurement of scale to identify sub-risks where the use of simplified methods would likely be appropriate, provided this is also commensurate with the nature and complexity of the risks.

TP.7.21. For example, where undertakings assess that the impact of inflation risk on the overall risk profile of the portfolio is small, they may consider that an explicit recognition of inflation scenarios would not be necessary. A scale criterion may also be used, for example, where the portfolio to be measured is segmented into different sub-portfolios. In such a case, the relative scale of the individual sub-portfolios in relation to the overall portfolio could be considered.

TP.7.22. Related to this, a measurement of scale may also be used to introduce a distinction between material and non-material risks. Introducing materiality in this context would provide a threshold or cut-off point below which it would be regarded as justifiable to omit (or not explicitly recognise) certain risks.

TP.7.23. To measure the scale of risks, further than introducing an absolute quantification of the risks, undertakings will also need to establish a benchmark or reference volume which leads to a relative rather than an absolute assessment. In this way, risks may be considered "small" or "large" relative to the established benchmark. Such a benchmark may be defined, for example, in terms of a volume measure such as premiums or technical provisions that serves as an approximation for the risk exposure.

Combination of the three indicators and overall assessment

TP.7.24. The three indicators - nature, scale and complexity - are strongly interrelated, and in assessing the risks the focus should be on the combination of all three factors. This overall assessment of proportionality would ideally be more qualitative than quantitative, and cannot be reduced to a simple formulaic aggregation of isolated assessments of each of the indicators.

TP.7.25. In terms of nature and complexity, the assessment should seek to identify the main qualities and characteristics of the risks, and should lead to an evaluation of the degree of their complexity and predictability. In combination with the "scale" criterion, undertakings may use such an assessment as a "filter" to decide whether the use of simplified methods would be likely to be appropriate. For this purpose, it may be helpful to broadly categorise the risks according to the two dimensions "scale" and "complexity/predictability":
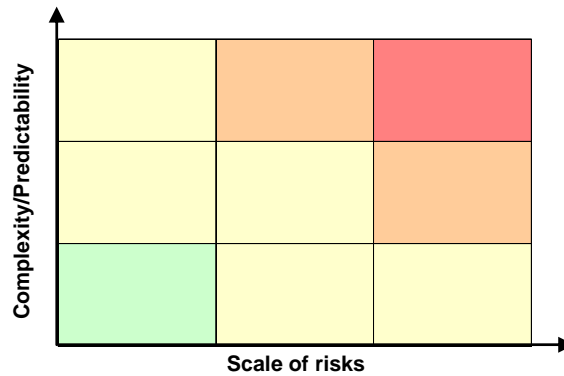
TP.7.26. An assessment of nature, scale and complexity may thus provide a useful basis for the second step of the proportionality process where it is decided whether a specific valuation methodology would be proportionate to the underlying risks.

Step 2: Assessment of the model error

TP.7.27. For the best estimate, this means that a given valuation technique should be seen as proportionate if the resulting estimate is not expected to diverge materially from the "true" best estimate which is given by the mean of the underlying risk distribution, i.e. if the model error implied by the measurement is immaterial. More generally, a given valuation technique for the technical provision should be regarded as proportionate if the resulting estimate is not expected to diverge materially from the current transfer value.

TP.7.28. Where in the valuation process several valuation methods turn out to be proportionate, undertakings would be expected to select and apply the method which is most appropriate in relation to the underlying risks.

Materiality in the context of a valuation of technical provisions

TP.7.29. In order to clarify the meaning of materiality undertakings will use the definition of materiality used in International Accounting Standards (IAS)[16]:

"Information is material if its omission or misstatement could influence the economic decisions of users taken on the basis of the financial statements. Materiality depends on the size of the item or error judged in the particular circumstances of its omission or misstatement. Thus, materiality provides a threshold or cut-off point rather than being a primary qualitative characteristic which information must have if it is to be useful".

TP.7.30. When determining how to address materiality, undertakings should have regard to the purpose of the work and its intended users. For a valuation of technical provisions – and more generally for a qualitative or quantitative assessment of risk for solvency purposes – this should include the supervisory authority. Undertakings may adjust their assessment of materiality to the particular situation of a QIS exercise which usually requires a lower degree of accuracy than financial and supervisory reporting.

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[16] Materiality is defined in the glossary of the International Accounting Standards Board's "Framework for the Preparation and Presentation of Financial Statements"

Assessment of the estimation uncertainty in the valuation

TP.7.31.   Regardless of what methods should be applied for the valuation of technical provisions, it is important that an assessment of their appropriateness should in general include an assessment of the model error implicit to the calculations.

TP.7.32.   Such an assessment may be carried out by expert judgement or by more sophisticated approaches, for example:

- Sensitivity analysis in the framework of the applied model: this means to vary the parameters and/or the data thereby observing the range where a best estimate might be located.

- Comparison with the results of other methods: applying different methods gives insight in potential model errors. These methods would not necessarily need to be more complex.

- Descriptive statistics: in some cases the applied model allows the derivation of descriptive statistics on the estimation error contained in the estimation.[17] Such information may assist in quantitatively describing the sources of uncertainty.

- Back-testing: comparing the results of the estimation against experience may help to identify systemic deviations which are due to deficiencies in the modelling.[18]

TP.7.33.   **Undertakings are not required to quantify the degree of model error in quantitative terms, or to re-calculate the value of its technical provisions 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 a QIS exercise which usually requires a lower degree of accuracy than financial and supervisory reporting may be taken into account in the assessment.

Approach in cases where model error is expected to be material

TP.7.34.   Where the intended use of a valuation technique is expected to lead to a material degree of model error, undertakings should consider which alternative techniques would be available. Where practicable, another more appropriate valuation method should be applied.

TP.7.35.   In some circumstances, however, it may be unavoidable for undertakings to apply a valuation method which leads to an increased level of estimation uncertainty in the valuation. This would be the case where undertakings, to carry out the valuation, would need to make assumptions which are uncertain or conjectural and which cannot be validated. For example, this could be the case where there are deficiencies in the data, so that there is only insufficient pertinent past experience data available to derive or validate assumptions.

TP.7.36.   Under these circumstances, it would be acceptable for undertakings to determine the best estimate of the technical provision by applying a technique which carries an

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[17]   Of course, this would not include the uncertainty arising from a misspecification of the model itself.
[18]   Cf. also the third step of the proportionality assessment process.

increased level of estimation uncertainty or model error. Undertakings should document that this is the case and consider the implications of the increased level of uncertainty with regard to the reliability of the valuation and their overall solvency position.

TP.7.37.   In particular, undertakings should assess whether the increased level of estimation uncertainty is adequately addressed in the determination of the SCR and the setting of the risk margin in the technical provision.

TP.7.38.   Where the use of a valuation technique results in a material increase in the level of uncertainty associated with the best estimate liability, undertakings should include a degree of caution in the judgements needed in setting the assumptions and parameters underlying the best estimate valuation. However, this exercise of caution should not lead to a deliberate overstatement of the best estimate provision. To avoid a double-counting of risks, the valuation of the best estimate should be free of bias and should not contain any additional margin of prudence.

V.2.6.1.   Possible simplifications for life insurance

Biometric risk factors

TP.7.39.   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.

TP.7.40.   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:
- neglect the expected future changes in biometrical risk factors[19];

- 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 analyze 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.

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[19] For example, this simplification could be applied to short term contracts.

Surrender option

TP.7.41.   Besides the rational or irrational behaviour of policyholders, the experience of surrenders tends to suggest that rational reasons for movements in surrender rates are:

- quality of sales advice and whether any misselling may occur, leading to earlier surrenders in excess of later surrenders;

- the economic cycle affecting policyholders' ability to pay further premiums;

- the personal circumstances of policyholders and whether they can afford premiums.

TP.7.42.   A non-exhaustive list of possible simplifications for modelling surrender rates, which could be used in combination, includes:

- assume that surrenders occur independently of financial/ economic factors;

- assume that surrenders occur independently of biometric factors;

- assume independency in relation to management actions;

- assume that surrenders occur independently of the undertaking specific information;

- use a table of surrender rates that are differentiated by factors such as age, time since policy inception, product type,...;

- model the surrender as a hazard process either with a non-constant or constant intensity.

TP.7.43.   Some of these simplifications convert the hazard process in a deterministic function which implies independency between the surrender time and the evaluation of economic factors, which is obviously not a realistic assumption since policyholder behaviour is not static and is expected to vary as a result of changing economic environment.

TP.7.44.   Other possible surrender models[20] where the surrender rate SR_t for a policy at time t also depend on economic variables include the following:

- Lemay's model $\qquad SR_t = a \cdot \alpha + b \cdot \dfrac{FV_t}{GV_t}$

- Arctangent model $\qquad SR_t = a + b \cdot \arctan(m\Delta_t - n)$

- Parabolic model $\qquad SR_t = a + b \cdot sign(\Delta_t) \cdot \Delta_t^2$

- Modified parabolic model $\qquad SR_t = a + b \cdot sign(\Delta_t) \cdot \Delta_t \cdot k + c^{(CR_{t-1} - CR_t)}$

- Exponential model $\qquad SR_t = a + b \cdot e^{m \cdot \frac{CR_t}{MR_t}}$

- New York State Law 126 $\qquad SR_t = a + b \cdot sign(\Delta_t) \cdot \Delta_t \cdot k - c \cdot \left(\frac{FV_t - CSV_t}{FV_t}\right)$

where a, b, c, m, n, j, k are coefficients, α denotes underlying (possible time dependent) base lapse rate, FV denotes the fund/account value of the policy, GV

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[20] Models giving surrender rates above 100 % are not relevant.

denotes the guaranteed value of the policy, Δ equals reference market rate less crediting rate less surrender charge, *CR* denotes the credit rate, *MR* denotes the reference market rate, *CSV* denotes the cash surrender value and

$$sign(x) = 1 \qquad \text{if } x \geq 0 \text{ and}$$

$$sign(x) = -1 \qquad \text{if } x < 0.$$

TP.7.45.   For with profit contracts the surrender option and the minimum guarantees are clearly dependent. Furthermore, management actions will also have a significant impact on the surrender options that might not be easily captured in a closed formula.

Financial options and guarantees

TP.7.46.   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. This latter may be developed as part of level 3 guidance.

Investment guarantees

TP.7.47.   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 premiums, 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 premiums (when applicable), mortality rates, expenses, surrender rates, ...;

- apply formulaic simplified approach for the time values if they are not considered to be material.

Other options and guarantees

TP.7.48.   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 discretionary benefits

TP.7.49.　　Possible simplifications for determining the future bonuses may include, where appropriate:

- assume that economic conditions will follow a certain pattern, not necessarily stochastic, appropriately assessed;

- assume that the business mix of undertakings' portfolios will follow a certain pattern, not necessarily stochastic, appropriately assessed.

TP.7.50.　　The undertakings could use all or some of the simplifications proposed in the previous paragraph to determine amounts of future discretionary bonuses, or approximate the amount of available extra benefits for distribution to policyholders as the difference (or appropriate percentage of the difference) between the value of the assets currently held to back insurance liabilities of these contracts and the technical provisions for these contracts, without taking into account future discretionary bonuses.

TP.7.51.　　The possible simplification for distribution of extra benefits to a particular line of business (to each policy) is to assume a constant distribution rate of extra benefits.

Expenses and other charges

A)　　Expenses

TP.7.52.　　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

TP.7.53.　　The possible simplification for other charges is to assume that:

- other charges are a constant share of extra benefits; or

- a constant charge (in relative terms) from the policy fund.

Other issues

TP.7.54.　　Having in mind the wide range of assumptions and features taken into account to calculate life insurance 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.

TP.7.55.　　As an example, other possible simplification is to assume that:

- the projection period is one year and that

- cash-flows to/from the policyholders occur either at the end of the year or in the middle of the year.

TP.7.56.　　Another possible simplification for the payments of premiums which also include lapses and premium waivers (e.g. premium waivers in case of disability of the insured person) is to assume that future premiums are paid independently of the financial markets and undertakings' specific information. If lapses and premium waivers could not be treated as independent of financial markets or undertaking

specific parameters, than lapses should be valued with similar techniques as those for surrender options or investment guarantees.

TP.7.57.   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.

V.2.6.2.   Possible simplifications for non-life insurance

TP.7.58.   Simplifications proposed in these specifications will only be applicable under the framework contained above to define the proportionality principle regarding technical provisions

Outstanding reported claim provision. First simplification

TP.7.59.   Description. This simplification applies to the calculation of the best estimate of reported claims by means of considering the number of claims reported and the average cost thereof. Therefore it is a simplification applicable when it does not deliver material model error in the estimate of frequency and severity of claims, and its combination. This simplification can be used to calculate outstanding claims provision and provision for incurred but not reported claims as a whole, adding to N_i the IBNR claims calculated as N_t.

TP.7.60.   Calculation. The calculation is rather straightforward:

$$\sum_{i}^{n}\left(N_i \bullet A_i\right) - P_i$$

where:

N_i = number of claims reported, incurred in year i

A_i = average cost of claims closed in year i

P_i = payments for claims incurred in year i

N_i and P_i are known, while A_i is determined using the average cost of claims closed in the year i, independently of the accident year, multiplying that amount by a factor to take into account future inflation and discounting.

Undertakings should complete this reserve with an incurred but not reported provision (IBNR) and an unallocated loss adjustment expenses (ULAE) provision.

Annex I provides a numerical example of this method.

TP.7.61.   Criteria for application. Additionally to the general requirements set out in these specifications, the above method is an allowable simplification when the size of

claims incurred in a year has a small variance, or the number of claims incurred in a year is big enough to allow the average cost to be representative.

TP.7.62.   These two conditions are unlikely to exist in case of claims that have a medium or long term of settlement since the claim is reported.

TP.7.63.   It should be noted that this method does not seem appropriate in situations where only few development years or occurrence years (for example less than 4) are available. In these cases, it is likely that the claims which are still open are the more complex ones, with higher average of expected ultimate loss. Especially for reinsurance business, this simplification is not applicable, as the necessary data are not available.

Outstanding reported claim provision. Second simplification

TP.7.64.   In circumstances where (e.g. due to the nature or size of the portfolio) a lack of data for the valuation of technical provisions is unavoidable for the undertaking, insurers may have to use appropriate approximations, including case by case approaches. In such cases, further judgmental adjustments or assumptions to the data may often need to be applied in order to allow the valuation to be performed using such approximations in line with the principle of proportionality'.

TP.7.65.   Description. This method consists in the simple sum of estimates of each claim reported at the date of reference of the valuation. The allowance of a simplified method based on a '*case-by-case approach*' should be assessed carefully, according to the features of the claims portfolio and the undertaking internal structure and capabilities.

TP.7.66.   Scope. Further to the general requirements set out in these specifications, the undertaking should develop written documentation on:

- procedures applicable to assess the initial valuation of a claim when hardly anything is known about its features. Valuation must be based on the experience on the average cost of claims with similar features;

- the method to include inflation, discounting and direct expenses;

- the frequency of the valuations' review, which must be at least quarterly;

- the procedure to take into account the changes in both entity specific, legal, social, or economic environmental factors;

- the requirements in order to consider the claim to be closed.

TP.7.67.   Calculation. This method should start estimating each individual provision for a single claim upon up-to-date and credible information and realistic assumptions. Furthermore:

- this estimate should take account of future inflation according to a reliable forecast of the time-pattern of the payments;

- the future inflation rates should be market consistent and suitable for each line of business and for the portfolio of the undertaking;

- individual valuations should be revised as information is improved;

- furthermore, where back testing evidences a systematic bias in the valuation, this should be offset with an appropriate adjustment, according to the experience gained with claims settlement in previous years and the expected future deviations;

- undertakings should complete the valuation resulting from this method with an IBNR and an ULAE provision.

TP.7.68. Criteria for application. Further to the general requirements set out in these specifications, this method is an allowable simplification in the case of small portfolios where the undertaking has sufficient information, but the number of claims is too small to test patterns of regularity.

TP.7.69. This method is also allowable, although as an approximation, in case of (a) high-severity-low-frequency claims, and (b) new (re)insurance company or new line of business, although only temporarily until achieving sufficient information to apply standard methods. However, where the lack of information is expected to be permanent (e.g. the case of 'tail' risks with a very slow process of collecting claims information), the undertaking would be required to complement the data available by making extra efforts to look for relevant external information to allow the understanding of the underlying risks and to use extensively adequate expert opinion and judgements. Documentation is also a key aspect in this subject (see these specifications regarding data quality).

Incurred but not reported claims provision. First simplification

TP.7.70. Description. This simplification applies to the calculation of the best estimate of incurred but not reported claims (IBNR) by means of an estimation of the number of claims that would be expected to be declared in the followings years and the cost thereof.

TP.7.71. Calculation. The final estimate of this technical provision is derived from the following expression, where just for illustrative purposes a three-year period of observation has been considered (the adaptation of the formula for longer series is immediate):

$$\text{IBNR reserve year } t = C_t \times N_t \quad,$$

where:

C_t = average cost of IBNR claims, after taking into account inflation and discounting. This cost should be based on the historical average cost of claims reported in the relevant accident year. Since a part of the overall cost of claims comes from provisions, a correction for the possible bias should be applied.

and

$N_t = R_t * Av$, being

$$AV = [(N_{t-1} / p_1) + (N_{t-2} / p_2) + N_{t-3}] / [R_{t-1} + R_{t-2} + R_{t-3}]$$

Furthermore, in these expressions:

N_{t-i} = number of claims incurred but not reported at the end of the year t-i, independently of the accident year (to assess the number of IBNR claims all the information known by the undertaking till the end of the year t should be included).

p_1 = percentage of IBNR claims at the end of year t-3 that have been reported during the year t-2

p_2 = percentage of IBNR claims at the end of year t-3 that have been reported during the years t-2 and t-1

R_{t-i} = claims reported in year t, independently of accident year.

TP.7.72.   This method should be based on an appropriate number of years where reliable data are available, so as to achieve a reliable and robust calculation. The more years of experience available the better quality of the mean obtained.

TP.7.73.   Obviously, this method only applies where the incurred and reported claims provision has been valued without considering IBNR, for example it has been assessed using some of the aforementioned simplifications.

Incurred but not reported claims provision. Second simplification

TP.7.74.   Description. This simplification should apply only when it is not possible to apply reliably the first simplification. In this simplification, the best estimate of incurred but not reported claims (IBNR) is estimated as a percentage of the provision for reported outstanding claims.

TP.7.75.   Calculation. This simplification is based on the following formula:

$$\text{Provision IBNR}_{LOB} = factor_{LOB\_U} * \text{PCO\_reported}_{LOB},$$

where:

$\text{PCO\_reported}_{LOB}$ = provision for reported claims outstanding

$factor_{LOB\_U}$ = factor specific for each LOB and undertaking.

TP.7.76.   Criteria for application. Further to the general requirements set out to use simplifications, this method may be applied only where it is not possible to apply reliably the first simplification due to an insufficient number of years of experience. Obviously, this method only applies where the incurred and reported claims provision has been valued without considering IBNR, for example it has been assessed using some of the aforementioned simplifications.

Simplification for claims settlement expenses

TP.7.77.   Description. This simplification estimates the provision for claims settlement expenses as a percentage of the claims provision.

TP.7.78.   Calculation. This simplification is based on the following formula, applied to each line of business:

$$\text{Provision for ULAE} = R * [\ IBNR\ +\ a * \text{PCO\_reported}\ ]$$

where:

R = Simple average of R_i (e.g. over the last two exercises), and

R_i = Expenses / (gross claims + subrogations).

$IBNR$ = provision for IBNR

$PCO\_reported$ = provision for reported claims outstanding

a = Percentage of claim provisions (set as 50 per cent)

TP.7.79.   Criteria for application. Further to the general requirements set out in these specifications, this method is an allowable simplification when expenses can reasonable be supposed proportional to provisions as a whole, this proportion is stable in time and the expenses distribute uniformly over the lifetime of the claims portfolio as a whole.

Simplifications for premium provision

First simplification

TP.7.80.   Description. This simplification provides the best estimate of the premium provision when the undertaking is not able to calculate a reliable estimate of the expected future claims and expenses derived from the business in force.

TP.7.81.   Calculation. This simplification is based on the following formula, applied to each line of business:

Best estimate Premium provision =

[Pro-rate of unearned premium over the life of the premium   + Adjustment for any expected insufficiency of the premium in respect future claims and expenses] / (1 + rf_rate_1y / 3)
time BE = (Present value of future premiums on existing contracts+Provision for unearned premiums + Provision for unexpired risks)/(1+i/3)

where:

rf_rate_1y is the risk-free interest rate 1-year term

TP.7.82.   Criteria for application. Further to the general requirements set out in these specifications, this method is an allowable simplification when the premium provision is supposed to decrease at an even rate during the forthcoming year.

Second simplification (expected claims ratio based simplification)

TP.7.83.   Description

The expected loss method described in this subsection derives a best estimate for premium provision, based on an estimate of the combined ratio in the LOB in question.

These specifications are explained in respect of gross insurance business, although they may apply *mutatis mutandis* to the calculation of reinsurance recoverables corresponding premium provisions.

TP.7.84.   Input

The following input information is required:

- estimate of the combined ratio (CR) for the LOB during the run-off period of the premium provision;

- present value of future premiums for the underlying obligations (as to the extent to which, according to these specifications, future premiums should be taken into account in the valuation of premium provisions);

- unearned premium reserve for the underlying obligation (intended to denote the paid premium for the unexpired risk period determined on a *pro rata temporis* basis).

The combined ratio for an accident year (= occurrence year) should be defined as the ratio of expenses and incurred claims in a given LOB or homogenous group of risks over earned premiums. The earned premiums should exclude prior year adjustment. The expenses should be those attributable to the premiums earned other than claims expenses. Incurred claims should exclude the run-off result.

Alternatively, if it is more practicable, the combined ratio for an accident year may be considered to be the sum of the expense ratio and the claims ratio. The expense ratio is the ratio of expenses (other than claims expenses) to written premiums, and the expenses are those attributable to the written premiums. The claims ratio for an accident year in a given LOB or homogenous group of risks should be determined as the ratio of the ultimate loss of incurred claims over earned premiums.

TP.7.85.   Output
Best estimate of the premium provision (gross of reinsurance).

TP.7.86.   **Calculation**
The best estimate is derived from the input data as follows:

$$BE = CR \bullet \left[\ UPR \,/\, \textit{(1 - commission rate)}\ \right] + (CR - 1) \bullet PVFP + AC \bullet PVFP$$

Where:

BE	=	best estimate of premium provision
CR	=	estimate of combined ratio for LoB, excluding acquisition expenses
AC	=	Estimate of acquisition expenses ratio for LoB
UPR	=	unearned premium reserve
PVFP	=	present value of future premiums (discounted using the prescribed term structure of risk-free interest rates)

TP.7.87.   Where UPR is based on the total premium (without deducting acquisition costs), 'commission rate' in the formula above should be set at nil.

Special cases

Where, due to the features of the business, an undertaking lacks sufficient information to derive a reliable estimate of CR (e.g. CR refers to a new line of business), and a market development pattern is available for the LOB being measured, a further alternative is to combine such pattern with the market expected loss. This possibility

does not apply where the undertaking lacks sufficiently reliable information due to non-compliance with the data quality standards set out in these specifications.

Where the market expected loss is applicable, the undertaking should follow a three step approach:

- estimate the (undiscounted) total claims cost for the next future accident year by multiplying the ultimate claims ratio (based on undiscounted figures) by the (undiscounted) estimate of premiums that will be earned during next year;

- use the market development pattern to split the total claims cost per development year. Discounting can then be applied using the rates applicable to each maturity;

- the final step is to add the estimate for the present value of future expenses (based on the estimated expense ratio) and deduct the present value of future premiums.

TP.7.88.   *Criteria for application*
The following conditions should be met for an application of a market development pattern:

- it can be expected that the combined ratio remains stable over the run-off period of the premium provision;

- a reliable estimate of the combined ratio can be made;

- the unearned premium provision is an adequate exposure measure for estimating future claims during the unexpired risk period (until the point in time where the next future premium is expected).

V.2.6.3.   Possible simplifications for reinsurance recoverables

Life reinsurance

TP.7.89.   For the calculation of the probability-weighted average cash-flows of the recoverables or net payments to the policyholder the same simplifications as for the calculation of best estimate of life insurance policies could be applied.

TP.7.90.   The result from the calculation should be adjusted to take account of the expected losses due to the default of the counterparty.

Non-life reinsurance

TP.7.91.   The approaches considered represent Gross-to-Net techniques, meaning that it is presupposed that an estimate of the technical provisions gross of reinsurance (compatible with the Solvency II valuation principles) is already available. Following such techniques the value of reinsurance recoverables is derived in a subsequent step as the excess of the gross over the net estimate.

TP.7.92.   Finally, it should be noted that where this subsection addresses the issue of recoverables (and corresponding net valuations), this is restricted to recoverables from reinsurance contracts, and does not include consideration of recoverables from SPVs.

TP.7.93.   From a practical perspective it is understood that Solvency II does not prevent methods of calculation – including simplifications – whereby the technical provisions net of reinsurance are estimated in a first step, while an estimate of the reinsurance recoverables is fixed as a residual (i.e. as the difference between the estimated technical provisions gross and net of reinsurance, respectively). Accordingly, this approach has been chosen in the following discussion of the Gross-to-Net techniques that may be applied in the context of non-life insurance.

Gross-to-net techniques

TP.7.94.   A detailed analysis of the gross-to-net techniques can be found in the *Report on Proxies* elaborated by CEIOPS/Groupe Consultatif Coordination Group[21] as well as the gross-to-net techniques which were tested (based on the recommendations contained in this report) in the QIS4 exercise. This description of gross-to-net techniques has been included purely for informational purposes.

Analysis

TP.7.95.   This subsection includes the general high-level criteria to be followed by an (re)insurance undertaking applying gross-to-net techniques to guarantee its compatibility with the Solvency II framework.

Compatibility of Gross-to-Net Calculations with Solvency II

TP.7.96.   The technical "gross-to-net" methods considered in this subsection are designed to calculate the value of net technical provisions in a direct manner, by converting best estimates of technical provisions gross of reinsurance to best estimates of technical provisions net of reinsurance. The value of the reinsurance recoverables is then given as the excess of the gross over the net valuation:

Reinsurance recoverables = gross provisions – net provisions

TP.7.97.   An application of gross-to-net valuation techniques – and more broadly of any methods to derive net valuations of technical provisions – may be integrated into the Solvency II Framework by using a three-step approach as follows:

- **Step 1**: Derive valuation of technical provisions net of reinsurance.

- **Step 2**: Determine reinsurance recoverables as difference between gross and net valuations.

- **Step 3**: Assess whether valuation of reinsurance recoverables is compatible with Solvency II.

Step 1:Derivation of technical provisions net of reinsurance

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[21] CEIOPS/Groupe Consultatif Coordination Group: "Report on Proxies", July 2008,
   http://www.ceiops.eu/media/docman/public_files/consultations/consultationpapers/Final%20Report%20on%20Proxies.pdf

TP.7.98.   The starting point for this step is a valuation of technical provisions gross of reinsurance. For non-life insurance obligations, the value of gross technical provisions would generally be split into the following components per homogeneous group of risk or (as a minimum) lines of business:

PP_{Gross} = the best estimate of premium provisions gross of reinsurance;
PCO_{Gross} = the best estimate of claims provisions gross of reinsurance; and
RM   = the risk margin.

TP.7.99.   From this, a valuation of the best estimate technical provisions net of reinsurance within a given homogeneous risk group or line of business may be derived by applying Gross-to-Net techniques to the best estimates components referred to above.[22]

TP.7.100.   The technical provisions net of reinsurance in the given homogeneous risk group or line of business would then exhibit the same components as the gross provisions, i.e.:

PP_{Net} = the best estimate of premium provisions net of reinsurance;
PCO_{Net} = the best estimate of claims provisions net of reinsurance; and
RM   = the risk margin.

Step 2: Determination of reinsurance recoverables as difference between gross and net valuations

TP.7.101.   On basis of the results of step 1, the reinsurance recoverables (RR) per homogenous risk groups (or lines of business) may be calculated as follows (using the notation as introduced above):

$$RR = (PP_{Gross} - PP_{Net}) + (PCO_{Gross} - PCO_{Net})$$

TP.7.102.   Note that implicitly this calculation assumes that the value of reinsurance recoverables does not need to be decomposed into best estimate and risk margin components.

Step 3: Assessment of compatibility of reinsurance recoverables with Solvency II

TP.7.103.   In this step, it would need to be assessed whether the determination of the reinsurance recoverables in step 2 is consistent with Solvency II.

TP.7.104.   In particular, this would require an analysis as to whether the issues referred to in the second and third paragraph of Article 81 of the Solvency II Framework Directive, i.e. the time difference between direct payments and recoveries and the expected losses due to counterparty risks, were taken into account.

TP.7.105.   To achieve consistency with the required adjustment related to expected losses due to counterparty defaults, it would generally be necessary to integrate an analogous adjustment into the determination of net of reinsurance valuation components in step 1. Such an adjustment would need to be treated separately and would not be covered by one of the gross-to-net techniques discussed in this subsection.

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[22] Alternatively, the best estimates net of reinsurance may also be derived directly, e.g. on basis of triangles with net of reinsurance claims data.

The Scope of Gross-to-Net Techniques

TP.7.106.   Non-life insurance undertakings would be expected to use of Gross-to-Net methods in a flexible way, by applying them to either premium provisions or provisions for claims outstanding or to a subset of lines of business or accident (underwriting) years, having regard to e.g. the complexity of their reinsurance programmes, the availability of relevant data, the importance (significance) of the sub-portfolios in question or by using other relevant criteria.

TP.7.107.   An undertaking would typically use a simplified Gross-to-Net technique, for example, when:

- the undertaking has not directly estimated the net best estimate;

- the undertaking has used a case by case approach for estimating the gross best estimate;

- the undertaking cannot ensure the appropriateness, completeness and accuracy of the data;

- the underlying reinsurance programme has changed.

Degree of Detail and Corresponding Principles/Criteria

TP.7.108.   It seems unlikely that a Gross-to-Net simplified technique being applied to the overall portfolio of a non-life insurance undertaking would provide reliable and reasonably accurate approximations of the best estimate of technical provisions net of reinsurance.[23] Accordingly, non-life insurance undertakings should, in general, carry out the Gross-to-Net calculations at a sufficiently granular level. In order to achieve this level of granularity a suitable starting point would be:

- to distinguish between homogenous risk groups or, as a minimum, lines of business;

- to distinguish between the premium provisions and provisions for claims outstanding (for a given homogenous risk group or line of business); and

- with respect to the provisions for claims outstanding, to distinguish between the accident years not finally developed and – if the necessary data is available and of sufficient quality – to distinguish further between provisions for RBNS-claims and IBNR-claims, respectively.

TP.7.109.   A further refinement that may need to be applied when stipulating the Gross-to-Net techniques would be to take into account the type of reinsurance cover and especially the relevant (i.e. most important) characteristics of this cover.

TP.7.110.   When applying such refinements, the following general considerations should be made:

- whereas increasing the granularity of Gross-to-Net techniques will generally lead to a more risk-sensitive measurement, it will also increase their complexity, potentially leading to additional implementation costs for undertakings. Therefore, following the principle of proportionality, a more granular approach

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[23]   A possible exception may be a monoline insurer that has kept its reinsurance programme unchanged over time.

should only be chosen where this is necessary regarding the nature, scale and complexity of the underlying risks (and in particular the corresponding reinsurance program);

- for certain kinds of reinsurance covers (e.g. in cases where the cover extends across several lines of business, so that it is difficult to allocate the effect of the reinsurance risk mitigation to individual lines of business or even homogeneous groups of risk, or where the cover is only with respect to certain perils of a LOB), increasing the granularity of Gross-to-Net techniques as described below will not suffice to derive an adequate determination of provisions net of reinsurance. In such cases, individual approaches tailored to the specific reinsurance cover in question would need to be used;

- as an alternative to Gross-to-Net calculations, it may be contemplated to use a direct calculation of net provisions based on triangular claims data on a net basis. However, it should be noted that such a technique would generally require adjustments of the underlying data triangle in order to take into account changes in the reinsurance program over time, and therefore would generally be rather resource intensive. Also, an application of such "direct" techniques may not yield a better quality valuation than an application of more granular Gross-to-Net techniques as discussed below.

Distinguishing between premium provisions and provisions for claims outstanding

TP.7.111.   For both the premium provisions and the provisions for claims outstanding it is assumed at the outset that the Gross-to-Net methods should be stipulated for the individual lines of business.

Premium provisions

TP.7.112.   With respect to the premium provisions, the relationship between the provisions on a gross basis (PPGross,k), the provisions on a net basis (PPNet,k) and the Gross-to-Net "factor" (GNk(ck)) – for line of business (or homogeneous risk group) no. k – can be represented in a somewhat simplified manner as follows:[24]

$$\mathbf{PP_{Net,k} = GN_k(c_k) \times PP_{Gross,k},}$$

where $\mathbf{c_k}$ is a parameter-vector representing the relevant characteristics of the reinsurance programme covering the CBNI claims related to line of business no. k at the balance sheet day.

TP.7.113.   For lines of business where premiums, claims and technical provisions are related to the underwriting year (and not the accident year), the distinction between premium provisions and provisions for claims outstanding is not clear-cut. In these cases the technical provisions related to the last underwriting year comprise both premiums provisions and provisions for claims outstanding[25] and the distinction between Gross-to-Net techniques for the two kinds of technical provisions makes no sense.

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[24]   For the sake of simplicity it is assumed that the Gross-to-Net techniques in question can be represented by a multiplicative factor to be applied on the gross provisions.

[25]   If the line of business in question contains multiyear contracts this will be the case for several of the latest underwriting years.

Provisions for claims outstanding

TP.7.114.   With respect to the provisions for claims outstanding, separate Gross-to-Net techniques should be stipulated for each accident year not finally developed (for a given line of business (or homogenous risk group)). Accordingly, the relationship between the provisions on a gross basis ($PCO_{Gross,k,i}$), the provisions on a net basis ($PCO_{Net,k,i}$) and the Gross-to-Net "factor" ($GN_{k,i}(c_{,k,i})$) for line of business (or homogeneous risk group) no. k and accident year no. i, can be represented in a somewhat simplified manner as follows:

$$\mathbf{PCO_{Net,k,i} = GN_{k,i}(c_{k,i}) \times PCO_{Gross,k,i},}$$

where $c_{k,i}$ is a parameter-vector representing the relevant characteristics of the reinsurance programme for this combination of line of business and accident year.

TP.7.115.   A rationale for introducing separate techniques for the individual development years or groups of development years may be that claims reported and settled at an early stage (after the end of the relevant accident year) in general have a claims distribution that differs from the distribution of claims reported and/or settled at a later stage. Accordingly, the impact of a given reinsurance programme (i.e. the ratio between expected claims payments on a net basis and expected claims on a gross basis) will differ between development years or groups of development years.

TP.7.116.   A rationale for introducing separate techniques for RBNS-claims and IBNR-claims may be that insurance undertakings in general will have more information regarding the RBNS-claims and should accordingly be able to stipulate the Gross-to-Net technique to be applied on the gross best estimate for RBNS-provisions in a more accurate manner. On the other hand the Gross-to-Net technique to be applied on the gross best estimate for IBNR-provisions is then likely to be stipulated in a less precise manner, especially if more sophisticated techniques are not available.

TP.7.117.   Finally, a rationale for making a split between "large" claims and "small" claims may be that the uncertainties related to expected claim amounts on a <u>net</u> basis for claims classified as "large" may in some (important) cases be small or even negligible compared to the uncertainties related to the corresponding claim amounts on a <u>gross</u> basis. However, this supposition depends (at least partially) on the thresholds for separation of "large" and "small" claims being fixed for the individual lines of business.

SECTION 2 – SCR – STANDARD FORMULA

SCR.1. Overall structure of the SCR

SCR.1.1.   SCR General remarks

Overview

SCR.1.1.   The calculation of the Solvency Capital Requirement (SCR) according to the standard formula is divided into modules as follows:
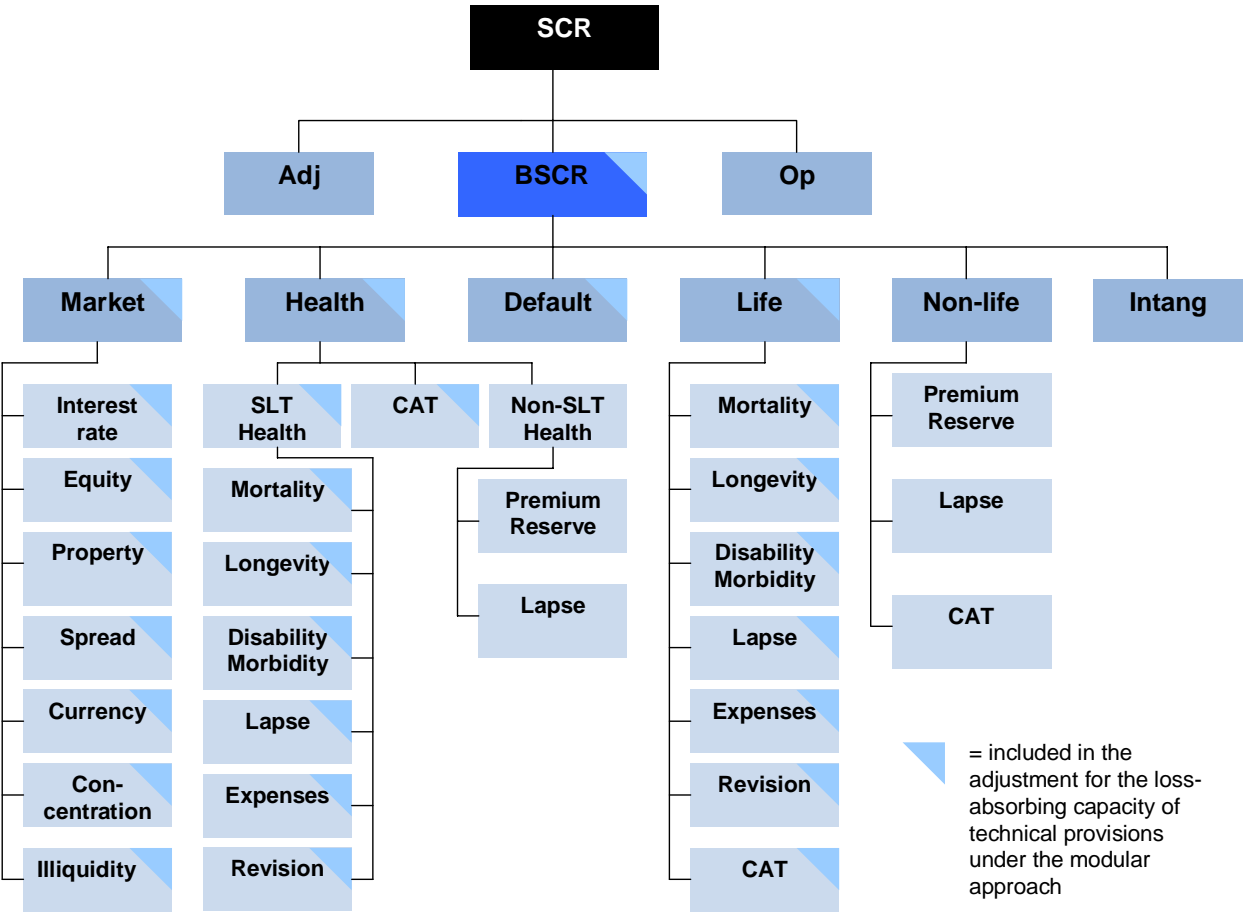
SCR.1.2.   For each module and sub-module, the specifications are split into the following subsections:

- Description: this defines the scope of the 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. (This subsection is only included where simplified calculations are envisaged.)

Technical provisions in the SCR standard formula calculations

SCR.1.3.   For the purposes of the SCR standard formula calculation, 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.

Scope of underwriting risk modules

SCR.1.4.   The SCR standard formula includes three modules for underwriting risk: the life, the health and the non-life underwriting risk module. The scope of the modules is defined as follows:

- The life underwriting risk module captures the risk of life (re)insurance obligations other than health (re)insurance obligations.

- The health underwriting risk module captures the risk of health (re)insurance obligations.

- The non-life underwriting risk module captures the risk of non-life (re)insurance obligations other than health (re)insurance obligations.

For the purpose of this distinction the definition of life, health and non-life insurance obligations set out in subsection V.2.1 on segmentation applies. In particular, annuities stemming from non-life insurance contracts are either in the scope of the health underwriting module (if the underlying contract is Non-SLT health insurance) or in the scope of the life insurance contract (if the underlying contract is not Non-SLT health insurance).

Scenario-based calculations

SCR.1.5.   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 undertaking (NAV).

SCR.1.6.   The net asset value is defined as the difference between assets and liabilities. As explained above, 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.1.7.   The scenario 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 policyholders under the scenario.

- Where risk mitigation techniques meet the requirements set out in subsections SCR.12 and SCR.13, 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 reflect a risk for the undertaking, this should not lead to a "negative capital requirement". The corresponding capital requirement in such a situation is nil.

SCR.1.8.   Future management actions 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 standard formula SCR should be objective, realistic and verifiable. Guidance on these requirements can be found in subsection V.2.2.

Calibration

SCR.1.9.   The SCR should correspond to the Value-at-Risk of the basic own funds of an insurance or reinsurance undertaking subject to a confidence level of 99.5% over a one-year period. The parameters and assumptions used for the calculation of the SCR reflect this calibration objective.

SCR.1.10.   To ensure that the different modules of the standard formula are calibrated in a consistent manner, this calibration objective applies to each individual risk module.

SCR.1.11.   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.

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[26] NAV = assets – liabilites 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. (Cf. Article 101(3) of the Solvency II Framework Directive where it is specified that the SCR corresponds to the Value-at-Risk of basic own funds.)

Treatment of new business in the standard formula

SCR.1.12.   The SCR should cover the risk of existing business as well as the new business expected to be written over the following 12 months.

SCR.1.13.   In the standard formula, new non-life insurance and Non-SLT health insurance business is taken into account in the premium risk part of the premium and reserve risk sub-modules. The volume measure for this risk component is based on the expected premiums earned and written during the following twelve months. The sub-modules thereby allow for unexpected losses stemming from this business. However, the standard formula does not take into account the expected profit or loss of this business.

SCR.1.14.   For life insurance and SLT health insurance the calculation of underwriting risk in the standard formula is based on scenarios. The scenarios consist of an instantaneous stress that occurs at the valuation date and the capital requirements are the immediate loss of basic own funds resulting from the stresses. The scenarios do not take into account the changes in assets and liabilities over the 12 months following the scenario stresses. Therefore these capital requirements do not take into account the expected profit or loss of the business written during the following 12 months.

Proportionality and simplifications

SCR.1.15.   The principle of proportionality is intended to support the consistent application of the principles-based solvency requirements to all insurers.

SCR.1.16.   In principle, Solvency II provides a range of methods to calculate the SCR which allows undertakings to choose a method that is proportionate to the nature, scale and complexity of the risk that are measured:

- full internal model
- standard formula and partial internal model
- standard formula with undertaking-specific parameters
- standard formula
- simplification

SCR.1.17.   In QIS5, undertakings may apply to several parts of the standard formula calculation specified simplifications, provided that the simplified calculation is proportionate to the nature, scale and complexity of the risks.

SCR.1.18.   In assessing whether a simplified calculation could be considered proportionate to the underlying risks, the insurer should have regard to the following steps:

Step 1: Assessment of nature, scale and complexity

SCR.1.19.   The insurer should assess the nature, scale and complexity of the risks. This is intended to provide a basis for checking the appropriateness of specific simplifications carried out in the subsequent step.

Step 2: Assessment of the model error

SCR.1.20.   In this step the insurer should assess whether a specific simplification can be regarded as proportionate to the nature, scale and complexity of the risks analysed in the first step.

SCR.1.21.   Where simplified approaches are used to calculate the SCR, this could introduce additional estimation uncertainty (or model error). The higher the estimation uncertainty, the more difficult it will be for the insurer to rely on the estimation and to ensure that it is suitable to achieve the calibration objective of the SCR.

SCR.1.22.   Therefore the insurer should assess the model error that results from the use of a given simplification, having regard to the nature, scale and complexity of the underlying risks. The simplification should be regarded as proportionate if the model error is expected to be non-material.

SCR.1.23.   Undertaking are not required to quantify the degree of model error in quantitative terms, or to re-calculate the value of the capital requirement 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 included in the simplification is immaterial. The particular situation of a QIS exercise which usually requires a lower degree of accuracy than financial and supervisory reporting may be taken into account in the assessment.

SCR.1.2.   SCR Calculation Structure

Overall SCR calculation

Description

SCR.1.24.   The SCR is the end result of the standard formula calculation.

Input

SCR.1.25.   The following input information is required:

BSCR	=	Basic Solvency Capital Requirement
SCR_{op}	=	The capital requirement for operational risk
Adj	=	Adjustment for the risk absorbing effect of technical provisions and deferred taxes

Output

SCR.1.26.   This module delivers the following output information:

SCR   =   The overall standard formula capital requirement

Calculation

SCR.1.27.   The SCR is determined as follows:

$$SCR = BSCR + Adj + SCR_{Op}$$

Description

SCR.1.28.   The Basic Solvency Capital Requirement (BSCR) is the Solvency Capital Requirement before any adjustments, combining capital requirements for six major risk categories.

Input

SCR.1.29.   The following input information is required:

SCR_{mkt} =   Capital requirement for market risk

SCR_{def} =   Capital requirement for counterparty default risk

SCR_{life} =   Capital requirement for life underwriting risk

SCR_{nl} Capital requirement for non-life underwriting risk

SCR_{health} Capital requirement for health underwriting risk

$SCR_{intangibles}$ Capital requirement for intangible assets risk

Output

SCR.1.30.   The module delivers the following output:

$BSCR$ = Basic Solvency Capital Requirement

Calculation

SCR.1.31.   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 calculated in accordance with SCR.4

SCR.1.32.   The factor $Corr_{i,j}$ denotes the item set out in row i and in column j of the following correlation matrix *Corr*:

i \ j	Market	Default	Life	Health	Non-life
Market	1				
Default	0.25	1			
Life	0.25	0.25	1		
Health	0.25	0.25	0.25	1	
Non-life	0.25	0.5	0	0	1

SCR.2. Loss absorbing capacity of technical provisions and deferred taxes

SCR.2.1. Definition of future discretionary benefits

SCR.2.1. For the definition of future discretionary benefits see subsection V.2.2.

SCR.2.2. Gross and net SCR calculations

SCR.2.2. The solvency capital requirement for each risk should be derived under a gross and a net calculation.

SCR.2.3. 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 undertaking. The gross calculation does not reflect all aspects of the economic reality as it ignores the risk-mitigating effect of future discretionary benefits.

SCR.2.4. The net calculation of the solvency capital requirement should be defined as follows:

The insurer is able to vary its assumptions on future bonus rates in response to the shock being tested, based on reasonable expectations and having regard to realistic management actions.

SCR.2.5. The gross calculation as follows:

In the calculation of the net SCR for each (sub-)module, undertakings are calculating a stressed balance sheet and comparing it to the unstressed balance sheet that was used to calculate own funds. Therefore, for each (sub-)module undertakings can derive the best estimate value of the technical provisions relating only to future discretionary benefits from both balance sheets. The change in these provisions measures the impact of the risk mitigation. For each sub-module, this difference should be added to the net SCR used to derive the gross SCR.

The same outcome can be achieved by carrying out the same calculation as for the net calculation, but with the additional assumption that the value of future discretionary benefits does not change as a result of the scenario.

SCR.2.3. Calculation of the adjustment for loss absorbency of technical provisions and deferred taxes

SCR.2.6. The adjustment for the loss-absorbency of technical provisions and deferred taxes reflects the potential compensation of unexpected losses through a decrease in technical provisions or deferred taxes. In relation to technical provisions the adjustment takes account of the risk mitigating effect provided by future discretionary benefits to the extent undertakings can establish that a reduction in such benefits may be used to cover unexpected losses when they arrive.

SCR.2.7. In QIS5 the following two approaches for the calculation of the adjustment for the loss-absorbency of technical provisions and deferred taxes are tested:

- the equivalent scenario; and

- the modular approach.

SCR.2.8. **Undertakings are expected to carry out the calculation of the adjustment according to both approaches.** This will allow stakeholders and the political level to compare both approaches and decide on the approach that should be adopted under Solvency II. The double calculation is only required for the adjustment itself. For calculations that depend of the SCR (like the risk margin or the eligible own funds) the result of the **equivalent scenario** should be used.

SCR.2.9. Under both approaches the adjustment for loss absorbency of technical provisions and deferred taxes is split into two parts as follows:

$$Adj = Adj_{TP} + Adj_{DT}$$

where

Adj_{TP} = adjustment for loss absorbency of technical provisions

Adj_{DT} = adjustment for loss absorbency of deferred taxes

SCR.2.10. The adjustment for loss absorbency of technical provisions and deferred taxes should not be negative.

Method 1: Equivalent scenario

Adjustment for loss absorbency of technical provisions

SCR.2.11. The Basic Solvency Capital Requirement (*BSCR*) should be calculated by aggregating the gross capital requirements using the relevant correlation matrices.

SCR.2.12. The net Basic Solvency Capital Requirement (*nBSCR*) should be calculated using a single scenario under which all of the risks covered by the standard formula occur simultaneously. The process involves the following steps:

- The capital requirement for each risk should be calculated gross of the adjustment for loss absorbency of technical provisions

- The gross capital requirements should be used as inputs to determine the equivalent scenario based on the relative importance of each of the sub-risks to the undertaking. However, the features of participating business may be such that the construction of the single equivalent scenario from net capital requirements is more appropriate and would not lead to significantly different results. Where this is the case, undertakings may use net capital requirements for the derivation of the single equivalent scenario.

- The undertaking should consider the management actions which would be applied in reaction to such a scenario and, in particular, whether their assumptions about future bonus rates would change if such a scenario was to occur.

- The change in the undertaking's net asset value should then be calculated on the assumption that all the shocks underlying the single equivalent scenario occurred simultaneously. Thereby, the management actions identified above should be taken into account in the recalculation of technical provisions.

- $nBSCR$ is the reduction in net asset value under the equivalent scenario.

SCR.2.13. The adjustment to the Basic SCR 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 total value of future discretionary bonuses for the purpose of calculating the technical provisions:

$$Adj_{TP} = -\min(BSCR - nBSCR;\ FDB)$$

Adjustment for loss absorbency of deferred taxes

SCR.2.14. The adjustment for the loss-absorbing capacity of deferred taxes should be equal to the change in the value of deferred taxes of undertakings that would result from an instantaneous loss of an amount that is equal to the following amount:

$$SCRshock = BSCR + Adj_{TP} + SCR_{Op}$$

where $BSCR$ is the Basic SCR, Adj_{TP} is the adjustment for the loss-absorbing capacity of technical provisions calculated according to the equivalent scenario and SCR_{Op} denotes the capital requirement for operational risk.

SCR.2.15. 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, insurance and reinsurance undertakings should take into account the magnitude of the loss and its impact on the undertaking's financial situation when assessing whether the realisation of that deferred tax asset is probable within a reasonable timeframe.

SCR.2.16. 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.2.17. 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, the equivalent scenario can be used for this purpose.

Construction of the equivalent scenario

SCR.2.18. To facilitate the testing of the single equivalent scenario, CEIOPS provides a spreadsheet which determines the single equivalent scenario for each undertaking. Examples for the construction of the equivalent scenario can be found in Annex J.

Method 2: Modular approach

Adjustment for loss absorbency of technical provisions

SCR.2.19. Under the modular approach, the solvency capital requirement for each risk should be calculated both gross and net of the loss absorbency of technical provisions.

SCR.2.20. 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.2.21. The net Basic Solvency Capital Requirement (*nBSCR*) should be calculated by aggregating the net capital requirements (for example $nMkt_{int}$) using again the relevant correlation matrices.

SCR.2.22. The adjustment to the Basic SCR 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 total value of future discretionary bonuses for the purpose of calculating the technical provisions:

$$Adj_{TP} = -\min(BSCR - nBSCR; FDB)$$

SCR.2.23. The adjustment for loss-absorbing capacity of technical provisions under the modular approach should account for risk mitigating effects in relation the following risks:

- market risk

- life underwriting risk

- health SLT underwriting risk

- health CAT risk

- counterparty default risk

For all other risks the gross capital requirement and the net capital requirement coincide.

SCR.2.24. If an undertaking wishes to simplify the process for a risk that is in the scope of the modular approach – particularly in cases where the risk absorbing effect is not expected to be material – it may assume the calculation including the loss-absorbing effects of technical provisions is equal to the calculation excluding the loss-absorbing effects of technical provisions (i.e., it may put $nMkt_{int} = Mkt_{int}$).

Adjustment for loss absorbency of deferred taxes

SCR.2.25. The adjustment for the loss-absorbing capacity of deferred taxes should be equal to the change in the value of deferred taxes of undertakings that would result from an instantaneous loss of an amount that is equal to the following amount:

$$SCRshock = BSCR + Adj_{TP} + SCR_{Op}$$

where *BSCR* is the Basic SCR, *Adj*$_{TP}$ is the adjustment for the loss-absorbing capacity of technical provisions calculated according to the modular approach and *SCR*$_{Op}$ denotes the capital requirement for operational risk.

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, insurance and reinsurance undertakings should take into account the magnitude of the loss and its impact on the undertaking'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.

SCR.2.28. 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, undertakings 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 of the standard formula to the Basic SCR.

SCR.3. SCR Operational risk

<u>Description</u>

SCR.3.1.   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.3.2.   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.

<u>Input</u>

SCR.3.3.   The inputs for this module are:

$pEarn_{life}$	=	Earned premium during the 12 months prior to the previous 12 months for life insurance obligations, without deducting premium ceded to reinsurance
$pEarn_{life-ul}$	=	Earned premium during the 12 months prior to the previous 12 months for life insurance obligations where the investment risk is borne by the policyholders, without deducting premium ceded to reinsurance
$Earn_{life}$	=	Earned premium during the previous 12 months for life insurance obligations, without deducting premium ceded to reinsurance
$Earn_{life-ul}$	=	Earned premium during the previous 12 months for life insurance obligations where the investment risk is borne by the policyholders without deducting premium ceded to reinsurance
$Earn_{nl}$	=	Earned premium during the previous 12 months for non-life insurance obligations, without deducting premiums ceded to reinsurance
TP_{life}	=	Life insurance obligations. For the purpose of this calculation, technical provisions should not include the risk margin, should be without deduction of recoverables from reinsurance contracts and special purpose vehicles
$TP_{life-ul}$	=	Life insurance obligations for life insurance obligations where the investment risk is borne by the policyholders. For the purpose of this calculation, technical provisions should not include the risk margin, should be without deduction of recoverables from reinsurance contracts and special purpose

vehicles

TP_{nl}	=	Total non-life insurance obligations excluding obligations under non-life contracts which are similar to life obligations, including annuities. For the purpose of this calculation, technical provisions should not include the risk margin and should be without deduction of recoverables from reinsurance contracts and special purpose vehicles
Exp_{ul}	=	Amount of annual expenses incurred during the previous 12 months in respect life insurance where the investment risk is borne by the policyholders.
$BSCR$	=	Basic SCR

SCR.3.4. In all the aforementioned input, life insurance and non-life insurance obligations should be defined in the same way as that set out in subsection V.2.1 on segmentation.

Output

SCR.3.5. This module delivers the following output information:

SCR_{Op} = Capital requirement for operational risk

Calculation

SCR.3.6. 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 operational risk charge for all business other than life insurance where the investment risk is borne by the policyholders

is determined as follows:

$$Op = \max (Op_{premiums} ; Op_{provisions})$$

where

$Op_{premiums} = 0.04 \cdot (Earn_{life} - Earn_{life-ul}) + 0.03 \cdot Earn_{non\text{-}life} +$

$\max (0, 0.04 \cdot (Earn_{life} - 1.1 \cdot pEarn_{life} - (Earn_{life-ul} - 1.1 \cdot pEarn_{life-ul}))) +$

$\max (0, 0.03 \cdot Earn_{non\text{-}life} - 1.1 \cdot pEarn_{non\text{-}life})$

and:

$$Op_{provisions} = 0.0045 \cdot \max(0, \; TP_{life} - TP_{life\text{-}ul}) + 0.03 \cdot \max(0, \; TP_{non\text{-}life})$$

SCR.4. SCR Intangible asset risk module

<u>Description</u>

SCR.4.1. Where intangible assets are recognised according to the specifications set out in subsection V.1 (see table in subsection V.1.4), the risks inherent to these items should be considered in the calculation of the SCR.

SCR.4.2. Intangible assets are exposed to two 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 undertaking).

<u>Input</u>

SCR.4.3. The input for this module is:

IA =   value of intangible assets according to subsection V.1

<u>Output</u>

SCR.4.4. The output for this module is the capital requirement for intangible assets, denoted as $SCR_{intangible}$

<u>Calculation</u>

$SCR_{intangible} = 0.8 \cdot IA$

SCR.5. SCR market risk module

SCR.5.2.   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.

SCR.5.2. Undertakings should calculate the capital requirement for market risk separately:

(a)   for participations as defined in Article 92(2) of Directive 2009/138/EC in financial and credit institutions,

(b)   for participations in related undertakings:

(i)   excluded from the scope of the group supervision[27] under Article 214 (a) of Directive 2009/138/EC; or

(ii)   deducted from the own funds eligible for the group solvency in accordance with Article 229 of Directive 2009/138/EC;

(c)   for other assets and liabilities.

The value of participations referred to in (a) are excluded from own funds. To avoid double counting, the capital requirement for market risk for these participations should be nil.

The capital requirement for market risk for investments in related undertakings referred to in point 1 (b) should be equal to the loss in the basic own funds that would result from an instantaneous decrease of 100% in the value of these investments.

The capital requirement for market risk should be calculated as the sum of the capital requirement corresponding to points (b) and (c).

The separate calculation of market risk for the participations referred to above is introduced for QIS5 purposes to facilitate the collection of data on these participations.

Input

SCR.5.3. The following input information is required[28]:

Mkt_{int}^{Up} =   Capital requirement for interest rate risk for the "up" shock

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[27] Participations will only be considered to be excluded from the scope of group supervision where the related undertaking is situated in a third country where there are legal impediments to the transfer of information that is necessary to determine the value of that undertaking or the associated risks. For the purposes of QIS5, these related undertakings may include but, are not necessarily limited to those undertakings that are excluded from the scope of supplementary supervision under Article 3 (3) of the Insurance Groups Directive.

[28] Where for all subrisks the first seven capital requirements *Mkt* are not including the potential loss absorbing capacity of technical provisions.

Mkt_{int}^{Down} = Capital requirement for interest rate risk for the "down" shock

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

Mkt_{ip} = Capital requirement for illiquidity premium risk

$nMkt_{int}^{Up}$ = Capital requirement for interest rate risk for the "up" shock including the loss absorbing capacity of technical provisions

$nMkt_{int}^{Down}$ = Capital requirement for interest rate risk for the "down" shock including the loss absorbing capacity of technical provisions

$nMkt_{prop}$ = Capital requirement for property risk including the loss absorbing capacity of technical provisions

$nMkt_{sp}$ = Capital requirement for spread risk including the loss-absorbing capacity of technical provisions

$nMkt_{conc}$ = Capital requirement for concentration risk including the loss-absorbing capacity of technical provisions

$nMkt_{fx}$ = Capital requirement for currency risk including the loss-absorbing capacity of technical provisions

$nMkt_{eq}$ = Capital requirement for equity risk including the loss-absorbing capacity of technical provisions

$nMkt_{ip}$ = Capital requirement for illiquidity premium risk including the loss-absorbing capacity of technical provisions

Output

SCR.5.4. 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

Calculation

SCR.5.5. The market sub-risks should be combined to an overall capital requirement SCR_{mkt} for market risk using a correlation matrix as follows:

$$SCR_{mkt} = \max\left(\begin{array}{c} \sqrt{\sum_{rxc} CorrMktUp_{r,c} \cdot Mkt_{up,r} \cdot Mkt_{up,c}} \; ; \\ \sqrt{\sum_{rxc} CorrMktDown_{r,c} \cdot Mkt_{down,r} \cdot Mkt_{down,c}} \end{array}\right)$$

where

$CorrMktUp_{r,c}$ =   the entries of the correlation matrix $CorrMktUP$

$Mkt_{up\ r,}, Mkt_{up,c}$ =   Capital requirements for the individual market risks under the interest rate up stress according to the rows and columns of the correlation matrix $CorrMktUp$

$CorrMktDown_{r,c}$ =   the entries of the correlation matrix $CorrMktDown$

$Mkt_{down,\ r,}, Mkt_{down,c}$ =   Capital requirements for the individual market risks under the interest rate down stress according to the rows and columns of the correlation matrix $CorrMktDown$

and the correlation matrices $CorrMktUp$ and $CorrMktDown$ are defined as:

CorrMktDown	Interest	Equity	Property	Spread	Currency	Concen-tration	Illiquidity premium
Interest	1						
Equity	0.5	1					
Property	0.5	0.75	1				
Spread	0.5	0.75	0.5	1			
Currency	0.25	0.25	0.25	0.25	1		
Concentration	0	0	0	0	0	1	
Illiquidity premium	0	0	0	-0.5	0	0	1

CorrMktUp	Interest	Equity	Property	Spread	Currency	Concen-tration	Illiquidity premium
Interest	1						
Equity	0	1					

Property	0	0.75	1				
Spread	0	0.75	0.5	1			
Currency	0.25	0.25	0.25	0.25	1		
Concentration	0	0	0	0	0	1	
Illiquidity premium	0	0	0	-0.5	0	0	1

SCR.5.6. Because the correlations for spread risk above are calibrated to spreads widening, a negative correlation between illiquidity premium risk and spread risk is set at -0.5.

SCR.5.7. The capital requirement for $nSCR_{mkt}$ is determined as follows:

$$nSCR_{mkt} = \max\left(\begin{array}{c} \sqrt{\sum_{rxc} CorrMktUP_{r,c} \cdot nMkt_{up,r} \cdot nMkt_{up,c}}\;; \\ \sqrt{\sum_{rxc} CorrMktDown_{r,c} \cdot nMkt_{down,r} \cdot nMkt_{down,c}} \end{array} \right)$$

SCR.5.3. Scenario-based calculations

SCR.5.8. 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 subsection SCR.1.1.

SCR.5.4. Look-through approach

SCR.5.9. 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.5.10. The same look-through approach should also be applied for other indirect exposures except for participations.

SCR.5.11. 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.5.12. The above recommendations should be applied to both passively and actively managed funds.

SCR.5.13. Where a collective investment scheme is not sufficiently transparent to allow a reasonable allocation of the investments, reference should be made to the investment mandate of the scheme. It should be assumed that the scheme invests in accordance with its mandate in such a manner as to produce the maximum overall capital requirement. For example, it should be assumed that the scheme invests assets in

each rating category, starting at the lowest category permitted by the mandate, to the maximum extent. If a scheme may invest in a range of assets exposed to the risks assessed under this module, then it should be assumed that the proportion of assets in each exposure category is such that the overall capital requirement is maximised.

SCR.5.14.   As a third choice to the look-through and mandate-based methods, undertakings should consider the collective investment scheme as an equity investment and apply the global equity risk stress (if the assets within the collective investment scheme are only listed in the EEA or OECD) or other equity stress (otherwise).

SCR.5.5. Mkt_{int} interest rate risk

Description

SCR.5.15.   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 applies to both real and nominal term structures.

SCR.5.16.   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.

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.

Input

SCR.5.17.   The following input information is required:

$$NAV \quad = \quad \text{Net value of assets minus liabilities}$$

Output

SCR.5.18.   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

$nMkt_{int}^{Up}$ =   Capital requirement for interest rate risk after upward shock including the loss absorbing capacity of technical provisions

$nMkt_{int}^{Down}$ =   Capital requirement for interest rate risk after downward shock including the loss absorbing capacity of technical provisions

Calculation

SCR.5.19.   The capital requirement for interest rate risk is determined as the result 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 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.5.20.   Where an undertaking is exposed to interest rate movements in more than one currency, the capital requirement for interest rate risk should be calculated based on the combined relative change on all relevant yield curves.

SCR.5.21.   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 $s^{down}(t)$
0.25	70%	-75%
0.5	70%	-75%
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%
21	26%	-29%
22	26%	-30%
23	26%	-30%
24	26%	-30%
25	26%	-30%
30	25%	-30%

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.

Note that for maturities greater than 30 years a stress of +25%/-30% should be maintained.

SCR.5.22.   Irrespective of the above stress factors, the absolute change of interest rates in the downward scenario should at least be one percentage point. Where the unstressed rate is lower than 1%, the shocked rate in the downward scenario should be assumed to be 0%. This constraint does not apply to index linked bonds (i.e. those which contain no material inflation risk).

SCR.5.23.   The interest rate scenarios should be calculated under the condition that the scenario does not change the value of future discretionary benefits in technical provisions.

SCR.5.24.   Additionally, the result of the scenarios should be determined under the condition that the value of future discretionary benefits can change and that undertaking is able to vary its assumptions in future bonus rates in response to the shock being tested.

SCR.5.25.   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:

If $nMkt_{int}^{Up} > nMkt_{int}^{Down}$ then $nMkt_{int} = \max(nMkt_{in}^{Up}, 0)$ and $Mkt_{int} = Mkt_{int}^{Up}$ if $nMkt_{int} > 0$ and $= 0$ otherwise

If $nMkt_{int}^{Down} \leq nMkt_{int}^{Down}$ then $nMkt_{int} = \max(nMkt_{int}^{Down}, 0)$ and $Mkt_{int} = Mkt_{int}^{Down}$ if $nMkt_{int} > 0$ and $= 0$ otherwise.

SCR.5.6. Mkt_{eq} equity risk

<u>Description</u>

SCR.5.26.   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.

SCR.5.27.   For the calculation of the risk capital requirement, hedging and risk transfer mechanisms should be taken into account according to the principles of subsection SCR.12. 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 subsection SCR.12.5. For example, where an equity option not part of such a rolling hedge program provides

protection for the next six months, as a simplification, undertakings should assume that the option only covers half of the current exposure.

<u>Input</u>

SCR.5.28.   The following input information is required:

NAV =   The net value of assets minus liabilities

<u>Output</u>

SCR.5.29.   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

<u>Calculation</u>

SCR.5.30.   Undertakings should calculate the capital requirement for equity risk separately:

(a)   for assets and liabilities referred to in point (i) of paragraph 1 of Article 304 of Directive 2009/138/EC,

(b)   for other assets and liabilities.

The capital requirement for equity risk should be calculated as the sum of the capital requirement corresponding respectively to point (a) and (b).

For the purpose of QIS5, the application of point (a) is set out below[29].

SCR.5.31.   For the determination of the capital requirement for equity risk, the following split is considered, equities is listed in regulated markets in the countries which are members of the EEA or the OECD ("Global equity" category), and other equities ("Other equity" category). "Other" comprises equity listed only in emerging markets, non-listed equity, hedge funds and any other investments not included elsewhere in the market risk module:

SCR.5.32.   The calculation is carried out as follows:

SCR.5.33.   In a first step, for each category i a capital requirement is determined as the result of a pre-defined stress scenario for category i as follows:

$$Mkt_{eq,i} = \max(\Delta NAV \mid equity\ shock_i ; 0)$$

where

$equity\ shock_i$ =   Prescribed fall in the value of equities in the

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[29] See "Special reference to assets and liabilities referred to in point (i) of paragraph 1 of Article 304 of Directive 2009/138/EC (duration-based approach)"

category *i*

$Mkt_{eq,i}$ = Capital requirement for equity risk with respect to category *i*,

and where the equity shock scenarios for the individual categories are specified as follows:

	Global	*Other*
equity shock$_i$	30%	40%

SCR.5.34.   Note that the stresses above takes account of a symmetric adjustment according to Article 106 of the Solvency II Framework Directive of **-9%**. The base levels of the two stresses are **39%** and **49%**.

SCR.5.35.   The capital requirement Mkt$_{eq,i}$ is determined as the immediate effect on the net value of asset and liabilities expected in the event of an immediate decrease of *equity shock$_i$* in value of equities belonging to category i taking account of all the participant's individual direct and indirect exposures to equity prices.

SCR.5.36.   For the determination of this capital requirement, all equities and equity type exposures have to be taken into account, including private equity as well as certain types of alternative investments, excluding equity owned in an undertaking part of the same group in which case the approach for the treatment of participations applies. The treatment of participations is as follows:

- The equity shock is nil for participations in financial and credit institutions.

- The equity shock is 22% for strategic participations, whether listed in regulated markets in the countries which are members of the EEA or the OECD (global equity) or not (other equity).

- other participations are subject to the equity shock as foreseen in the paragraphs above.

SCR.5.37.   Alternative investments should cover all types of equity type risk like hedge funds, derivatives, managed futures, investments in SPVs etc., which can not be allocated to spread risk or classical equity type risk, either directly, or through a look through test.

SCR.5.38.   The equity exposure of mutual funds should be allocated on a "look-through" basis as specified for collective investments funds in the subsection SCR.5.4.

SCR.5.39.   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	Global	Other
Global	1	
Other	0.75	1

SCR.5.40.   The equity scenarios should be calculated under the condition that the scenario does not change the value of future discretionary benefits in technical provisions.

SCR.5.41.   Additionally, the result of the scenarios should be determined under the condition that the value of future discretionary benefits can change and that undertaking is able to vary its assumptions in future bonus rates in response to the shock being tested. The resulting capital requirement is $nMkt_{eq}$.

Special reference to assets and liabilities referred to in point (i) of paragraph 1 of Article 304 of Directive 2009/138/EC (duration-based approach)

SCR.5.42.   For life insurance undertakings providing:

(a)   occupational-retirement-provision business in accordance with Article 4 of Directive 2003/41/EC, or

(b)   retirement benefits paid by reference to reaching, or the expectation of reaching, retirement where the premiums paid for those benefits have a tax deduction which is authorised to policyholders in accordance with the national legislation of the Member State that has authorised the undertaking;

and where

(i)   all assets and liabilities corresponding to this business are ring-fenced, managed and organised separately from the other activities of the insurance undertakings, without any possibility of transfer, and

(ii)   the activities of the undertaking related to points a) and b), in relation to which the approach referred to in this paragraph is applied, are carried out only in the Member State where the undertaking has been authorised, and

(iii)   the average duration of the liabilities corresponding to this business held by the undertaking exceeds an average of 12 years,

the equity risk capital requirement $Mkt_{eq,I,\,LEV}$ is 22% on the assets and liabilities corresponding to these business[30].

SCR.5.7. Mkt_{prop} property risk

Description

SCR.5.43.   Property risk arises as a result of sensitivity of assets, liabilities and financial investments to the level or volatility of market prices of property.

SCR.5.44.   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 insurance undertaking.

SCR.5.45.   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

- an investment in a company which took out loans from institutions outside the scope of the insurance group in order to leverage its investments in properties.

SCR.5.46.   Collective real estate investment vehicles should be treated like other collective investment vehicles with a look-through approach.

Input

SCR.5.47.   The following input information is required:

NAV =   Net value of assets minus liabilities

Output

SCR.5.48.   The module delivers the following output:

Mkt_{prop} =   Capital requirement for property risk[31]

$nMkt_{prop}$ =   Capital requirement for property risk including the loss

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[30] For QIS5 purposes, it is assumed that Member States authorize this specific treatment and that the undertakings receive supervisory approval (see Article 304 of the Solvency II Framework Directive (Directive 2009/138/EC).
[31]   Not including the potential loss absorbing capacity of technical provisions.

absorbing capacity of technical provisions

<u>Calculation</u>

SCR.5.49.   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.5.50.   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.5.51.   The property scenario should be calculated under the condition that the scenario does not change the value of future discretionary benefits in technical provisions.

SCR.5.52.   Additionally, the result of the scenario should be determined under the condition that the value of future discretionary benefits can change and that undertaking is able to vary its assumptions in future bonus rates in response to the shock being tested. The resulting capital requirement is $nMkt_{prop}$.

SCR.5.8. Mkt_{fx} currency risk

<u>Description</u>

SCR.5.53.   Currency risk arises from changes in the level or volatility of currency exchange rates.

SCR.5.54.   Undertakings may be exposed to currency risk arising from various sources, including their investment portfolios, as well as assets, liabilities and investments in related undertakings. The design of the currency risk sub-module is intended to take into account currency risk for an undertaking arising from all possible sources.

SCR.5.55.   The *local currency* is the currency in which the undertaking 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.5.56.   Note that for each relevant foreign currency C, 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.5.57.   Investments in listed equity should be assumed to be sensitive to the currency of its main listing. Non-listed equity and property should be assumed to be sensitive to the currency of its location.

Input

SCR.5.58.   The following input information is required:

NAV = Net value of assets minus liabilities

<u>Output</u>

SCR.5.59.   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

$nMkt_{fx}^{Up}$ = Capital requirement for currency risk after an upward shock including the loss absorbing capacity of technical provisions

$nMkt_{fx}^{Down}$ = Capital requirement for currency risk after a downward shock including the loss absorbing capacity of technical provisions

Calculation

SCR.5.60.   The capital requirement for currency risk is determined as the result of two pre-defined scenarios:

$$Mkt_{fx,C}^{Up} = \max(\Delta NAV \mid fxupward\ shock;0)$$

$$Mkt_{fx,C}^{Down} = \max(\Delta NAV \mid fxdownward\ shock;0)$$

SCR.5.61.   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.5.62.   All of the participant's individual currency positions and its investment policy (e.g. hedging arrangements, gearing etc.) should be taken into account. For each currency, the contribution to the capital requirement $Mkt_{fx,C}$ will then be determined as the maximum of the results $Mkt_{fx,C}^{Up}$ and $Mkt_{fx,C}^{Down}$. The total capital requirement Mkt_{fx} will be the sum over all currencies of $Mkt_{fx,C}$.

Special reference to currencies pegged to the euro

SCR.5.63.   The size of the shock for certain non euro but pegged currencies is as follows:

- Danish krone against any of EUR, Lithuanian litas or Estonian kroon = ±*2.25%*

- Estonian kroon against EUR or Lithuanian litas = ±0%

- Latvian lats against any of EUR, Lithuanian litas or Estonian kroon = ±1%

- Lithuanian litas against EUR or Estonian kroon = ±0%

- Latvian lats against Danish krone = ±3.5%

SCR.5.64. The currency scenarios should be calculated under the condition that the scenario does not change the value of future discretionary benefits in technical provisions.

SCR.5.65. Additionally, the result of the scenarios should be determined under the condition that the value of future discretionary benefits can change and that undertaking is able to vary its assumptions in future bonus rates in response to the shock being tested. The resulting capital requirements are $nMkt_{fx}^{Up}$ and $nMkt_{fx}^{Down}$.

SCR.5.66. 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:

If $nMkt_{fx}^{Up} > nMkt_{fx}^{Down}$ then $Mkt_{fx} = Mkt_{fx}^{Up}$ and $nMkt_{fx} = nMkt_{fx}^{Up}$.

If $nMkt_{fx}^{Up} \leq nMkt_{fx}^{Down}$ then $Mkt_{fx} = nMkt_{fx}^{Down}$ and $nMkt_{fx} = nMkt_{fx}^{Down}$.

SCR.5.9.Mkt$_{sp}$ spread risk

Description

SCR.5.67. 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.

SCR.5.68. The spread risk module applies in particular to the following classes of bonds:

- Investment grade corporate bonds
- High yields corporate bonds
- Subordinated debt
- Hybrid debt.

SCR.5.69. Furthermore, the spread risk module is applicable to all types of asset-backed securities as well as to all the tranches of structured credit products such collateralised debt obligations. This class of securities includes transactions of schemes whereby the credit risk associated with an exposure or pool of exposures is tranched, having the following characteristics:

- payments in the transaction or scheme are dependent upon the performance of the exposure or pool of exposures; and

- the subordination of tranches determines the distribution of losses during the ongoing life of the transaction or scheme.

SCR.5.70. For collateralised debt obligations it will be important to take into account the nature of the risks associated with the collateral assets. For example, in the case of a CDO-squared, the rating should take into account the risks associated with the CDO tranches held as collateral, i.e. the extent of their leveraging and the risks associated with the collateral assets of these CDO tranches

SCR.5.71. The spread risk sub-module will further cover in particular credit derivatives, for example (but not limited to) credit default swaps, total return swaps and credit linked notes that are not held as part of a recognised risk mitigation policy.

SCR.5.72. In relation to credit derivatives, only the credit risk which is transferred by the derivative is covered in the spread risk sub-module.

SCR.5.73. Instruments sensitive to changes in credit spreads may also give rise to other risks, which should be treated accordingly in the appropriate modules. For example, the counterparty default risk associated with the counterparty of a risk-mitigating transaction should be addressed in the counterparty default risk module, rather than in the spread risk sub-module.

SCR.5.74. The spread risk sub-module also covers the credit risk of other credit risky investments including in particular:

- participating interests

- debt securities issued by, and loans to, affiliated undertakings and undertakings with which an insurance undertaking is linked by virtue of a participating interest

- debt securities and other fixed-income securities

- participation in investment pools

- deposits with credit institutions

SCR.5.75. The design for the sub-module implies that credit spread risk hedging programmes can still be taken into account when calculating the capital requirement for this risk type. This enables undertakings to gain appropriate recognition of, and allowance for, their hedging instruments – subject to proper treatment of the risks inherent in the hedging programmes.

SCR.5.76. Input

SCR.5.77. The following input information is required:

MV_i	=	the value of the credit risk exposure i according to subsection V.1
$rating_i$	=	for corporate bonds, the external rating of credit risk exposure i
$duration_i$	=	for corporate bonds, the duration of credit risk exposure i

attach$_i$	=	for structured credit products, the attachment point of the tranche held
detach$_i$	=	for structured credit products, the detachment point of the tranche held
tenure$_i$	=	for structured credit products, the average tenure of the assets securitised
ratingdist$_i$	=	for structured credit products, a vector of the rating distribution in the asset pool securitised

SCR.5.78.   In cases where several ratings are available for a given credit exposure, the second-best rating should be applied.

Output

SCR.5.79.   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

Calculation

SCR.5.80.   The capital requirement for spread risk is determined as follows:

$$Mkt_{sp} = Mkt_{sp}^{bonds} + Mkt_{sp}^{struct} + Mkt_{sp}^{cd}$$

where:

Mkt_{sp}^{bonds}	=	the capital requirement for spread risk of bonds
Mkt_{sp}^{struct}	=	the capital requirement for spread risk of structured credit products
Mkt_{sp}^{cd}	=	the capital requirement for credit derivatives

Spread risk on bonds

SCR.5.81.   The capital requirement for spread risk of bonds is determined as the result of a pre-defined scenario :

$$Mkt_{sp}^{bonds} = \max(\Delta NAV \mid spread\ shock\ on\ bonds; 0)$$

SCR.5.82. The spread risk shock on bonds is the immediate effect on the net value of asset and liabilities expected in the event of an instantaneous decrease of values in bonds due to the widening of their credit spreads:

$$\sum_i MV_i \cdot duration_i \cdot F^{up}(rating_i)$$

where:

$F^{up}(rating_i)$ = a function of the rating class of the credit risk exposure which is calibrated to deliver a shock consistent with VaR 99.5% following a widening of credit spreads

SCR.5.83. To determine the spread risk capital requirement for bonds, the following factors F^{up} should be used:

Spread risk factors for bonds

	F^{up}	Duration Floor	Duration Cap
AAA	0,9%	1	36
AA	1,1%	1	29
A	1,4%	1	23
BBB	2,5%	1	13
BB	4,5%	1	10
B or lower	7,5%	1	8
Unrated	3,0%	1	12

SCR.5.84. The factors F^{up} are applied to assess the impact of a widening of spreads on the value of bonds. For example, for a AAA-rated bond with a duration of 5 years a loss in value of 4,5% would be assumed under the widening of spreads scenario.

SCR.5.85. The shock factors of function F^{up} will be multiplied with the modified duration of a bond. For variable interest rate bonds, the modified duration used in the calculation should be equivalent to a fixed income bond with coupon payments equal to the forward interest rate.

SCR.5.86. For unrated bonds, the issuer rating could be used as a proxy if the unrated bond does not inhibit any specificities which detriment credit quality, e.g. subordination.

Special reference to mortgage covered bonds and public sector covered bonds

SCR.5.87. In order to provide mortgage covered bonds and public sector covered bonds with a treatment in spread risk sub-module according their specific risk features, the risk factor F^{up} applicable should be 0,6% and the duration cap should be 53 years when all the following requirements are met:

- the asset has a AAA credit quality

- the covered bond meets the requirements defined in Article 22(4) of the UCITS directive 85/611/EEC

Special reference to exposures to governments, central banks, multilateral development banks and international organisations

SCR.5.88.   No capital requirement should apply for the purposes of this sub-module to borrowings by or demonstrably guaranteed by national government of an EEA state, issued in the currency of the government, or issued by a multilateral development bank as listed in Annex VI, Part 1, Number 4 of the Capital Requirements Directive (2006/48/EC) or issued by an international organisation listed in Annex VI, Part 1, Number 5 of the Capital Requirements Directive (2006/48/EC) or issued by the European Central Bank.

SCR.5.89.   To determine the spread 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 factors Fup should be used:

Spread risk factors for exposures to non-EEA governments and central banks denominated and funded in the domestic currency

	F^{up}	Duration Floor	Duration Cap
AAA	0%	--	--
AA	0%	--	--
A	1,1%	1	29
BBB	1,4%	1	23
BB	2,5%	1	13
B or lower	4,5%	1	10
Unrated	3,0%	1	12

SCR.5.90.   In order to allow an analysis of the impact of these provisions, undertakings should disclose their exposures to government and central banks.

Spread risk on structured products

SCR.5.91.   The capital requirement for spread risk of structured credit products[32] is determined as the result of two pre-defined scenarios:

$$Mkt^{struct}_{sp,underlying} = \max(\Delta NAV \mid spread\ shock\ on\ underlying\ assets\ of\ structured\ products; 0)$$

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[32] When Solvency 2 is in place, if the originator or sponsor of a structure credit product issued after 1 January 2011 or where underlying exposures are added or substituted after 31 December 2014 does not comply with the 5% net retention rate foreseen in the CRD (2006/48/EC), the capital requirement for the product should be 100%, regardless of the seniority of the position. For the purposes of QIS5, such specific treatment should not be applied. Undertakings are however required to fill the relevant questions in the questionnaire.

$$Mkt_{sp,direct}^{struct} = \max(\Delta NAV \mid directspread\ shock\ on\ structured\ products; 0)$$

SCR.5.92.   The spread shock on underlying assets of structured products is the immediate effect on the net asset value expected in the event of the following instantaneous decrease of values in structured products due to the widening of the credit spreads of bonds of the underlying assets:

$$\sum_i MV_i \frac{(G(ratingdist_i, tenure_i) - attach_i)}{detach_i - attach_i}$$

where

$G(ratingdist_i, tenure_i)$ = a function[33] of the rating class and tenure of the credit risk exposure within a securitised asset pool which is calibrated to deliver a shock consistent with VaR 99.5%

SCR.5.93.   The function G is determined as follows:

$G(ratingdist_i, tenure_i)$	AAA	AA	A	BBB	BB	B	CCC or lower	Unrated
[0-2 years[	0.4%	0.9%	2.8%	5.3%	14.6%	31.1%	52.7%	6.3%
[2-4 years[	0.8%	1.7%	4.9%	9.6%	23.9%	44.8%	66.6%	11.4%
[4-6 years[	1.2%	2.8%	6.5%	13.1%	30.1%	51.2%	70.7%	15.7%
[6-8 years[	1.8%	4.1%	8.4%	16.4%	35.3%	55.0%	72.6%	19.6%
8+ years	2.4%	5.3%	10.3%	19.6%	39.3%	57.8%	73.5%	23.5%

SCR.5.94.   The direct spread shock on structured products is the immediate effect on the net asset value expected in the event of the following instantaneous decrease of values in structured products due to the widening of their credit spreads:

$$\sum_i MV_i \bullet duration_i \bullet F^{'up}(rating_i)$$

where:

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[33] This function is derived from two other functions. See Annex S for the details of the calculations.

$F^{,up}(rating_i)$ =   a function of the rating class of the credit risk exposure which is calibrated to deliver a shock consistent with VaR 99.5% following a widening of credit spreads

SCR.5.95.   To determine the spread risk capital requirement for structured products, the following factors $F^{,up}$ should be used:

Spread risk factors for structured products (direct spread shock)

	$F^{,up}$	Duration Floor	Duration Cap
AAA	0,9%	1	36
AA	1,1%	1	29
A	1,4%	1	23
BBB	2,5%	1	13
BB	6,75%	1	10
B or lower	11,25%	1	8
Unrated	3,0%	1	12

SCR.5.96.   The factors $F^{,up}$ are applied to assess the impact of a widening of spreads on the value of structured products. For example, for a AAA-rated structured product with a duration of 5 years a loss in value of 4.5% would be assumed under the widening of spreads scenario.

SCR.5.97.   The capital requirement for spread risk on structured products is derived from the type of shock that gives rise to the highest capital requirement including the loss absorbing capacity of technical provisions:

If $nMkt^{struct}_{sp,underlying} > nMkt^{struct}_{sp,direct}$ then $Mkt_{sp}{}^{struct} = Mkt^{struct}_{sp,underlying}$ and $nMkt_{sp}{}^{struct} = nMkt^{struct}_{sp,underlying}$.

If $nMkt^{struct}_{sp,underlying} \leq nMkt^{struct}_{sp,direct}$ then $Mkt_{sp}{}^{struct} = Mkt^{struct}_{sp,direct}$ and $nMkt_{sp}{}^{struct} = nMkt^{struct}_{sp,direct}$.

Spread risk on credit derivatives

SCR.5.98.   For credit derivatives a scenario-based approach is followed. Credit derivatives encompass credit default swaps (CDS), total return swaps (TRS), and credit linked notes (CLN), where:

- the undertaking does not hold the underlying instrument or another exposure where the basis risk between that exposure and the underlying instrument is immaterial in all possible scenarios; or

- the credit derivative is not part of the undertaking's risk mitigation policy.

SCR.5.99.   The capital requirement for spread risk of credit derivatives is determined as the result of two pre-defined scenario :

$$Mkt_{sp,upward}^{cd} = \max(\Delta NAV \mid upward\ spread\ shock\ on\ credit\ derivatives;0)$$

$$Mkt_{sp,downward}^{cd} = \max(\Delta NAV \mid downward\ spread\ shock\ on\ credit\ derivatives;0)$$

SCR.5.100.   The upward (respectively downward) spread risk shock on credit derivatives is the immediate effect on the net value of asset and liabilities, after netting with offsetting corporate bond exposures, expected in the event of an instantaneous widening (respectively decrease) of the credit spreads of credit derivatives of the following magnitude:

Spread risk factors for credit derivatives

	Widening of the spreads (in absolute terms)	Decrease of the spreads (in relative terms)
AAA	+130 bp	-75%
AA	+150 bp	-75%
A	+260 bp	-75%
BBB	+450 bp	-75%
BB	+840 bp	-75%
B or lower	+1620 bp	-75%
Unrated	+500 bp	-75%

SCR.5.101.   The capital requirement for spread risk on credit derivatives derived from the type of shock that gives rise to the highest capital requirement including the loss absorbing capacity of technical provisions:

If $nMkt_{sp,upward}^{cd} > nMkt_{sp,downward}^{cd}$ then $Mkt_{sp}^{cd} = Mkt_{sp,upward}^{cd}$ and $nMkt_{sp}^{cd} = nMkt_{sp,upward}^{cd}$.

If $nMkt_{sp,upward}^{cd} \leq nMkt_{sp,downward}^{cd}$ then $Mkt_{sp}^{cd} = Mkt_{sp,downward}^{cd}$ and $nMkt_{sp}^{cd} = nMkt_{sp,downward}^{cd}$.

Simplified calculations for the spread risk on bonds

SCR.5.102.   The following simplification may be used provided:

  a. The simplification is proportionate to the nature, scale and complexity of the risks that the undertaking faces.

  b. The standard calculation of the spread risk sub-module is an undue burden for the undertaking.

SCR.5.103.   The simplification is defined as follows:

$$Mkt_{sp}^{bonds} = MV^{bonds} \cdot \sum_i \%MV_i^{bonds} \bullet F^{up}(rating_i) \bullet duration_i + \Delta Liab_{ul}$$

where:

MVbonds	=	Total market value of bond portfolio
$\%Mv_i^{bonds}$	=	Proportion of bond portfolio at rating i
F^{up}	=	Defined as in the standard calculation
$duration_i$	=	Average duration of bond portfolio at rating i, weighted with the market value of the bonds

and where *ΔLiab_{ul}* is the overall impact on the liability side for policies where the policyholders bear the investment risk with embedded options and guarantees of the stressed scenario, with a minimum value of 0 (sign convention: positive sign means losses). The stressed scenario is defined as a drop in value on the assets by

$$MV \cdot \sum_i \%MV_i \bullet F^{up}(rating_i) \bullet duration_i$$

SCR.5.10.   Mkt_{conc} market risk concentrations

Description

SCR.5.104.   The scope of the concentration risk sub-module extends to assets considered in the equity, spread risk and property risk sub-modules, and excludes assets covered by the counterparty default risk module in order to avoid any overlap between both elements of the standard calculation of the SCR.

SCR.5.105.   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.5.106.   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.5.107.   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.5.108.   According to an economic approach, exposures which belong to the same 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 exposures. The legal entities of the group or the conglomerate considered in the

calculation of own funds should be treated as one exposure in the calculation of the capital requirement.

<u>Input</u>

SCR.5.109.   Risk exposures in assets need to be grouped according to the counterparties involved.

E_i	=	Exposure at default to counterparty i
$Assets_{xl}$	=	Total amount of assets considered in this sub-module.
$rating_i$	=	External rating of the counterparty i

SCR.5.110.   Where an undertaking has more than one exposure to a counterparty then E_i is the aggregate of those exposures at default. $Rating_i$ should be a weighted rating determined as the rating corresponding to a weighted average credit quality step, calculated as:

Weighted average credit quality step = rounded average of the credit quality steps of the individual exposures to that counterparty, weighted by the net exposure at default in respect of that exposure to that counterparty

For the purpose of this calculation, credit quality steps 1A and 1B should be assigned a value of 0 and 1 respectively.

SCR.5.111.   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.5.112.   Exposures via investment funds or such entities whose activity is mainly the holding and management of an undertaking'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'.

<u>Output</u>

SCR.5.113.   The module delivers the following outputs:

Mkt_{conc}	=	Total capital requirement concentration risk sub-module

<u>Calculation</u>

SCR.5.114.   The calculation is performed in three steps: (a) excess exposure, (b) risk concentration capital requirement per 'name', (c) aggregation.

SCR.5.115.   The excess exposure is calculated as:

$$XS_i = \max\left(0; \frac{E_i}{Assets_{xl}} - CT\right),$$

where the concentration threshold CT, depending on the rating of counterparty i, is set as follows:

rating$_i$	Concentration threshold (CT)
AA-AAA	3%
A	3%
BBB	1.5%
BB or lower	1.5%

and where *Assets$_{xl}$* is the total amount of assets considered in the concentration risk sub-module should not include:

a. assets held in respect of life insurance contracts where the investment risk is borne by the policyholders;

b. exposures of an insurance or reinsurance undertaking to a counterparty which belongs to the same group as defined in Article 212 of Directive 2009/138/EC, provided that the following conditions are met:

  –   the counterparty is an insurance or reinsurance undertaking or a financial holding company, asset management company or ancillary services undertaking subject to appropriate prudential requirements;

  –   the counterparty is included in the same consolidation as the undertaking on a full basis;

  –   there is no current or foreseen material practical or legal impediment to the prompt transfer of own funds or repayment of liabilities from the counterparty to the undertaking.;

c. assets covered in the counterparty default risk module.

SCR.5.116.   The risk concentration capital requirement per 'name' i is calculated as the result of a pre-defined scenario:

Conc$_i$ =ΔNAV|concentration shock

The concentration risk shock on a name 'i' is the immediate effect on the net value of asset and liabilities expected in the event of an instantaneous decrease of values of $XS_i \cdot g_i$ in the concentrated exposure where the parameter g, depending on the credit rating of the counterparty, is determined as follows:

rating$_i$	Credit Quality Step	g_i
AAA	1A	0.12

AA	1B	0.12
A	2	0.21
BBB	3	0.27
BB or lower	4– 6	0.73

For unrated counterparties that are (re)insurance undertakings that will be subject to Solvency 2 and that would meet their MCR, the parameter g, depending on the solvency ratio (own funds/SCR), is determined as follows:

Solvency ratio	g_i
>175%	0.12
>150%	0.21
>125%	0.27
<125%	0.73

For other unrated counterparties, the parameter g should be 0.73.

SCR.5.117.   The capital requirement for concentration risk is determined assuming no correlation among the requirements for each counterparty i.

$$Mkt_{conc} = \sqrt{\sum_i \left(Conc_i^2 \right)}$$

SCR.5.118.   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

Special reference to mortgage covered bonds and public sector covered bonds

SCR.5.119.   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 threshold applicable should be 15% when all the following requirements are met:

- the asset has a AA credit quality

- the covered bond meets the requirements defined in Article 22(4) of the UCITS directive 85/611/EEC

Concentration risk capital in case of properties

SCR.5.120.   Undertakings should identify the exposures in a single property higher than 10 per cent of 'total assets' (concentration threshold) considered in this sub-module according to paragraphs above (subsection *description*). Government bonds should be included in this amount, notwithstanding the exemption specified below.

SCR.5.121.   For this purpose the undertaking should take into account both 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.5.122.   Properties located in the same building or sufficiently nearby should be considered a single property.

SCR.5.123.   The risk concentration capital requirement per property i is calculated as the result of a pre-defined scenario:

$Conc_i = \Delta NAV|concentration\ shock$

The concentration risk shock on a property 'i' is the immediate effect on the net value of asset and liabilities expected in the event of an instantaneous decrease of values of $0.12 \cdot XS_i$ in the concentrated exposure.

Special reference to exposures to governments, central banks, multilateral development banks and international organisations

SCR.5.124.   No capital requirement should apply for the purposes of this sub-module to borrowings by or demonstrably guaranteed by national government of an EEA state, issued in the currency of the government, or issued by a multilateral development bank as listed in Annex VI, Part 1, Number 4 of the Capital Requirements Directive (2006/48/EC) or issued by an international organisation listed in Annex VI, Part 1, Number 5 of the Capital Requirements Directive (2006/48/EC) or issued by the European Central Bank.

SCR.5.125.   To determine the spread 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* should be used:

Concentration risk factors for exposures to non-EEA governments and central banks denominated and funded in the domestic currency

rating$_i$	Credit Quality Step	g^*_i
AAA	1A	0
AA	1B	0
A	2	0.12
BBB	3	0.21
BB	4	0.27
B or lower, unrated	5– 6, -	0.73

Special reference to exposures to bank deposits

SCR.5.126. Bank deposits considered in the concentration risk sub-module[34] 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 undertaking and provided there is no double-counting of such guarantee with any other element of the SCR calculation.

Special reference to participations

SCR.5.127. No capital requirement should apply for the purposes of this sub-module to exposures of undertakings to a counterparty which belongs to the same group as defined in Article 212 of Directive 2009/138/EC, provided that the following conditions are met:

– the counterparty is an insurance or reinsurance undertaking or a financial holding company, asset management company or ancillary services undertaking subject to appropriate prudential requirements;

– the counterparty is included in the same consolidation as the undertaking on a full basis;

– there is no current or foreseen material practical or legal impediment to the prompt transfer of own funds or repayment of liabilities from the counterparty to the undertaking.;

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SCR.5.11. Mkt_{ip} illiquidity premium risk

Description

SCR.5.128. As the illiquidity premium observed in the financial markets is recognised in the calculation of technical provisions, the market risk module should capture the illiquidity premium risk.

SCR.5.129. Illiquidity premium risk arises from the risk of increase of the value of technical provisions due to a decrease in the illiquidity premium.

SCR.5.130. The effect of an increase of the illiquidity premium is captured in the calibration of the spread risk module.

Input

SCR.5.131. The following input information is required:

NAV = Net value of assets minus liabilities

Output

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[34] 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 spread risk sub-module..

SCR.5.132.   The module delivers the following output:

Mkt_{ip} =   Capital requirement for illiquidity premium risk[35]

$nMkt_{ip}$ =   Capital requirement for illiquidity premium risk including the loss-absorbing capacity of technical provisions

Calculation

SCR.5.133.   The capital requirement for illiquidity premium risk is determined as the result of a pre-defined scenario:

$$Mkt_{ip} = \max(\Delta NAV \mid illiquity\ premium\ shock; 0)$$

SCR.5.134.   The illiquidity premium shock is the immediate effect on the net value of asset and liabilities expected in the event of a 65% fall in the value of the illiquidity premium observed in the financial markets[36].

SCR.5.135.   The scenario for illiquidity premium risk should be calculated under the condition that the assumptions on future bonus rates (reflected in the valuation of future discretionary benefits in technical provisions) remain unchanged before and after the shock being tested.

SCR.5.136.   Additionally, the result of the scenario should be determined under the condition that the participant is able to vary its assumptions in future bonus rates in response to the shock being tested. The resulting capital requirement is $nMkt_{ip}$.

SCR.5.12.   Treatment of risks associated to SPV notes held by an undertaking

SCR.5.137.   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[37] and meet the requirements set out in Article 211 of Directive 2009/138/EC and rated BBB or better: Their risks should be considered in the 'spread risk', 'interest rate risk' and concentration sub-modules according its rating.

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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[35]   Not including the potential loss absorbing capacity of technical provisions.
[36] The calibration of this shock is explained in Annex A.
[37] "special purpose vehicle" means any undertaking, whether incorporated or not, other than an existing insurance or reinsurance undertaking, which assumes risks from insurance or reinsurance undertakings 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 reinsurance obligations of such an undertaking

SCR.6. SCR Counterparty risk module

SCR.6.1.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 undertakings over the forthcoming twelve months. The scope of the counterparty default risk module includes risk-mitigating contracts, such as reinsurance 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.

SCR.6.2.   For each counterparty, the counterparty default risk module should take account of the overall counterparty risk exposure of the undertaking concerned to that counterparty, irrespective of the legal form of its contractual obligations to that undertaking.

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.   The class of type 1 exposures covers the exposures which may not be diversified and where the counterparty is likely to be rated. The class should consist of exposures in relation to

- reinsurance arrangements,

- securitisations and derivatives,

- any other risk mitigating contracts,

- cash at bank,

- deposits with ceding institutions, if the number of independent counterparties does not exceed 15,

- capital, initial funds, letters of credit as well as any other commitments received by the undertaking which have been called up but are unpaid, if the number of independent counterparties does not exceed 15, and

- guarantees, letters of credit, letters of comfort which the undertaking has provided as well as any other commitments which the undertaking has provided and which depend on the credit standing of a counterparty.

SCR.6.5.   For determining the number of independent counterparties, counterparties which belong to the same 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.6.6. The class of type 2 exposures covers the exposures which are usually diversified and where the counterparty is likely to be unrated. The class of type 2 exposure should consist of all exposures which are in the scope of the module and are not of type 1, in particular

- receivables from intermediaries,

- policyholder debtors, including mortgage loans,

- deposits with ceding institutions, if the number of independent counterparties exceeds 15, and

- capital, initial funds, letters of credit as well as any other commitments received by the undertaking which have been called up but are unpaid, if the number of independent counterparties exceeds 15.

SCR.6.7. Undertaking 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, undertakings must then classify all such exposures as type 1 or as type 2.

Input

SCR.6.8. The following input information is required in relation to type 1 exposures:

$Recoverables_i$	=	Best estimate recoverables from the reinsurance contract (or SPV) i plus any other debtors arising out of the reinsurance arrangement or SPV securitisation
$MarketValue_i$	=	Value of the derivative i according to subsection V.1
$Collateral_i$	=	Risk-adjusted value of collateral in relation to the reinsurance 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 subsection V.1 of the guarantee, letter of credit, letter of comfort or similar commitment i
SCR^{hyp}	=	The (hypothetical) capital requirement for underwriting and market risk under the condition that the risk mitigating effect of the reinsurance arrangement, SPV or derivative of a particular counterparty is not taken into account in its calculation. These values are only determined for the purpose of the counterparty default risk module
$SCR^{without}$	=	The capital requirements for underwriting risk and market risk without any amendments. These are the requirements as defined in the sections on underwriting risks and market risk. They are available

		as soon as the calculations of the particular modules have been made
$Rating_i$	=	Rating of counterparty in relation reinsurance, SPV, derivative, guarantee, letter of credit, letter of comfort or similar commitment i

SCR.6.9.   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.
$E_{past\text{-}due}$	=	Sum of the values of receivables from intermediaries which are due for more than 3 months.

Output

SCR.6.10.   The module delivers the following output:

SCR_{def}	=	Capital requirement for counterparty default risk
$nSCR_{def}$	=	Capital requirement for counterparty default risk including the risk absorbing capacity of technical provisions

Calculation

SCR.6.11.   The capital requirements for type 1 and type 2 exposures should be calculated separately. A low 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.6.12.   Additionally, undertakings should determine the capital requirement for counterparty default risk including the risk absorbing capacity of technical provisions $nSCR_{def}$ as the loss in net asset value resulting from a counterparty default loss of the amount SCR_{def}. The result of the scenario should be determined under the condition that the value of future discretionary benefits can change and that undertakings are able to vary its assumptions in future bonus rates in response to the shock being tested.

SCR.6.2. Calculation of capital requirement for type 1 exposures

SCR.6.13.   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:

$$SCR_{def,1} = \begin{cases} 3 \cdot \sqrt{V} & if \ \sqrt{V} \leq 5\% \cdot \sum_i LGD_i \\ \min\left(\sum_i LGD_i; 5 \cdot \sqrt{V}\right) & else \end{cases},$$

where the sum is taken over all independent counterparties with type 1 exposures and

LGD_i = Loss-given-default for type 1 exposure of counterparty i

V = Variance of the loss distribution of the type 1 exposures

SCR.6.14.   For the calculation of the variance V of the loss distribution, the following summations of loss-given-default values are relevant. For each rating class j, y_j and z_j are defined as follows:

$$y_j = \sum_i LGD_i \ \text{ and } \ z_j = \sum_i (LGD_i)^2,$$

where sums run over all independent counterparties i in the rating class j.
The variance V of the loss distribution is then calculated as follows:

$$V = \sum_j \sum_k u_{j,k} \cdot y_j \cdot y_k + \sum_j v_j \cdot z_j$$

where j and k in the sums run over all rating classes and u_{jk} and v_j are fixed parameters which only depend on the rating classes, with

$$u_{ij} = \frac{p_i(1-p_i)p_j(1-p_j)}{(1+\gamma)(p_i+p_j)-p_ip_j} \qquad v_i = \frac{(1+2\gamma)p_i(1-p_i)}{2+2\gamma-p_i} \ \text{ with } \gamma = 0.25$$

and where p denotes the probability of default. For QIS5 this should be set as follows:

Rating$_i$	Credit Quality Step	p_i
AAA	1	0.002%
AA		0.01%
A	2	0.05%
BBB	3	0.24%
BB	4	1.20%
B	5	6.04%
CCC or lower	6	30.41%

SCR.6.15.   In cases where more than one rating is available for a counterparty, the second-highest rating should be used.

Counterparties without a credit rating

SCR.6.16.   For unrated counterparties that are undertakings that will be subject to Solvency 2 and that would meet their MCR, the probability of default, depending on the solvency ratio (own funds/SCR), is determined as follows:

Solvency ratio	p_i
>200%	0.025%
>175%	0.050%
>150%	0.1%
>125%	0.2%
>100%	0.5%
>90%	1%
>80%	2%
≤80%	10%

For unrated counterparties that are undertakings that will be subject to Solvency 2 and that would not meet their MCR, the probability of default should be 30%.

For other unrated counterparties, the probability of default should be 10%.

Counterparties which belong to the same group

SCR.6.17.   If an undertaking has more than several counterparty which are not independent (for example because they belong to one group) then it is necessary to assign a probability of default to the whole set of dependent counterparties. This overall probability of default should be average probability of the counterparties weighted with the corresponding losses given-default.

Banks

SCR.6.18.   Unrated banks compliant with the Capital Requirements Directive (2006/48/EC) should be treated as if having a BBB rating.

SCR.6.3.Loss-given-default for risk mitigating contracts

SCR.6.19.   The LGD of an exposure is conceptually defined to be the loss of basic own funds which the insurer would incur if the counterparty defaulted.

SCR.6.20.   In case of default, typically a part of the exposure can still be collected. In order to allow for the potential recovery of the counterparty, the LGD is amended by a factor $(1 - RR)$ where RR denotes the recovery rate of the counterparty. The recovery rate may be different for reinsurance arrangements and securitisations on one hand and for derivatives on the other hand.

SCR.6.21.   For a reinsurance arrangement or securitisation *i*, the loss-given-default LGD_i should be calculated as follows:

$$LGD_i = \max\left(50\% \cdot \left(\mathrm{Re\,cov\,} erables_i + RM_{re,i} - Collateral_i\right);0\right),$$

where

$Recoverables_i$ = Best estimate recoverables from the reinsurance contract (or SPV) *i* plus any other debtors arising out of the reinsurance arrangement or SPV securitisation

$RM_{re,i}$ = Risk mitigating effect on underwriting risk of the reinsurance arrangement or SPV securitisation i

$Collateral_i$ = Risk-adjusted value of collateral in relation to the reinsurance arrangement or SPV securitisation i.

SCR.6.22.   However, if a reinsurance counterparty has tied up an amount for collateralisation commitments (both on and off balance sheet, including commitments) greater than 60% of the assets on its balance sheet, the loss-given-default LGD_i should be calculated as follows:

SCR.6.23.

$$LGD_i = \max\left(90\% \cdot \left(\mathrm{Re\,cov\,} erables_i + RM_{re,i} - Collateral_i\right);0\right),$$

where

$Recoverables_i$ = Best estimate recoverables from the reinsurance contract (or SPV) *i* plus any other debtors arising out of the reinsurance arrangement or SPV securitisation

$RM_{re,i}$ = Risk mitigating effect on underwriting risk of the reinsurance arrangement or SPV securitisation *i*

$Collateral_i$ = Risk-adjusted value of collateral in relation to the reinsurance arrangement or SPV securitisation *i*.

SCR.6.24.   The best estimate of the $Recoverables_i$ might be netted with liabilities towards the same legal entity to the extent they could be set off in case of the default of the legal entity. For this purpose, liabilities should be valued according to subsection V.1.

SCR.6.25.   For a derivative *i*, the loss-given-default LGD_i should be calculated as follows:

$$LGD_i = \max\left(90\% \cdot \left(MarketValue_i + RM_{fin,i} - Collateral_i\right);0\right),$$

where

$MarketValue_i$ = Value of the derivative *i* according to subsection V.1.

$RM_{fin,i}$ = Risk mitigating effect on market risk of the derivative *i*

$Collateral_i$ = Risk-adjusted value of collateral in relation to the derivative *i*.

Calculation of the risk mitigating effect

SCR.6.26.   The risk mitigating effects $RM_{re,i}$ and $RM_{fin,i}$ are defined as the difference between the following two capital requirements:

- The (hypothetical) capital requirement for underwriting and market risk under the condition that the risk mitigating effect of the reinsurance arrangement, SPV or derivative of a particular counterparty is not taken into account in its calculation (SCR^{hyp}). These values are only determined for the purpose of the counterparty default risk module.

- The capital requirements for underwriting risk and market risk without any amendments ($SCR^{without}$). These are the requirements as defined in the sections on underwriting risks and market risk. They are available as soon as the calculations of the particular modules have been made.

SCR.6.27.   The hypothetical capital requirement in relation to counterparty (i) is determined by a recalculation of the modules which are affected by the risk mitigating contracts with that counterparty. This should be done for life reinsurance and for derivatives as follows:

The scenario outcome should be reassessed assuming that the risk-mitigating contract with counterparty (i) will not provide any compensation for the losses incurred under the scenario.

SCR.6.28.   In particular, if a module of the SCR did not allow for the risk mitigating effect of the risk-mitigating contract with counterparty (i) in the calculation of the capital requirement without any amendments, the two capital requirements coincide and $RM_{re,i}$ and $RM_{fin,i}$ are zero.

SCR.6.29.   For non-life reinsurance, the following method should be applied. If the reinsurance treaties with a counterparty affect only one non-life line of business, then the difference $SCR_{nl}^{hyp} - SCR_{nl}^{without}$ should be approximated by the following term:

$$\sqrt{\begin{array}{l}\left(NL_{cat}^{hyp} - NL_{cat}^{without}\right)^2 + \left(3\sigma_{(\text{prem,lob})} \cdot \left(P_{lob}^{hyp} - P_{lob}^{without}\right)\right)^2 + \left(3\sigma_{(\text{res,lob})} \cdot recoverables\right)^2 \\ + 9\sigma_{(\text{prem,lob})} \cdot \left(P_{lob}^{hyp} - P_{lob}^{without}\right) \cdot \sigma_{(\text{res,lob})} \cdot recoverables\end{array}}$$

where

$\left(NL_{cat}^{hyp} - NL_{cat}^{without}\right) = $ Counterparty's share of CAT losses

$\left(P_{lob}^{hyp} - P_{lob}^{without}\right) = $ Reinsurance premium of the counterparty in the affected line of business

recoverables = Reinsurance recoverables in relation to the counterparty in the affected line of business

$\sigma_{(prem,lob)}$ = Standard deviation for premium risk in the affected line of business as used in the premium and reserve risk sub-module

$\sigma_{(res,lob)}$ = Standard deviation for reserve risk in the affected line of business as used in the premium and reserve risk sub-module

SCR.6.30.   If the reinsurance treaties with a counterparty affect more than one non-life line of business, the terms defined above for each line of business can be summed up to determine an approximation for $SCR_{nl}^{hyp} - SCR_{nl}^{without}$.

Where a risk mitigation instrument transfers both underwriting risk and market risk, the risk mitigating effect should be given by the aggregation (assuming a correlation factor of 0.25) between the risk-mitigating effect in relation to underwriting risk and the risk-mitigating effect in relation to market risk.

SCR.6.4.Loss-given-default for type 1 exposures other than risk mitigating contracts

SCR.6.31.   For cash at bank, deposits with ceding institutions and unpaid but called up capital the loss-given-default should be the value of the corresponding asset according to subsection V.1.

SCR.6.32.   For guarantees, letters of credit, letters of comfort and other commitment which depend on the credit standing of a counterparty the loss-given default should be the difference between their nominal value and their value according to subsection V.1.

SCR.6.33.   If in relation to a counterparty more than one type 1 exposures exist, then the loss-given-default for this counterparty should be the sum of the losses-given-default of the single exposures assignment.

SCR.6.5.Calculation of capital requirement for type 2 exposures

SCR.6.34.   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.6.35.   The counterparty default risk shock on type 2 exposures is the immediate effect on the net value of asset and liabilities expected in the event of a fall in the value of the type 2 exposures as follows:

$$15\% \cdot E + 90\% \cdot E_{past-due},$$

where

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.

Additional information on mortgage loans

SCR.6.36.   Where relevant, undertakings should disclose these additional information, separately for residential and commercial properties:

$$\sum_i Exposure_i$$ =   the total mortgage exposure to all borrowers (*i* denotes borrower *i*)

$$\sum_i Secured_i$$ =   the fully and completely secured part of the exposure to all borrowers (*i* denotes borrower *i*)

$$\sum_i \max(Exposure_i - Secured_i; 0)$$ =   The unsecured part of the exposure to all borrowers (*i* denotes borrower *i*)

The fully and completely secured part of the exposure is that part of the mortgage exposure that is covered by real estate property, after application of a haircut to the value of the real estate property. It should also meet the conditions given in Directive 2006/48/EC, appendix VI section 9.

The haircut to be applied to the value of the real estate property is 25% for residential real estate property and 50% for commercial real estate property. Therefore, the fully and completely secured part of the exposure is equal to 75% of the value of residential real estate property, and 50% of the value of commercial real estate property.

SCR.6.6.Treatment of risk mitigation techniques

SCR.6.37.   The counterparty default risk module should take into account techniques to mitigate default risk like collaterals or netting of receivables with liabilities. Allowance should be made as follows:

Collaterals

SCR.6.38.   If a collateral meets the two following requirements:

   a. The legal mechanism by which collateral is pledged or transferred should ensure that the undertaking has the right to liquidate or take legal possession of the collateral, in a timely manner, in case of any default event related to the counterparty ("the counterparty requirement");

   b. Where applicable, the legal mechanism by which collateral is pledged or transferred should ensure that the undertaking has the right to liquidate or take possession of the collateral, in a timely manner, in case of any default event related to a third party custodian holding the collateral ("the custodian requirement"),

then the loss-given-default (in case of a type 1 exposure) or the value of the exposure (in case of a type 2 exposure) may be reduced by the risk-adjusted value of the collateral.

The risk-adjusted value of the collateral should be calculated as follows:

$$Collateral = 100\% \cdot \left(MarketValue_{Collateral} - MktRisk_{Collateral}\right),$$

where

$MarketValue_{Collateral}$ = Market value of the collateral assets

$MktRisk_{Collateral}$ = Adjustment for market risk.

SCR.6.39.   If the collateral is held by or deposited with a third party custodian and the collateral only meets the counterparty requirement, then the risk-adjusted value of the collateral should be calculated as follows:

$$Collateral = 90\% \cdot \left(MarketValue_{Collateral} - MktRisk_{Collateral}\right),$$

where

$MarketValue_{Collateral}$ = Market value of the collateral assets

$MktRisk_{Collateral}$ = Adjustment for market risk.

SCR.6.40.   If a collateral does not meet the counterparty requirement, then it should not be taken into account as a risk mitigant.

SCR.6.41.   For the calculation of the adjustment for market risk, the reduction of the market value of the collateral according to the equity, property, credit spread and currency risk sub-module should be determined and aggregated according to the correlation matrix of the market risk module.

SCR.6.42.   For the calculation of the currency risk sub-module, the currency of the collateral is compared to the currency of the secured credit exposure. If the collateral assets are bank deposits which are not subject to the credit spread risk, the adjustment should be increased by the capital requirement for counterparty default risk of the deposits.

Segregated assets

SCR.6.43.   Where, and to the extent that, the liabilities of the counterparty are covered by strictly segregated assets under arrangements which meet the requirements set out in section SCR.12 on financial risk mitigation techniques, the segregated assets should be treated like collaterals in the calculation of the counterparty default risk module.

Letters of credit

SCR.6.44.   If a letter of credit is provided to secure a credit exposure and the arrangement meets the requirement defined in section SCR.12 on financial risk mitigation techniques, then the counterparty of the credit exposure can be replaced by the provider of the letter of credit in the calculation of the counterparty default risk module. This replacement affects the probability of default that is taken into account in the calculation as well as the assessment whether the counterparty is independent from other counterparties.

SCR.6.45.   A letter of credit should not be taken into account in the calculation of the counterparty default risk module if is approved as ancillary own funds.

Netting

SCR.6.46.   The loss-given-default (in case of a type 1 exposure) or the value of the exposure (in case of a type 2 exposure) may be netted with liabilities towards the same legal entity to the extent they could be set off in case of default of the legal entity. The general requirement defined in sections SCR.12 and SCR.13 should be met in relation to netting if it is taken into account in the calculation. In particular, if the legal situation in relation to netting is unclear, then no netting should be taken into account. No netting should be allowed for if the liabilities are expected to be met before the credit exposure is cleared.

SCR.6.7. Simplifications

Simplifications for the calculation of loss given default for risk-mitigating contracts (type 1 exposure)

Simplified calculation for derivatives

SCR.6.47.   The calculation of the risk mitigating effect for derivatives can be simplified as follows:

SCR.6.48.   If the financial instruments of counterparty (i) affect only one sub-module of the market risk module, then the difference $SCR_{market}^{hyp} - SCR_{market}^{without}$ may be replaced by the difference $Mkt_{sub-risk}^{hyp} - Mkt_{sub-risk}^{without}$ of the sub-module affected.

SCR.6.49.   If the financial instruments of counterparty (i) affect more than one sub-module, the difference $SCR_{market}^{hyp} - SCR_{market}^{without}$ may be replaced by the sum of the differences $Mkt_{sub-risk}^{hyp} - Mkt_{sub-risk}^{without}$ of the sub-modules affected.

Simplified calculation for life reinsurance

SCR.6.50.   The calculation of the risk mitigating effect for life reinsurance can be simplified as follows:

SCR.6.51.   If the reinsurance treaties with counterparty (i) affect only one sub-module of the life underwriting risk module, then the difference $SCR_{life}^{hyp} - SCR_{life}^{without}$ may be replaced by the difference $Life_{sub-risk}^{hyp} - Life_{sub-risk}^{without}$ of the sub-module affected.

SCR.6.52.   If the reinsurance treaties with counterparty (i) affect more than one sub-module of the life underwriting risk module, the difference $SCR_{life}^{hyp} - SCR_{life}^{without}$ may be replaced by the sum of the differences $Life_{sub-risk}^{hyp} - Life_{sub-risk}^{without}$ of the sub-modules affected.

SCR.6.53.   For proportional life reinsurance a further simplification is possible:

$$SCR_{life}^{hyp} - SCR_{life}^{without} \approx \left(\frac{BE^{gross}}{BE^{net}} - 1 \right) \cdot SCR_{life}^{without},$$

where BE^{net} is the best estimate provision for life insurance net of reinsurance, and BE^{gross} is the best estimate provision for life insurance net of reinsurance except reinsurance towards counterparty (i).

Simplified calculation for non-life reinsurance

SCR.6.54.   The calculation of the risk mitigating effect for non-life reinsurance can be simplified as follows:

- In a first step, calculate $SCR_{nl}^{hyp} - SCR_{nl}^{without}$ for all reinsurance counterparties together.

- In a second step, approximate the share of a single counterparty (i) as follows:

$$\left(SCR_{nl}^{hyp} - SCR_{nl}^{without} \right)_i \approx \left(SCR_{nl}^{hyp} - SCR_{nl}^{without} \right) \cdot \frac{Rec_i}{Rec_{total}},$$

where Rec_i are the reinsurance recoverables towards counterparty (i) and Rec_{total} the overall reinsurance recoverables.

Implementation of the simplified calculations for derivatives and reinsurance

SCR.6.55.   The simplifications should only be used if the following conditions are met:

- There are no indications that the simplification significantly misestimates the risk mitigating effect.

- The capital requirement for counterparty default risk under the simplified calculation is less than 20% of the overall SCR before and deferred taxes. For this comparison the overall SCR can be calculated by means of the simplified calculation for the counterparty default risk capital requirement.

- The result of the sophisticated calculation is not easily available.

Simplification in relation to the number of counterparties

SCR.6.56.   In order to reduce the number of calculations of risk mitigating effects, the following simplification are offered:

SCR.6.57.   Instead of treating each counterparty (i) separately in the calculation of LGD_i and SCR_{def}, the set of counterparties is divided into disjoint subsets and the calculation is modified as follows:

- In the determination of LGD_i each subset is treated as one counterparty.

- For the calculation of SCR_{def} it is necessary to assign a probability of default (or a rating) to the subset. This probability of default is the highest probability of default of the counterparties in the subset.

Simplifications for the treatment of risk-mitigation techniques

Simplifications for collaterals

SCR.6.58.   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 custodian requirements 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:

$$Collateral = 75\% \cdot MarketValue_{Collateral}$$

SCR.7. SCR Life underwriting risk module

SCR.7.1.Structure of the life underwriting risk module

SCR.7.1.   This module covers the risk arising from the underwriting of life insurance, associated with both the perils covered and the processes followed in the conduct of the business.

SCR.7.2.   The scope of the life underwriting risk module includes all the life insurance and reinsurance obligations as defined in the subsection V.2.1 on segmentation with the exception of SLT health insurance obligations. In particular, annuities stemming from non-life insurance contracts are in the scope of the module unless the contract was classified as health insurance.

SCR.7.3.   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 subsection SCR.1.1.

Description

SCR.7.4.   The life underwriting risk module consists of seven sub-modules for mortality risk, longevity risk, disability/morbidity risk, lapse risk, expense risk, revision risk and catastrophe risk.

Input

SCR.7.5.   The following input information is required:

$Life_{rev}$	=	Capital requirement for revision risk
$Life_{mort}$	=	Capital requirement for mortality risk
$Life_{long}$	=	Capital requirement for longevity risk
$Life_{dis}$	=	Capital requirement for disability risk
$Life_{lapse}$	=	Capital requirement for lapse risk
$Life_{exp}$	=	Capital requirement for expense risk
$Life_{CAT}$	=	Capital requirement for catastrophe risk
$nLife_{mort}$	=	Capital requirement for mortality risk including the loss-absorbing capacity of technical provisions
$nLife_{long}$	=	Capital requirement for longevity risk including the loss-absorbing capacity of technical provisions
$nLife_{dis}$	=	Capital requirement for disability risk including the loss-absorbing capacity of technical provisions

$nLife_{lapse}$ = Capital requirement for lapse risk including the loss-absorbing capacity of technical provisions

$nLife_{exp}$ = Capital requirement for expense risk including the loss-absorbing capacity of technical provisions

$nLife_{CAT}$ = Capital requirement for catastrophe risk including the loss-absorbing capacity of technical provisions

Output

SCR.7.6.   The module delivers the following output:

SCR_{Life} = Capital requirement for life underwriting risk

$nSCR_{Life}$ = Capital requirement for life underwriting risk including the loss absorbing capacity of technical provisions

Calculation

SCR.7.7.   The capital requirement for life risk is derived by combining the capital requirements for the life sub-risks using a correlation matrix as follows:

$$SCR_{life} = \sqrt{\sum_{rxc} CorrLife_{r,c} \cdot Life_r \cdot Life_c}$$

where

$CorrLife_{r,c}$ = The entries of the correlation matrix $CorrLife$

$Life_r, Life_c$ = Capital requirements for individual life sub-risks according to the rows and columns of correlation matrix $CorrLife$

and where the correlation matrix $CorrLife$ is defined as follows:

	Mortality	Longevity	Disability	Lapse	Expenses	Revision	CAT
Mortality	1						
Longevity	-0.25	1					
Disability	0.25	0	1				
Lapse	0	0.25	0	1			
Expenses	0.25	0.25	0.5	0.5	1		
Revision	0	0.25	0	0	0.5	1	
CAT	0.25	0	0.25	0.25	0.25	0	1

SCR.7.8.   The net capital requirement for life risk is determined as follows:

$$nSCR_{life} = \sqrt{\sum_{rxc} CorrLife_{r,c} \cdot nLife_r \cdot nLife_c}$$

where $nLife_{rev}$ is defined to be equal to $Life_{rev}$

SCR.7.2. $Life_{mort}$ mortality risk

<u>Description</u>

SCR.7.9.   Mortality risk is associated with (re)insurance obligations (such as term assurance or endowment policies) where a (re)insurance undertaking guarantees to make a single or recurring series of payments in the event of the death of the policyholder during the policy term.

SCR.7.10.   It is applicable for (re)insurance 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 the technical provisions.

SCR.7.11.   The capital requirement should be calculated as the change in net asset value (assets minus liabilities) following a permanent increase in mortality rates.

SCR.7.12.   Where (re)insurance obligations provide benefits both in case of death and survival and the death and survival benefits are contingent on the life of the same insured 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 contract if the net result of the scenario is favourable to the (re)insurer).

SCR.7.13.   Where model points are used for the purposes of calculating the technical provisions and the grouping of the data captures appropriately the mortality risk of the portfolio, each model points can be considered to represent a single policy for the purposes of the sub-module.

<u>Input</u>

SCR.7.14.   No specific input data is required for this module.

<u>Output</u>

SCR.7.15.   The module delivers the following output:

$Life_{mort}$ =   Capital requirement for mortality risk

$nLife_{mort}$ =   Capital requirement for mortality risk including the loss-absorbing capacity of technical provisions

<u>Calculation</u>

SCR.7.16. The capital requirement for mortality risk is defined as the result of a mortality scenario defined as follows:

$$Life_{mort} = (\Delta NAV \mid mortshock)$$

where

ΔNAV	=	The change in the net value of assets minus liabilities
mortshock	=	A permanent 15% increase in mortality rates for each age and each policy where the payment of benefits (either lump sum or multiple payments) is contingent on mortality risk

SCR.7.17. The mortality scenario should be calculated under the condition that the scenario does not change the value of future discretionary benefits in technical provisions.

SCR.7.18. Additionally, the result of the scenario should be determined under the condition that the value of future discretionary benefits can change and that undertaking is able to vary its assumptions in future bonus rates in response to the shock being tested. The resulting capital requirement is *nLife_{mort}*.

Simplification

SCR.7.19. The 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 undertaking faces.

- The standard calculation of the mortality risk sub-module is an undue burden for the undertaking.

SCR.7.20. The capital requirement for mortality risk according to the simplified calculation is 15 per cent (the mortality shock rate) of the product of the following factors:

- the total capital at risk,

- an undertaking-specific expected average death rate over the next year (weighted by the sum assured),

- the modified duration of the liability cash-flows *n* and

- the projected mortality increase ($1.1^{((n-1)/2)}$), based on the assumption that the average mortality rate of the portfolio, due to age, increases over the period corresponding to the length of the duration with 10% a year.

SCR.7.3.Life_{long} longevity risk

<u>Description</u>

SCR.7.21.   Longevity risk is associated with (re)insurance obligations (such as annuities) where a (re)insurance undertaking guarantees to make recurring series of payments until the death of the policyholder and where a decrease in mortality rates leads to an increase in the technical provisions, or with (re)insurance obligations (such as pure endowments) where a (re)insurance undertaking guarantees to make a single payment in the event of the survival of the policyholder for the duration of the policy term.

SCR.7.22.   It is applicable for (re)insurance 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.

SCR.7.23.   The capital requirement should be calculated as the change in net asset value (assets minus liabilities) following a permanent decrease in mortality rates.

SCR.7.24.   Where (re)insurance obligations provide benefits both in case of death and survival and the death and survival benefits are contingent on the life of the same insured 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 (re)insurer).

SCR.7.25.   Where model points are used for the purposes of calculating the technical provisions and the grouping of the data captures appropriately the longevity risk of the portfolio, each model points can be considered to represent a policy for the purposes of applying this sub-module.

<u>Input</u>

SCR.7.26.   No specific input data is required for this module.

<u>Output</u>

SCR.7.27.   The module delivers the following output:

$Life_{long}$ =   Capital requirement for longevity risk

$nLife_{long}$ =   Capital requirement for longevity risk including the loss-absorbing capacity of technical provisions

<u>Calculation</u>

SCR.7.28.   The capital requirement for longevity risk is defined as a result of a longevity scenario as follows:

$$Life_{long} = (\Delta NAV \mid longevityshock)$$

where

ΔNAV	=	The change in the net value of assets minus liabilities
longevityshock	=	a (permanent) 20% decrease in mortality rates for each age and each policy where the payment of benefits (either lump sum or multiple payments) is contingent on longevity risk

SCR.7.29.   The longevity scenario should be calculated under the condition that the scenario does not change the value of future discretionary benefits in technical provisions.

SCR.7.30.   Additionally, the result of the scenario should be determined under the condition that the value of future discretionary benefits can change and that undertaking is able to vary its assumptions in future bonus rates in response to the shock being tested. The resulting capital requirement is $nLife_{long}$.

Simplification

SCR.7.31.   The 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 undertaking faces.

- The standard calculation of the longevity risk sub-module is an undue burden for the undertaking.

SCR.7.32.   The capital requirement for longevity risk according to the simplified calculation can be taken as 20 per cent (the longevity shock rate) of the product of the following factors:

- the best estimate for contracts subject to longevity risk,

- an undertaking-specific expected average death rate over the next year (weighted by the sum assured),

- the modified duration of the liability cash-flows n and

- the projected mortality increase ($1.1^{((n-1)/2)}$), based on the assumption that the average mortality rate of the portfolio, due to age, increases over the period corresponding to the length of the duration with 10% a year.

SCR.7.4. Life$_{dis}$ disability-morbidity risk

Description

SCR.7.33.   Morbidity or disability risk is the risk of loss, or of adverse changes in the value of insurance liabilities, resulting from changes in the level, trend or volatility of disability and morbidity rates.

SCR.7.34.   It is applicable for (re)insurance obligations contingent on a definition of disability. However it can be expected that the majority of (re)insurance obligations for which disability-morbidity risk is applicable will be covered by the health module rather than by the life underwriting module. This sub-module of the life underwriting risk module is therefore likely to be applicable only in cases where it is not appropriate to unbundle contracts.

SCR.7.35.   The (re)insurance obligations may be structured such that, upon the diagnosis of a disease or the policyholder 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 policyholder. In the latter case, the (re)insurance undertaking is also exposed to the risk that the policyholders receives the payments for longer than anticipated i.e. that claim termination rates are lower than anticipated (recovery risk).

Input

SCR.7.36.   No specific input data is required for this module.

Output

SCR.7.37.   The module delivers the following output:

$Life_{dis}$ =   Capital requirement for disability risk

$nLife_{dis}$ =   Capital requirement for disability risk including the loss-absorbing capacity of technical provisions

Calculation

SCR.7.38.   The capital requirement for disability risk is defined as the result of a disability scenario as follows:

$$Life_{dis} = (\Delta NAV \mid disshock)$$

where

ΔNAV =   Change in the net value of assets minus liabilities

$Disshock$ =   A combination of the following changes applied to each policy where the payment of benefits (either lump sum or multiple payments) is contingent on disability risk:

- An increase of 35% in disability rates for the next year, together with a (permanent) 25% increase (over best estimate) in disability rates at each age in following years

- Plus, where applicable, a permanent decrease of 20% in morbidity/disability recovery rates.

SCR.7.39.   The disability-morbidity scenario should be calculated under the condition that the scenario does not change the value of future discretionary benefits in technical provisions.

SCR.7.40.   Additionally, the result of the scenario should be determined under the condition that the value of future discretionary benefits can change and that undertaking is able to vary its assumptions in future bonus rates in response to the shock being tested. The resulting capital requirement is $nLife_{dis}$.

<u>Simplification</u>

SCR.7.41.   The 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 undertaking faces.

- The standard calculation of the disability-morbidity risk sub-module is an undue burden for the undertaking.

SCR.7.42.   The capital requirement for disability risk according to the simplified calculation is the sum of

- the capital requirement for an increase of 35% in morbidity/ disability inception rates for the first year,

- the capital requirement for an increase of morbidity/disability inception rates by 25% for all subsequent years and

- the capital requirement in respect of the risk that the duration of claims is greater than expected, represented by a 20% decrease in the termination rates, where the individual elements are calculated as sketched below.

SCR.7.43.   The individual elements sketched in the previous paragraphs should be calculated by using the following bases of calculation:

(a) For the increased morbidity/disability inception rates during the first year, 35% of the product of the following factors:

- the total disability capital at risk (in year one) and

- an undertaking-specific expected average rate of transition from healthy to sick over the first year (weighted by the sum assured/ annual payment).

(b) For the increased morbidity/disability inception rates during all subsequent years, 25% of the product of the following factors:

- the total disability capital at risk in year two,

- an undertaking-specific expected average rate of transition from healthy to sick over the second year (weighted by the sum assured/annual payment),

- the modified duration of the liability cash-flows n diminished by one and

- the projected disability increase ($1.1^{((n-2)/2)}$), based on the assumption that the average disability rate of the portfolio, due to age, increases over the period corresponding to the length of the duration with 10% a year.

(c)   With respect to the risk that the duration of claims is greater than expected, 20% the product of the following factors:

- technical provisions (best estimate) for contracts subject to disability claims,

- an undertaking-specific expected termination rate (i.e. average rate of transition from sick to healthy/dead over the next year),

- the modified duration of the liability cash-flows n and

- the projected disability increase $(1.1^{((n-1)/2)})$.

SCR.7.5. Life$_{lapse}$ lapse risk

Description

SCR.7.44.   Lapse risk is the risk of loss or change in liabilities due to a change in the expected exercise rates of policyholder options. In relation to the policyholder options that the lapse sub-module covers, a comprehensive approach is taken. The module takes account of all legal or contractual policyholder options which can significantly change the value of the future cash-flows. This includes options to fully or partly terminate, decrease, restrict or suspend the insurance cover as well as options which allow the full or partial establishment, renewal, increase, extension or resumption of insurance cover.

SCR.7.45.   In the following, the term "lapse" is used to denote all these policyholder options.

Input

SCR.7.46.   No specific input data is required for this module.

Output

SCR.7.47.   The module delivers the following output:

$Life_{lapse}$ =   Capital requirement for lapse risk (not including the loss-absorbing capacity of technical provisions)

$nLife_{lapse}$ =   Capital requirement for lapse risk including the loss-absorbing capacity of technical provisions

Calculation

SCR.7.48.   The capital requirement for lapse risk should be calculated as follows:

$$Life_{lapse} = \max(Lapse_{down}; Lapse_{up}; Lapse_{mass}),$$

where

$Life_{lapse}$ =   Capital requirement for lapse risk

$Lapse_{down}$ =   Capital requirement for the risk of a permanent decrease of the rates of lapsation

Lapse$_{up}$	=	Capital requirement for the risk of a permanent increase of the rates of lapsation
Lapse$_{mass}$	=	Capital requirement for the risk of a mass lapse event

SCR.7.49. Capital requirements for the three sub-risks should be calculated based on a policy-by-policy comparison of surrender value and best estimate provision. The surrender strain of a policy 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 policyholders 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 kind of policy terminations irrespective of their name in the terms and conditions of the policy. In particular, the surrender value may be zero if no compensation is paid on termination.

SCR.7.50. The capital requirement for the risk of a permanent decrease of the rates of lapsation should be calculated as follows:

$$Lapse_{down} = \Delta NAV \mid lapseshock_{down} \, ,$$

where

ΔNAV	=	Change in the net value of assets minus liabilities (not including changes in the risk margin of technical provisions)
lapseshock$_{down}$	=	Reduction of 50% in the assumed option take-up rates in all future years for all policies without a positive surrender strain or otherwise adversely affected by such risk. Affected by the reduction are options to fully or partly terminate, decrease, restrict or suspend the insurance cover. Where an option allows the full or partial establishment, renewal, increase, extension or resumption of insurance cover, the 50% reduction should be applied to the rate that the option is not taken up.
		The shock should not change the rate to which the reduction is applied to by more than 20% in absolute terms.

SCR.7.51. The capital requirement for the risk of a permanent increase of the rates of lapsation should be calculated as follows:

$$Lapse_{up} = \Delta NAV \mid lapseshock_{up} \, ,$$

where

ΔNAV	=	Change in the net value of assets minus liabilities (not including changes in the risk margin of technical provisions)
lapseshock$_{up}$	=	Increase of 50% in the assumed option take-up rates in all future years for all policies with a positive surrender strain or otherwise adversely affected by such risk. Affected by the increase are options to fully or partly terminate, decrease, restrict or suspend the insurance cover. Where an option allows the full or partial establishment, renewal, increase,

extension or resumption of insurance cover, the 50% increase should be applied to the rate that the option is not taken up.

The shocked rate should not exceed 100%.

SCR.7.52. Therefore, the shocked take-up rate 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 take-up rate in $lapseshock_{up}$
R_{down}	=	shocked take-up rate in $lapseshock_{down}$
R	=	take-up rate before shock

SCR.7.53. The capital requirement for the risk of a mass lapse event $Lapse_{mass}$ should be calculated as follows:

$$Lapse_{mass} = \Delta NAV \mid lapseshock_{mass},$$

where

ΔNAV	=	Change in the net value of assets minus liabilities (not including changes in the risk margin of technical provisions)
$lapseshock_{up}$	=	The combination of the following changes:

- the surrender of 30% of the insurance policies with a positive surrender strain falling other than policies for non-retail business;

- the surrender of 70% of the insurance policies with a positive surrender strain for non-retail business.

SCR.7.54. Non-retail business is defined as

- management of group pension funds, comprising the management of investments, and in particular the assets representing the reserves of bodies that effect payments on death or survival or in the event of discontinuance or curtailment of activity (Article 2(3)(b)(iii) of the Solvency II Framework Directive 2009/138/EC); or

- the operations referred to in the first bullet point where they are accompanied by insurance covering either conservation of capital or payment of a minimum interest (Article 2(3)(b)(iii) and (iv) of the Solvency II Framework Directive 2009/138/EC)

which meet the following additional condition:

- the policyholder is either not a natural person; or

- a natural person acting for the benefit of the beneficiaries under those policies, but excluding policies in respect of which there is a family relationship between that natural person and the beneficiaries, and policies effected for private estate planning or inheritance purposes in circumstances where the number of beneficiaries under the policy does not exceed 20.

SCR.7.55.   The lapse scenarios should be calculated under the condition that the scenario does not change the value of future discretionary benefits in technical provisions.

SCR.7.56.   Additionally, the result of the scenarios should be determined under the condition that the value of future discretionary benefits can change and that undertaking is able to vary its assumptions in future bonus rates in response to the shock being tested. The resulting capital requirement is $nLife_{lapse}$.

Simplifications

Calculation on policy-by-policy basis

SCR.7.57.   If it is proportionate to the nature, scale and complexity of the risk, the comparison of surrender value and best estimate provision for the determination of the surrender strain might be made on the level of homogeneous risk groups instead of a policy-by-policy basis. A calculation on the level of homogeneous risk groups should be considered to be proportionate if
- the homogeneous risk groups appropriately distinguish between policies of different lapse risk;

- the result of a policy-by-policy calculation would not differ materially from a calculation on homogeneous risk groups; and

- a policy-by-policy calculation would be an undue burden compared to a calculation on homogeneous risk groups which meet the two criteria above.

Factor-based formula for scenario effect

SCR.7.58.   A simplified calculation of $Lapse_{down}$ and $Lapse_{up}$ may be made if the following conditions are met:
- The simplified calculation is proportionate to nature, scale and complexity of the risk.

- The quantification of the scenario effect defined above would be an undue burden.

SCR.7.59.   The simplified calculations are defined as follows:

$$Lapse_{down} = 50\% \cdot l_{down} \cdot n_{down} \cdot S_{down}$$

and

$$Lapse_{up} = 50\% \cdot l_{up} \cdot n_{up} \cdot S_{up} \ ,$$

where

$l_{down}; l_{up}$ =   estimate of the average rate of lapsation of the policies with a negative/positive surrender strain

$n_{down}; n_{up}$ =   average period (in years), weighted by surrender strains, over which the policy with a negative/positive surrender strain runs off

$S_{down}; S_{up}$ =   sum of negative/positive surrender strains

SCR.7.60.   The simplified calculation should be done at an appropriate granularity.

SCR.7.6. Life$_{exp}$ expense risk

Description

SCR.7.61.   Expense risk arises from the variation in the expenses incurred in servicing insurance and reinsurance contracts.

Input

SCR.7.62.   No specific input data is required for this module.

Output

SCR.7.63.   The module delivers the following output:

$Life_{exp}$ =   Capital requirement for expense risk

$nLife_{exp}$ =   Capital requirement for expense risk including the loss-absorbing capacity of technical provisions

Calculation

SCR.7.64.   The capital requirement for expense risk is determined as follows:

$$Life_{exp} = \Delta NAV \mid expshock$$

where:

ΔNAV =   Change in the net value of assets minus liabilities

$expshock$ =   Increase of 10% in future expenses compared to best estimate anticipations, and increase by 1% per annum of

the expense inflation rate compared to anticipations.

SCR.7.65.   An expense payment should not be included in the scenario, if its amount is already fixed at the valuation date (for instance agreed payments of acquisition provisions). For policies with adjustable expense loadings the analysis of the scenario should take into account realistic management actions in relation to the loadings.

SCR.7.66.   The expense scenario should be calculated under the condition that the scenario does not change the value of future discretionary benefits in technical provisions.

SCR.7.67.   Additionally, the result of the scenario should be determined under the condition that the value of future discretionary benefits can change and that undertaking is able to vary its assumptions in future bonus rates in response to the shock being tested. The resulting capital requirement is $nLife_{exp}$.

Simplification

SCR.7.68.   The 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 undertaking faces.

- The standard calculation of the expense risk sub-module is an undue burden for the undertaking.

SCR.7.69.   The simplification is defined as follows:

$$Life_{exp} = 0.1 \cdot n \cdot E + \left(\frac{1}{k} * ((1+k)^n - 1) - \frac{1}{i} * ((1+i)^n - 1) \right) \cdot E$$

where

E = Expenses incurred in servicing life obligations during the last year.

n = Average period in years over which the risk runs off, weighted by renewal expenses

i = Expected inflation rate (i.e. inflation assumption applied in calculation of best estimate)

k = Stressed inflation rate (i.e. i + 1%)

SCR.7.7. Life$_{rev}$ revision risk

Description

SCR.7.70.   Revision risk is the risk of loss, or of adverse change in the value of insurance and reinsurance 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.

SCR.7.71. This risk module should be applied only to annuities where the benefits payable under the underlying insurance policies could increase as a result of changes in the legal environment or in the state of health of the person insured.

SCR.7.72. This includes annuities arising from non-life claims (excluding annuities arising from health obligations which are treated in the health SLT module) where the amount of the annuity may be revised during the next year for the reasons mentioned above.

<u>Input</u>

SCR.7.73. No specific input data is required for this module.

<u>Output</u>

SCR.7.74. The module delivers the following output:

$Life_{rev}$ = Capital requirement for revision risk

<u>Calculation</u>

SCR.7.75. The capital requirement for revision risk is determined as follows:

$$Life_{rev} = \Delta NAV \mid revshock$$

where:

ΔNAV = Change in the net value of assets minus liabilities

$revshock$ = 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.

SCR.7.8. Life$_{CAT}$ catastrophe risk sub-module

<u>Description</u>

SCR.7.76. The life catastrophe sub-module is restricted to (re)insurance obligations which are contingent on mortality, i.e. where an increase in mortality leads to an increase in technical provisions

SCR.7.77. Catastrophe risk stems from extreme or irregular events whose effects are not sufficiently captured in the other life underwriting risk sub-modules. Examples could be a pandemic event or a nuclear explosion.

SCR.7.78.   Catastrophe risk is mainly associated with products (such as term assurance, critical illness or endowment policies) in which a company guarantees to make a single or recurring & periodic series of payments when a policyholder dies.

SCR.7.79.   Where model points are used for the purposes of calculating the technical provisions and the grouping of the data captures appropriately the mortality risk of the portfolio, each model points can be considered to represent a single policy for the purposes of the sub-module.

Input

SCR.7.80.   No specific input data is required for this module.

Output

SCR.7.81.   The module delivers the following output:

$Life_{CAT}$ =   Capital requirement for life catastrophe risk

$nLife_{CAT}$ =   Capital requirement for catastrophe risk including the loss-absorbing capacity of technical provisions

Calculation

SCR.7.82.   The capital requirement for life catastrophe risk component is defined as follows:

$$Life_{CAT} = \Delta NAV \mid life\ CAT\ shock$$

where:

ΔNAV =   Change in the net value of assets minus liabilities

$life\ CAT\ shock$ =   Absolute increase in the rate of policyholders dying over the following year of 1.5 per mille (only applicable to policies which are contingent on mortality)

SCR.7.83.   The life catastrophe scenario should be calculated under the condition that the scenario does not change the value of future discretionary benefits in technical provisions.

SCR.7.84.   Additionally, the result of the scenario should be determined under the condition that the value of future discretionary benefits can change and that undertaking is able to vary its assumptions in future bonus rates in response to the shock being tested. The resulting capital requirement is $nLife_{CAT}$.

Simplification

SCR.7.85.   The 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 undertaking faces.

- The standard calculation of the catastrophe risk sub-module is an undue burden for the undertaking.

SCR.7.86.   The following formula may be used as a simplification for the Life catastrophe risk sub-module:

$$Life_{CAT} = \sum_i 0.0015 \cdot Capital\_at\_Risk_i$$

where the subscript i denotes each policy where the payment of benefits (either lump sum or multiple payments) is contingent on mortality, and where $Capital\_at\_Risk_i$ is determined as:

$$Capital\_at\_Risk_i = SA_i + AB_i \cdot Annuity\_factor - BE_i$$

and

BE_i =   Best estimate provision (net of reinsurance) for each policy i

SA_i =   For each policy i: where benefits are payable as a single lump sum, the sum assured (net of reinsurance) on death.

AB_i =   For each policy i: where benefits are not payable as a single lump sum, the Annualised amount of Benefit (net of reinsurance) payable on death or disability.

$Annuity\_factor$ =   Average annuity factor for the expected duration over which benefits may be payable in the event of a claim

SCR.8. Health underwriting risk

SCR.8.1. Structure of the health underwriting risk module

<u>Description</u>

SCR.8.1. The health underwriting risk module reflects the risk arising from health insurance and reinsurance obligations, in relation to the perils covered and the processes used in the conduct of business.

SCR.8.2. The definition of health insurance and reinsurance obligations is set out in subsection V.2.1 on segmentation. Health (re)insurance obligations can be split according to their technical nature into

- Health insurance obligations pursued on a similar technical basis to that of life insurance (SLT Health); and

- Health insurance obligations not pursued on a similar technical basis to that of life insurance (Non-SLT Health).

SCR.8.3. The health underwriting risk module consists of the following sub-modules:

- the SLT Health underwriting risk sub-module;

- the Non-SLT Health underwriting risk sub-module;

- the health catastrophe risk sub-module.

SCR $_{Health}$

Health $_{SLT}$ Health$_{CAT}$ Health$_{Non\,SLT}$

Mortality risk

Longevity risk

Expense risk

Disability-morbidity risk

Revision risk

Lapse risk

Premium & reserve risk

Lapse

= included in the adjustment for the loss-absorbing capacity of technical provisions under the modular approach.

SLT   = Similar to Life insurance Technics
Non-SLT = Not Similar to Life insurance Technics
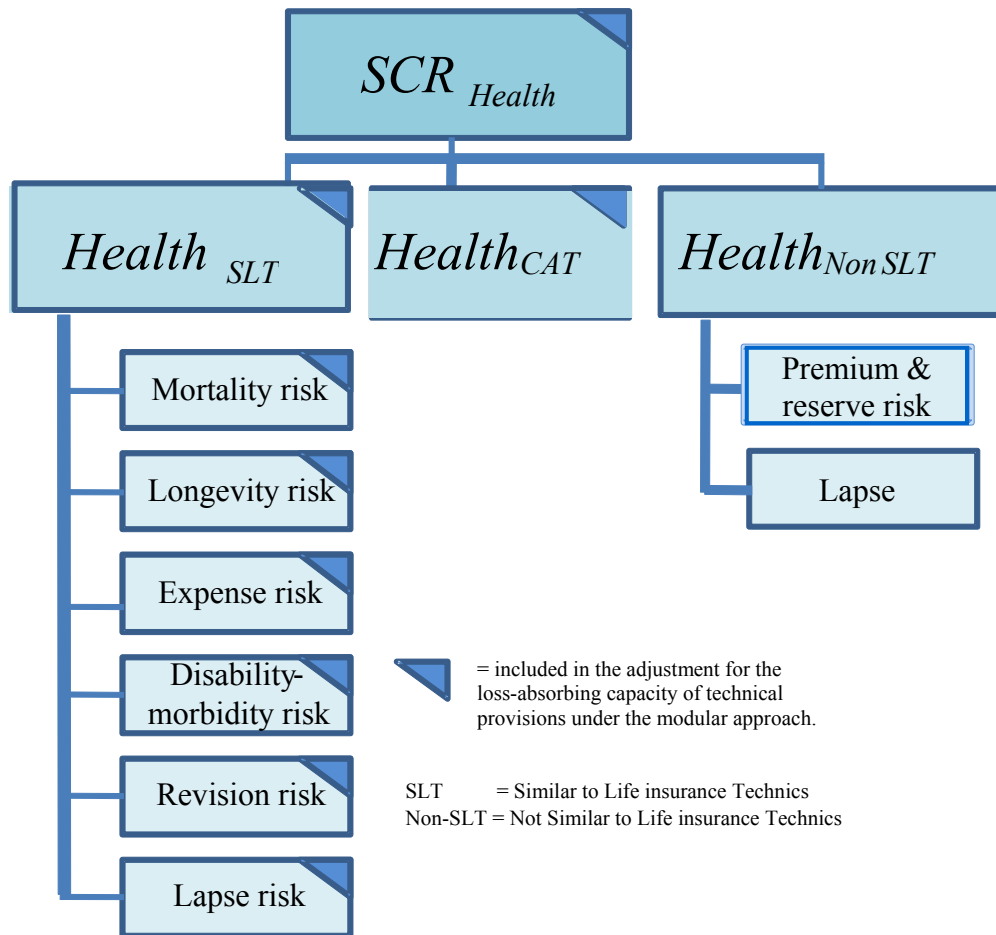
Input:

SCR.8.4. The following input information is required:

$Health_{SLT}$ = Capital requirement for SLT health underwriting risk

$Health_{Non\,SLT}$ = Capital requirement for Non-SLT health underwriting risk

$nHealth_{SLT}$ = Capital requirement for SLT health underwriting risk including the loss-absorbing capacity of technical provisions

$Health_{CAT}$ = Capital requirement for health catastrophe risk

$nHealth_{CAT}$ = Capital requirement for health catastrophe risk including the loss-absorbing capacity of technical provisions risk

Output:

SCR.8.5. The risk module delivers the following output:

SCR_{Health} = Capital requirement for health underwriting risk

$$nSCR_{Health} \quad = \quad \text{Capital requirement for health underwriting risk including the loss-absorbing capacity of technical provisions}$$

Calculation:

SCR.8.6. The capital requirement for health underwriting risk is derived by combining the capital requirements for the health sub-modules using a correlation matrix as follows:

$$SCR_{Health} = \sqrt{\sum_{rxc} CorrHealth_{rxc} \bullet Health_r \bullet Health_c}$$

where:

$CorrHealth_{rxc}$ = Entries of the matrix $CorrHealth$

$Health_r, Health_c$ = The capital requirements for individual health underwriting sub-modules according to the rows and columns of correlation matrix $CorrHealth$

and where the correlation matrix $CorrHealth$ is defined as follows:

$CorrHealth$	$Health_{SLT}$	$Health_{Non\,SLT}$	$Health_{CAT}$
$Health_{SLT}$	1		
$Health_{Non\,SLT}$	0.5	1	
$Health_{CAT}$	0.25	0.25	1

SCR.8.7. The capital requirement $nSCR_{Health}$ is determined as follows:

$$nSCR_{Health} = \sqrt{\sum_{rxc} CorrHealth_{rxc} \bullet nHealth_r \bullet nHealth_c}$$

SCR.8.2. SLT Health (Similar to Life Techniques) underwriting risk sub-module

Description

SCR.8.8. SLT Health underwriting risk arises from the underwriting of health (re)insurance obligations, pursued on a similar technical basis to life insurance, and is associated with both the perils covered and processes used in the conduct of the business.

SCR.8.9. This sub-module includes annuities arising from Non-SLT health contracts like workers' compensation contracts or accident contracts.

SCR.8.10.   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 subsection SCR.1.1.

Input:

SCR.8.11.   The following input information is required:

$Health_{mortality}^{SLT}$ = Capital requirement for SLT Health mortality risk

$Health_{longevity}^{SLT}$ = Capital requirement for SLT Health longevity risk

$Health_{disability\,/\,morbidity}^{SLT}$ = Capital requirement for SLT Health disability and morbidity risk

$Health_{expense}^{SLT}$ = Capital requirement for SLT Health expense risk

$Health_{revision}^{SLT}$ = Capital requirement for SLT Health revision risk

$Health_{lapse}^{SLT}$ = Capital requirement for SLT Health lapse risk

$nHealth_{mortality}^{SLT}$ = Capital requirement for SLT Health mortality risk including the loss-absorbing capacity of technical provisions

$nHealth_{longevity}^{SLT}$ = Capital requirement for SLT Health longevity risk including the loss-absorbing capacity of technical provisions

$nHealth_{disability\,/\,morbidity}^{SLT}$ = Capital requirement for SLT Health disability and morbidity risk including the loss-absorbing capacity of technical provisions

$nHealth_{expense}^{SLT}$ = Capital requirement for SLT Health expense risk including the loss-absorbing capacity of technical provisions

$nHealth_{revision}^{SLT}$ = Capital requirement for SLT Health revision risk including the loss-absorbing capacity of technical provisions

$nHealth_{lapse}^{SLT}$ = Capital requirement for SLT Health lapse risk including the loss-absorbing capacity of technical provisions

Output:

SCR.8.12.   The sub-module delivers the following output:

$Health_{SLT}$ = Capital requirement for health (re)insurance obligations pursued on a similar technical basis to that of life insurance

$nHealth_{SLT}$ = Capital requirement for health (re)insurance obligations pursued on a similar technical basis to that of life insurance including the loss-absorbing capacity of technical provisions

Calculation:

SCR.8.13.   The capital requirement for SLT Health underwriting risk is derived by combining the capital requirements for the SLT Health sub-modules using a correlation matrix as follows:

$$Health_{SLT} = \sqrt{\sum_{rxc} CorrHealth_{rxc}^{SLT} \bullet Health_r^{SLT} \bullet Health_c^{SLT}}$$

where:

$CorrHealth_{rxc}^{SLT}$ =   Entries of the matrix $CorrHealth^{SLT}$

$Health_r^{SLT}, Health_c^{SLT}$ =   The capital requirements for individual health underwriting sub-modules according to the rows and columns of correlation matrix $CorrHealth^{SLT}$

and where the correlation matrix $CorrHealth^{SLT}$ is defined as follows:

	Mortality	Longevity	Disability/ morbidity	Lapse	Expense	Revision
Mortality	1					
Longevity	-0.25	1				
Disability/ morbidity	0.25	0	1			
Lapse	0	0.25	0	1		
Expense	0.25	0.25	0.50	0.5	1	
Revision	0	0.25	0	0	0.50	1

SCR.8.14.   The capital requirement $nHealth_{SLT}$ is determined as follows:

$$nHealth_{SLT} = \sqrt{\sum_{rxc} CorrHealth_{rxc}^{SLT} \bullet nHealth_r^{SLT} \bullet nHealth_c^{SLT}}$$

SLT Health mortality risk

Description:

SCR.8.15.   The SLT Health mortality risk covers the risk of loss, or of adverse change in the value of (re)insurance liabilities, resulting from changes in the level, trend, or volatility of mortality rates, where an increase in the mortality rate leads to an increase in the value of (re)insurance liabilities.

SCR.8.16.   The SLT Health mortality sub-module aims at capturing the increase in general mortality that negatively affects the obligations of the undertaking. For the health products concerned by this risk, mortality risk relates to the general mortality probabilities used in the calculation of the technical provisions. Even if the health product does not insure death risk, there may be a significant mortality risk because the valuation includes profit at inception: if the policyholder dies early he/she will not pay future premiums and the profit of the insurer will be lower than allowed for in the technical provisions. For SLT health (re)insurance this can be a relevant effect.

SCR.8.17.   The risk module delivers the following output:

$Health_{mortality}^{SLT}$ =   Capital requirement for SLT Health mortality risk

$nHealth_{mortality}^{SLT}$ =   Capital requirement for SLT Health mortality risk including the loss-absorbing capacity of technical provisions

SCR.8.18.   The calculation of $Health_{mortality}^{SLT}$ and $nHealth_{mortality}^{SLT}$ is made in the same way as in the mortality risk sub-module of the life underwriting risk module.

SLT Health longevity risk

SCR.8.19.   Description: the SLT Health longevity risk covers the risk of loss, or of adverse change in the value of (re)insurance liabilities, resulting from the changes in the level, trend, or volatility of mortality rates, where a decrease in the mortality rate leads to an increase in the value of (re)insurance liabilities.

SCR.8.20.   The risk module delivers the following output:

$Health_{longevity}^{SLT}$ =   Capital requirement for SLT Health longevity risk

$nHealth_{longevity}^{SLT}$ =   Capital requirement for SLT Health longevity risk including the loss-absorbing capacity of technical provisions

SCR.8.21.   The calculation of $Health_{longevity}^{SLT}$ and $nHealth_{longevity}^{SLT}$ is made in the same way as in the longevity risk sub-module of the life underwriting risk module.

SLT Health disability/morbidity risk

SCR.8.22.   Description: the SLT Health disability/morbidity risk covers the risk of loss, or of adverse change in the value of (re)insurance liabilities, resulting from changes in the level, trend or volatility of the frequency or the initial severity of the claims, due to changes:

- In the disability, sickness and morbidity rates

- In medical inflation

SCR.8.23.   The disability/morbidity risk sub-module is based on a distinction between medical expense insurance and income protection insurance:

- **Medical expense insurance** obligations are obligations which cover the provision of preventive or curative medical treatment or care including medical treatment or care due to illness, accident, disability and infirmity, or financial compensation for such treatment or care.

- **Income protection insurance obligations** are obligations which cover financial compensation in consequence of illness, accident, disability or infirmity other than obligations considered as medical expenses insurance obligations.

SCR.8.24.   These terms are defined in in similar way as in Non-SLT health insurance, but with the difference that no separate segment for workers' compensation insurance is established. SLT health insurance obligations which cover workers' compensation need to be assigned according to their nature to either medical expense insurance or income protection insurance.

SCR.8.25.   Medical expense reinsurance and income protection reinsurance are defined as reinsurance relating to medical expense insurance and income protection insurance respectively.

SCR.8.26.   The following input information are required:

$Health^{SLT}_{medical}$	=	Capital requirement for disability/morbidity risk for medical expense (re)insurance
$Health^{SLT}_{income}$	=	Capital requirement for disability/morbidity risk for income protection (re)insurance
$nHealth^{SLT}_{medical}$	=	Capital requirement for disability/morbidity risk for medical expense (re)insurance including the loss-absorbing capacity of technical provisions
$nHealth^{SLT}_{income}$	=	Capital requirement for disability/morbidity risk for income protection (re)insurance including the loss-absorbing capacity of technical provisions

SCR.8.27.   The risk module delivers the following output:

$Health^{SLT}_{disability/morbidity}$	=	Capital requirement for SLT Health disability and morbidity risk
$nHealth^{SLT}_{disability/morbidity}$	=	Capital requirement for SLT Health disability and morbidity risk including the loss-absorbing capacity of technical provisions

SCR.8.28.   The capital requirement for SLT Health disability/morbidity risk is determined as follows:

$$Health^{SLT}_{disability/morbidity} = Health^{SLT}_{medical} + Health^{SLT}_{income}$$

$$nHealth_{disability/morbidity}^{SLT} = nHealth_{medical}^{SLT} + nHealth_{income}^{SLT}$$

SLT Health disability/morbidity risk for medical expense (re)insurance

SCR.8.29.   For medical expense (re)insurance, the determination of the disability/morbidity capital requirement cannot be based on disability or morbidity probabilities. A large part of the risk in medical expense (re)insurance is independent from the actual health status of insured person. For example, it may be very expensive to find out whether the insured person is ill or to prevent the insured person from becoming ill – these expenses are usually covered by the health policy. If an insured person is ill, the resulting expenses significantly depend on the individual case. It can also happen that an insured person is ill but does not generate significant medical expenses.

SCR.8.30.   Moreover, technically the business is not based on disability /morbidity probabilities but on expected annual medical expenses.

Input

SCR.8.31.   The calculation is scenario-based. Input information is the effect of two specified scenarios on the net value of assets minus liabilities (NAV).

Output

SCR.8.32.   The sub-module delivers the following output

$Health_{medical}^{SLT}$	=	Capital requirement for disability/morbidity risk for medical expense (re)insurance
$nHealth_{medical}^{SLT}$	=	Capital requirement for disability/morbidity risk for medical expense (re)insurance including the loss-absorbing effect of technical provisions

Calculation

SCR.8.33.   The capital requirement is computed by analysing the scenarios *claim shock up* and *claim shock down* defined as follows:

Scenario	Permanent absolute change of claim inflation	Permanent relative change of claims
claim shock up	+1%	+5%
claim shock down	−1%	−5%

SCR.8.34.   The scenario *claim shock down* needs only to be analysed for policies that include a premium adjustment mechanism which foresees an increase of premiums if claims are higher than expected and a decrease of premiums if claims are lower

than expected. Otherwise, undertakings should assume that the result of the scenario *claim shock down* is zero.

SCR.8.35.   In a first step, capital requirements for increase and decrease of claims are calculated:

$$Health^{SLT}_{medical,up} \quad = \quad \Delta NAV | claim\ shock\ up$$

$$Health^{SLT}_{medical,down} \quad = \quad \Delta NAV | claim\ shock\ down$$

$$nHealth^{SLT}_{medical,up} \quad = \quad \Delta NAV | claim\ shock\ up$$

$$nHealth^{SLT}_{medical,down} \quad = \quad \Delta NAV | claim\ shock\ down$$

SCR.8.36.   *ΔNAV* is the change in the net value of assets and liabilities under the scenario. The scenario is assumed to occur immediately after the valuation date. In the first two scenarios, the calculation is made under the condition that the assumptions on future bonus rates remain unchanged before and after the shocks. The last two calculations are made under the condition that the assumptions on future bonus rates may be changed in response to the shock. Moreover, the revaluation should allow for any relevant adverse changes in policyholders behaviour (option take-up) in this scenario.

SCR.8.37.   The relevant scenario (*up* and *down*) is the most adverse scenario taking into account the loss-absorbing capacity of technical provisions:

$$nHealth^{SLT}_{medical} = \max(nHealth^{SLT}_{medical,up}; nHealth^{SLT}_{medical,down})$$

$$Health^{SLT}_{medical} = \begin{cases} Health^{SLT}_{medical,up} & if \quad nHealth^{SLT}_{medical,up} > nHealth^{SLT}_{medical,down} \\ Health^{SLT}_{medical,down} & if \quad nHealth^{SLT}_{medical,up} < nHealth^{SLT}_{medical,down} \\ \max(Health^{SLT}_{medical,up}; Health^{SLT}_{medical,down}) & if \quad nHealth^{SLT}_{medical,up} = nHealth^{SLT}_{medical,down} \end{cases}$$

SLT Health disability/morbidity risk for income protection (re)insurance

SCR.8.38.   For income protection (re)insurance, the determination of the capital requirement for disability/morbidity risk is based on disability or morbidity probabilities. Considering that the risk in income protection (re)insurance depends on the health status of the insured person, the SLT Health disability/morbidity risk for income protection (re)insurance should be treated in the same way as disability/morbidity risk in the Life underwriting risk module.

SCR.8.39.   The risk module delivers the following output:

$Health_{income}^{SLT}$	=	Capital requirement for disability/morbidity risk for income protection (re)insurance
$nHealth_{income}^{SLT}$	=	Capital requirement for disability/morbidity risk for income protection (re)insurance including the loss-absorbing capacity of technical provisions

SCR.8.40.   The calculation of $Health_{income}^{SLT}$ and $nHealth_{income}^{SLT}$ is made in the same way as set out for the disability-morbidity risk sub-module of the life underwriting risk module.

SLT Health expense risk

SCR.8.41.   The SLT Health expense risk covers the risk of loss, or of adverse change in the value of (re)insurance liabilities, resulting from changes in the level, trend, or volatility of the expenses incurred in servicing insurance or reinsurance contracts. Expense risk arises if the expenses anticipated when pricing a guarantee are insufficient to cover the actual costs accruing in the following year. All expenses incurred have to be taken into account.

SCR.8.42.   The risk module delivers the following output:

$Health_{expense}^{SLT}$	=	Capital requirement for SLT Health expense risk
$nHealth_{expense}^{SLT}$	=	Capital requirement for SLT Health expense risk including the loss-absorbing capacity of technical provisions

SCR.8.43.   The calculation of $Health_{expense}^{SLT}$ and $nHealth_{expense}^{SLT}$ is computed as in the life expense risk sub-module of the life underwriting risk module.

SLT Health revision risk

SCR.8.44.   The SLT Health revision risk covers the risk of loss, or of adverse change in the value of annuity (re)insurance liabilities resulting from fluctuations in the level, trend, or volatility of the revision rates applied to benefits, due to changes in:

- the legal environment (or court decision); only future changes approved or strongly foreseeable at the calculation date under the principle of constant legal environment, or

- the state of health of the person insured (sick to sicker, partially disabled to fully disabled, temporarily disabled to permanently disabled).

SCR.8.45.   The SLT Health revision risk sub-module applies in particular to annuities arising from Non-SLT health insurance.

SCR.8.46.   The risk module delivers the following output:

$Health_{revision}^{SLT}$	=	Capital requirement for SLT Health revision risk
$nHealth_{revision}^{SLT}$	=	Capital requirement for SLT Health revision risk including the loss-absorbing capacity of technical provisions

SCR.8.47.   The calculation of $Health_{revision}^{SLT}$ and $nHealth_{revision}^{SLT}$ is made in the same way as in the revision risk sub-module of the life underwriting risk module, but with a stress of 4% instead of 3%.

SLT Health lapse risk

SCR.8.48.   Description: the SLT Health lapse risk covers the risk of loss, or of adverse change in the value of (re)insurance liabilities, resulting from changes in the level or volatility of the rates of policy lapses, terminations, renewals and surrenders.

SCR.8.49.   The risk module delivers the following output:

$Health_{lapse}^{SLT}$	=	Capital requirement for SLT Health lapse risk
$nHealth_{lapse}^{SLT}$	=	Capital requirement for SLT Health lapse risk including the loss-absorbing capacity of technical provisions

SCR.8.50.   The calculation of $Health_{lapse}^{SLT}$ and $nHealth_{lapse}^{SLT}$ is computed in the same way as in the lapse risk sub-module of the life underwriting risk module, but with the following change: for $Lapse_{up}$, and for $Lapse_{down}$, the increase and the decrease in lapse rates is 20% instead of 50%.

SCR.8.3. Non-SLT Health (Not Similar to Life Techniques) underwriting risk sub-module

Description

SCR.8.51.   Non-SLT Health underwriting risk arises from the underwriting of health (re)insurance obligations, <u>not</u> pursued on a similar technical basis to that of life insurance, following from both the perils covered and processes used in the conduct of business. Non-SLT Health underwriting risk also includes the risk resulting from uncertainty included in assumptions about exercise of policyholder options like renewal or termination options.

SCR.8.52.   The Non-SLT Health underwriting risk sub-module takes account of the uncertainty in the results of undertakings related to existing insurance and reinsurance obligations as well as to the new business expected to be written over the following 12 months.

SCR.8.53.   The Non-SLT Health underwriting risk sub-module does not include the risk relation to extreme or exceptional events. This risk is captured in the health catastrophe sub-module

<u>Input</u>

SCR.8.54.   The following input information is required:

$Health_{pr}^{NonSLT}$ =   Capital requirement for Non-SLT Health premium and reserve risk

$Health_{lapse}^{NonSLT}$ =   Capital requirement for Non-SLT Health lapse risk

<u>Output</u>

SCR.8.55.   The risk module delivers the following output:

| $Health_{Non SLT}$ | = | Capital requirement for Health (re)insurance obligations not pursued on a similar technical basis to that of life insurance |

<u>Calculation</u>

SCR.8.56.   The capital requirement for non-life underwriting risk is derived by combining the capital requirements for the non-life sub-risks using a correlation matrix as follows:

$$Health^{NonSLT} = \sqrt{\left(Health_{pr}^{NonSLT}\right)^2 + \left(Health_{lapse}^{NonSLT}\right)^2}$$

Non SLT Health premium & reserve risk

SCR.8.57.   This module combines a treatment for the two main sources of underwriting risk, premium risk and reserve risk.

SCR.8.58.   Premium risk results from fluctuations in the timing, frequency and severity of insured events. Premium risk relates to policies to be written (including renewals) during the period, and to unexpired risks on existing contracts. Premium risk includes the risk that premium provisions turn out to be insufficient to compensate claims or need to be increased.

SCR.8.59.   Premium risk also includes the risk resulting from the volatility of expense payments. Expense risk can be quite material for some lines of business and should therefore be fully reflected in the module calculations. Expense risk is implicitly included as part of the premium risk.

SCR.8.60.   Reserve risk results from fluctuations in the timing and amount of claim settlements.

<u>Input</u>

SCR.8.61.   In order to carry out the non-life premium and reserve risk calculation, undertakings need to determine the following:

PCO_{lob} =   Best estimate for claims outstanding for each LoB. This amount should be less the amounts recoverable from reinsurance and special purpose vehicles

$P_{lob}^{t,written}$ =   Estimate of net written premium for each LoB during the forthcoming year

$P_{lob}^{t,earned}$ =   Estimate of net earned premium for each LoB during the forthcoming year

$P_{lob}^{t-1,written}$ =   Net written premium for each LoB during the previous year

P_{lob}^{PP} =   Present value of net premiums of existing contracts which are expected to be earned after the following year for each LoBs.

SCR.8.62.   The term P_{lob}^{PP} is only relevant for contracts with a coverage period that exceeds the following year. For annual contracts without renewal options P_{lob}^{PP} is zero. Undertakings may not calculate P_{lob}^{PP} where it is likely not to be material compared to $P_{lob}^{t,earned}$.

SCR.8.63.   The module delivers the following output:

$Health_{pr}^{NonSLT}$ =   Capital requirement for Non-SLT Health premium and reserve risk

<u>Calculation</u>

SCR.8.64.   The capital requirement for the combined premium risk and reserve risk is determined as follows:

$$Health_{Premium\&Reserve}^{NonSLT} = \rho(\sigma_{NonSLT\ Health}) \cdot V_{NonSLT\ Health}$$

where

$V_{NonSLT\ Health}$ =   Volume measure (for Non-SLT Health (re)insurance obligations)

$\sigma_{NonSLT\ Health}$	=	Standard deviation (for Non-SLT Health (re)insurance obligations) resulting from the combination of the reserve and premium risk standard deviation
$\rho\big(\sigma_{NonSLT\ Health}\big)$	=	A function of the standard deviation

SCR.8.65.   The function $\rho(\sigma)$ is specified as follows:

$$\rho(\sigma) = \frac{\exp\left(N_{0.995} \bullet \sqrt{\log\left(\sigma^2 + 1\right)}\right)}{\sqrt{\sigma^2 + 1}} - 1$$

where

$N_{0.995}$	=	99.5% quantile of the standard normal distribution

SCR.8.66.   The function $\rho\big(\sigma_{NonSLT\ Health}\big)$ is set such that, assuming a lognormal distribution of the underlying risk, a risk capital requirement consistent with the VaR 99.5% calibration objective is produced. Roughly $\rho\big(\sigma_{NonSLT\ Health}\big) \approx 3 \cdot \sigma_{NonSLT\ Health}$.

SCR.8.67.   The volume measure $V_{NonSLT\ Health}$ and the standard deviation $\sigma_{NonSLT\ Health}$ for the Non-SLT Health (re)insurance obligations are determined in 2 steps as follows:

- in a first step, for each lines of business (LoB) standard deviations and volume measures for both premium risk and reserve risk are determined;

- in a second step, the standard deviations and volume measures for the premium risk and the reserve risk are aggregated to derive an overall volume measure $V_{NonSLT\ Health}$ and an overall standard deviation $\sigma_{NonSLT\ Health}$.

<u>Step 1: Volume measures and standard deviations per LoB</u>

SCR.8.68.   The premium and reserve risk sub-module is based on the same segmentation into lines of business used for the calculation of technical provisions. However, an insurance line of business and the corresponding line of business for proportional reinsurance are merged, based on the assumption that the risk profile of both lines of business is similar.

SCR.8.69.   For each LoB, the volume measures and standard deviations for premium and reserve risk are denoted as follows:

$V_{(prem,lob)}$	=	The volume measure for premium risk
$V_{(res,lob)}$	=	The volume measure for reserve risk
$\sigma_{(prem,lob)}$	=	Standard deviation for premium risk
$\sigma_{(res,lob)}$	=	Standard deviation for reserve risk

SCR.8.70.   The volume measure for premium risk in the individual LoB is determined as follows:

$$V_{(prem,lob)} = \max(P_{lob}^{t,written}; P_{lob}^{t,earned}; P_{lob}^{t-1,written}) + P_{lob}^{PP}$$

SCR.8.71.   If the undertaking has committed to its supervisor that it will restrict premiums written over the period so that the actual premiums written (or earned) over the period will not exceed its estimated volumes, the volume measure is determined only with respect to estimated premium volumes, so that in this case:

$$V_{(prem,lob)} = \max(P_{lob}^{t,written}; P_{lob}^{t,earned}) + P_{lob}^{PP}$$

SCR.8.72.   The market-wide estimates of the net standard deviation for premium risk for each line of business are

LoB	Standard deviation for premium risk (net of reinsurance)
Medical expense	$4\% \cdot NP_{lob}$
Income protection	$8.5\% \cdot NP_{lob}$
Workers' compensation	$5.5\% \cdot NP_{lob}$
Non-proportional health reinsurance	17%

SCR.8.73.   The adjustment factor for non-proportional reinsurance NP_{lob} of a line of business allows undertakings to take into account the risk-mitigating effect of particular per risk excess of loss reinsurance.

SCR.8.74.   Undertakings may choose for each line of business to set the adjustment factor to 1 or to calculate it as set out in Annex N.

SCR.8.75.   The volume measure for reserve risk for each line of business is determined as follows:

$$V_{lob}^{res} = PCO_{lob}$$

SCR.8.76.   The market-wide estimate of the net of reinsurance standard deviation for reserve risk for each line of business are:

LoB	Standard deviation for reserve risk (net of reinsurance)
Medical expense	10%
Income protection	14%
Workers' compensation	11%
Non-proportional health reinsurance	20%

SCR.8.77.   The standard deviation for premium and reserve risk in the individual LoB is defined by aggregating the standard deviations for both subrisks under the assumption of a correlation coefficient of $\alpha = 0.5$:

$$\sigma_{(lob)} = \frac{\sqrt{\left(\sigma_{(prem,lob)}V_{(prem,lob)}\right)^2 + 2\alpha\sigma_{(prem,lob)}\sigma_{(res,lob)}V_{(prem,lob)}V_{(res,lob)} + \left(\sigma_{(res,lob)}V_{(res,lob)}\right)^2}}{V_{(prem,lob)} + V_{(res,lob)}}$$

Step 2: Overall volume measures and standard deviations

SCR.8.78.   The volume measure $V_{NonSLT\ Health}$ is determined as follows:

$$V_{NonSLT\ Health} = \sum_{lob} V_{lob}$$

where

$$V_{lob} = \left(V_{(prem,lob)} + V_{(res,lob)}\right) \cdot \left(0.75 + 0.25 \cdot DIV_{lob}\right)$$

and

$$DIV_{lob} = \frac{\sum_{j}\left(V_{(prem,j,lob)} + V_{(res,j,lob)}\right)^2}{\left(\sum_{j}\left(V_{(prem,j,lob)} + V_{(res,j,lob)}\right)\right)^2}$$

where the index j denotes the geographical segments as set out in Annex M and $V_{(prem,j,lob)}$ and $V_{(res,j,lob)}$ denote the volume measures as defined above but restricted to the geographical segment j.

However, the factor DIV_{lob} should be set to 1 where the standard deviation for premium or reserve risk of the line of business is an undertaking-specific parameter.

Undertakings may choose to allocate all of their business in a line of business to the main geographical segment in order to simplify the calculation.

SCR.8.79.   The overall standard deviation $\sigma_{NonSLT\ Health}$ is determined as follows:

$$\sigma_{NonSLT\ Health} = \frac{\sqrt{\sum_{rxc} CorrLob_{Non\ SLT}^{rxc} \cdot \sigma_r \cdot \sigma_c \cdot V_r \cdot V_c}}{\sum_r V_r}$$

where

r, c	=	All indices of the form (LoB)
$CorrLob_{Non\ SLT}^{rxc}$	=	Entries of the correlation matrix $CorrLob_{Non\ SLT}$
σ_r, σ_c	=	Standard deviation for the individual lines of business, as defined in step 1
V_r, V_c	=	Volume measures for the individual lines of business, as defined in step 1

SCR.8.80.   The correlation matrix $CorrLob_{NonSLT}$ between lines of business is defined as follows:

$CorrLob_{Non\ SLT}$	Medical expense	Income protection	Workers' compensation	NP health reinsurance
Medical expense	1			
Income protection	0.5	1		
Workers' compensation	0.5	0.5	1	
NP health reinsurance	0.5	0.5	0.5	1

Output

SCR.8.81.   This module delivers the following output information:

$Health_{pr}^{NonSLT}$	=	Capital requirement for Non-SLT Health premium and reserve risk

$Health^{Non\ SLT}_{lapse}$ Lapse risk

SCR.8.82.   Non-life insurance contracts can include policyholder options which significantly influence the obligations arising from them. Examples for such options are options to terminate a contract before the end of the previously agreed insurance period and options to renew contracts according to previously agreed conditions.

Where such policyholder options are included in a non-life insurance contract, the calculation of premium provisions is based on assumptions about the exercise rates of these options. Lapse risk is the risk that these assumptions turn out to be wrong or need to be changed.

SCR.8.83.   Where non-life insurance contracts do not include policyholder options or where the assumptions about the exercise rate of such options have no material influence on premium provisions, the contracts do not need to be included in the calculations of the lapse risk sub-module. Where this is the case for the whole portfolio of an undertaking (except for a non-material part) the three components of the sub-module can be set to zero.

SCR.8.84.   The capital requirement for lapse risk should be calculated as follows:

$$Health_{lapse}^{NonSLT} = \max(Lapse_{down}; Lapse_{up}; Lapse_{mass}),$$

where

$Health_{lapse}^{NonSLT}$	=	Capital requirement for lapse risk
$Lapse_{down}$	=	Capital requirement for the risk of a permanent decrease of the rates of lapsation
$Lapse_{up}$	=	Capital requirement for the risk of a permanent increase of the rates of lapsation
$Lapse_{mass}$	=	Capital requirement for the risk of a mass lapse event

SCR.8.85.   The capital requirement for the risk of a permanent decrease of the rates of lapsation should be calculated as follows:

$$Lapse_{down} = \Delta NAV \mid lapseshock_{down},$$

where

ΔNAV	=	Change in the net value of assets minus liabilities (not including changes in the risk margin of technical provisions)
$lapseshock_{down}$	=	Reduction of 50% in the assumed option take-up rates in all future years for all policies adversely affected by such risk. Affected by the reduction are options to fully or partly terminate, decrease, restrict or suspend the insurance cover. Where an option allows the full or partial establishment, renewal, increase, extension or resumption of insurance cover, the 50% reduction should be applied to the rate that the option is not taken up.
		The shock should not change the rate to which the reduction is applied to by more than 20% in absolute terms.

SCR.8.86.   The capital requirement for the risk of a permanent increase of the rates of lapsation should be calculated as follows:

$$Lapse_{up} = \Delta NAV \mid lapseshock_{up} \, ,$$

where

ΔNAV	=	Change in the net value of assets minus liabilities (not including changes in the risk margin of technical provisions)
$lapseshock_{up}$	=	Increase of 50% in the assumed option take-up rates in all future years for all policies adversely affected by such risk. Affected by the increase are options to fully or partly terminate, decrease, restrict or suspend the insurance cover. Where an option allows the full or partial establishment, renewal, increase, extension or resumption of insurance cover, the 50% increase should be applied to the rate that the option is not taken up.

The shocked rate should not exceed 100%.

SCR.8.87.   Therefore, the shocked take-up rate 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 take-up rate in $lapseshock_{up}$
R_{down}	=	shocked take-up rate in $lapseshock_{down}$
R	=	take-up rate before shock

SCR.8.88.   The capital requirement for the risk of a mass lapse event $Lapse_{mass}$ should be calculated as follows:

$$Lapse_{mass} = \Delta NAV \mid lapseshock_{mass} \, ,$$

where

ΔNAV	=	Change in the net value of assets minus liabilities (not including changes in the risk margin of technical provisions)
$lapseshock_{up}$	=	The surrender of 30% of the insurance policies with a negative best estimate for premium provision

Simplification

SCR.8.89.   If it is proportionate to the nature, scale and complexity of the risk, the calculation of the lapse risk sub-module might be made on the basis of homogeneous risk groups instead of a policy-by-policy basis. A calculation on the basis of homogeneous risk groups should be considered to be proportionate if

- the homogeneous risk groups appropriately distinguish between policies of different lapse risk;

- the result of a policy-by-policy calculation would not differ materially from a calculation on homogeneous risk groups; and

- a policy-by-policy calculation would be an undue burden compared to a calculation on homogeneous risk groups which meet the two criteria above.

SCR.8.4. Health risk equalization systems

SCR.8.90.   In some health insurance markets undertakings participate in risk equalisation systems which mitigate the premium and reserve risk of Non-SLT health insurance. Under particular conditions the risk-mitigating effect of risk equalisation systems can be taken into account in the QIS5 standard formula. In this case the standard deviations for premium and reserve risk can be fully or partially be replaced by standard deviation which are specific for the risk equalisation system.

SCR.8.91.   Health risk equalisation system (HRES) means arrangements under national legislation to share claims payments of non-life health insurance obligations among insurance undertakings and which comply with the following requirements:

   (a)   The mechanism for the sharing of claims is transparent and fully specified in advance of the annual period that it applies to;

   (b)   The mechanism for the sharing of claims, the number of insurance undertakings that participate in the HRES and the risk characteristics of the business subject to the HRES ensure that for each undertaking participating in the HRES the volatility of annual losses of the business subject to the HRES is significantly reduced by means of the HRES;

   (c)   The health insurance subject to the HRES is compulsory and serves as a partial or complete alternative to health cover provided by the statutory social security system;

   (d)   In case of default of insurance undertakings participating in the HRES, one or several governments guarantee to fully meet the policyholder claims of the insurance business that is subject to the HRES.

SCR.8.92.   CEIOPS may for the purposes of QIS5 determine standard deviations for non-life health premium and reserve risk for the lines of business medical expense insurance, income protection insurance and workers' compensation insurance for business that is subject to a HRES provided that the following conditions are met:

   (a)   the standard deviations are determined separately for each of the lines of business which are subject to the HRES;

   (b)   the standard deviation for premium risk is an estimate of the representative standard deviation of an insurance undertaking's combined ratio, being the ratio of the following annual amounts:

   •   the sum of the amounts of payments, including the relating expenses, and technical provisions set up for claims incurred during the year for the business subject to the HRES, including any amendments due to the HRES;

   •   the earned premium of the year for the business subject to the HRES;

(c)   the standard deviation for reserve risk is an estimate of the representative standard deviation of an insurance undertaking's run-off ratio, being the ratio of the following annual amounts:

- the run-off result for the business subject to the HRES, including any amendments due to the HRES; the run-off result is the difference between the best estimate provision for claims outstanding (including incurred but not reported claims) at the beginning of the year and the best estimate provision for claims outstanding for the same claims at the end of the year;

- best estimate provision for claims outstanding (including incurred but not reported claims) at the beginning of the year for the business subject to the HRES;

(d)   the determination of the standard deviation is based on adequate, applicable and relevant actuarial and statistical techniques;

(e)   the determination of the standard deviation is based on complete, accurate and appropriate data that is directly relevant for the business subject to the HRES and reflects the diversification at the level of the insurance undertaking;

(f)   the determination of the standard deviation is based on current and credible information and realistic assumptions;

(g)   the determination of the standard deviation also takes into account any risks which are not mitigated by the HRES, in particular expense risk and risks which are not reflected in the health catastrophe risk sub-module and that could affect a larger number of insurance undertakings subject to the HRES at the same time;

(h)   notwithstanding points (a) to (g), the standard deviation of a segment is not lower than half the standard deviation specified in subsection SCR.8.3.

SCR.8.93.   Where CEIOPS has determined a standard deviation for non-life health insurance premium risk for business subject to a HRES in accordance with the criteria set out above, undertakings should use this standard deviation instead of the standard deviation of the segment specified in subsection SCR.8.3 for the calculation of Non-SLT health premium and reserve risk sub-module.

SCR.8.94.   Where not all their business in a line of business *lob* is subject to the HRES, but only a part of it, undertakings should use a premium risk standard deviation for the calculation of Non-SLT health premium and reserve risk sub-module that is equal to the following:

$$\frac{1}{V_{(prem,lob,nHRES)} + V_{(prem,lob,HRES)}} \cdot \left(\sigma_{(prem,lob)} \cdot V_{(prem,lob,nHRES)} + \sigma_{(prem,lob,HRES)} \cdot V_{(prem,lob,HRES)} \right)$$

where $V_{(prem,lob,nHRES)}$ denotes the volume measure for Non-SLT health premium risk of business in line of business *lob* that is not subject to the HRES, $V_{(prem,lob,HRES)}$ denotes the volume measure for Non-SLT health premium risk of business in line of business *lob* that is subject to the HRES, $\sigma_{(prem,lob)}$ denotes the standard deviation for

Non-SLT health premium risk as specified in subsection SCR.8.3 and $\sigma_{(prem,lob,HRES)}$ denotes the standard deviation for non-life health insurance premium risk of line of business *lob* for business subject to the HRES. $V_{(prem,lob,nHRES)}$ and $V_{(prem,lob,HRES)}$ should be calculated in the same way as the volume measure for Non-SLT health premium risk of segment *lob*, but taking into account only the insurance and reinsurance obligations not subject and subject to the HRES respectively. With regard to the standard deviation for reserve risk the same approach should be followed.

SCR.8.5. Health catastrophe risk sub-module

<u>Description</u>

SCR.8.95.   The health catastrophe risk capital requirement covers the risk of loss, or of adverse change in the value of insurance liabilities, resulting from the significant uncertainty of pricing and provisioning assumptions related to outbreaks of major epidemics, as well as the unusual accumulation of risks under such extreme circumstances.

SCR.8.96.   This module is based on the guidance and advice of the CEIOPS Catastrophe Task force. A description of their work has been published on the CEIOPS website under "Final guidance on the calibration and application of catastrophe standardised scenarios for the standard formula SCR".

SCR.8.97.   The health catastrophe risk sub-module under the standard formula should be calculated using standardised scenarios.

SCR.8.98.   The standardised scenarios for health catastrophes considered in QIS5 are:

- Arena disaster
- Concentration scenario
- Pandemic scenario

SCR.8.99.   It should be noted that:

- Scenarios are applicable to worldwide exposures.
- Geographical boundaries are recognised where necessary.
- Scenarios should be provided gross of reinsurance and gross of all other mitigation instruments (for example national pool arrangements). Undertakings should take into account reinsurance and other mitigation instruments to estimate their net loss as specified below.
- Scenarios have not been provided by line of business nor segmented between Non-SLT and SLT. The scenarios are for health in general allowing for the respective risks affecting SLT and Non-SLT.
- The scenarios also apply to proportional reinsurance.

SCR.8.100.   The above selection was based on the likelihood of such events occurring being extreme or exceptional and therefore giving rise to losses, or adverse changes in the value of insurance and reinsurance liabilities.

SCR.8.101.   The health catastrophe risk sub-module does currently not capture the health catastrophe risk of all exposures. Circumstances in which the standardised scenarios may not be appropriate are:

- Where an undertaking accepts non-proportional reinsurance of some or all of the products included in the health catastrophe scenarios.

- Where undertakings have exposures which are not captured by the health catastrophe scenarios.

Input

H_{CAT_Arena}	=	Capital requirement for health catastrophe risk under an Arena scenario net of risk mitigation
$H_{CAT\_Concentration}$	=	Capital requirement for health catastrophe risk under a Concentration scenario net of risk mitigation
$H_{CAT\_Pandemic}$	=	Capital requirement for health catastrophe risk under a Pandemic scenario net of risk mitigation

Calculation

SCR.8.102.   The H_{CAT} will be the square root of the sum of the capital requirements for the three scenarios above. It is assumed all three are independent:

$$H_{CAT} = \sqrt{(H_{CAT\_Arena})^2 + (H_{CAT\_Concentration})^2 + (H_{CAT\_Pandemic})^2}$$

SCR.8.103.   Undertakings may estimate the net capital requirement for Catastrophe Risk applying the following formulae:

Where the XL cover follows a proportional cover:

   MAX ((L*MS*QS)-XLC, 0) +MIN ((L*MS*QS), XLF) + REINST

Where a proportional cover follows an XL cover:

   MAX ((L*MS)-XLC, 0) *QS +MIN((L*MS), XLF) *QS + REINST

Where

   L= the total gross loss amount. The total gross loss amount of the catastrophe will be provided as part of the information of the scenario.

MS= the market share. This proportion might be determined with reference to exposure estimates, historical loss experience or the share of total market premium income received. The total market loss amount of the catastrophe will be provided as part of the information of the scenario.

QS= quota share retention. Allowance must be made for any limitations, e.g. event limits which are frequently applied to QS treaties

XLC= the upper limit of the XL programme that is applicable in case of the scenario event

XLF= the XL retention of the XL programme that is applicable in case of the scenario event.

REINST = the reinstatement premium or premiums (in case of scenarios with a succession of 2 or more identical events)

SCR.8.104.   Risk mitigation contracts can take a variety of forms and the above equation may not be applicable. Guidance is provided through a set of examples that show how firms could net down their gross estimations and this is included in Annex L.3.

SCR.8.105.   In the EEA there is a variety of national arrangements which provide protection in different ways. Without going into the specifics of each arrangement, undertakings should net down their gross estimation to reflect such protection, if applicable. Where Reinsurers provide or could potentially provide cover to the national arrangements, such reinsurance companies need to estimate a capital requirement for this exposure.

SCR.8.106.   In calculating net losses undertakings should include consideration of reinstatement premiums directly related to the scenario. Both outwards reinstatement premiums associated with reinstating risk transfer protection and Inwards reinstatement premiums in respect of assumed reinsurance business should be calculated.

SCR.8.107.   The module delivers the following output:

H_{CAT}	=	Health catastrophe risk (for health insurance obligations) net of risk mitigation

Arena disaster

SCR.8.108.   The Arena disaster aims to capture the risk of having lots of people in one place at one time and a catastrophic event affecting such location and people.

Input

E_p	=	exposure measure i.e. total sum insured by product type p
MS_P	=	market share by product type p as listed below

SCR.8.109.   Each undertaking will be required to provide its total sum insured by product type, E_p.

SCR.8.110.   All policies which include one or more of the following product types should be included in the calculation. The product types defined are a representation of the type of benefits paid (so you can have many different products but overall the type of benefits paid under these products should fall into one of the 5 categories below).

Product types

- Accidental Deaths
- Permanent Total Disability
- Long Term Disability
- Short Term Disability
- Medical/Injuries

SCR.8.111.   The product types above are sufficiently granular that an undertaking should be able to allocate its business to one of them, provided it keeps appropriate records.

SCR.8.112.   For the estimation of E_p, undertakings need to consider:

- In the case of disability where payments are not lump sums, the exposure measure should be the present value of expected future payments for disability claims.
- In calculating the present value of future payments, firms should assume that a short term disability would last for 12 months and a long term disability would last for 10 years (or a shorter period for which the average policy would make payments) from the date of the catastrophe event; firms should also make allowance for any deferred period before claim payments commence.
- Firms should also add extra exposure for any Personal Accident riders.
- For medical expense insurance, the sum insured should be taken to be zero. Medical expense insurance, be it on a SLT or non-SLT basis, may cover all of an insured's medical treatment (such as in the Netherlands or Germany) or may function to top up or provide an alternative to the state health system. In the latter type of market, medical treatment of the consequences of a catastrophe would fall to the state health system rather than to health insurers. As healthcare resources are transferred to deal with the catastrophe within the state health system, it is possible that the claims on the medical expenses

insurers would reduce rather than increase. For example, UK products provide access to care from private care providers. These providers attend to acute conditions such as cancer, cardiovascular disease, etc and not emergencies. In emergencies arising from an accident or a pandemic, policyholders would rely on the National Health Service for treatment/care rather than private providers. For markets such as these, no capital requirements are considered necessary for the catastrophe scenarios specified. For the former type of market, insurers would have to pay the medical expenses of those affected by the catastrophe. For a market event (such as an arena event or some form of pandemic) the constrained capacity within the medical services systems means that it is anticipated that the treatment would be in place of other healthcare treatments that the insurer would be paying for anyway. The types of treatment and their costs would differ. However, it is expected that the overall increase in claim cost would be modest and would be reflected in the ordinary volatility risk.

The one scenario in which catastrophe capital may be required is under the concentration scenario and the insurer would cover the cost of all medical treatment arising out of the scenario. If medical expense insurance is offered to a group of employees (or similar) then an event effecting those employees would generate an unanticipated increase in claim cost for the insurer and any offset from the substitution effect considered above would be very small. Capital would be required here and should be calculated in a similar manner to that for other types of benefit. As a result medical expenses are captured only under the Concentration scenario.

SCR.8.113. The market share by product type MS_P should be provided by the undertaking. The factors should be estimated according to their share of the market for each of the respective countries where they have exposure. The volume measure used to estimate this should be written premiums. If this information is not readily available, the undertakings should be able to make some estimation based on their knowledge of their market. Information could be supplied by the local supervisors and probably also accessed from local associations of insurance companies. Undertakings should provide a short explanation of how they have arrived at their estimation.

Calculation

SCR.8.114. The total capital requirement as a result of an arena disaster is estimated as follows:

$$H_{CAT\_ARENA\_CTRY} = 0.5 * S * \sum_{}^{products} I_p * x_p * E_p * MS_p$$

$$H_{CAT\_ARENA} = \sqrt{\sum_{CTRY} ((H_{CAT\_ARENA\_CTRY})^2)}$$

Where

S	=	Arena capacities as outlined in Annex L.1.
I_P	=	insurance penetration for product type and by country
x_P	=	proportion of accidental deaths/disabilities (short and long term) and injuries
P	=	product types

SCR.8.115.   The value for S is maximum capacity of the largest arena in each country as provided in Annex L.1.

SCR.8.116.   The values of I_p are provided in Annex L.2.

SCR.8.117.   Where the health product types considered are features of a larger product package (such as workers' compensation) then a calculation of the required capital should be made for each of the relevant product types. Disabilities are split in to short-term and long-term in assessing likely claim amounts under disability income policies taking into account the monthly benefit amount and the expected duration of the claim.

SCR.8.118.   The factors X_P represent the distribution of injuries by type. Theses apply in each country as follows:

Table 2. Injury Distributions

	%
Accidental Deaths	10.0
Permanent Total Disability	1.5
Long Term Disability	5.0
Short Term Disability	13.5
Medical/Injuries	30.0
Total percentage	60.0

SCR.8.119.   Undertakings should then apply any adjustment due to risk mitigation to estimate the net capital requirement. Details should be provided on this calculation.

Output

The output is given by:

H_{CAT_ARENA}	=	Capital requirement for health catastrophe risk under an Arena scenario net of risk mitigation

Concentration scenario

SCR.8.120.   The Concentration scenario, aims to capture the risk of having concentrated exposures, the largest of which is being affected by a disaster. For example: a disaster within densely populated office blocks in a financial hub.

Input

SCR.8.121.   Each undertaking will be required to provide:

E_p	=	exposure measure i.e. total sum insured by product type p
C	=	the number of lives insured by the undertaking in its largest known concentration of lives working in a single building plus those lives known to be covered and working within a 300m radius.

SCR.8.122.   Each undertaking will be required to provide its average sum insured by product type, E_p.

SCR.8.123.   All policies which include one or more of the following product types should be included in the calculation. The product types defined are a representation of the type of benefits paid (so you can have many different products but overall the type of benefits paid under these products should fall into one of the 5 categories below).

Product types

- Accidental Deaths
- Permanent Total Disability
- Long Term Disability
- Short Term Disability
- Medical/Injuries

SCR.8.124.   The product types above are sufficiently granular that an undertaking should be able to allocate its business to one of them, provided it keeps appropriate records.

SCR.8.125.   For the estimation of E_p, undertakings need to consider:

o   In the case of disability where payments are not lump sums, the exposure measure should be the present value of expected future payments for disability claims.

- o In calculating the present value of future payments, firms should assume that a short term disability would last for 12 months and a long term disability would last for 10 years (or a shorter period for which the average policy would make payments) from the date of the catastrophe event; firms should also make allowance for any deferred period before claim payments commence. Where partial disability payments are possible, firms should assume that claimants are entitled to a full benefit for the full duration of the claim.
- o For medical expense insurance, the sum insured should be taken as the average claim paid in the last two underwriting years in respect of hospital treatments for accidental causes.
- o Firms should also add extra exposure for any Accident riders.

SCR.8.126. Where the health product types considered are features of a larger product package (such as workers' compensation) then a calculation of required capital should be made for each of the relevant product types. Disabilities are split in to short-term and long-term in assessing likely claim amounts under disability income policies taking into account the monthly benefit amount and the expected duration of claim.

SCR.8.127. Disabilities are split in to short-term and long-term in assessing likely claim amounts under disability income policies taking into account the monthly benefit amount and the expected duration of claim. Where a lump sum is payable under a permanent and total disability policy or rider benefit then this would be considered as a long term disability claim.

Calculation

SCR.8.128. The capital requirement for the concentration scenario is estimated as follows:

$$H_{CAT\_CONC\_CTRY} = C * \sum^{Pr\,oducts} x_p * E_p$$

$$H_{CAT\_CONC} = \sqrt{\sum_{CTRY}((H_{CAT\_CONC\_CTRY})^2)}$$

where

$H_{CAT\ CONC}$	=	is the capital requirement for the concentration scenario
X_P	=	proportion of accidental deaths/disabilities (short and long term) and injuries by product type)
P	=	product types

SCR.8.129. The factors X_p represent the distribution of injuries by type. These apply in each country as follows:

Table 3. Injury Distribution x$_p$

	%
Accidental Deaths	10.0
Permanent Total Disability	1.5
Long Term Disability	5.0
Short Term Disability	13.5
Medical/Injuries	30.0
Total percentage	60.0

SCR.8.130.   Undertakings should then apply any adjustment due to risk mitigation to estimate the net capital requirement. Details should be provided on this calculation.

Output

SCR.8.131.   The output is given by:

$H_{CAT\_Concentration}$	=	Capital requirement for Health catastrophe risk under a concentration scenario net of risk mitigation

Pandemic scenario

SCR.8.132.   The Pandemic scenario, aims to capture the risk that there could be a pandemic that results in non lethal claims, e.g. where victims infected are unlikely to recover and could lead to a large disability claim

SCR.8.133.   The scenario will impact the following products:
- disability income (both long and short term)
- products covering permanent and total disability either as a stand alone benefit or as part of another product, such as a stand alone critical illness product.
- Pandemic risk will be small for medical insurance. Thus medical expenses is not included for pandemic as it is considered to be captured in the premium and reserve risk module. The scenario aims to capture the risk that there could be a pandemic that results in non lethal claims, e.g. where victims infected are unlikely to recover and could lead to a large disability claim

Input

SCR.8.134.   Each undertaking will be required to provide:

E_p	=	exposure measure i.e. total sum insured by product type p

SCR.8.135. For the estimation of E_p, undertakings need to consider:

- In the case of disability where payments are not lump sums, the exposure measure should be the present value of future payments for disability claims.
- In calculating the present value of future payments, firms should assume that claimants would not recover and that payments would cease only on death or at the end of the claim payment period specified in the policy conditions; firms should also make allowance for any deferred period before claim payments commence. Where partial disability payments are possible, firms should assume that claimants are entitled to a full benefit for the full duration of the claim.

Calculation

SCR.8.136. The total capital requirement is estimated as follows:

$$H_{CAT\_PAN} = R \sum_{product} E_p$$

where

H_{CAT_PAN}	=	the capital requirement for the pandemic scenario net of risk mitigation
R	=	the proportion of lives affected by the Pandemic = 0.075‰

SCR.8.137. Undertakings should then apply any adjustment due to risk mitigation to estimate the net capital requirement. Details should be provided on this calculation.

Output

SCR.8.138. The output is given by:

H_{CAT_PAN}	=	Capital requirement for Health catastrophe risk net of risk mitigation under a pandemic scenario

SCR.9. Non-life underwriting risk

SCR.9.1.   SCR_{nl} non-life underwriting risk module

Description

SCR.9.1. Non-life underwriting risk is the risk arising from non-life insurance obligations, in relation to the perils covered and the processes used in the conduct of business.

SCR.9.2. Non-life underwriting risk also includes the risk resulting from uncertainty included in assumptions about exercise of policyholder options like renewal or termination options.

SCR.9.3. The non-life underwriting risk module takes account of the uncertainty in the results of undertakings related to existing insurance and reinsurance obligations as well as to the new business expected to be written over the following 12 months.

SCR.9.4. The non-life underwriting risk module consists of the following sub-modules:

- the non-life premium and reserve risk sub-module

- the non-life lapse risk sub-module

- the non-life catastrophe risk sub-module

    Input

SCR.9.5. The following input information is required:

NL_{pr} = Capital requirement for non-life premium and reserve risk

NL_{lapse} = Capital requirement for non-life lapse risk

NL_{CAT} = Capital requirement for non-life catastrophe risk

    Output

SCR.9.6. The module delivers the following output:

SCR_{nl} = Capital requirement for non-life underwriting risk

    Calculation

SCR.9.7. The capital requirement for non-life underwriting risk is derived by combining the capital requirements for the non-life sub-risks using a correlation matrix as follows:

$$SCR_{nl} = \sqrt{\sum CorrNL_{r,c} \cdot NL_r \cdot NL_c}$$

where

$CorrNL_{r,c}$	=	The entries of the correlation matrix $CorrNL$
NL_r, NL_c	=	Capital requirements for individual non-life underwriting sub-risks according to the rows and columns of correlation matrix $CorrNL$

and where the correlation matrix $CorrNL$ is defined as:

$CorrNL$	NL_{pr}	NL_{lapse}	NL_{CAT}
NL_{pr}	1		
NL_{lapse}	0	1	
NL_{CAT}	0.25	0	1

SCR.9.2. NL$_{pr}$ Non-life premium & reserve risk

Description

SCR.9.8. This module combines a treatment for the two main sources of underwriting risk, premium risk and reserve risk.

SCR.9.9. Premium risk results from fluctuations in the timing, frequency and severity of insured events. Premium risk relates to policies to be written (including renewals) during the period, and to unexpired risks on existing contracts. Premium risk includes the risk that premium provisions turn out to be insufficient to compensate claims or need to be increased.

SCR.9.10. Premium risk also includes the risk resulting from the volatility of expense payments. Expense risk can be quite material for some lines of business and should therefore be fully reflected in the module calculations. Expense risk is implicitly included as part of the premium risk.

SCR.9.11. Reserve risk results from fluctuations in the timing and amount of claim settlements.

Input

SCR.9.12. In order to carry out the non-life premium and reserve risk calculation, undertakings need to determine the following:

PCO_{lob}	=	Best estimate for claims outstanding for each LoB. This amount should be less the amount recoverable from reinsurance and special purpose vehicles

$P_{lob}^{t,written}$	=	Estimate of net written premium for each LoB during the forthcoming year
$P_{lob}^{t,earned}$	=	Estimate of net earned premium for each LoB during the forthcoming year
$P_{lob}^{t-1,written}$	=	Net written premium for each LoB during the previous year
P_{lob}^{PP}	=	Present value of net premiums of existing contracts which are expected to be earned after the following year for each LoBs.

SCR.9.13.   The term P_{lob}^{PP} is only relevant for contracts with a coverage period that exceeds the following year. For annual contracts without renewal options P_{lob}^{PP} is zero. Undertakings may not calculate P_{lob}^{PP} where it is likely not to be material compared to $P_{lob}^{t,earned}$.

SCR.9.14.

Calculation

SCR.9.15.   The premium and reserve risk capital requirement delivers the following output information:

| NL_{pr} | = | Capital requirement for premium and reserve risk |

SCR.9.16.   The capital requirement for the combined premium risk and reserve risk is determined as follows:

$$NL_{pr} = \rho(\sigma) \bullet V$$

where

V	=	Volume measure
σ	=	Combined standard deviation
$\rho(\sigma)$	=	A function of the combined standard deviation

SCR.9.17.   The function $\rho(\sigma)$ is specified as follows:

$$\rho(\sigma) = \frac{\exp(N_{0.995} \bullet \sqrt{\log(\sigma^2 + 1)})}{\sqrt{\sigma^2 + 1}} - 1$$

where

| $N_{0.995}$ | = | 99.5% quantile of the standard normal distribution |

SCR.9.18.   The function $\rho(\sigma)$ is set such that, assuming a lognormal distribution of the underlying risk, a risk capital requirement consistent with the VaR 99.5% calibration objective is produced. Roughly, $\rho(\sigma) \approx 3 \cdot \sigma$

SCR.9.19.   The volume measure V and the combined standard deviation σ for the overall non-life insurance portfolio are determined in two steps as follows:

- For each individual LoB, the standard deviations and volume measures for both premium risk and reserve risk are determined;

- The standard deviations and volume measures for the premium risk and the reserve risk in the individual LoBs are aggregated to derive an overall volume measure V and a combined standard deviation σ.

The calculations needed to perform these two steps are set out below.

Step 1: Volume measures and standard deviations per LoB

SCR.9.20.   The premium and reserve risk sub-module is based on the same segmentation into lines of business used for the calculation of technical provisions. However, an insurance line of business and the corresponding line of business for proportional reinsurance are merged, based on the assumption that the risk profile of both lines of business is similar. The lines of business for NSLT health insurance and reinsurance are covered in the health underwriting risk module.

SCR.9.21.   The following numbering of LoBs applies for the calculation:

Number	Line of business
1	Motor vehicle liability
2	Motor, other classes
3	Marine, aviation, transport (MAT)
4	Fire and other property damage
5	Third-party liability
6	Credit and suretyship
7	Legal expenses
8	Assistance
9	Miscellaneous
10	Non-proportional reinsurance – property

11	Non-proportional reinsurance – casualty
12	Non-proportional reinsurance – MAT

SCR.9.22.   For each LoB, the volume measures and standard deviations for premium and reserve risk are denoted as follows:

$V_{(prem,lob)}$	=	The volume measure for premium risk
$V_{(res,lob)}$	=	The volume measure for reserve risk
$\sigma_{(prem,lob)}$	=	standard deviation for premium risk
$\sigma_{(res,lob)}$	=	standard deviation for reserve risk

SCR.9.23.   The volume measure for premium risk in the individual LoB is determined as follows:

$$V_{(prem,lob)} = \max(P_{lob}^{t,written}; P_{lob}^{t,earned}; P_{lob}^{t-1,written}) + P_{lob}^{PP}$$

SCR.9.24.   If the undertaking has committed to its regulator that it will restrict premiums written over the period so that the actual premiums written (or earned) over the period will not exceed its estimated volumes, the volume measure is determined only with respect to estimated premium volumes, so that in this case:

$$V_{(prem,lob)} = \max(P_{lob}^{t,written}; P_{lob}^{t,earned}) + P_{lob}^{PP}$$

SCR.9.25.   The market-wide estimates of the net standard deviation for premium risk for each line of business are:

LoB	standard deviation for premium risk (net of reinsurance)
Motor vehicle liability	10%·NP_{lob}
Other motor	7%· NP_{lob}
MAT	17%· NP_{lob}
Fire	10%· NP_{lob}
3rd-party liability	15%· NP_{lob}
Credit	21.5%· NP_{lob}
Legal expenses	6.5%· NP_{lob}

Assistance	5%· NP_{lob}
Miscellaneous	13%· NP_{lob}
Np reins (prop)	17.5%
Np reins (cas)	17%
Np reins (MAT)	16%

SCR.9.26.   The adjustment factor for non-proportional reinsurance NP_{lob} of a line of business allows undertakings to take into account the risk-mitigating effect of particular per risk excess of loss reinsurance.

SCR.9.27.   Undertakings may choose for each line of business to set the adjustment factor to 1 or to calculate it as set out in Annex N.

SCR.9.28.   The volume measure for reserve risk for each individual LoB is determined as follows:

$$V_{(res,lob)} = PCO_{lob}$$

SCR.9.29.   The market-wide estimate of the net of reinsurance standard deviation for reserve risk for each line of business are:

LoB_t	standard deviation for reserve risk (net of reinsurance)
Motor vehicle liability	9.5%
Other motor	10%
MAT	14%
Fire	11%
3rd-party liability	11%
Credit	19%
Legal expenses	9%
Assistance	11%
Miscellaneous	15%
Np reins (prop)	20%
Np reins (cas)	20%
Np reins (MAT)	20%

SCR.9.30.   No further adjustments are needed to these results.

SCR.9.31.   The standard deviation for premium and reserve risk in the individual LoB is defined by aggregating the standard deviations for both subrisks under the assumption of a correlation coefficient of $\alpha = 0.5$:

$$\sigma_{(lob)} = \frac{\sqrt{\left(\sigma_{(prem,lob)}V_{(prem,lob)}\right)^2 + 2\alpha\sigma_{(prem,lob)}\sigma_{(res,lob)}V_{(prem,lob)}V_{(res,lob)} + \left(\sigma_{(res,lob)}V_{(res,lob)}\right)^2}}{V_{(prem,lob)} + V_{(res,lob)}}$$

Step 2: Overall volume measures and standard deviations

SCR.9.32.   The overall standard deviation σ is determined as follows:

$$\sigma = \sqrt{\frac{1}{V^2} \cdot \sum_{r,c} CorrLob_{r,c} \cdot \sigma_r \cdot \sigma_c \cdot V_r \cdot V_c}$$

where

r,c	=	All indices of the form (lob)
$CorrLob_{r,c}$	=	The entries of the correlation matrix CorrLob
Vr, Vc	=	Volume measures for the individual lines of business, as defined in step 1

SCR.9.33.   The overall volume measure for each LoB, V_{lob} is obtained as follows:

$$V_{lob} = \left(V_{lob}^{prem} + V_{lob}^{res}\right) \cdot \left(0.75 + 0.25 \cdot DIV_{lob}\right)$$

where

$$DIV_{lob} = \frac{\sum_j \left(V_{(prem,j,lob)} + V_{(res,j,lob)}\right)^2}{\left(\sum_j \left(V_{(prem,j,lob)} + V_{(res,j,lob)}\right)\right)^2}$$

and where the index *j* denotes the geographical segments as set out in Annex M and $V_{(prem,j,lob)}$ and $V_{(res,j,lob)}$ denote the volume measures as defined above but restricted to the geographical segment j.

However, the factor DIV_{lob} should be set to 1 for the line of business credit and suretyship and where the standard deviation for premium or reserve risk of the line of business is an undertaking-specific parameter.

Undertakings may choose to allocate all of their business in a line of business to the main geographical segment in order to simplify the calculation.

SCR.9.34.   The correlation matrix *CorrLob* is defined as follows:

CorrLob	1	2	3	4	5	6	7	8	9	10	11	12
1: Motor vehicle liability	1											
2: Other motor	0,5	1										
3: MAT	0,5	0,25	1									
4: Fire	0,25	0,25	0,25	1								
5: 3rd party liability	0,5	0,25	0,25	0,25	1							
6: Credit	0,25	0,25	0,25	0,25	0,5	1						
7: Legal exp.	0,5	0,5	0,25	0,25	0,5	0,5	1					
8: Assistance	0,25	0,5	0,5	0,5	0,25	0,25	0,25	1				
9: Miscellaneous.	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	1			
10:Np reins. (property)	0,25	0,25	0,25	0,5	0,25	0,25	0,25	0,5	0,25	1		
11:Np reins. (casualty)	0,25	0,25	0,25	0,25	0,5	0,5	0,5	0,25	0,25	0,25	1	
12:Np reins. (MAT)	0,25	0,25	0,5	0,5	0,25	0,25	0,25	0,25	0,5	0,25	0,25	1

Output

SCR.9.35.   This module delivers the following output information:

NL_{pr} =   Capital requirement for premium and reserve risk

SCR.9.3. NL_{Lapse} Lapse risk

SCR.9.36.   Non-life insurance contracts can include policyholder options which significantly influence the obligations arising from them. Examples for such options are options to terminate a contract before the end of the previously agreed insurance period and options to renew contracts according to previously agreed conditions. Where such policyholder options are included in a non-life insurance contract, the calculation of premium provisions is based on assumptions about the exercise rates of these options. Lapse risk is the risk that these assumptions turn out to be wrong or need to be changed.

SCR.9.37.   Where non-life insurance contracts do not include policyholder options or where the assumptions about the exercise rate of such options have no material influence on premium provisions, the contracts do not need to be included in the calculations of the lapse risk sub-module. Where this is the case for the whole portfolio of an undertaking (except for a non-material part) the three components of the sub-module can be set to zero.

SCR.9.38.   The capital requirement for lapse risk should be calculated as follows:

$$NL_{lapse} = \max(Lapse_{down}; Lapse_{up}; Lapse_{mass}),$$

where

NL_{lapse}	=	Capital requirement for lapse risk
$Lapse_{down}$	=	Capital requirement for the risk of a permanent decrease of the rates of lapsation
$Lapse_{up}$	=	Capital requirement for the risk of a permanent increase of the rates of lapsation
$Lapse_{mass}$	=	Capital requirement for the risk of a mass lapse event

SCR.9.39.   The capital requirement for the risk of a permanent decrease of the rates of lapsation should be calculated as follows:

$$Lapse_{down} = \Delta NAV \mid lapseshock_{down},$$

where

ΔNAV	=	Change in the net value of assets minus liabilities (not including changes in the risk margin of technical provisions)
$lapseshock_{down}$	=	Reduction of 50% in the assumed option take-up rates in all future years for all policies adversely affected by such risk. Affected by the reduction are options to fully or partly terminate, decrease, restrict or suspend the insurance cover. Where an option allows the full or partial establishment, renewal, increase, extension or resumption of insurance cover, the 50% reduction should be applied to the rate that the option is not taken up.
		The shock should not change the rate to which the reduction is applied to by more than 20% in absolute terms.

SCR.9.40.   The capital requirement for the risk of a permanent increase of the rates of lapsation should be calculated as follows:

$$Lapse_{up} = \Delta NAV \mid lapseshock_{up},$$

where

ΔNAV	=	Change in the net value of assets minus liabilities (not including changes in the risk margin of technical provisions)
$lapseshock_{up}$	=	Increase of 50% in the assumed option take-up rates in all future years for all policies adversely affected by such risk. Affected by the increase are options to fully or

partly terminate, decrease, restrict or suspend the insurance cover. Where an option allows the full or partial establishment, renewal, increase, extension or resumption of insurance cover, the 50% increase should be applied to the rate that the option is not taken up.

The shocked rate should not exceed 100%.

SCR.9.41.   Therefore, the shocked take-up rate 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 take-up rate in *lapseshock*$_{up}$
R_{down}	=	shocked take-up rate in *lapseshock*$_{down}$
R	=	take-up rate before shock

SCR.9.42.   The capital requirement for the risk of a mass lapse event *Lapse*$_{mass}$ should be calculated as follows:

$$Lapse_{mass} = \Delta NAV \mid lapseshock_{mass},$$

where

ΔNAV	=	Change in the net value of assets minus liabilities (not including changes in the risk margin of technical provisions)
lapseshock$_{up}$	=	The surrender of 30% of the insurance policies with a negative best estimate for premium provision

Simplification

SCR.9.43.   If it is proportionate to the nature, scale and complexity of the risk, the calculation of the lapse risk sub-module might be made on the basis of homogeneous risk groups instead of a policy-by-policy basis. A calculation on the basis of homogeneous risk groups should be considered to be proportionate if

- the homogeneous risk groups appropriately distinguish between policies of different lapse risk;

- the result of a policy-by-policy calculation would not differ materially from a calculation on homogeneous risk groups; and

- a policy-by-policy calculation would be an undue burden compared to a calculation on homogeneous risk groups which meet the two criteria above.

SCR.9.4. Non life CAT risk sub - module

Description

SCR.9.44. Under the non-life underwriting risk module, catastrophe risk is defined in the Solvency II Framework Directive (Directive 2009/138/EC) as: "the risk of loss, or of adverse change in the value of insurance liabilities, resulting from significant uncertainty of pricing and provisioning assumptions related to extreme or exceptional events."

SCR.9.45. CAT risks stem from extreme or irregular events that are not sufficiently captured by the capital requirements for premium and reserve risk. The catastrophe risk capital requirement has to be calibrated at the 99.5% VaR (annual view).

SCR.9.46. The CAT risk sub-module under the standard formula should be calculated using one of the following alternative methods (or as a combination of both):

- Method 1: standardised scenarios

- Method 2: factor based methods

SCR.9.47. Undertakings using the standard formula should use method 1 for all exposures where possible. Where the application of method 1 is not possible undertakings should apply method 2 for the perils concerned. This may in particular be the case for the following exposures:

- natural catastrophe exposures outside of the European Economic Area
- miscellaneous insurance business
- non-proportional reinsurance business

Input

SCR.9.48. The following input information is required:

NL_CAT_1 = The catastrophe capital requirement under method 1

NL_CAT_2 = The catastrophe capital requirement under method 2

Calculation

SCR.9.49. $NL\_CAT = \sqrt{(NL\_CAT_1)^2 + (NL\_CAT_2)^2}$

Output

SCR.9.50.   NL_CAT will be the aggregation of the capital requirements for the method 1 and method 2. It is assumed both are independent.

Method 1: standardised scenarios

Description

SCR.9.51.   The non-life catastrophe sub-module is based on the guidance and advice of the Catastrophe Task force. A description of their work has been published on the CEIOPS website under the name of "Final guidance on the calibration and application of catastrophe standardised scenarios for the standard formula SCR". This includes detailed information on how scenarios have been calibrated.

SCR.9.52.   The non-life catastrophe standardised scenarios considered in this document are outlined below.

SCR.9.53.   Natural catastrophes: extreme or exceptional events arising from the following perils:

- Windstorm

- Flood

- Earthquake

- Hail

- Subsidence

SCR.9.54.   Man-Made Catastrophes: extreme or exceptional events arising from:

- Motor

- Fire

- Marine

- Aviation

- Liability

- Credit & Suretyship

- Terrorism

SCR.9.55.   Storm surge is also included. Where this is covered and is considered to be a material peril, it has been combined with the windstorm peril due to the inherently coupled nature.

SCR.9.56.   Furthermore:

- Scenarios are all EEA-based. An exception to this is the French Dom/Tom scenario[38].

- Geographical specifications are recognised where appropriate.

- Scenarios are provided gross of reinsurance and gross of all other mitigation instruments (for example national pool arrangements or cat bonds) unless otherwise stated. Undertakings should take into account reinsurance and other mitigation instruments to estimate their net loss. Care should be taken to ensure no double counting.

- Scenarios have been provided by peril or event and not by line of business. The approach is considered the most appropriate for the purpose of Catastrophe risk due to tail correlation across lines of business.

- The scenarios are not appropriate for non-proportional reinsurance writers. The reason is that the relationship between total insured value and loss damage ratio (1 in 200 loss / total exposure) (and also premium and loss damage ratio) is more variable between reinsurance undertakings and from one year to the next, than for direct or proportional reinsurance writers. The relationship depends on the level of excess at which non proportional business is written and the pattern of participation by (re)insurance layer. The complexity that would be introduced by attempting to allow for non proportional business would be disproportional to the benefits gained.

SCR.9.57.   The above selection was based on the likelihood of such events resulting extreme or exceptional and therefore giving rise to losses, or adverse changes in the value of insurance liabilities.

SCR.9.58.   Undertakings need to assess whether the standardised scenarios appropriately capture the risks to which they are exposed. Circumstances in which the standardised scenarios presented in this paper will be inadequate, include among others:

- Where undertakings have non-life exposures outside the EEA, except French Dom Tom.

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[38] The French Overseas Departments and Territories (French: départements d'outre-mer et territoires d'outre-mer or DOM-TOM) consist broadly of French-administered territories outside of the European continent. The French Overseas Departments and Territories include in particular island territories in the Atlantic, Pacific and Indian oceans, a territory on the South American coast, and several periantarctic islands.
According to the French constitution the French Overseas Departments are an integral part of France: French laws and regulations apply (civil code, penal code, administrative law, social laws, tax laws et cetera), in departments as in the mainland. As a result they have been considered within the scope of the task force.

- Where undertakings write non proportional reinsurance business and this cannot be properly reflected by the standardised scenario.

- Where undertakings write miscellaneous business

Input

SCR.9.59.   The following input information is required:

$NL\_CAT_{1NatCat}$ =   Catastrophe capital requirement for natural catastrophes net of risk mitigation

$NL\_CAT_{1Man\ made}$ =   Catastrophe capital requirement for man made net of risk mitigation

Calculation

SCR.9.60.   The NL_CAT_1 will be the aggregation of the capital requirements for Natural catastrophe and man made disasters. It is assumed both are independent:

$$NL\_CAT_1 = \sqrt{\left(NL\_CAT_{1Nat\_cat}\right)^2 + \left(NL\_CAT_{1Man\_made}\right)^2}$$

	Nat Cat	Man made
Nat cat	1	0
Man Made	0	1

Output

SCR.9.61.   The NL_CAT_1 will be the aggregation of the capital requirements for natural catastrophe and man made disasters net of risk mitigation. It is assumed both are independent:

Natural Catastrophes, NL_CAT$_{1Nat\_cat}$

SCR.9.62.   Annex L.4 provides a table which specifies the countries that need to carry out the calculations for each of the natural catastrophe perils.

Calculation

SCR.9.63.   The NL_CAT$_{1NatCat}$ will be given as:

- Firstly catastrophe capital requirements at country level should be aggregated to estimate the catastrophe capital requirement at peril level:

$$CAT_{peril} = \sqrt{\sum_{ctry,i,i} Corr_{ctry,i,j} * CAT_{peril\_ctry,i} * CAT_{peril\_ctry,j}}$$

Where:

CAT_{peril}	=	Catastrophe capital requirement for each peril type = Windstorm, Earthquake, Flood, Hail and Subsidence.
$CAT_{peril\_ctry,i,j}$	=	Catastrophe capital requirement for each peril type by country = Windstorm, Earthquake, Flood, Hail and Subsidence. Where there are separate reinsurance programmes for each country the aggregations (across countries) are done net of reinsurance.
$Corr_{ctry,i,j}$	=	Correlation between countries i,j

- Secondly, catastrophe capital requirements at peril level should be aggregated to estimate the catastrophe capital requirement at total level:

$$NL\_CAT_{1NatCat} = \sqrt{\sum_{peril,i,i} Corr_{peril,i,j} * CAT_{peril,i} * CAT_{peril,j}}$$

Where:

NL_CAT_{NatCat}	=	Catastrophe capital requirement for non life net of risk mitigation under method 1.
$Corr_{peril,i,j}$	=	Correlation between perils i,j
$CAT_{peril,i,j}$	=	Catastrophe capital requirement for each peril= Windstorm, Earthquake, Flood, Hail and Subsidence. . Where there are separate reinsurance programmes per peril, the aggregation (across perils) are done net of reinsurance.

SCR.9.64. The correlation between countries for each of the Nat Cat perils has been derived from multiple probabilistic event set based simulation tools as well as from expert judgement. The correlation coefficients reflect the relationship between countries in case of windstorms/floods/earthquakes with a return period of 1:200 years or more. The correlation coefficients strongly depend on the proximity of the countries, or, for flood, the shape of the river network.

SCR.9.65. The country correlation matrixes $Corr_{ctry,i,j}$ for each peril are:

For Windstorm:

	AT	BE	CH	CZ	DE	DK	ES	FR	UK	IE	IS	LU	NL	NO	PL
AT	1.00														
BE	0.25	1.00													
CH	0.50	0.25	1.00												
CZ	0.25	0.25	0.25	1.00											
DE	0.25	0.50	0.25	0.25	1.00										
DK	0.00	0.25	0.00	0.00	0.50	1.00									
ES	0.00	0.00	0.25	0.00	0.00	0.00	1.00								
FR	0.25	0.50	0.50	0.25	0.50	0.25	0.25	1.00							
UK	0.00	0.50	0.00	0.00	0.25	0.25	0.00	0.25	1.00						
IE	0.00	0.25	0.00	0.00	0.25	0.00	0.00	0.00	0.50	1.00					
IS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00				
LU	0.25	0.75	0.25	0.25	0.50	0.25	0.00	0.75	0.25	0.25	0.00	1.00			
NL	0.25	0.75	0.25	0.25	0.50	0.50	0.00	0.50	0.50	0.25	0.00	0.50	1.00		
NO	0.00	0.00	0.00	0.00	0.25	0.50	0.00	0.00	0.25	0.00	0.00	0.25	0.25	1.00	
PL	0.00	0.25	0.00	0.25	0.50	0.25	0.00	0.00	0.00	0.00	0.00	0.25	0.25	0.00	1.00

For Flood:

	AT	BE	CH	CZ	FR	DE	HU	IT	BG	PL	RO	SI	SK	UK
AT	1.00													
BE	0.00	1.00												
CH	0.25	0.00	1.00											
CZ	0.75	0.00	0.00	1.00										
FR	0.00	0.25	0.25	0.00	1.00									
DE	0.75	0.25	0.25	0.75	0.25	1.00								
HU	0.75	0.00	0.00	0.25	0.00	0.75	1.00							
IT	0.00	0.00	0.25	0.00	0.00	0.00	0.00	1.00						
BG	0.25	0.00	0.00	0.00	0.00	0.25	0.25	0.00	1.00					
PL	0.75	0.00	0.00	0.75	0.00	0.75	0.25	0.00	0.00	1.00				
RO	0.75	0.00	0.00	0.25	0.00	0.75	0.75	0.00	0.50	0.25	1.00			
SI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.00	0.00	1.00		
SK	0.75	0.00	0.00	0.75	0.00	0.75	0.25	0.00	0.00	0.50	0.25	0.25	1.00	
UK	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00

For earthquake:

	AT	BE	BG	CR	CY	FR	DE	HE	HU	IS	IT	PT	RO	SI	CZ	CH	SK
AT	1.00																

BE	0.00	1.00															
BG	0.00	0.00	1.00														
CR	0.00	0.00	0.00	1.00													
CY	0.00	0.00	0.00	0.00	1.00												
FR	0.00	0.00	0.00	0.00	0.00	1.00											
DE	0.00	0.25	0.00	0.00	0.00	0.00	1.00										
HE	0.00	0.00	0.25	0.00	0.00	0.00	0.00	1.00									
HU	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00								
IS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00							
IT	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00						
PT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00					
RO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00				
SI	0.00	0.00	0.00	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.00	1.00			
CZ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00		
CH	0.00	0.00	0.00	0.00	0.00	0.25	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	
SK	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.00	1.00

For hail:

	AT	BE	FR	DE	IT	LU	NL	CH	ES
AT	1.00								
BE	0.00	1.00							
FR	0.00	0.25	1.00						
DE	0.00	0.00	0.00	1.00					
IT	0.00	0.00	0.00	0.00	1.00				
LU	0.00	0.50	0.25	0.25	0.00	1.00			
NL	0.00	0.50	0.00	0.25	0.00	0.00	1.00		
CH	0.00	0.00	0.25	0.00	0.00	0.00	0.00	1.00	
ES	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00

SCR.9.66. The peril correlation matrix $Corr_{peril,i,j}$ is:

	Windstorm	Earthquake	Flood	Hail	Subsidence
Windstorm	1.00				
Earthquake	0.00	1.00			
Flood	0.25	0.00	1.00		
Hail	0.25	0.00	0.00	1.00	
Subsidence	0.00	0.00	0.00	0.00	1.00

SCR.9.67. Undertakings should net down for reinsurance appropriately depending on the type of protection they have.

SCR.9.68.   Where there are separate reinsurance programmes for each country the aggregations (across countries) are done net of reinsurance. Where there are separate reinsurance programmes per peril, the aggregation (across perils) are done net of reinsurance.

SCR.9.69.   Undertakings may estimate the net capital requirement for the relevant scenarios applying the following formulae:

Where the XL cover follows a proportional cover:

$$\text{MAX}((L*MS*QS)-XLC, 0) + \text{MIN}((L*MS*QS), XLF) + REINST$$

Where a proportional cover follows an XL cover:

$$\text{MAX}((L*MS)-XLC, 0)*QS + \text{MIN}((L*MS), XLF)*QS + REINST$$

Where

L = the total gross loss amount. The total gross loss amount of the catastrophe will be provided as part of the information of the scenario.

MS = the market share. This proportion might be determined with reference to exposure estimates, historical loss experience or the share of total market premium income received. The total market loss amount of the catastrophe will be provided as part of the information of the scenario.

QS = quota share retention. Allowance must be made for any limitations, e.g. event limits which are frequently applied to QS treaties

XLC = the upper limit of the XL programme that is applicable in case of the scenario event

XLF = the XL retention of the XL programme that is applicable in case of the scenario event.

$REINST$ = the reinstatement premium or premiums (in case of scenarios with a succession of 2 or more identical events)

SCR.9.70.   However risk mitigation contracts can take a variety of forms and the above equation may often not be applicable. Guidance is provided through a set of examples that show how undertakings ought to net down their gross estimations and this is included in Annex L.3. Moreover, undertakings, including captives, should be able to take into account the risk mitigation effect of aggregate limits.

SCR.9.71.   In the EEA there is a variety of national arrangements which provide protection in different ways. Without going into the specifics of each arrangement, undertakings should net down their gross estimation to reflect such protection, if applicable. Where Reinsurers provide or could potentially provide cover to the national arrangements, such reinsurance companies need to estimate a capital requirement for this exposure.

SCR.9.72.   In calculating net losses undertakings should include consideration of reinstatement premiums directly related to the scenario. Both Outwards reinstatement premiums associated with reinstating risk transfer protection and

Inwards reinstatement premiums in respect of assumed reinsurance business should be calculated.

SCR.9.73.   Undertakings should provide the details of calculations and explain how they have arrived to the net estimation.

Output

SCR.9.74.   The module delivers the following output:

$NL\_CAT_{1NatCat}$ Catastrophe capital requirement for non life net of risk mitigation

$Cat_{Windstorm}$

Input

SCR.9.75.   Undertakings need to provide the following information:

TIV_{ZONE}	=	This comprises the weighted sum of:
		$TIV_{ZONE\_Fire} + TIV_{ZONE\_MAT}$
		TIV_{ZONE_Fire} = total insured value for Fire and other damage by zone
		TIV_{ZONE_MAT} = total insured value for Marine by zone. Within the Marine Class, the material components are Cargo (=static warehouse risks) and Marine XL. The Static Cargo sums insured can be entered into the CRESTA table as per the direct property. The Marine XL (= Reinsurance of direct marine insurers) have exactly the same issues as Property Treaty reinsurers in that the standardised method would not be appropriate.
		(Note that TIV_{ZONE_MPD} is not required for the Windstorm scenario.)
		Inputs should be entered as gross figures unless otherwise stated.

Calculation

SCR.9.76.   The formula to be applied by undertakings for their respective gross exposures in each of the EEA countries is as follows:

$$WTIV_{ZONE} = F_{ZONE} * TIV_{ZONE}$$

$$CAT_{Windstorm\_ctry} = Q_{CTRY} \sqrt{\sum_{rxc} AGG_{r,c} * WTIV_{ZONE,r} * WTIV_{ZONE,c}}$$

where,

$CAT_{Windstorm\_ctry}$	=	The estimation of the gross windstorm cat capital requirement for a specific country
Q_{CTRY}	=	1 in 200 year factor for each country. The Q_{CTRY} are provided in Annex L.5.
F_{ZONE}	=	relativity factors for each zone by country[39]
$AGG_{r,c}$	=	Rows and columns of the aggregation matrix AGG by country. [40]
$WTIV_{zone,r}$, $WTIV_{zonec}$	=	Geographically weighted total insured value by zone.

SCR.9.77.   Undertakings are required to allow for multiple events. As a result undertakings should estimate two alternatives A and B on a gross basis and then net down for reinsurance as described below, including consideration of any reinstatement premiums and coverage limits.

$Cat_{Windstorm(A)\_ctry\_net}$ = loss from EventA1 + subsequent loss from EventA2,

where

Loss from Event A1 = 0.8* $CAT_{Windstorm(A)\_ctry}$ then net down for reinsurance
Loss from Event A2 = 0.4*$CAT_{Windstorm(A)\_ctry}$ then net down for reinsurance

$CAT_{windstorm(B)\_ctry\_net}$ = Loss from EventB1 + subsequent loss from EventB2

where

Loss from Event B1 = 1* $CAT_{Windstorm(B)\_ctry}$ then net down for reinsurance
Loss from Event B2 = 0.2* $CAT_{Windstorm(B)\_ctry}$ then net down for reinsurance

$Cat_{Windstorm\_ctry\_net}$= Max ($Cat_{Windstorm(A)\_ctry\_net}$, $Cat_{Windstorm(B)\_ctry\_net}$)

Output

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[39] These values are provided in an excel spreadsheet « parameters for non life catastrophe »

[40] These values are provided in an excel spreadsheet « parameters for non life catastrophe »

$CAT_{Windstorm\_ctry\_net}$ = Catastrophe capital requirement for windstorm net of risk mitigation.

SCR.9.78. Undertakings should note that the output may be gross or net depending on whether the undertaking has reinsurance protection and whether this should be applied at a country level or peril level. For example you may have a European windstorm programme in which case this would still be gross and not adjusted for risk mitigation until aggregating at country level, or individual country cover in which case this would be net. When netting down, undertakings should take care to adjust and interpret formulae accordingly.

$Cat_{Earthquake}$

Input

SCR.9.79. Undertakings need to provide the following information:

TIV_{ZONE}	=	This comprises the weighted sum of:
		$TIV_{ZONE\_Fire} + TIV_{ZONE\_MAT}$
		TIV_{ZONE_Fire} = total insured value for Fire and other damage by zone
		TIV_{ZONE_MAT} = total insured value for Marine by zone. Within the Marine Class, the material components are Cargo (=static warehouse risks) and Marine XL. The Static Cargo sums insured can be entered into the CRESTA table as per the direct property. The Marine XL (= Reinsurance of direct marine insurers) have exactly the same issues as Property Treaty reinsurers in that the standardised method would not be appropriate.
		(Note that TIV_{ZONE_MPD} is not required for the earthquake scenario.)
		Inputs should be entered as gross figures unless otherwise stated.

Calculation

SCR.9.80. The formula to be applied by undertakings for their respective gross exposures in each of the EEA countries is as follows:

$$WTIV_{ZONE} = F_{ZONE} * TIV_{ZONE}$$

$$CAT_{Earthquake\_ctry} = Q_{CTRY} \sqrt{\sum_{rxc} AGG_{r,c} * WTIV_{ZONE,r} * WTIV_{ZONE,c}}$$

where,

$CAT_{Earthquake\_ctry}$	=	The estimation of the gross earthquake cat capital requirement for a specific country
Q_{CTRY}	=	1 in 200 year factor for each country. The Q_{CTRY} are provided in Annex L.5.
F_{ZONE}	=	Relativity factors for each zone by country[41]
$AGG_{r,c}$	=	Rows and columns of the aggregation matrix AGG by country. [42]
$WTIV_{zone,r},$ $WTIV_{zonec}$	=	Geographically weighted total insured value by zone.

Output

$CAT_{Earthquake\_ctry\_net}$ =   Catastrophe capital requirement for earthquake net of risk mitigation

SCR.9.81.   Undertakings should note that the output may be gross or net depending on whether the undertaking has reinsurance protection and whether this should be applied at a country level or peril level. For example you may have a European windstorm programme in which case this would still be gross and not adjusted for risk mitigation until aggregating at country level, or individual country cover in which case this would be net. When netting down, undertakings should take care to adjust and interpret formulae accordingly.

Cat_{Flood}

Input

SCR.9.82.   Undertakings need to provide the following information:

TIV_{ZONE}	=	This comprises the weighted sum of: $TIV_{ZONE\_Fire} + TIV_{ZONE\_MAT} + 2*TIV_{ZONE\_MPD}$ TIV_{ZONE_Fire} = total insured value for Fire and other damage by zone TIV_{ZONE_MAT} = total insured value for Marine by zone. Within the Marine Class, the material components are Cargo (=static warehouse risks) and Marine XL. The Static Cargo sums insured can be entered into the CRESTA table as per the direct property. The Marine XL (= Reinsurance of direct marine insurers) have exactly the same issues

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[41] These values are provided in an excel spreadsheet « parameters for non life catastrophe »

[42] These values are provided in an excel spreadsheet « parameters for non life catastrophe »

	as Property Treaty reinsurers in that the standardised method would not be appropriate. TIV_{ZONE_MPD} = total insured value for Motor property damage by zone Inputs should be entered as gross figures unless otherwise stated.

Calculation

SCR.9.83.   The formula to be applied by undertakings for their respective gross exposures in each of the EEA countries is as follows:

$$WTIV_{ZONE} = F_{ZONE} * TIV_{ZONE}$$

$$CAT_{Flood\_ctry} = Q_{CTRY} \sqrt{\sum_{rxc} AGG_{r,c} * WTIV_{ZONE,r} * WTIV_{ZONE,c}}$$

where,

CAT_{Flood_ctry}	=	The estimation of the gross flood cat capital requirement for a specific country
Q_{CTRY}	=	1 in 200 year factor for each country. The Q_{CTRY} are provided in Annex L.5.
F_{ZONE}	=	relativity factors for each zone by country[12]
$AGG_{r,c}$	=	Rows and columns of the aggregation matrix AGG by country.[43]
$WTIV_{zone,r,}$ $WTIV_{zonec}$	=	Geographically weighted total insured value by zone.

SCR.9.84.   Undertakings are required to allow for multiple events. As a result undertakings should estimate two events A and B on a gross basis and then net down for reinsurance as described below, including consideration of any reinsurance premiums and coverage limits.

$CAT_{Flood(A)\_ctry\_net}$ = Loss from EventA1 + subsequent Loss from EventA2,

Where
Loss from EventA1 = 0.65* $CAT_{Flood (A)\_ctry}$ then net down for reinsurance
Loss from EventA2 = 0.45* $CAT_{Flood (A)\_ctry}$ then net down for reinsurance

$CAT_{Flood(B)\_ctry\_net}$ = Loss from EventB1 + subsequent Loss from EventB2

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[43] These values are provided in an excel spreadsheet « parameters for non life catastrophe »

Where

Loss from EventB1 = $1 * CAT_{Flood\,(B)\_ctry}$ then net down for reinsurance
Loss from EventB2 = $0.1 * CAT_{Flood\,(B)\_ctry}$ then net down for reinsurance

And then,

$$CAT_{Flood\_ctry\_net} = Max\,(CAT_{Flood(A)\_ctry\_net}, CAT_{Flood(B)\_ctry\_net})$$

Output

| $CAT_{Flood\_ctry\_net}$ | = | Catastrophe capital requirement for flood net of risk mitigation |

SCR.9.85.   Undertakings should note that the output may be gross or net depending on whether the undertaking has reinsurance protection and whether this should be applied at a country level or peril level. For example you may have a European windstorm programme in which case this would still be gross and not adjusted for risk mitigation until aggregating at country level, or individual country cover in which case this would be net. When netting down, undertakings should take care to adjust and interpret formulae accordingly.

Cat_Hail

Input

SCR.9.86.   Undertakings need to provide the following information:

| TIV_{ZONE} | = | This comprises the weighted sum of:

$TIV_{ZONE\_Fire} + TIV_{ZONE\_MAT} + 5 * TIV_{ZONE\_MPD}$

TIV_{ZONE_Fire} = total insured value for Fire and other damage by zone

TIV_{ZONE_MAT} = total insured value for Marine by zone. Within the Marine Class, the material components are Cargo (=static warehouse risks) and Marine XL. The Static Cargo sums insured can be entered into the CRESTA table as per the direct property. The Marine XL (= Reinsurance of direct marine insurers) have exactly the same issues as Property Treaty reinsurers in that the standardised method would not be appropriate.

TIV_{ZONE_MPD} = total insured value for Motor property damage by zone

Inputs should be entered as gross figures unless otherwise stated. |

<u>Calculation</u>

SCR.9.87.   The formula to be applied by undertakings for their respective gross exposures in each of the EEA countries is as follows:

$$WTIV_{ZONE} = F_{ZONE} * TIV_{ZONE}$$

$$CAT_{Hail\_ctry} = Q_{CTRY} \sqrt{\sum_{rxc} AGG_{r,c} * WTIV_{ZONE,r} * WTIV_{ZONE,c}}$$

where,

CAT_{Hail_ctry}	=	The estimation of the gross hail CAT capital requirement for a specific country
Q_{CTRY}	=	1 in 200 year factor for each country. The Q_{CTRY} are provided in Annex L.5.
F_{ZONE}	=	relativity factors for each zone by country
$AGG_{r,c}$	=	Rows and columns of the aggregation matrix AGG by country.[44]
$WTIV_{zone,r,}$ $WTIV_{zonec}$	=	Geographically weighted total insured value by zone.

SCR.9.88.   Undertakings are required to allow for multiple events. As a result undertakings should estimate two events A and B on a gross basis and then net down for reinsurance as described below, including consideration of any reinstatement premiums and coverage limits.

$CAT_{Hail(A)\_ctry\_net}$ = Loss from EventA1 + subsequent Loss from EventA2,

Where
Loss from EventA1 = 0.7* $CAT_{Hail(A)\_ctry}$ then net down for reinsurance
Loss from EventA2 = 0.5* $CAT_{Hail (A)\_ctry}$ then net down for reinsurance

$CAT_{Hail(B)\_ctry\_net}$ = Loss from EventB1 + subsequent Loss from EventB2

Where

Loss from Event B1 = 1* $CAT_{Hail(B)\_ctry}$ then net down for reinsurance
Loss from Event B2 = 0.2* $CAT_{Hail(B)\_ctry}$ then net down for reinsurance

And then,

$Cat_{Hail\_ctry\_net}$ = Max ($Cat_{Hail(A)\_ctry\_net}$, $Cat_{Hail(B)\_ctry\_net}$)

<u>Output</u>

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[44] These values are provided in an excel spreadsheet « parameters for non-life catastrophes »

| CAT_{Hail_ctry_net} | = | Catastrophe capital requirement for flood net of risk mitigation |

$CAT_{Hail\_ctry\_net}$	=	Catastrophe capital requirement for flood net of risk mitigation

SCR.9.89.   Undertakings should note that the output may be gross or net depending on whether the undertaking has reinsurance protection and whether this should be applied at a country level or peril level. For example you may have a European windstorm programme in which case this would still be gross and not adjusted for risk mitigation until aggregating at country level, or individual country cover in which case this would be net. When netting down, undertakings should take care to adjust and interpret formulae accordingly.

$Cat_{Subsidence}$

Input

SCR.9.90.   Undertakings need to provide the following information:

TIV_{ZONE}	=	This comprises of: TIV_{ZONE_Fire} TIV_{ZONE_Fire} = total insured value for Fire and other damage by zone only in respect of residential buildings.

Calculation

SCR.9.91.   The formula to be applied by undertakings for their respective gross exposures in each of the EEA countries is as follows:

$$WTIV_{ZONE} = F_{ZONE} * TIV_{ZONE}$$

$$CAT_{Subsidence\_ctry} = Q_{CTRY} \sqrt{\sum_{rxc} AGG_{r,c} * WTIV_{ZONE,r} * WTIV_{ZONE,c}}$$

where,

$CAT_{Subsidence\_ctry}$	=	The estimation of the gross subsidence cat capital requirement for a specific country
Q_{CTRY}	=	1 in 200 year factor for each country. The Q_{CTRY} are provided in Annex L.5.
F_{ZONE}	=	relativity factors for each zone by country

AGG$_{r,c}$	=	Rows and columns of the aggregation matrix AGG by country. [45]
WTIV$_{zone,r}$, WTIV$_{zonec}$	=	Geographically weighted total insured value by zone.

Output

CAT$_{Subsidence\_ctry\_net}$	=	Catastrophe capital requirement for flood net of risk mitigation

SCR.9.92.   Undertakings should note that the output may be gross or net depending on whether the undertaking has reinsurance protection and whether this should be applied at a country level or peril level. For example you may have a European windstorm programme in which case this would still be gross and not adjusted for risk mitigation until aggregating at country level, or individual country cover in which case this would be net. When netting down, undertakings should take care to adjust and interpret formulae accordingly.

Man-made Catastrophe, NL_CAT$_{Man-made}$

Input

SCR.9.93.   The following input information is required:

CAT_{Fire}	=	Catastrophe capital requirement for Fire net of risk mitigations
CAT_{Motor}	=	Catastrophe capital requirement for Motor net of risk mitigations
CAT_{Marine}	=	Catastrophe capital requirement for Marine net of risk mitigations
CAT_{Credit}	=	Catastrophe capital requirement for Credit net of risk mitigations
$CAT_{Liability}$	=	Catastrophe capital requirement for Liability net of risk mitigations
$CAT_{Aviation}$	=	Catastrophe capital requirement for Aviation net of risk mitigations
$CAT_{Terrorism}$	=	Catastrophe capital requirement for Terrorism net of risk mitigations

Calculation

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[45] These values are provided in an excel spreadsheet « parameters for non-life catastrophes »

SCR.9.94.   The $NL\_CAT_{1ManMade}$ will be given as:

$$NL\_CAT_{1ManMade} = \sqrt{\sum_{x}((CAT_{x\_net})^2)}$$

where

CAT_{x_net}	=	Net Cat capital requirements for man-made event x
x	=	Fire, motor, marine, credit & suretyship, terrorism, aviation and liability.

SCR.9.95.   Independence is assumed between the types of man-made events.

SCR.9.96.   All scenarios, unless explicitly mentioned are described gross of risk mitigation. Undertakings may estimate the net capital requirement for the relevant scenarios applying the following formulae:

Where the XL cover follows a proportional cover:

MAX ((L*MS*QS)-XLC, 0) +MIN ((L*MS*QS), XLF) + REINST

Where a proportional cover follows an XL cover:

MAX ((L*MS)-XLC, 0) *QS +MIN((L*MS), XLF) *QS + REINST

Where

L= the total gross loss amount. The total gross loss amount of the catastrophe will be provided as part of the information of the scenario.

MS= the market share. This proportion might be determined with reference to exposure estimates, historical loss experience or the share of total market premium income received. The total market loss amount of the catastrophe will be provided as part of the information of the scenario.

QS= quota share retention. Allowance must be made for any limitations, e.g. event limits which are frequently applied to QS treaties

XLC= the upper limit of the XL programme that is applicable in case of the scenario event

XLF= the XL retention of the XL programme that is applicable in case of the scenario event.

REINST = the reinstatement premium or premiums (in case of scenarios with a succession of 2 or more identical events)

SCR.9.97.   However risk mitigation contracts can take a variety of forms and the above equation may not be applicable. Guidance is provided through a set of examples that show how undertakings ought to net down their gross estimations and this is

included in Annex L.3. A helper tab will be included trying to illustrate such examples. Moreover, undertakings, including captives, should be able to take into account the risk mitigation effect of aggregate limits as defined in section 14.2. Undertakings should provide the details of calculations and explain how they have arrived to the net estimation.

SCR.9.98.   In the EEA there is a variety of national arrangements which provide protection in different ways. Without going into the specifics of each arrangement, undertakings should net down their gross estimation to reflect such protection, if applicable. Where Reinsurers provide or could potentially provide cover to the national arrangements, such reinsurance companies need to estimate a capital requirement for this exposure.

SCR.9.99.   Where there are separate reinsurance programmes for each country the aggregations (across countries) are done net of reinsurance. Where there are separate reinsurance programmes per peril, the aggregation (across perils) are done net of reinsurance.

SCR.9.100.   In calculating net losses undertakings should include consideration of reinstatement premiums directly related to the scenario. Both Outwards reinstatement premiums associated with reinstating risk transfer protection and Inwards reinstatement premiums in respect of assumed reinsurance business should be calculated.

Output

SCR.9.101.   The $NL\_CAT_{1ManMade}$ will be given as net catastrophe risk capital requirement for man made events.

CAT_{Fire}

SCR.9.102.   Undertakings with exposures under the Fire and other damage line of business are exposed to this scenario.

SCR.9.103.   Below is an illustration of what has been considered to be a possible Fire man made scenario: Actual historic examples would include for example Buncefield and Toulouse.

> *Scenario Rotterdam*
> *Consider an explosion or fire in the oil refineries at the port of Rotterdam – one of the largest ports in the world. Large volumes of crude oil are stored around the port, and these catch fire as a result of the explosion. The fire causes a large number of fatalities, closure of the whole port (business interruption), almost complete destruction of port buildings and machinery as well as generating a highly toxic cloud of fumes.*
>
> *Scenario Armament company*
> *Due to a short circuit in an army aircraft a fire occurs in the premises of an armament*

company. In the building are 10 highly developed fighter jets, which are destroyed along with the hall and machinery.

SCR.9.104.   There are two options for the calculation of the risk capital requirement, as outlined below: Option 1 requires detailed exposure information whilst option 2 is a simplified scenario. Undertakings should attempt option 1 where possible.

Option 1

Input

SCR.9.105.   Undertakings will need to provide details of:

P	=	Sum insured of largest known concentration of exposures under the Fire and Other Damage line of business in a 150 metre radius. The concentration is intended to cover, for example, damage in the vicinity of industrial facilities (this could impact residential or industrial).

Calculation

SCR.9.106.   The formula to be applied by undertakings is as follows:

$$CAT_{Fire} = P * x$$

Where,

CAT_{Fire}	=	the estimation of the gross Fire Cat capital requirement (under Option 1)
P	=	Sum insured of largest known concentration of exposures under the fire and other damage line of business in a 150m radius as described above.
x	=	proportion of damage caused by scenario (= 100%)

SCR.9.107.   While it is recognised that the relative weighting of coverage will vary from policy to policy, an average damage ratio factor of 100% should be applied to the total exposure in a 150 metre radius.

SCR.9.108.   Undertakings should net down accordingly for risk mitigation.

Output

The outputs are:

CAT$_{Fire\_net}$	=	Catastrophe capital requirement for Fire net of risk mitigation

Option 2

Input

SCR.9.109.   Undertakings, will be required to provide the following inputs for each of the sub lines that they are exposed to:

SI$_{FR}$	=	Sum Insured for Fire for residential business
SI$_{FC}$	=	Sum Insured for Fire for commercial business
SI$_{FI}$	=	Sum Insured for Fire for industrial business
LSR	=	Maximum loss of the Largest Single Risk across all sub lines. This refers to one single location, e.g. a building; however, it could be covered by one or more policies.

Calculation

SCR.9.110.   A split according to residential, industrial and commercial provides a more risk sensitive result. For residential risks, the underlying catastrophic scenario is a clash of many individual risks, whereas for industrial risks, the catastrophic scenario can be one single industrial plant suffering a large loss.

SCR.9.111.   The scenario incorporates both an extreme single event as well as a market loss event. The capital requirement is estimated as follows:

$$CAT_{Fire} = Max\left(LSR, \sum_{sub-lines} SI_x * F_x \right)$$

where,

CAT$_{Fire}$	=	the estimation of the gross Fire Cat capital requirement (under Option 2)
SI$_x$	=	is the sum insured by sub-line of business x, where x is residential, commercial and industrial respectively.
F$_x$	=	are the Fire/Business Interruption market wide factors by sub-line of business x, where x is residential, commercial and industrial respectively
LSR	=	is the single largest risk across all sub lines. By largest single risk refers to one single location for example a building. It could be covered by one or many policies.

F$_x$ are :

Residential	0.004%
Commercial	0.010%
Industrial	0.073%

SCR.9.112.   Undertakings should then apply any adjustment due to risk mitigation to estimate the net capital requirement. Details should be provided on this calculation.

Output

CAT$_{Fire\_net}$	=	Catastrophe capital requirement for fire net of risk mitigations

Motor

SCR.9.113.   Below are illustrations of a possible Motor man-made scenario:

> *Motor Scenario 1 – Selby-like*
>
> *Consider a car, which falls off a bridge onto a railway and causes a collision of two trains. Assume 10 fatalities and 80 injured persons as well as a high degree of material damage to the car, the trains and the bridge.*
>
> *Motor Scenario 2 – Mont Blanc tunnel like*
>
> *Consider a collision of two trucks in a tunnel of 500 metre length. Both trucks catch fire and cause the quick development of heat and smoke. Assume 40 fatalities, 40 injured persons as well as a high degree of damage to the tunnel and the vehicles. There are also associated Business Interruption losses.*
>
> *Motor Scenario 3 –Extreme crash*
>
> *Consider a major collision of a car with a coach killing all passengers on board the coach. Assume coach passengers are Premier League / Bundesliga / Serie A football players travelling to international football match.*

SCR.9.114.   Undertakings with exposures under the Motor Third Party Liability line of business are exposed to this scenario.

Input

SCR.9.115.   Undertakings will need to provide details of:

LIM$_{COUNTRY}$	=	Highest sum insured offered. For example if unlimited,

		undertakings should type in "unlimited" or a monetary amount
$VY_{COUNTRY}$	=	Number of vehicles insured per country

Calculation

SCR.9.116.   The gross motor catastrophe risk capital requirement is then given by solving the formula: The gross motor catastrophe charge, CAT_{Motor}, is then the solution to the following equation:

$$-\log_e(0.005) = F_{UNLIM}(CAT_{Motor}) + F_{LIM}(CAT_{Motor})$$

where,

$$F_{UNLIM}(x) = F_{MTPL} * \left[\sum_{Country} (LIM_{FAIL\_COUNTRY} * VY_{COUNTRY}) \right] * \left(\frac{GL_{MTPL}}{x} \right)^{ALPHA}$$

$$F_{LIM}(x) = F_{MTPL} * \left[\sum_{Country, where x < LIM_{COUNTRY}} (1 - LIM_{FAIL\_COUNTRY}) * VY_{COUNTRY} \right] * \left(\frac{GL_{MTPL}}{x} \right)^{ALPHA}$$

and,

$LIM_{COUNTRY}$	=	Highest sum insured offered. For example if unlimited, undertakings should type in "unlimited" or a monetary amount.
$VY_{COUNTRY}$	=	Number of vehicles insured per country
CAT_{Motor}	=	Gross 1 in 200 year occurrence for an undertaking, ignoring policy limits $$CAT_{Motor} = \frac{GL_{MPTL}}{\left(\frac{-\log_e(0.995)}{F_{TOTAL}} \right)^{\frac{1}{ALPHA}}}$$
F_{MTPL}	=	Frequency of the Europe-wide Scenario per vehicle per annum

		$$F_{MTPL} = \dfrac{-\log_e(1 - \dfrac{1}{RP_{MTPL}})}{VY_{MTPL}}$$
VY_{MTPL}	=	Total vehicle years (millions) assumed in Europe-wide scenario = 300
RP_{MTPL}	=	Return Period of Europe-wide Scenario = 20 years
GL_{MTPL}	=	Gross Loss of Europe-wide Scenario = €275m
F_{TOTAL}	=	Total expected frequency of scenario loss for undertaking $$F_{TOTAL} = F_{MTPL} * \sum_{Country} VY_{COUNTRY}$$
$ALPHA$	=	Pareto shape parameter = 2
LIM_{FAIL}	=	Proportion of 'limit failure losses' amongst the extreme losses for each country = 6% (except for Iceland, Cyprus and Malta = 0%)
$LIM_{FAIL\_COUNTRY}$	=	Proportion of 'limit failure losses' amongst the extreme losses for each country = LIM_{FAIL} for all countries except Iceland, Cyprus and Malta =0.

SCR.9.117.   The return period of 20 years should be amenable to some form of subjective real-world judgment when considered against the historic events. In addition, a 1-in-20 year pan European loss should exceed the 1-in-200 year loss for any individual undertaking.

SCR.9.118.   The underlying model for these extreme losses is being assumed to be a Poisson / Pareto with vehicle years driving the Poisson frequency and the pan-Europe scenario some pareto parameters. The only other parameter needed is the pareto shape parameter, alpha.

SCR.9.119.   The underlying assumption is made that every insured vehicle in Europe is equally likely to be involved in the types of incident envisaged in this scenario.

SCR.9.120.   This enables the calculation of the frequency of the scenario per million vehicles.

$F_{MPTL} = -\log_e(1 - 1 / RP_{MTPL}) / VY_{MTPL}$

SCR.9.121.   In the absence of policy limits this can then be used with the undertaking exposure to calculate the gross risk capital requirement for an undertaking.

$$F_{TOTAL} = F_{MTPL} * \Sigma_{COUNTRY} (VY_{COUNTRY})$$

$$GRC_{MTPL} = GL_{MPTL} / ((- \log_e(0.995) / F_{TOTAL})^{\wedge} (1/ALPHA))$$

SCR.9.122.   However, the scenario must also consider limits of coverage provided by undertakings in different countries. In addition, allowance must also be made for losses caused outside the 'home' country of the insurance.

SCR.9.123.   The scenario therefore includes a 'limit failure factor' for each country which represents a proportion of the extreme losses that are considered to occur in such a way that the cover under the original policy is unlimited. The suggested value of this parameter is 6% for all countries except Iceland, Cyprus and Malta where 0% was chosen. (Note that this parameter has no effect for countries with unlimited exposures.) This value of the parameter was estimated by comparing the results of an earlier version of this approach against a study performed by the GDV[46].

SCR.9.124.   Allowing for the limits requires an additional input from the undertakings, $LIM_{COUNTRY}$, defined above.

SCR.9.125.   The calculation of the gross risk capital requirement allowing for limits is more involved than for the no limits case. For ease of exposition is can be considered in two parts

$F_{UNLIM}(x)$	=	Frequency of a loss of size x, ignoring limits
$F_{LIM}(x)$	=	Frequency of a loss of size x, allowing for limits

$F_{UNLIM}(x)$
$= F_{MTPL} * [\Sigma_{COUNTRY} (LIM_{FAIL\_COUNTRY} * VY_{COUNTRY})] * (GL_{MTPL} / x)^{ALPHA}$

$F_{LIM}(x) = F_{MTPL} * \Sigma_{COUNTRY \ (where \ x<LIMCOUNTRY)} [(1-LIM_{FAIL\_COUNTRY})* VY_{COUNTRY}] * (GL_{MTPL} / x)^{ALPHA}$

SCR.9.126.   The gross risk capital requirement can then be calculated as the solution of the following equation.

$$-\log_e(0.005) = F_{UNLIM}(CAT_{Motor}) + FLIM(CAT_{Motor})$$

SCR.9.127.   Undertakings should then apply any adjustment due to risk mitigation to estimate the net capital requirement for Motor. Details should be provided on this calculation.

SCR.9.128.   The net risk capital requirement should be calculated by the undertaking allowing for any additional contingent premiums payable.

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[46] Accumulation risks and large risks under Solvency II, December 2009, GDV

Output

CAT_{Motor_net}	=	Catastrophe capital requirement for Motor net of risk mitigation

Marine

SCR.9.129.   Undertakings with exposures under MAT, in particular Marine property and liability are exposed to this scenario.

SCR.9.130.   Below are illustrations of a possible Marine man-made scenario:

Marine Scenario 1 – Collision
A Collision between a gas/oil tanker and a cruise ship causing 100 deaths and 950 seriously injured people. The cruise ship is operated out of Miami and claims are litigated in the US. The tanker is deemed at fault, is unable to limit liability and has cover with a P&I club for four/fourths liability

Marine Scenario 2 – Loss of major platform/complex
A total loss to all platforms and bridge links of a major complex

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SCR.9.131.   The CAT_{Marine} capital   requirement   is   estimated   as:

$$CAT_{Marine} = \sqrt{(CAT_{Marine1})^2 + (CAT_{Marine2})^2}$$

where   :

$CAT_{Marine1}$ = Major marine collision event, and

$CAT_{Marine2}$ = Loss of major offshore platform/complex

Marine Collision (scenario 1)

SCR.9.132.   Undertakings should consider the scenario specification below:
Scenario specification:

Description: Collision between a gas / oil tanker and a cruise ship causing 100 deaths and 950 seriously injured persons.

The cruise ship is operated out of Miami and claims are litigated in the US.

The tanker is to blame, is unable to limit liability, and has cover with a P&I club for four fourths collision liability.

Costing Info:

$m	Unit cost	Number	Gross Loss
Death	2	100	200
Injury	3	950	2,850
Oil Pollution	550	1	550
Total			3,600

Notes for undertakings:

P&I clubs and their reinsurers should note that this scenario exhausts the Collective Overspill P&I Protection and First Excess layer of the Oil Pollution protection under the Intl Group reinsurance programme

Hull insurers should consider their largest gross lines in respect of both Tankers and Cruise ships

Marine Reinsurers will need to consider carefully their potential for accumulation under this scenario and document any methodology or assumptions when calculating their gross loss position.

Input

SCR.9.133.   Undertakings will need to provide details of:

SI_{Ht}	=	Undertakings maximum gross marine hull exposures to tankers (t).
SI_{Lt}	=	Undertakings maximum gross exposure to marine liability, subject to liability falling as per the scenario specification.
SI_{Lo}	=	Undertakings maximum gross exposure to liability in respect of Oil pollution
SI_{Hc}	=	Undertakings maximum gross marine hull exposures to cruise ships (c)

Calculation

SCR.9.134.   The formula to be applied by undertakings in calculating their respective gross exposures is as follows:

$$CAT_{Marine1} = SI_{Ht} + SI_{Lt} + SI_{Lo} + SI_{Hc}$$

Where SI_{Ht}, SI_{Hc}, SI_{lt} and SI_{lo} are as defined above.

SCR.9.135.   Undertakings should carry out the same calculation as above with netted down figures for SI_{Ht}, SI_{Hc}, SI_{Lt} and SI_{Lo} to take account of risk mitigations. Undertakings should net down accordingly for risk mitigation.

Output

SCR.9.136.   The outputs are:

$CAT_{Marine1\_net}$	=	Catastrophe capital requirement for Marine scenario 1 net of risk mitigation

Loss of major platform/complex (scenario 2)

SCR.9.137.   Undertakings should consider the scenario specification below:

Scenario specification:

Description:	This scenario contemplates a Piper Alpha type total loss to all platforms and bridge links of a major complex
	All coverage in respect of property damage, removal of wreckage, liabilities, loss of production income and capping of well/making wells.
Notes for undertakings:	Only consider Marine lines of business in calculating gross and net losses; A&H, Personal Accident & Life catastrophe risk capital requirements are handled separately.
	Marine Reinsurers will need to consider carefully their potential for accumulation under this scenario and document any methodology or assumptions when calculating their gross loss position.

Input

SCR.9.138.   Undertakings will need to provide details of:

SI_i	=	Undertakings gross exposure by subclass i for the largest offshore complex accumulation, where i = property damage, removal of wreck, loss of production income, making wells etc.

Calculation

SCR.9.139.   The formula to be applied by undertakings in calculating their respective gross exposures is as follows:

$$CAT_{Marine2} = \sum_i SI_i$$

Where SI$_i$ is as defined above.

SCR.9.140.   Undertakings should carry out the same calculation as above with netted down figures for SI$_i$ to take account of risk mitigations. Undertakings should net down accordingly for risk mitigation.

Output

SCR.9.141.   <u>The outputs are:</u>

CAT$_{Marine2\_net}$	=	Catastrophe capital requirement for Marine scenario 2 net of risk mitigation

SCR.9.142.   The CAT$_{Marine}$ total capital requirement net of risk mitigation is then calculated as:

$$CAT_{Marine\_net} = \sqrt{(CAT_{Marine1\_net})^2 + (CAT_{Marine2\_net})^2}$$

Credit and Suretyship

SCR.9.143.   Undertakings with exposures under the Credit and Suretyship line of business are exposed to this scenario.

Input

SCR$_{CAT\_individual\_max\_loss\_net}$, =	net capital requirement of the maximum loss of the individual (group) exposures.
SCR$_{CAT\_recession\_net}$ =	net capital requirement of the recession based scenario described below.

Calculation

$$SCR_{CAT\_credit\_net} = \sqrt{(SCR_{CAT\_individual\_\max\_loss\_net})^2 + (SCR_{CAT\_recesion\_net})^2}$$

where

SCR.9.144.   The SCR$_{CAT\_credit\_net}$ scenario is designed to adequately consider the risk at a gross level and the mitigating effects of proportional and non-proportional reinsurance as well.

SCR.9.145.   The SCR$_{CAT\_recession\_net}$ scenario addresses the pro-cyclical nature of the C&S line of business.

Where

SCR.9.146.   SCR$_{CAT\_individual\_max}$ loss should be calculated as the maximum loss derived from one of the two following cases:

a) The default of the largest three exposures using a PML% of 14% and a recourse rate of 28%. Normally the PML is the possible maximum loss taking into account working the preventing measures working properly. However, the PML of 14% refers to the worse case situation that some measurements are not working properly[47]. These assumptions are reflecting an average loss given default of approximately 10% for the large risks[48]. The largest exposure should be identified according the sum of the following magnitudes:

   I.   + Ultimate gross loss amount after PML and recourse.
   II. - Recovery expected from reinsurance
   III. +/- any other variation based on existing legal or contractual commitments, which modify the impact of the failure of the exposure on the undertaking (an example might be the reinstatements in respect of existing reinsurance contracts)

This sum should identify the amount to compare with the output of paragraph b) in order to derive SCR$_{CAT\_individual\_max\_loss\_net}$.

b) The default of the largest three group exposures using a PML% of 14% and a recourse rate of 28%. For the identification of the largest group exposure and the assessment of the losses the undertaking should apply the methodology described in paragraph a).

SCR.9.147.   SCR$_{CAT\_recession\_net}$ = SCR$_{CAT\_recession\_ratio\_net}$ * *Net earned premium* including a dampening mechanism based on the *net loss ratio* of the undertaking. The SCR$_{CAT\_recession\_net}$ should be calculated according the following method and assumptions:

- Exposures should be classified into homogeneous groups of risks based on the nature of the exposures.
- For each group of exposures the undertaking should calculate the net loss ratio, SCR$_{CAT\_recession\_ratio\_net}$ and SCR$_{CAT\_recession\_net}$ based on the failure rates, recourse rate and loss given default as described below.
- The percentages refer to the original assured amounts (gross exposures). However the aggregated SCR$_{CAT\_recession\_ratio\_net}$ and SCR$_{CAT\_recession\_net}$ are based on the overall *net loss ratio*.

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[47] An example of the calculation of the ultimate gross loss amount after PML and recourse has been included in the annex.
[48] A LGD of 10% is in line with the latest PML Study of 23th September 2008 initiated by the PML Working Group.

- With the failure rates the $SCR_{CAT\_recession\_net}$ can be calculated for the current scenario and the worst case scenario:
  a. *Fail_rate_max* = the maximum value observed in the index of failures rates, selected by the undertaking, in a long period of observation. The period of observation should be at least 10 years building up to 30 years. With the *Fail_rate_max* the worst case scenario can be calculated in case *Fail_rate_current = Fail_rate_max.*
  b. *Fail_rate_min* = the minimum amount of the continuing average of 3 consecutive years observed in the same data.
  c. *Fail_rate_current* = the current failure rate.
  d. *Failure rate max(min;current)* = maximum of the *fail_rate_min* and *fail_rate_current.*
  e. *Recourse rate = Recourse rate of the current scenario reflects to the actual recourse rate, the recourse rate of the worse scenario should reflect to the estimated worse case recourse rate.*
  f. *Loss given default* is the result of the ultimate gross loss amount compared to the gross exposure.
- The above-mentioned rates should be derived from the failure rates observed and periodically updated (see below the specific item at this respect).
- The dampening mechanism is limited to a $SCR_{CAT\_recession\_ratio\_net}$ of 200% of the net earned premium with a *net loss ratio* lower than 25% and to a $SCR_{CAT\_recession\_ratio\_net}$ of 100% of the net earned premium with a *net loss ratio* higher than 125%. Within the limits the $SCR_{CAT\_recession\_ratio\_net}$ = 225% minus *net loss ratio.* This mechanism aims to ensure that at the peak of the cycle (low *failure* rates), the $SCR_{CAT\_recession\_net}$ should reach its highest value and C&S undertakings should be required to have enough own funds to cover a higher SCR. On the other hand, at the trough of the cycle, SCR will be at its lowest value, so that own funds will be released. In other words, as undertakings face harder net claims ratio due to an increase of failure rates, the SCR decreases.

SCR.9.148.   A summary of 10 possible scenario´s is included within QIS 5 TS with the following assumptions:

- The *fail_rate_max* is 0,50%, the *fail_rate_min* is 0,05% and the current failure rate varies from 0,05% up to 0,50%.
- The retention after reinsurance recovery for $SCR_{CAT\_individual\_max\_loss\_net}$ will be € 10 million per risk (both single and group exposures) and for $SCR_{CAT\_recession\_net}$ 50% based on a 50% Quota Share.
- The 10 possible scenarios are realistic scenarios based on representative market figures (e.g. underwriting risk profiles en P&L figures) to show the impact of the dampening mechanism and to give an example how the calculation should be set up.

Aviation

SCR.9.149.   Undertakings will need to provide the following information from their Schedules A, B and C. The CTF has based the Aviation scenario on the information captured by the ABC schedules used by reinsurers to collect information regarding the exposures of insurers. These schedules are standard and every aviation insurer should have such information.

Input

SCR.9.150.   Undertakings will need to provide the following information:

$SHARE_{Hull}$	=	Undertakings share for hull
MIT_{Hull}	=	Mitigation / Reinsurance cover for hull
$SHARE_{Liability}$	=	Undertakings share for liability
$MIT_{Liability}$	=	Mitigation / Reinsurance cover for liability
WAP	=	Whole account protection, if applicable

Calculation

SCR.9.151.   The gross capital requirement for aviation will be estimated as:

$$CAT_{Aviation} = \underset{SchedA}{Max}(SHARE_{Total}) + \underset{SchedB}{Max}(SHARE_{Total}) + \underset{SchedC}{Max}(SHARE_{Total})$$

where

$CAT_{Aviation}$	=	the estimation of the gross Aviation Cat capital requirement
$SHARE_{Total}$	=	$SHARE_{hull} + SHARE_{liability}$ (as defined above)
Sched A,B,C	=	Schedule A, B and C respectively

SCR.9.152.   The net capital requirement for aviation will be estimated as:

$$CAT_{Aviation\_net} = \left[\underset{SchedA}{Max}(SHARE_{Total} - MIT_{Total}) + \underset{SchedB}{Max}(SHARE_{Total} - MIT_{Total}) + \underset{SchedC}{Max}(SHARE_{Total} - MIT_{Total})\right] - WAP$$

Where

$SHARE_{Total}$	=	$SHARE_{hull} + SHARE_{liability}$
Sched A,B,C	=	Schedule A, B and C respectively
MIT_{Total}	=	$MIT_{hull} + MIT_{liability}$
WAP	=	Whole Account Protection reinsurance if applicable

Output

SCR.9.153.   The outputs are:

CAT$_{Aviation\_net}$	=	Catastrophe capital requirement for Aviation net of risk mitigation

Liability

SCR.9.154.   The liability scenarios need to cover the following lines of business:-

- General Third party liability (incl hospitals)
- Product liability (incl recall and MPT where written)
- Professional indemnity/E&O (incl medmal)
- D&O
- Employer's liability/workers comp
- Pollution/environmental impairment liability
- Cyber liability (eg network security etc)
- Employment practices liability (although not common outside the US)

SCR.9.155.   Undertakings will need to provide the following information:

Input

GWP$_{E\&O}$	=	Gross written premium for Errors & Omissions business
GWP$_{GTPL}$	=	Gross written premium for General Third Party Liability business
GWP$_{EL}$	=	Gross written premium for Employers Liability business
GWP$_{D\&O}$	=	Gross written premium for Directors and Officers business

Calculation

SCR.9.156.   The formula to be applied by undertakings is as follows:

$$V_{GWP\_f,r,c} = GWP_i * f_i$$

$$CAT_{Liability} = \sqrt{AGG_{r,c} * V_{GWP\_f,r} * V_{GWP\_f,c} *}$$

Where,

CAT$_{Liability}$	=	Estimation of gross liability Cat capital requirement.
GWP$_i$	=	Gross written premium for line of business i, where i = E&O, D&O, GTPL and EL.
f$_i$	=	Risk factor for line of business , where i = E&O, D&O, GTPL and EL (= 125%, 200%, 225%, 200% respectively).
V$_{GWP\_f,r,c}$	=	The vector of GWP*f for each line of business I, where i = E&O, D&O, GTPL and EL.

AGG$_{r,c}$	=	Rows and columns of the aggregation matrix between lines of business.

SCR.9.157.   Undertakings should net down accordingly for risk mitigation.

Output

CAT$_{Liability\_net}$	=	Catastrophe capital requirement for Liability net of risk mitigation

Terrorism

SCR.9.158.   The total Terrorism capital requirement should be estimated as one of two options:

Option 1

Input

SCR.9.159.   Undertakings will need to provide details of:

P	=	Sum insured of largest known concentration of exposures under the Fire and Other Damage line of business in a 300 metre radius. The concentration may cover densely populated office blocks as found in financial hubs.

Calculation

SCR.9.160.   The formula to be applied by undertakings is as follows:

$$CAT_{Terr} = P * x$$

Where,

x	=	proportion of damage caused by scenario (= 50%)

SCR.9.161.   While the relative weighting of coverage will vary from policy to policy, an average damage ratio factor of 50% should be applied to the total exposure in a 300 metre radius.

SCR.9.162.   Undertakings should net down accordingly for risk mitigation.

Output

SCR.9.163.   The outputs are:

CAT_{Terr_net} =   Catastrophe capital requirement for Terrorism net of risk mitigation

Option 2

SCR.9.164.   This is a simplified option that undertakings should choose only if they are not able to provide P (as defined above).

Input

SCR.9.165.   Undertakings will need to provide details of:

Q	=	Largest 5 sums insured under the Fire and Other Damage line of business, insured in a capital city. The 5 largest risks may be based in densely populated areas as found in financial hubs.

Calculation

SCR.9.166.   The formula to be applied by undertakings is as follows:

$$CAT_{Terr} = Q * x$$

Where,

x	=	proportion of damage caused by scenario (=50%)

SCR.9.167.   Undertakings should net down accordingly for risk mitigation.

Output

SCR.9.168.   The outputs are:

CAT_{Terr_net}	=	Catastrophe capital requirement for Terrorism net of risk mitigation

9.4.2 Method 2: Factor based method

SCR.9.169.   Undertakings should apply the factor based method in circumstances such as:

- When Method 1 is not appropriate

- When partial internal model is not appropriate

- For the Miscellaneous line of business.

SCR.9.170.   Circumstances in which the Method 1 may not be appropriate are stated above.

SCR.9.171.   To allow a practical combination of method 1 and 2, the method 2 factors should be considered country specific. This will allow integration with method 1 and will also be easier to net down for reinsurance.

SCR.9.172.   Where undertakings have difficulty in splitting premiums by countries, they may use some proxies, for example proportionate to exposure. The proxy will need to be described.

SCR.9.173.   Losses are combined by assuming independence of events and 100% correlation between direct insurance, proportional reinsurance and non-proportional reinsurance for the same line of business.

SCR.9.174.   Assumptions include:

- Factors represent a single event. This is a simplification of the standard formula.
- The premium for a given line of business should be split between different events before applying the factors.
- The factors are gross.
- The premium input is <u>gross</u> written premium.

SCR.9.175.   The capital requirement for the non-life CAT risk is determined as follows:

$$NL_{CAT} = \sqrt{\left(\left(\sqrt{\sum_{t=1,2,3,5}(c_t \times P_t)^2} + c_{11} \times P_{11}\right)^2 + \sum_{t=4,7,8,9,10,13}(c_t \times P_t)^2 + (c_6 \times P_6 + c_{12} \times P_{12})^2\right)}$$

SCR.9.176.   The rationale for the formula is that it assumes events are independent, except for direct insurance and proportional reinsurance and the corresponding non-proportional reinsurance business, which are 100% correlated as per QIS4 (Major MAT disaster is correlated with non-proportional MAT reinsurance and the events that affect Fire and property are added together assuming independence and then correlated with non-proportional property reinsurance).

Input

SCR.9.177. The following input information is required:

P_t = estimate of the gross written premium during the forthcoming year in the relevant lines of business which are affected by the catastrophe event.

Calculation

SCR.9.178. The capital requirement for the non-life CAT risk is determined as follows:

$$NL_{CAT} = \sqrt{\left(\left(\sqrt{\sum_{t=1,2,3,5}(c_t \times P_t)^2} + c_{11} \times P_{11} \right)^2 + \sum_{t=4,7,8,9,10,13}(c_t \times P_t)^2 + (c_6 \times P_6 + c_{12} \times P_{12})^2 \right)}$$

where

c_t = Are the calibrated gross factors by event and applicable to all countries

Events	Lines of business affected	Gross Factor c_t
Storm	Fire and property; Motor, other classes	175%
Flood	Fire and property; Motor, other classes	113%
Earthquake	Fire and property; Motor, other classes	120%
Hail	Motor, other classes	30%
Major fires, explosions	Fire and property	175%
Major MAT disaster	MAT	100%
Major motor vehicle liability disasters	Motor vehicle liability	40%
Major third party liability disaster	Third party liability	85%
Credit	Credit	139%
Miscellaneous	Miscellaneous	40%
NPL Property	NPL Property	250%

NPL MAT	NPL MAT	250%
NPL Casualty	NPL Casualty	250%

SCR.9.179.   Undertakings should net down their gross capital requirement for risk mitigation in the same way as under method 1.

Output

NL_{CAT_2} =   The net capital requirement for the non-life catastrophe risk under method 2

SCR.10. Undertaking specific parameters

SCR.10.1.   Undertakings are encouraged to calculate undertaking-specific parameters in QIS5. Undertaking-specific parameters are an important element of the standard formula and contribute to more risk-sensitive capital requirements and facilitate the risk management of undertakings. The use of undertaking-specific parameters in QIS5 will enhance the usefulness of the SCR results and allow a better assessment of the underwriting risk that undertakings are exposed to. In particular undertaking-specific parameters will help to revise the calibration of the corresponding market parameters.

SCR.10.1.   Subset of standard parameters that may be replaced by undertaking-specific parameters

SCR.10.2.   The following subset of standard parameters in the life, non-life and health underwriting risk modules may be replaced by undertaking-specific parameters:

a) Non life premium and reserve risk parameters: standard deviation for premium risk $\sigma_{(prem,LoB)}$ and standard deviation for reserve risk $\sigma_{(res,LoB)}$, as defined in paragraphs SCR.9.28 and SCR9.32.

b) Non-SLT health premium and reserve risk parameters: standard deviation for premium risk $\sigma_{(prem,LoB)}$ and standard deviation for reserve risk $\sigma_{(res,LoB)}$, as defined in paragraphs SCR.8.72 and SCR.8.76.

c) SLT Health revision risk: replace a standard parameter of revision shock in the SLT Health revision risk sub-module as defined in paragraph SCR.8.47.

d) Revision risk: replace a standard parameter of revision shock in the revision risk sub-module as defined in paragraph SCR.7.75.

SCR.10.3.   For all other parameters undertakings should use the values of standard formula parameters.

SCR.10.2.   The supervisory approval of undertaking-specific parameters

SCR.10.4.   Under Solvency II the use of undertaking-specific parameters requires supervisory approval. However for the purposes of QIS5, undertakings which wish to replace all or a subset of the parameters specified above by undertaking-specific parameters should assume they have received the relevant supervisory approval.

SCR.10.3.   Requirements on the data used to calculate undertaking-specific parameters

SCR.10.5.   Undertaking-specific parameters should be calibrated on the basis of internal data of the undertaking or on the basis of data that is directly relevant for its operations.

SCR.10.6.   The data used for the calculation of undertaking-specific parameters should be complete, accurate and appropriate.

SCR.10.7.   Annex O includes guidance on the assessment of completeness, accuracy and appropriateness of data.

SCR.10.4.   The standardised methods to calculate undertaking-specific parameters

SCR.10.8.   A credibility mechanism should be used when applying undertaking-specific parameters and should be included for undertaking-specific parameters for both premium and reserve risk, because the estimators used in the standardised methods include a significant estimation error.

SCR.10.9.   Undertakings should derive the undertaking-specific parameters as follows:

For premium risk:

$$\sigma_{(prem,lob)} = c \cdot \sigma_{(U,prem,lob)} + (1-c) \cdot \sigma_{(M,prem.lob)}$$

Where

c = credibility factor for LOB,

$\sigma_{(U,prem,lob)}$ = undertaking-specific estimate of the standard deviation for premium risk,

$\sigma_{(M,prem,lob)}$ = standard parameters of the standard deviation for premium risk which are provided in SCR.9 (Non Life Underwriting Risk Section).

For reserve risk:

Undertakings should derive new parameters as follows:

$$\sigma_{(res,lob)} = c \cdot \sigma_{(U,res,lob)} + (1-c) \cdot \sigma_{(M,res.lob)}$$

Where

c = credibility factor,

$\sigma_{(U,res,lob)}$ = undertaking-specific estimate of the standard deviation for reserve risk,

$\sigma_{(M,res,lob)}$ = standard parameters of the standard deviation for reserve risk which are provided in SCR.9 (Non Life Underwriting Risk Section).

SCR.10.10.   The credibility factors to be applied should be chosen according to the length of the time series N_{lob} used for the estimation and the LoB property.

- For Third-party liability, Motor vehicle liability and Credit and suretyship:

N_{lob}	5	6	7	8	9	10	11	12	13	14	≥ 15

C	34%	43%	51%	59%	67%	74%	81%	87%	92%	96%	100%

- for all other lines of business:

N_{lob}	5	6	7	8	9	≥ 10
C	34%	51%	67%	81%	92%	100%

SCR.10.5. Premium Risk

Assumptions

SCR.10.11. Undertaking-specific parameters allow for expense volatility implicitly. Undertakings should assume claims and expense volatility are similar, and thus no additional adjustments are needed to the volatility determined using loss ratio only.

SCR.10.12. Insurance and reinsurance undertakings should adjust their data for inflation where the inflationary experience implicitly included in time series used is not representative of the inflation that might occur in the future, where this is considered to have a material impact.

Analysis

SCR.10.13. The analysis should be performed using the net earned premiums as the volume measure and the net ultimate claims after one year to derive a standard deviation.

Standardised methods

SCR.10.14. Since none of the methods is considered to be perfect, undertakings should apply a variety of methods to estimate their appropriate volatility.

SCR.10.15. The standardised methods for estimating the undertaking-specific parameters $\sigma_{(U,prem,lob)}$ are:

Method 1

SCR.10.16. The assumptions are that for the particular undertaking, any year and any LoB:

- The expected loss is proportional to the premium

- The company has a different but constant expected loss ratio (i.e. does not allow for premium rate changes)

- The variance of the loss is proportional to the earned premium and

- The least squares fitting approach is appropriate.

SCR.10.17. The terms set out below are defined as follows:

$U_{Y,lob}$	=	The ultimate after one year by accident year and LoB
μ_{lob}	=	Expected loss ratio by LoB
β_{lob}^2	=	Constant of proportionality for the variance of loss by LoB
$\varepsilon_{Y,lob}$	=	An unspecified random variable with distribution with mean zero and unit variance
$V_{Y,lob}$	=	Earned premium by accident year and LoB
N_{lob}	=	The number of data points available by LoB
V_{lob}	=	The result from the volume calculation from the current year V_{lob}=max(estimate of net written premium during the forthcoming year, estimate of net earned premium during the forthcoming year, net written premium during the previous year)+ expected present value of net claims and expense payments which relate to claims incurred after the following year and covered by existing contracts

The distribution of losses should be formulated as:

$$U_{Y,lob} \sim V_{Y,lob}\mu_{lob} + \sqrt{V_{Y,lob}}\beta_{lob}\varepsilon_{Y,lob}$$

This should be re-arranged to give a set of independent, identically distributed observations:

$$\beta_{lob}\varepsilon_{Y,lob} = \frac{U_{Y,lob} - V_{Y,lob}\mu_{lob}}{\sqrt{V_{Y,lob}}}$$

The estimator for β_{lob} becomes:

$$\hat{\beta}_{lob}^2 = \frac{1}{N_{lob}-1}\sum_Y \frac{\left(U_{Y,lob} - V_{Y,lob}\mu_{lob}\right)^2}{V_{Y,lob}}$$

Minimising this estimator the following is obtained:

$$\hat{\mu}_{lob} = \frac{\sum_Y U_{Y,lob}}{\sum_Y V_{Y,lob}}$$

This can be substituted back into the estimator of β_{lob} which becomes:

$$\hat{\beta}_{lob} = \sqrt{\frac{1}{N_{lob}-1}\sum_Y \frac{\left(U_{Y,lob} - V_{Y,lob}\frac{\sum_Y U_{Y,lob}}{\sum_Y V_{Y,lob}}\right)^2}{V_{Y,lob}}}$$

SCR.10.18.   The standard deviation $\sigma_{(U,prem,lob)}$ then becomes :

$$\sigma_{(U,prem,lob)} = \frac{\hat{\beta}_{lob}}{\sqrt{V_{lob}}}$$

SCR.10.19.   The additional data requirements for this undertaking-specific parameter:

The data used should meet the following additional requirements:

- The data should reflect the premium risk that is covered in the line of business during the following year, in particular in relation to its nature and composition. The data should be adjusted for catastrophe claims to the extent they are addressed in the non-life or health CAT risk sub-modules.

- Claims should be net of reinsurance. The data should reflect the reinsurance cover of the undertaking for the following year.

- Claims should be adjusted for inflation. All data used should be adjusted for any trends which can be identified on a prudent, reliable an objective basis.

- Claims should not include unallocated expense payments.

- The data should stem from a sufficiently long period such that if cycles exist, at least a full cycle is covered in the data. The data should cover at least 5 years.

- The data should not lead to the increase of the estimation error to the material amount compared to the estimated value.

Method 2

SCR.10.20.   The assumptions are that for the particular undertaking, any year and any LoB:

- The expected loss is proportional to the premium

- The company has a different but constant expected loss ratio (for example the undertaking does not allow for premium rate changes, or changes in the underlying risk)

- The variance of the loss is proportional to the earned premium

- The distribution of the loss is lognormal and

- The maximum likelihood fitting approach is appropriate

SCR.10.21.   The terms set out below are defined as follows:

$U_{Y,lob}$	=	The ultimate after one year by accident year and LoB
μ_{lob}	=	Expected loss ratio by LoB
β_{lob}^2	=	Constant of proportionality for the variance of loss by LoB
$\varepsilon_{Y,lob}$	=	An unspecified random variable with distribution with mean zero and unit variance
$V_{Y,lob}$	=	Earned premium by accident year and LoB
$M_{Y,lob}$	=	The mean of the logarithm of the ultimate after one year by accident year and LoB
$S_{Y,lob}$	=	The standard deviation of the logarithm of the ultimate after one year by accident year and LoB
V_{lob}	=	The result from the volume calculation from the current year V_{lob}=max(estimate of net written premium during the forthcoming year, estimate of net earned premium during the forthcoming year, net written premium during the previous year)+ expected present value of net claims and expense payments which relate to claims incurred after the following year and covered by existing contracts

SCR.10.22.   The distribution of losses should be formulated as:

$$U_{Y,lob} \sim V_{Y,lob}\mu_{lob} + \sqrt{V_{Y,lob}}\beta_{lob}\varepsilon_{Y,lob}$$

SCR.10.23.   This allows formulation of the parameters of the lognormal distributions as follows:

$$S_{Y,lob} = \sqrt{\log\left(1 + \frac{\beta_{lob}^2}{V_{Y,lob}\mu_{lob}^2}\right)}$$

$$M_{Y,lob} = \log(V_{Y,lob}\mu_{lob}) - \frac{1}{2}S_{lob}^2$$

SCR.10.24.   The resultant simplified log Likelihood becomes

$$\log L = \sum_Y \left(-\log(S_{Y,lob}) - \frac{(\log(U_{Y,lob}) - M_{Y,lob})^2}{2S_{Y,lob}^2} \right)$$

SCR.10.25.   Then the parameter values β_{lob} and μ_{lob} are chosen that maximise this likelihood.

SCR.10.26.   The standard deviation $\sigma_{(U,prem,lob)}$ then becomes :

$$\sigma_{(U,prem,lob)} = \frac{\hat{\beta}_{lob}}{\sqrt{V_{lob}}}$$

SCR.10.27.   The additional data requirements for this undertaking-specific parameter are stated in paragraph SCR.10.20.

Method 3

SCR.10.28.   Since the method defined above for the calculation undertaking-specific estimates for standard deviation of premium risk include a significant estimation error, an alternative methodology is considered based on the Swiss Solvency Test[49].

SCR.10.29.   Under this approach, the calculation of undertaking-specific standard deviations in premium risk are based on the assumption that the claim number per accident year and claim size depend on a random variable $\Theta = [\Theta_1, \Theta_2]$ which represents the random fluctuation in number (Θ_1) as well as in claim size (Θ_2).

As:

$$\sigma_{(U,prem,lob)} = \frac{1}{V_{(prem,lob)}}\sqrt{Var(S_N)} \text{ , where}$$

$V_{(prem,lob)}$ - volume measure (known at the beginning of the year),

$S_N = \sum_{i=1}^{N} X_i$ – sum of a random number of claims, the claim size itself is also random,

and it is assumed that

$N|\Theta_1 \sim$Poiss ($\lambda(\Theta_1)$),

$X_i|\Theta_2 \sim$F($\mu(\Theta_2),\sigma(\Theta_2)$), where N and X_i are conditionally independent, λ, μ and σ denote the parameters of the distributions

Using the variance decomposition formula and the above assumptions it is easy to show that:

$$Var(S_N) = Var(E(S_N \mid \Theta)) + E(Var(S_N \mid \Theta)) =$$
$$Var(\lambda(\Theta_1))Var(\mu(\Theta_2)) + Var(\lambda(\Theta_1))(E[\mu(\Theta_2)])^2 + Var(\mu(\Theta_2))E[\lambda(\Theta_1)]^2 +$$
$$E(\lambda(\Theta_1))E[\mu(\Theta_2)]^2 + E\lambda(\Theta_1)E[\sigma(\Theta_2)]^2,$$

Which allows only the characteristics of the underlying distributions N and X in the estimation to be used.

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[49] See "Technical document on the Swiss Solvency Test",
http://www.finma.ch/archiv/bpv/download/e/SST_techDok_061002_E_wo_Li_20070118.pdf

SCR.10.30.   For the simplifying assumptions that only N depends on Θ and $\lambda(\Theta) = \lambda\Theta$, where $E(\Theta)=1$ the following is obtained[50]:

$$Var(S_N) = \mu^2 \lambda^2 Var(\Theta) + \lambda\mu^2 + \lambda\sigma^2$$

Therefore the undertaking should calculate, on the basis of the internal data of the undertaking concerned, or on the basis of data which is directly relevant for the operations of that undertaking, the following input data:

μ	=	the average value of claim size in the individual LoB with an inflation adjustment; the estimate should be derived by
		● summing up past, inflation adjusted individual ultimate claims values,
		● dividing above sum by the number of claims.
σ	=	the standard deviation of claim size in the individual LoB with an inflation adjustment estimated by means of the standard estimator
λ	=	the average number of claims in the individual LoB per earned premium by:
		average number of claims = total number of claims/total earned premiums with an inflation adjustment)
		multiplying the average number of claims with $V_{(prem,lob)}$
		If a volume measure other than earned premiums appears to be statistically more appropriate and this can be justified by the undertaking, the volume measure may replace earned premiums in the above procedure.
$Var(\Theta)$	=	estimate of the variance of random factor in the claim number in the individual LoB during the forthcoming year;

SCR.10.31.   Insurance and reinsurance undertakings should estimate $Var(\Theta)$ based on following input data:

J	=	maximum numbers of years with available data based on which undertaking calculate undertaking-specific

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[50] For more details please see "The Insurance Risk in the SST and in Solvency II: Modelling and Parameter Estimation" by Alois Gisler, http://www.actuaries.org/ASTIN/Colloquia/Helsinki/Papers/S3_24_Gisler.pdf

parameter

N_j = numbers of claims in year j

v_j = A priori expected number of claims in year j

Insurance and reinsurance undertakings should estimate $Var(\Theta)$ as[51]:

$$Var(\Theta) = \left(c \cdot \frac{v_\bullet}{J} \right)^{-1} \left(\frac{V_F}{\overline{F}} - 1 \right) \text{, where:}$$

$$F_j = \frac{N_j}{v_j},$$

$$v_\bullet = \sum_{j=1}^{J} v_j,$$

$$\overline{F} = \sum_{j=1}^{J} \frac{v_j}{v_\bullet} F_j,$$

$$V_F = \frac{1}{J-1} \sum_{j=1}^{J} v_j \left(F_j - \overline{F} \right)^2,$$

$$c = \sum_{j=1}^{J} \frac{v_j}{v_\bullet} \left(1 - \frac{v_j}{v_\bullet} \right).$$

SCR.10.32.   The data used for this undertaking-specific parameter to estimate μ, σ, λ and $Var(\Theta)$ should meet the following additional requirements:

- The data should reflect the premium risk that is covered in the line of business during the following year, in particular in relation to its nature and composition. The data should be adjusted for catastrophe claims to the extent they are addressed in the non-life or health CAT risk sub-modules.

- Claim sizes should be net of reinsurance. The data should reflect the reinsurance cover of the undertaking for the following year. Elements of reinsurance which cannot be related to individual claims (e.g. stop loss reinsurance) should be taken into account in an appropriate manner.

- Claim sizes should be adjusted for inflation. All data used should be adjusted for any trends which can be identified on a prudent, reliable and objective basis.

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[51] For more details of Var(Θ) estimation please see "The Insurance Risk in the SST and in Solvency II: Modelling and Parameter Estimation" by Alois Gisler, page 24/25,
http://www.actuaries.org/ASTIN/Colloquia/Helsinki/Papers/S3_24_Gisler.pdf.
Alternatively CEIOPS considers providing estimates of Var(Θ) since Θ could be understood as the non-undertaking specific random variable which reflects more condition to which is subject the whole market.

- Claim sizes should not include expense payments.

- The data should stem from a sufficiently long period such that if cycles exist, at least a full cycle is covered in the data. The data used to estimate $Var\lambda(\Theta)$ should cover at least 5 years.

- The data should not lead to the increase of the estimation error to the material amount compared to the estimated value.

- The level of prudence in the earned premiums used to estimate $E\lambda(\Theta)$ should be similar. Any other volume measure used should reflect the number of claims.

SCR.10.6.   Reserve Risk

Assumptions

SCR.10.33.   For expenses, undertakings should analyse claims payments excluding amounts for expenses. Claims and expense volatility are assumed to be similar, and thus no additional adjustments are needed to the volatility determined using claims data only.

SCR.10.34.   The effect of discounting will be the same in the stressed scenario as in the best estimate. As a result, no modification to the result is necessary.

SCR.10.35.   Insurance and reinsurance undertakings should adjust their data for inflation where the inflationary experience implicitly included in time series used is not representative of the inflation that might occur in the future, for example in the case of bodily injury claims.

10.6.2. Analysis

SCR.10.36.   The analysis should be performed using:

- the opening value of the net reserves as the volume measure and the net claims development result after one year for these exposures to derive a standard deviation.

- the net paid or net incurred triangle.

SCR.10.37.   Under the Merz-Wüthrich approach used in methods 2 and 3 below, the estimator explicitly only captures the prediction error and does not capture model error (for example the chain ladder assumptions do not hold) or the error in case the past data do not reflect the future business.

10.6.3. Standardised methods

SCR.10.38.   Since none of the methods is considered to be perfect, undertakings should apply a variety of methods to estimate their volatility.

SCR.10.39.   The standardised methods for estimating the undertaking-specific parameters $\sigma_{(U,res,lob)}$ are:

Method 1

SCR.10.40. The assumptions are that for any undertaking, any year and any LoB:
- The expected reserves in one year plus the expected incremental paid claims in one year is the current best estimate for claims outstanding,
- The variance of the best estimate for claims outstanding in one year plus the incremental claims paid over the one year is proportional to the current best estimate for claims outstanding, and
- The least squares fitting approach is appropriate.

SCR.10.41. Definition of terms:

β_{lob}^2	=	Constant of proportionality for the variance of the best estimate for claims outstanding in one year plus the incremental claims paid over the one year by LoB
$\varepsilon_{Y,lob}$	=	An unspecified random variable with distribution with mean zero and unit variance
$PCO_{lob,i,j}$	=	The best estimate for claims outstanding by LoB for accident year i and development year j
$I_{lob,i,j}$	=	The incremental paid claims by LoB for accident year i and development year j
$V_{Y,lob}$	=	Volume measure by calendar year and LoB
$R_{Y,lob}$	=	The best estimate for outstanding claims and incremental paid claims for the exposures covered by the volume measure, but in one year's time by calendar year and LoB
N_{lob}	=	The number of data points available by LoB where there is both a value of $V_{C,Y,lob}$ and $R_{C,Y,lob}$.
PCO_{lob}	=	The best estimate for claims outstanding by LoB

SCR.10.42. The following relationships are the defined:

$$V_{Y,lob} = \sum_{i+j=Y+1} PCO_{lob,i,j}$$

$$R_{Y,lob} = \sum_{\substack{i+j=Y+2 \\ i\neq Y+1}} PCO_{lob,i,j} + \sum_{\substack{i+j=Y+2 \\ i\neq Y+1}} I_{lob,i,j}$$

SCR.10.43. The distribution of losses should the be formulated as:

$$R_{Y,lob} \sim V_{Y,lob} + \sqrt{V_{Y,lob}}\beta_{lob}\varepsilon_{Y,lob}$$

SCR.10.44. This should be re-arranged to give a set of independent, identically distributed observations:

$$\beta_{lob}\varepsilon_{Y,lob} = \frac{R_{Y,lob} - V_{Y,lob}}{\sqrt{V_{Y,lob}}}$$

SCR.10.45. The estimator for β_{lob} becomes:

$$\hat{\beta}_{lob} = \sqrt{\frac{1}{N_{lob}-1}\sum_{Y}\frac{\left(R_{Y,lob}-V_{Y,lob}\right)^2}{V_{Y,lob}}}$$

SCR.10.46.   The $\sigma_{(U,res,lob)}$ then becomes :

$$\sigma_{(U,res,lob)} = \frac{\hat{\beta}_{lob}}{\sqrt{PCO_{lob}}}$$

SCR.10.47.   The additional data requirements for this undertaking-specific parameter:

The data used should meet the following additional requirements:

- The data should reflect the reserve risk that is covered in the line of business during the following year, in particular in relation to its nature and composition.

- Best estimates and payments should be net of reinsurance. The data should reflect the reinsurance cover of the undertaking for the following year (i.e. either the data were observed under a comparable reinsurance cover or they were prepared for that purpose by taking gross data and applying the current reinsurance programme in order to estimate data net of reinsurance).

- Best estimates and payments should be adjusted for inflation. All data used should be adjusted for any trends which can be identified on a prudent, reliable and objective basis.

- Best estimates and payments should not include expenses.

- The data should stem from a sufficiently long period such that if cycles exist, at least a full cycle is covered in the data. The data should cover at least 5 years.

- The data should not lead to the increase of the estimation error to the material amount compared to the estimated value.

Method 2

SCR.10.48.   This approach is based on the mean squared error of prediction of the claims development result over the one year and fitting a model to these results. The mean squared errors are calculated using the approach detailed in "Modelling The Claims Development Result For Solvency Purposes" by Michael Merz and Mario V Wüthrich, Casualty Actuarial Society E-Forum, Fall 2008[52].

SCR.10.49.   The output from the Merz and Wüthrich method would be:

$$\sqrt{MSEP} = \sigma_{(U,res,lob)} * PCO_{lob}$$

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[52] See http://www.soa.org/library/journals/north-american-actuarial-journal/2008/april/naaj-2008-vol12-no2-merz-wuthrich.pdf and http://www.actuaries.org/ASTIN/Colloquia/Manchester/Abstracts/wuethrich_abstract_final.pdf

SCR.10.50.   Therefore $\sigma_{(U,res,lob)} = \dfrac{\sqrt{MSEP}}{PCO_{lob}}$

SCR.10.51.   The additional data requirements for this undertaking-specific parameter:

The data used should meet the following additional requirements:

- The estimation should be made on complete claims triangles for payments. The data should stem from a sufficiently long period such that all material payments can be estimated from the triangle. The data should cover at least 5 years.

- The data should reflect the reserve risk that is covered in the line of business during the following year, in particular in relation to its nature and composition.

- Payments should be net of reinsurance. The data should reflect the reinsurance cover of the undertaking for the following year (i.e. either the data were observed under a comparable reinsurance cover or they were prepared for that purpose by taking gross data and applying the current reinsurance programme in order to estimate data net of reinsurance).

- Best estimates and payments should be adjusted for inflation. All data used should be adjusted for any trends which can be identified on a prudent, reliable and objective basis.

- The payments should not include expenses.

- The claims triangle should be consistent with the model assumptions of the Merz and Wüthrich method.

- The data should not lead to the increase of the estimation error to the material amount compared to the estimated value.

Method 3

SCR.10.52.   This approach is essentially consistent with the standard formula representation of the relationship between volatility of future reserve deterioration and volume.

SCR.10.53.   This approach is based on calculating the mean squared error of prediction of the claims development result over the one year and fitting a model to these results. The mean squared errors are calculated using the approach detailed in "Modelling The Claims Development Result For Solvency Purposes" by Michael Merz and Mario V Wüthrich, Casualty Actuarial Society E-Forum, Fall 2008.

SCR.10.54.

$CLPCO_{lob}$	=	The best estimate for claims outstanding by LoB estimated via the Chain Ladder method

Therefore $\sigma_{(U,res,lob)} = \dfrac{\sqrt{MSEP}}{CLPCO_{lob}}$.

SCR.10.55.   The additional data requirements for this undertaking-specific parameter are the same as for method 2.

SCR.10.7.   Shock for revision risk

SCR.10.56.   Revision risk is intended to capture the risk of adverse variation of an annuity's amount, as a result of an unanticipated revision of the claims process. This risk should be applied only to annuities and to those benefits that can be approximated by a life annuity arising from non-life claims (in particular, life assistance benefits from workers' compensation LoB). The undertaking-specific shock for revision risk is restricted only to workers' compensation or to annuities which are not subject to significant inflation risk. This restriction stems from the assumption in the calculation procedure, that the number and severity of revisions are independent. In the case of inflation the number and severity are usually dependent because the value of inflation determines which annuities will be revised and the severity of this revision.

SCR.10.57.   On the computation of this risk charge, the impact on those annuities for which a revision process is possible to occur during the next year (e.g. annuities where there are legal or other eligibility restrictions should not be included) should be considered. Unless the future amounts payable are fixed and known with certainty, all those benefits that can be approximated by a life annuity (life assistance) are also subject to revision risk.

SCR.10.58.   In order to derive undertaking-specific parameters for revision risk, undertaking concerned should use time series of annual amounts of individual annuities (life assistance benefits) in payment in consecutive years, during the time horizon in which they are subject to revision risk.

Input

μ_X	=	the historical average relative change of individual annuities (or life assistance benefits)
σ_X	=	the historical standard deviation of relative change of individual annuities (or life assistance benefits), estimated by means of the standard estimator
$E(N)$	=	estimate of percentage of individual annuities (or life assistance benefits) for which a revision process is possible to occur during the forthcoming year; the estimate should be derived by

● estimating the average percentage of individual annuities (or life assistance benefits) for which a revision process occurred per best estimate of annuities provision (average percentage of revised annuities = (total number of revised annuities / total number of annuities) / total best estimate of annuities

provision),

> ● multiplying the average percentage of individual annuities (or life assistance benefits) with best estimate of annuities provision.
>
> If a volume measure other than best estimate of annuities provision appears to be statistically more appropriate and this can be justified by the undertaking, the volume measure may be replaced in the above procedure.

σ_N =   the historical standard deviation of percentage of individual annuities (or life assistance benefits) for which a revision process occurred), estimated by means of the standard estimator

Calculation:

- For each calendar year t, identify the set of annuities (or life assistance claims) that were exposed to revision risk during the whole year. Include also those individual annuities that were exposed only during a part of the year, but where an upward revision has effectively occurred in that period. Annuities (or life assistance claims) that entered or exited the books during the period (e.g. new claims, death of the beneficiary) should be excluded.

- Statistical fitting techniques should then be applied to these sets of observations, with the objective to fit a theoretical probability distribution to the relevant random variable Rev describing the 1-year percentage change in the annual amount of annuities (or life assistance claims) at the portfolio level.

- Undertakings are expected to validate the goodness-of-fit of all the distributions and assumptions made, using the sets of observations above derived. Particular attention should be paid to the robustness of the fitting techniques to the tails of the distributions. Non satisfactory results in these tests would be sufficient conditions to reject the request to use the undertaking specific parameter under analysis.

- The next step is to calculate the mean and standard deviation of the distribution of Rev using the appropriate and unbiased estimators and the sets of observations.

- The relevant size of the shock (*Revshock*) is then given by the difference between the quantile 99.5% of the distribution *VaR$_{0.995}$(Rev)* and its average $\overline{\mathrm{Rev}}$ divided by the average. In this step, it should be confirmed that the 'average' rate of revision assumed in the best estimate calculation is consistent with this result.

SCR.10.59.   The calculation of undertaking-specific revision shock in revision risk is based on the assumption that the frequency and the severity of revision depend on a random variable Θ which represents the random in the frequency process as well as in the severity of revision.

As:

$$\mathrm{Re}\,vshock = \frac{VaR_{0.995}(\mathrm{Re}\,v) - \overline{\mathrm{Re}\,v}}{\overline{\mathrm{Re}\,v}}, \text{ where}$$

$$\mathrm{Re}\,v = \sum_{i=1}^{N} X_i \quad \text{- sum of a random cases of annuities revision,}$$

assuming that

$N|\Theta \sim \mathrm{NB}\,(\alpha(\Theta),\,q(\Theta))$,

$X_i|\Theta \sim \mathrm{LN}(\mu(\Theta),\sigma(\Theta))$, where N and X_i are conditionally independent, α, q, μ and σ denote the parameters of the distributions.

Therefore

$$\overline{\mathrm{Re}\,v} = \mu_X E(N) \quad \text{- the average of the distribution,}$$

$$VaR_{0.995}(\mathrm{Re}\,v) = f(\mu_X, \sigma_X, E(N), \sigma_N).$$

SCR.10.60. $VaR_{0.995}(\mathrm{Re}\,v)$ should be derived using simulation. The undertaking should:

I.   simulate one number n_j from *NB (E(N), σ_N)*,

II.   simulate n_j numbers of x_i from $\mathrm{LN}(\mu_X, \sigma_X)$, i=1, ..., n,

III.   calculate $\mathrm{Re}\,v_j = \sum_{i=1}^{n_j} x_i$,

IV.   repeat 50 000 times steps I – III, which means calculate Rev_j for j=1, ..., 50 000,

V.   calculate $VaR_{0.995}(\mathrm{Re}\,v)$ as $F_{\mathrm{Re}\,v_j}^{-1}(0.995)$ of simulated values.

SCR.10.61.   The additional data requirements for this undertaking-specific parameter are that:

- The goodness-of-fit of the distributions and assumptions to the sets of observations should be considered satisfactory. In particular, the estimates of the average, standard deviation and 99.5% quantile of the *Rev* distribution should be sufficiently robust.

- The number of available historical years, and the number of annuities (or life assistance claims) within each year should be sufficiently large to allow for statistically credible results.

- The mix of types of annuities (or life assistance claims) should be relatively comparable across different years and should be representative of the current portfolio.

- There should not be structural changes in the environment, which could lead to a significant change in the behaviour of the revision risk drivers (e.g. change in legislation), both during the historical period and when compared with the expectations for next year.

SCR.11. Ring- fenced funds

SCR.11.1.   This chapter deals with the treatment of ring-fenced funds for the purposes of QIS5. It sets out the circumstances under which an adjustment should be made to the SCR and to own funds due to the existence of a ring-fenced fund. It also sets out the approach for making the adjustment to own funds and for making an adjustment to the SCR standard formula.

SCR.11.2.   Where an undertaking calculates the SCR using a full or partial internal model a different approach to calculating the notional SCR for the ring-fenced fund may be used. However, the approach for adjusting own funds using a notional SCR should be the same regardless of whether the SCR is calculated using the standard formula or a full or partial internal model.

SCR.11.3.   An adjustment to eligible own funds and to the SCR for ring-fenced funds is required if own-fund items within that ring-fenced fund (restricted own funds) have a reduced capacity to fully absorb losses on a going concern basis due to their lack of transferability within the insurance or reinsurance undertaking because the restricted own funds can only be used to cover losses on a defined portion of the undertaking's (re)insurance contracts or in respect to particular policyholders or beneficiaries or in relation to particular risks.

SCR.11.4.   Restrictions on reserves or provisions existing in financial statements, for example technical provisions set up in national accounts and equalisation provisions or reserves set up in national accounts, are outside the scope of this subsection and should not be considered to be ring-fenced funds.

Adjustments due to the existence of a ring-fenced fund

SCR.11.5.   For QIS5 purposes if undertakings have arrangements or products that meet the descriptions which follow, these arrangements or products should be considered as giving rise to adjustments due to the existence of a ring-fenced fund.

   a) **A fund of assets and liabilities in respect of profit participation ("with profits") business that is only available to cover losses arising in respect of particular policyholders or in relation to particular risks and where the following key features exist**

Key features

SCR.11.6.   Policyholders within the ring-fenced fund have distinct rights relative to other business written by the insurer, and shareholders have no direct obligations to policyholders.

SCR.11.7.   There are restrictions on the use of assets held within this fund to meet liabilities or losses arising outside the fund.

SCR.11.8.   An excess of assets over liabilities is usually maintained within the fund and this excess is then deemed to be "restricted" own funds since its use is subject to the restrictions referred to in the previous paragraph.

SCR.11.9.   There is often profit participation within the ring-fenced fund whereby policyholders receive a minimum proportion of the profits generated in the fund which are distributed through additional benefits or lower premium, and shareholders may then receive the balance of any distributed profits. In this case, the SCR needs to reflect the effect of profit participation.

SCR.11.10.   For those undertakings which operate on this basis, the approach to ring fencing adjustments set out in these specifications should be adopted.

b) Occupational retirement pensions business (IORP)

SCR.11.11.   In some Member States, insurance undertakings are permitted to carry out occupational pensions business subject to the provisions of the IORP Directive where the Member States have chosen to apply Article 4 of the IORP Directive. Where this is the case, assets and liabilities relating to the pensions business have to be ring-fenced (Article 4 of the IORP permits Members States to apply the IORP Directive approach provided that: […] *all assets and liabilities corresponding to the said business should be ring-fenced, managed and organised separately from the other activities of the insurance undertakings, without any possibility of transfer*).[53] For those undertakings which operate on this basis, the approach to ring fencing adjustments set out in these specifications should be adopted.

c) Clarification of the approach to composites

SCR.11.12.   Composites refer to those undertakings which are authorised to carry out simultaneously both life and non-life insurance activities. Composites can be either old or new composites. Old composites are undertakings which on the dates prescribed in Article 73 (5) of the Solvency II Framework Directive (Directive 2009/138/EC) pursued life and non-life insurance activities simultaneously. New composites are undertakings that pursue life insurance activities and accident and sickness non life activities.

SCR.11.13.   Notional MCR's should be calculated separately for the life and the non-life (re)insurance activities of composites so that each of the "*minimum financial obligations should not be borne by the other activity*"[54]. Composites are required to show separately the sources of results of both activities and the clear identification of eligible basic own fund items covering each notional MCR. Where the amount of eligible basic own-fund items with respect to one of the activities is insufficient to cover the relevant notional MCR then restrictions on the transferability of own funds may arise. Supervisory authorities have the power in such cases to apply to the deficient activity certain measures regardless of the results in the other activity. However, the undertaking may ask for supervisory authorisation for the transfer of eligible basic own fund items from one activity to the other.

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[53] The SII Directive refers to these undertakings in relation to the calculation of the equity risk charge (Article 304 of Solvency II Framework Directive (Directive 2009/138/EC), duration-based equity risk sub-module).
[54] Article 74(1) of Solvency II Framework Directive (Directive 2009/138/EC.

SCR.11.14.   While not all life and non-life activities of old and new composites are to be treated as ring-fenced funds, undertakings should nonetheless take into account the contractual or legal requirements specific to the jurisdiction in which that composite is operating, in order to determine whether the transferability of own funds is constrained on a going concern basis. In those cases where transferability is constrained, the approach to ring-fencing adjustments set out in these specifications should be adopted.

Clarification of the scope of ring fencing

SCR.11.15.   For the purposes of QIS 5 participants should note that conventional unit linked and reinsurance business do not fall within the scope of ring-fenced funds.

SCR.11.16.   It is recognised that the arrangements which give rise to ring-fenced funds as described above relate to life products. However because arrangements will differ according to national specificities ring-fenced funds may also arise in respect of non-life business arrangements.

SCR.11.17.   The existence of profit participation is not a defining feature of ring-fenced funds. Ring-fenced funds may exist where profit participation exists and also in the absence of profit participation.

SCR.11.18.   In the case of profit participation arrangements that are not ring-fenced funds participants should ensure that the impact of the profit participation is taken into account in the calculation of the SCR.

SCR.11.19.   In line with the principle of proportionality the approach may be adapted for those ring-fenced funds which are not material individually and in total. Materiality should be assessed by reference to the assets and the liabilities of the ring-fenced fund taking into account the definition of materiality set out in V.8.

SCR.11.20.   Where there is a number of ring-fenced funds which exhibit similar characteristics, the calculation of ring fencing adjustments in respect of own funds may be simplified. A calculation method may be applied to all the similar ring-fenced funds, provided that the undertaking has established that the methodology produces sufficiently accurate results.

General procedure to calculate the SCR due to the existence of a ring-fenced fund

SCR.11.21.   The calculation of the SCR for an undertaking which has a ring-fenced fund involves the calculation of a notional SCR for each ring-fenced fund and an SCR for the risks arising from the rest of the business outside the ring-fenced fund.

SCR.11.22.   For the calculation of the notional SCR, participants should apply the following steps:

a) When calculating the SCR for a risk module or sub-module, the impact at the level of the ring-fenced assets (before any adjustment to own funds) and liabilities should be computed;

b) Where the calculation of a risk module or sub-module is based on the impact of a scenario on the basic own funds of an undertaking, the impact of that scenario on the basic own funds at the level of each ring-fenced fund should be calculated.

Where the scenario would result in an increase in the basic own funds at the level of a ring-fenced fund, the gross[55] capital requirement should take into account, where relevant, any potential increase of liabilities (e.g. additional distributions of profits to policyholders where policyholder arrangements exist) even though the overall impact of the shock at the level of the undertaking is negative. This can only happen in the cases of bidirectional scenarios (interest rate risk, currency risk, lapse risk) where positive effects[56] calculated at the level of a ring-fenced fund can be observed;

c) The capital requirement at the level of each ring-fenced fund should be calculated net of the mitigating effect of future discretionary benefits. Where profit participation exists, the assumptions on the variation of future bonus rates should be realistic and have due regard to the impact of the shock at the level of the ring-fenced fund and to any contractual, legal or statutory clauses of the profit participation mechanism. The relevant (downward) adjustment of the notional SCR for the loss-absorbing capacity of technical provisions should not exceed, in relation to a particular ring-fenced fund, the amount of future discretionary benefits within the ring-fenced fund;

The decision on which scenario should be taken on board (i.e. upward or downward shock) should relate to the worst overall result to the undertaking (net charges) after the potential increases in liabilities referred to in point (b) (the worst scenario). If the worst case scenario produces a negative result for a particular capital charge (after taking into account potential increase of liabilities due to profit participation mechanisms) then it should be set to zero.

d) The notional Solvency Capital Requirements for the ring-fenced funds are derived by aggregating the capital requirements under the worst scenario for each sub-module and risk module using the usual procedure for aggregation of the standard formula. This allows diversification of risks within the ring-fenced fund to be recognised.

e) The total Solvency Capital Requirement for the undertaking as a whole is the sum of the notional Solvency Capital Requirements for the ring-fenced funds and the Solvency Capital Requirement for the remaining part of the undertaking. This ensures that the reduction of diversification benefits between the ring-fenced funds and between the remaining parts of the undertaking are reflected in the calculation.

SCR.11.23.   The procedure outlined in the SCR.11.21 assumes that the modular approach is used to calculate the adjustment for loss absorbency of technical provisions. With respect to the alternative approach – termed equivalent scenario approach – the procedure would be the same, except that step c) would be applied at the SCR level. Step c) would only need to be applied at each sub-module level if the equivalent scenario is derived using net capital charges as inputs.

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[55] Gross of the mitigating effect of future discretionary benefits.

[56] Positive effects should be understood as an increase in basic own funds (positive ΔNAV) before taking into account any additional increase of liabilities implied by the arrangement

General procedure to adjust own funds due to the existence of a ring-fenced fund

SCR.11.24.   When performing the adjustment to the eligible own funds in practice, participants should apply the following steps:

a) Calculate a notional SCR for each ring-fenced fund as well as a notional SCR for risks outside any ring-fenced fund. These calculations are made before making any adjustments to own funds[57]. Note that the notional SCR should be calculated for each ring-fenced fund as if that fund were a standalone entity, but based on the worst case scenario for the undertaking as a whole. In cases of bidirectional scenarios, if the worst case scenario produces a negative result for a particular capital charge (after taking into account potential increase of liabilities due to profit participation mechanisms) then it should be set to zero.

b) If a ring-fenced fund has sufficient own funds to cover its notional SCR, then the total own funds available to meet the SCR for the undertaking as a whole should exclude from own funds the excess own funds over the notional SCR in the ring-fenced fund. Own funds used to meet the notional SCR for the ring-fenced funds would be included in Tier 1 eligible own funds as would the shareholder value (shareholder value is defined as any future transfers attributable to shareholders in respect of profit participation arrangements where benefits to policyholders are reflected in technical provisions).

The amount representing the value of future shareholder transfers is assumed not to be restricted and therefore forms part of the own funds available to meet the SCR for the undertaking as a whole, unless distribution of part of the shareholder value to shareholders has been declared or approved by the directors in which case that amount should be excluded from own funds.

c) If a ring-fenced fund does not have sufficient own funds to meet its notional SCR, then the own funds which meet any part of the notional SCR may nonetheless be recognised as Tier 1 eligible own funds in meeting the SCR for the undertaking as a whole.

Example of the calculation of the SCR in the presence of ring-fenced funds

SCR.11.25.   Assume an undertaking has two profit participation mechanisms that benefit different groups of policyholders A and B. Those mechanisms are such that, by contractual laws, 80% of any future emerging profit (irrespective of the source, i.e. underwriting or financial) has to be allocated to the respective group of policyholders and technical provisions increase by the value of the 80% emerging profit. Only the remaining 20% can be released to shareholders.

SCR.11.26.   The blocks of business A and B constitute two ring-fenced funds. Within each ring-fenced fund, the expected value of future profit participation should be part of the value of technical provisions (following Solvency II valuation rules). The amount of future discretionary benefits for groups A and B is 100 and 300 respectively.

SCR.11.27.   Additionally the undertaking holds a block of non-participating business C.

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[57] This avoids any circularity in the calculation.

SCR.11.28.   The undertaking needs to calculate the SCR following the usual approach to the SCR standard formula calculations set out in these technical specifications.[58]

SCR.11.29.   For instance, the calculation of the interest rate risk charge, step a) would require the computation of the impact of both the upward and downward scenarios at the level of each ring-fenced fund (A and B) and at the level of the remaining business (C).

	A	B	C	(Sum)
ΔNAV before any adjustment (per relevant segment)				
upward shock	250	-100	-400	-250
downward shock	-80	200	500	620

SCR.11.30.   Step b)[59] requires the reduction of positive ΔNAV partial results due to profit participation at the level of the ring-fenced fund. In the current example, where positive, the ΔNAV results are reduced by 80% (such amount is retained in the ring-fenced fund and used to increase the benefits of the corresponding groups of policyholders).

	A	B	C	(Sum)
After increase of liabilities within the RFF				
upward shock	50	-100	-400	-450
downward shock	-80	40	500	460

SCR.11.31.   Step c) is concerned with the calculation of the net capital charges, and highlights the importance to assess the extent by which the management is able to reduce future discretionary bonuses at the level of each ring-fenced fund. In this example, it is assumed that the 1/3 of the negative ΔNAV results is mitigated by the reduction in future discretionary bonuses (note that on block of business C this is not possible because it is non-participating business).

	A	B	C	(Sum)
Net charges - after adjustment for loss absorbency of TP				
upward shock	50	-67	-400	-417
downward shock	-53	40	500	487

SCR.11.32.   Based on these results, the upward shock scenario is chosen to compute the SCR, as it corresponds to the worst scenario at the level of the undertaking.

SCR.11.33.   Within each ring-fenced fund the risk modules and sub-modules are aggregated to reflect diversification that exists within the ring-fenced fund. The example below assumes that the interest rate risk is the only risk in the market module and there is one further individual risk, mortality risk. A correlation of 50% between Interest rate risk and Mortality risk is assumed, for the purposes of this example.

SCR.11.34.   The notional SCRs for each of ring-fenced funds and the rest of the undertaking are then summed to given an overall SCR. The table below shows the breakdown of the SCR into the different components.

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[58] For practicality reasons, it will be assumed that the adjustment for the loss absorbency capacity of technical provisions is calculated using the modular approach.

[59] Note that this step only needs to be performed when calculating capital charges based on the worst of a range of scenarios.

	A	B	C	Entity
Interest rate risk shock				
Only revaluation of A&L	-250	67	400	217
After profit participation	-50	67	400	417
Mortality risk shock	10	125	200	335
Calculation of SCR	10	169	529	708

SCR.11.35.   The above example shows the effects of diversification within each ring-fenced fund and diversification within the remaining part of the undertaking. There is no diversification between the ring-fenced funds and between the remaining parts of the undertaking.

Calculation of total eligible own funds in the presence of ring-fenced funds

Case 1: Ring fenced fund in surplus after deducting notional SCR

SCR.11.36.   Where there are sufficient own funds within each ring-fenced fund to cover the respective notional SCR, the own funds in excess of the notional SCR should be excluded.

SCR.11.37.   If this is the case any amount representing the value of future shareholder transfers – see above – is not restricted and therefore forms part of the own funds available to meet the SCR for the undertaking as a whole – see RFF B below.

	A	B	C	Entity
Own Funds	200	400	1400	2000
SCR	10	169	529	708
Shareholder Value in RFF	0	30	0	30
OF available to cover SCR	10	199	1400	**1609**
OF unavailable to cover SCR	190	201	0	391

Case 2: Ring fenced fund in deficit after deducting notional SCR

SCR.11.38.   Where there are insufficient own funds within a ring-fenced fund to cover the notional SCR for that ring-fenced fund (fund A in this example):

a) There is no restriction on the amount of own funds in that ring fenced fund;

b) The deficit in that ring fenced fund is met by own funds outside the ring fencing arrangements i.e. arising in non-participating business C in this example.

	A	B	C	Entity
Own Funds	5	400	1400	1805
SCR	10	169	529	708
Shareholder Value in RFF	0	30	0	30
OF available to cover SCR	5	199	1400	**1604**
OF unavailable to cover SCR	0	201	0	201

SCR.12. Financial Risk mitigation

SCR.12.1. Scope

SCR.12.1. This subsection covers financial risk mitigation techniques. For the purposes of QIS5, financial risk mitigation techniques include the purchase or issuance of financial instruments (such as financial derivatives) which transfer risk to the financial markets.

SCR.12.2. The use of special purpose vehicles and reinsurance to mitigate underwriting risks are not considered to be financial risk mitigation techniques and are covered in subsection **SCR.13**.

SCR.12.3. The following are examples of financial risk mitigation techniques covered by this subsection:

- 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,

- Currency swaps and forwards to cover currency risk in relation to assets or liabilities,

- Swaptions acquired to cover variable/fixed risks.

SCR.12.4. The allowance of the above financial risk mitigation techniques is subject to the requirements in this subsection and the principles in Annex P being met.

SCR.12.5. Financial risk mitigation techniques do not include the risk mitigating effect provided by discretionary profit participation. Processes and controls that an undertaking 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 section V.2.

SCR.12.2. Conditions for using financial risk mitigation techniques

SCR.12.6. 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.12.7. Undertakings 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.12.8. The calculation of the SCR using the standard formula 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.12.9. There should be no double counting of mitigation effects.

SCR.12.10.   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.12.11.   Undertakings should not in their use of financial risk mitigation techniques anticipate the shocks considered in the SCR calculation. The SCR is intended to capture unexpected risks.

SCR.12.12.   The calculation should be made on the basis of assets and liabilities existing at the date of reference of the solvency assessment.

SCR.12.13.   With the exception of rolling hedging programmes see subsection SCR.12.5., 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 with the standard formula.

SCR.12.3.   Basis Risk

SCR.12.14.   Where the underlying assets or references of the financial mitigation instrument do not perfectly match the exposures of the undertaking, the financial risk mitigation technique should only be allowed in the calculation of the SCR with the standard formula if the undertaking 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.12.15.   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.

SCR.12.4.   Shared financial risk mitigation

SCR.12.16.   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 QIS5.

SCR.12.5.   Rolling and dynamic hedging

SCR.12.17.   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, undertakings 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.12.18.   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 can not 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.12.19.   Dynamic hedging should not be treated as a risk mitigation technique.

SCR.12.6.   Credit quality of the counterparty

SCR.12.20.   For QIS5 purposes, 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 undertaking should be able to demonstrate that the counterparty meets at least the standard of a BBB rated company.

SCR.12.21.   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.12.22.   Where a provider of protection was downgraded below BBB or became unrated at the end of 2009, but its rating was restored in 2010, the financial mitigation technique may be considered admissible for QIS5 purposes

SCR.12.23.   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 in subsection SCR.12.8 are met and the risks arising from the collateral are appropriately captured in the SCR (i.e. the counterparty default risk module for standard formula users).

SCR.12.7. Credit derivatives

SCR.12.24. The reduction of the SCR based on the mitigation of credit exposures by using credit derivatives should only be allowed where undertakings 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.12.25. 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.12.26. 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.12.27. Where the amount that the protection provider has undertaken to pay is higher than the exposure value then undertaking should provide further information on the nature of the risk mitigation technique.

SCR.12.28. 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.

SCR.12.8.   Collateral

SCR.12.29.   A collateralized transaction is a transaction in which an undertaking has a credit exposure or potential credit exposure which is hedged in whole or in part by collateral posted by a counterparty or by a third party on behalf of the counterparty.

SCR.12.30.   The legal mechanism by which collateral is pledged or transferred should ensure that the undertaking has the right to liquidate or take legal possession of the collateral, in a timely manner, in case of any default event related to the counterparty.

SCR.12.31.   Where applicable, the legal mechanism by which collateral is pledged or transferred should ensure that the undertaking has the right to liquidate or take possession of the collateral, in a timely manner, in case of any default event related to a third party custodian holding the collateral.

SCR.12.9.   Segregation of assets

SCR.12.32.   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.12.33.   The segregated assets should be held with a deposit-taking institution with a credit rating equal or equivalent to at least BBB.

SCR.12.34.   The segregated assets should be individually identifiable and should only be changed subject to the consent of the insurance or reinsurance undertaking.

SCR.12.35.   The insurance or reinsurance undertaking 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.

SCR.13. Insurance risk mitigation

SCR.13.1. Scope

SCR.13.1.   This subsection covers insurance risk mitigation techniques. For the purposes of QIS5, insurance risk mitigation techniques include the use of reinsurance contracts or special purpose vehicles to transfer underwriting risks.

SCR.13.2. Conditions for using insurance risk mitigation techniques

SCR.13.2.   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.13.3.   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.13.4.   The calculation of the SCR using the standard formula 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.13.5.   There should be no double counting of mitigation effects.

SCR.13.6.   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.13.7.   The allowance of insurance risk mitigation techniques is subject to the requirements in this subsection and the principles in Annex P being met.

SCR.13.3. Basis Risk

SCR.13.8.   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 with the standard formula if the undertaking 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.13.9.   For the non-life premium and reserve risk module under the standard formula SCR, one of the underlying assumptions of the design of the non-life premium and reserve risk sub-module (and the corresponding health risk sub-module) is that for a reinsurance arrangement, the ratio of net risk to gross risk (on a 99.5% Value-at-Risk level) is less than (or at least not significantly greater than) the net-to-gross ratio of best estimate provisions and premiums. Where this assumption is not valid, the sub-module produces a wrong estimate of the net risk and as a result:

- Recoverables and premiums for reinsurance should only be taken into account in the determination of the volume measures "net best estimate" and "net premiums" of the non-life premium and reserve risk sub-module, if the ratio of net to gross risk is in proportion with the reinsurance part of the best estimate and the premium. This would mean that the ratio of net to gross risk does not significantly exceed the net-to-gross ratio of premiums and best estimate provisions.
- In particular, no allowance should be made for finite reinsurance or comparable SPV constructions of the non-life premium and reserve risk sub-module in the standard formula.

SCR.13.4. Credit quality of the counterparty

SCR.13.10. For the purposes of QIS5, providers of insurance risk mitigation should meet the following requirements:
- Reinsurance 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 undertaking 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 reinsurance obligations of the undertaking

SCR.13.11. The assessment of the above should be based on the latest available information, which should be no more than 12 months old.

SCR.13.12. Notwithstanding the above, to the extent that collateral, meeting the requirements in subsection SCR.12.8 has been provided, the reinsurance should be recognised up to the amount of the collateral.

SCR.13.13. Risk mitigation may be used to mitigate the credit risk arising from reinsurance counterparties, subject to the requirements in subsection SCR.12 being met.

SCR.14. Captive simplifications

SCR.14.1. Scope for application of simplifications

SCR.14.1. The simplifications indicated below are split in two different categories. Section SCR.14.2 is about simplifications only applicable to captives based on their specific business model. Section SCR.14.3 deals with simplifications applicable to the ceding undertakings of captive reinsurance undertakings.

SCR.14.2. For the purpose of this section, 'captive insurance undertaking' means an insurance undertaking, owned either by a financial undertaking other than an insurance or reinsurance undertaking or a group of insurance or reinsurance undertakings within the meaning of Article 212(1)(c) of the Framework Solvency II Directive or by a non-financial undertaking, the purpose of which is to provide insurance cover exclusively for the risks of the undertaking or undertakings to which it belongs or of an undertaking or undertakings of the group of which it is a member and 'captive reinsurance undertaking' means a reinsurance undertaking, owned either by a financial undertaking other than an insurance or reinsurance undertaking or a group of insurance or reinsurance undertakings within the meaning of Article 212(1)(c) of the Framework Solvency II Directive or by a non-financial undertaking, the purpose of which is to provide reinsurance cover exclusively for the risks of the undertaking or undertakings to which it belongs or of an undertaking or undertakings of the group of which it is a member.

SCR.14.3. The definitions are to be understood in the sense that the group of the captive undertaking does not include another insurance or reinsurance undertaking, other than another captive undertaking which meets the requirements (a) and (b) below, besides other provisions stated in those definitions.

SCR.14.4. If the undertaking does not meet the legal definition of a captive as stated above, it will be considered as an insurance or reinsurance undertaking. This terminology (specific to SCR.14.11 – SCR.14.22) does not put into question the definition of captives included above. In this circumstance, the undertaking could nevertheless benefit from general simplifications.

SCR.14.5. The application of the simplifications will be limited to captives meeting the following requirements (Requirements **a (i-ii) and b)**:

(a) (i) all insured persons and beneficiaries of the insurance obligations are legal entities of the group of the captive insurance or reinsurance undertaking

(a) (ii) all insured persons and beneficiaries of the underlying direct insurance contract of the reinsurance obligations are legal entities of the group of the captive insurance or reinsurance undertaking.

(b) The insurance obligations of the direct insurance captive undertaking do not relate to <u>any compulsory third party liability insurance</u>.

SCR.14.6.   The term 'beneficiary' indicated in SCR.14.5 is to be understood as defined in recital 16 of the Framework Solvency II Directive (Directive 2009/138/EC): *"…The term beneficiary is intended to cover any natural or legal person who is entitled to a right under an <u>insurance contract</u>"*. From this recital it is clear that only insurance contracts are targeted since the Framework Directive specifically uses the term 'reinsurance contracts' when referring to reinsurance contracts. The term 'beneficiary' would thus relate to a situation in which a natural or legal person would have a direct right against a captive insurance undertaking or a captive reinsurance undertaking resulting from an insurance contract.

SCR.14.7.   The term 'insured person' is commonly defined as being 'a person whose interests are protected by an insurance contract' or 'a person who contracts for an insurance contract that indemnifies him against loss of property, life or health'. The terms 'insured person' and 'beneficiary' are thus always linked to the existence of an insurance contract linking the insured person, the beneficiary and an entity of the group.

SCR.14.8.   In addition to these requirements, the particular simplification should be proportionate to the nature, scale and complexity of the risks inherent in business of the captive undertaking. The assessment of proportionality should take into account that these undertakings only cover risks associated with the industrial or commercial group to which they belong.

SCR.14.9.   Irrespective of whether the captive undertaking meets the above requirements (ai), (aii) and (b) or makes use of particular captive simplifications, it can make use of the general simplifications provided for insurance and reinsurance undertakings, if the criteria of these simplifications can be fulfilled.

SCR.14.10.   Captives which exclusively write for instance one or more of the following risks could benefit from the simplifications in this advice (non exhaustive list):
- Property damage to property belonging to the captive owner's group;
- Machinery breakdown of equipment belong to the inventory of the captive owner's group;
- Risks which would fall under the category 'financial loss to the captive owner', like Business Interruption, Product and Environmental liability, Keyman insurance, Counterparty default insurance, Computer Crime and Fraud, Hull / Cargo insurance, Bankers' Blanked Bond, Transport insurance, Theft and Robbery insurance.
- Non compulsory liability in general. In this context, the notion of related/unrelated risk has been extensively addressed in appendix 1, paragraph 6 of the document 'IAIS issues paper on regulation and supervision of captive insurance companies'.

SCR.14.2.   Simplifications for captives only

Market interest rate risk

SCR.14.11.   Undertakings should apply a separate factor to the market value of interest rate sensitive assets, as well as a separate factor to the best estimate in each line of business in order to test the interest rate shock scenario. The factors to be applied to asset values are derived by using the term structure in force, and different maturities. To this end, assets are grouped into maturity intervals as follows:

Maturity of asset	Simplified duration
less than a year	0.5 year
between 1 and 3 years	2 years
between 3 and 5 years	4 years
between 5 and 10 years	7 years
above 10 years	12 years

SCR.14.12.   The factors derived can be directly applied to market values of assets in case of upward / downward shocks. These shocks on assets have been calibrated, for each maturity above, using the solver to estimate the coupon rate such that the present value of future cash flow equals to the nominal and measuring the difference between the present value of future cash flow using the normal discount rate and the discount rates after shocks.

SCR.14.13.   The effect of the interest rate shocks on the market value of interest rate sensitive assets and other liabilities $MVAL_i$, grouped in maturity intervals I, is calculated as follows:

$$\text{Interest rate risk asset up} = \sum_i MVAL_i \cdot dur_i \cdot rate_i \cdot shock_{i,up}$$

$$\text{Interest rate risk asset down} = \sum_i MVAL_i \cdot dur_i \cdot rate_i \cdot shock_{i,down}$$

where

dur_i = simplified duration of maturity interval i

$rate_i$ = risk-free rate for simplified duration of maturity interval i

$shock_{i,up}$ = relative upward shock of interest rate for simplified duration of maturity interval i

$shock_{i,down}$ = relative downward shock of interest rate for simplified duration of maturity interval i

SCR.14.14.   The simplified calculation should be done separately for assets of different currency.

SCR.14.15.   For the shocks on technical provisions, captives should in a first step assess the duration of the best estimate per LoB. In a second step, the relevant term structure is used to calculate the change in the best estimate BE_{lob} as follows:

$$\text{Interest rate risk best estimate up} = -\sum_{lob} BE_{lob} \cdot dur_{lob} \cdot rate_{lob} \cdot shock_{lob,up}$$

$$\text{Interest rate risk best estimate down} = -\sum_{lob} BE_{lob} \cdot dur_{lob} \cdot rate_{lob} \cdot shock_{lob,down}$$

where

dur_{lob}	=	modified duration of the best estimate in line of business *lob*
$rate_{lob}$	=	risk-free rate for modified duration dur_{lob}
$shock_{lob,up}$	=	relative upward shock of interest rate for modified duration dur_{lob}
$shock_{lob,down}$	=	relative downward shock of interest rate for modified duration dur_{lob}

SCR.14.16.   The simplified calculation should be done separately for assets of different currency.

Market spread risk

SCR.14.17.   Undertakings may assume all assets to be submitted to the spread risk module are rated BBB.

SCR.14.18.   For structured bonds, credit derivatives and bonds with a lower rating than BBB the standard calculation of the spread risk module needs to be applied.

Concentration risk

SCR.14.19.   Intra-group asset pooling arrangements of captive undertakings may be exempted from the concentration risk module to the extent that there exist legally effective formal provisions where the captive's liabilities can be offset by intra-group exposures it may hold on entities of the group.

SCR.14.20.   In order to take into account the nature of the business written by captives, the exemption threshold applicable in concentration risk should be a 15 per cent, where the following requirements are met:

  o the credit institution or cash-pooling entity of the group has a rating of AA;
  o the credit institutions do not belong to the same group;

SCR.14.21.   A look-through approach to intra-group asset pooling arrangements may be applied for the calculation of the market risk module, if the account of the captive undertaking meets the requirements stated for segregated assets on financial mitigation techniques

Non-life underwriting risk module

SCR.14.22.   For non-life premium and reserve risk, simplified formulas as follows can be used:

$$NL_{pr,lob} = 0.6 \cdot \sqrt{V_{(prem,lob)}^2 + 2 \cdot 0.5 \cdot V_{(prem,lob)} \cdot V_{(res,lob)} + V_{(res,lob)}^2}$$

$$NL_{pr} = \sqrt{\sum_{lob} NL_{pr,lob}^2 + 0.35 \cdot \sum_{\substack{(r,c) \\ (r \neq c)}} NL_{pr,r} \cdot NL_{pr,c}}$$

where (*r,c*) denotes a pair of lines of business and

$NL_{pr,lob}$	=	Capital requirement for premium and reserve risk for Line of business lob
$V_{(prem,lob)}$	=	Volume measure for premium risk for line of business lob as defined in non life underwriting
$V_{(res,lob)}$	=	Volume measure for reserve risk for line of business lob as defined in non life underwriting

SCR.14.3.   Simplifications applicable on ceding undertakings to captive reinsurers

SCR counterparty risk / recoverables towards a captive

SCR.14.23.   If an explicit, legally effective and enforceable guarantee by the captive owner for the liabilities of the captive exists, then the credit rating of the guarantor instead of the captive may be used

- in the calculation of the SCR counterparty default risk module for the ceding undertaking and

- in the calculation of the adjustment for expected losses due to counterparty default for the recoverables towards the captive.

Cut-through liability clauses

SCR.14.24.   Captives' ceding undertakings may consider the probability of default of the retroceding undertakings of a captive if a legally effective and enforceable 'cut-through-liability' clause exists or a similar binding agreement, for the amounts involved in the transactions with the captive. These amounts can be adjusted accordingly in the counterparty default risk module calculation of the ceding undertaking.

SCR.15. Participations

SCR.15.1.   Introduction

SCR.15.1.   This section includes the relevant extracts on participations. The intention of this section is to provide an overview picture of the treatment of participations in each area of these technical specifications.

SCR.15.2.   Participation means the ownership, directly or by way of control, of 20% or more of the voting rights or capital of an undertaking. For the different treatment in own funds of participations in financial and credit institutions or where Article 212 of the Framework Solvency II Directive is quoted, it includes also the holding, directly or indirectly, of voting rights or capital in an undertaking over which a significant influence is effectively exercised.

SCR.15.2.   Valuation

Balance sheet item	Applicable IFRS	Current approach under IFRS		Recommended Treatment and solvency adjustments for QIS5
		Definition	Treatment	
Participations in subsidiaries, associates and joint ventures	Ias 27 and IAS 28	Definition in IAS 27, IAS 28 and IAS 31	According to IAS 27,IAS 28 and IAS 31	- Holdings in related undertakings within the meaning of Article 212 of the Framework Solvency II Directive should be valued using quoted market prices in active markets. - In the case of a subsidiary undertaking where the requirements set for a market consistent valuation are not satisfied an adjusted equity method should be applied. - All other undertakings (not subsidiaries) should wherever possible use an adjusted equity method. As a last option mark to model can be used, based on maximizing observable market inputs and avoiding entity specific inputs. The adjusted equity method should require undertakings to value its holding in a related undertaking based on the participating undertaking's share of the excess of assets over liabilities of the related undertaking. When calculating the excess of assets over liabilities of the related undertaking, the participating undertaking must value the related undertaking's assets and liabilities in accordance with Section V (Valuation).

SCR.15.3.   For the purposes of QIS 5, the table below sets out the approach to be followed in relation to the different types of participations and subsidiaries.

	Nature of participation/ subsidiary	Approach for the own funds	Approach for the SCR Standard Formula	
1	Financial and credit institutions Where the participation is an intermediate holding company, whose primary purpose is to hold participations in financial and credit institutions and which do not hold any insurance participations, this should be treated as a financial institution.	Exclude from own funds by deducting an amount representing the value of the participation from Tier 1. Any investment in Tier 2 own funds of the participation should be deducted from Tier 2 basic own funds.	no capital charge for market risk	
2	Participations excluded from the scope of Group supervision (Article 214 (2) (a)) or deducted from own funds eligible for the Group solvency purposes (Article 229) other than participations in financial and credit institutions included in 1.	No specific treatment.	Market risk charge of 100%.	
3	Participations in insurance or reinsurance undertakings subject to Solvency II Directive		No concentration risk charge.	22% shock for strategic participations
				Standard equity risk charge for non strategic participations
4	Related undertakings where the investment is of a strategic nature other than those included in 1 to 3	no specific treatment	Specific equity risk charge (22% shock).	
5	Other related undertakings (i.e. those not included in 1 to 4).	no specific treatment	Standard equity risk charge (40% shock). If participations are listed in EEA or OECD countries, the standard equity risk charge derives from 30% shock. No concentration risk charge.	

SCR.15.4.   Participations will only be considered to be excluded from the scope of Group supervision in the table above where the related undertaking is situated in a third country where there are legal impediments to the transfer of information that is necessary to determine the value of that undertaking or the associated risks. For the purposes of QIS5, these related undertakings may include but, are not necessarily limited to those undertakings that are excluded from the scope of supplementary supervision under Article 3 (3) of the Insurance Groups Directive.

SCR.15.3.   Solvency Capital requirement Standard formula

Extracts of relevant sections

SCR.15.5.   (SCR.5.2) Undertakings should calculate the capital requirement for market risk separately:

(a)   for participations as defined in Article 92(2) of Directive 2009/138/EC in financial and credit institutions,

(b)   for participations in related undertakings:

(i)   excluded from the scope of the group supervision[60] under Article 214 (a) of Directive 2009/138/EC; or

(ii)   deducted from the own funds eligible for the group solvency in accordance with Article 229 of Directive 2009/138/EC;

(c)   for other assets and liabilities.

The value of participations referred to in (a) are excluded from the own funds. To avoid double counting, the capital requirement for market risk for these participations should be nil.

The capital requirement for market risk for investments in related undertakings referred to in paragraph 1 (b) should be equal to the loss in the basic own funds that would result from an instantaneous decrease of 100% in the value of these investments.

The capital requirement for market risk should be calculated as the sum of the capital requirement corresponding to points (b) and (c).

The separate calculation of market risk for the participations referred to above is introduced for QIS5 purposes to facilitate the collection of data on these participations.

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[60] Participations will only be considered to be excluded from the scope of Group supervision where the related undertaking is situated in a third country where there are legal impediments to the transfer of information that is necessary to determine the value of that undertaking or the associated risks. For the purposes of QIS5, these related undertakings may include but, are not necessarily limited to those undertakings that are excluded from the scope of supplementary supervision under Article 3 (3) of the Insurance Groups Directive.

SCR.15.6.	(SCR5.36) For the determination of this capital requirement, all equities and equity type exposures have to be taken into account, including private equity as well as certain types of alternative investments, excluding equity owned in an undertaking part of the same group in which case the approach for the treatment of participations applies. The treatment of participations is as follows:

- The equity shock is nil for participations in financial and credit institutions.

- The equity shock is 22% for strategic participations, whether listed in regulated markets in the countries which are members of the EEA or the OECD (global equity) or not (other equity).

- other participations are subject to the equity shock as foreseen in the paragraphs above.

SCR.15.7.	(SCR5.44) 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 insurance undertaking.

SCR.15.8.	(SCR5.127) No capital charge should apply for the purposes of this sub-module to exposures of undertakings to a counterparty which belongs to the same group as defined in Article 212 of Directive 2009/138/EC, provided that the following conditions are met:

–	the counterparty is an insurance or reinsurance undertaking or a financial holding company, asset management company or ancillary services undertaking subject to appropriate prudential requirements;

–	the counterparty is included in the same consolidation as the undertaking on a full basis;

–	there is no current or foreseen material practical or legal impediment to the prompt transfer of own funds or repayment of liabilities from the counterparty to the undertaking.;

**SCR.15.4.	Treatment of participations in insurance or reinsurance undertakings**

SCR.15.9.	For the specific treatment of participations in insurance or reinsurance undertakings participants are requested to test approaches 1 and 2 as described in the following paragraphs. The default option to be included in the BSCR is option 1.

SCR.15.10.	For participations in insurance or reinsurance undertakings considered as strategic the equity shock to be used in the scenario is 22%. For participations in

insurance or reinsurance undertakings not considered as strategic, the standard equity shock should be used as referred to in SCR.5.33.

SCR.15.11. In addition to the approach above, undertakings are requested to provide the following quantitative information:

Financial and credit institutions

- The value according to subsection SCR.15.2 as at 31 December 2009

- The own funds and the capital requirement of the financial and credit institutions

Participations in insurance and reinsurance undertakings

- The value of the participations according to subsection SCR.15.2

- The own funds and the SCR of the participated undertaking (where the SCR of the participated undertaking according to these technical specifications is not available, the current capital requirement for that participation should be provided)

- The percentage held in the participated undertaking

The information for participations in insurance and reinsurance undertakings is requested as at 31 December 2009, 31 December 2008 and 31 December 2007.

SECTION 3 – Internal Model

IM.1 The Solvency Capital Requirement can be calculated using the standard formula or using an internal model. Undertakings that already use a full or partial internal model should calculate the SCR **both** with the standard formula and with the internal model.

IM.2 Further information on the treatment of internal models can be found in the separate QIS5 document on internal models. This document is relevant for undertakings that currently use a full or partial internal model or that intend to apply to use a full or partial internal model under Solvency II.

SECTION 4 – Minimum Capital Requirement

MCR.1. Introduction

MCR.1 This section provides instructions for calculating the Minimum Capital Requirement (MCR) of the undertaking. The calculation of the MCR combines a linear formula with a floor of 25% and a cap of 45% of the SCR (whether calculated using the standard formula or an internal model). The MCR is subject to an absolute floor, expressed in euros, depending on the nature of the undertaking.

MCR.2 For composite undertakings, the notional non-life and life MCR are also calculated.

MCR.2. Overall MCR calculation

Input

MCR.3 The following input information is required:

MCR_{NL}	=	the linear formula component for non-life insurance or reinsurance obligations
MCR_L	=	the linear formula component for life insurance or reinsurance obligations
SCR	=	the SCR of the undertaking
$AMCR$	=	the absolute floor of the MCR, as defined in Article 129(1)d of the Solvency II Framework Directive, and clarified further below.

MCR.4 Where an undertaking provides information both on its SCR calculated using the standard formula and its SCR calculated using a full or partial internal model, the MCR should be calculated twice, first using the SCR standard formula and second using the internal model SCR.

MCR.5 The segmentation approach for the purposes of determining the linear formula components for life and non-life insurance and reinsurance obligations should follow the same approach as that set out in subsection V.2.1 (Segmentation). Health insurance obligations should therefore be split into health insurance or reinsurance obligations which are pursued on a similar technical to that of life insurance and health insurance or reinsurance obligations which are not pursued on a similar technical basis to that of life insurance.

MCR.6 For the purpose of QIS5, the capital add-on, which is required (if relevant) to be included in the calculation of the MCR corridor, is considered to be zero for all undertakings.

MCR.7 The values of the absolute floor $AMCR$ are:

    (i)   EUR 2 200 000 for non-life insurance undertakings, including captive insurance undertakings, save in the case where all or some of the risks included

in one of the classes 10 to 15 listed in Part A of Annex I[61] are covered, in which case it should be no less than EUR 3 200 000,

(ii) EUR 3 200 000 for life insurance undertakings, including captive insurance undertakings,

(iii) EUR 3 200 000 for reinsurance undertakings, except in the case of captive reinsurance undertakings, in which case the Minimum Capital Requirement should be no less than EUR 1 000 000,

(iv) the sum of the amounts set out in points (i) and (ii) for insurance undertakings as referred to in Article 73(5) of the Solvency II Framework Directive (Directive 2009/138/EC also known as "old composite" undertakings).

(v) the sum of amounts set out in points (i) and (ii) for insurance undertakings as referred to in Article 73(2) of the Solvency II Framework Directive (Directive 2009/138/EC also known as "new composite" undertakings).

Output

MCR.8 The calculation delivers the following output:

MCR	the Minimum Capital Requirement of the undertaking

MCR.9 The following intermediate outputs are also calculated:

MCR_{linear}	=	the linear formula, whose calculation is further detailed below.
$MCR_{combined}$	=	the combined MCR of the undertaking, i.e. the linear formula result subject to a floor of 25% and a cap of 45% of the SCR (without taking into account the absolute floor)

Calculation

MCR.10 For undertakings other than composites, the MCR linear formula is calculated as the sum of the two components, whose calculation is detailed further below. Composites should calculate the MCR using the approach set out in subsection MCR.6.:

$$MCR_{linear} = MCR_{NL} + MCR_{L}$$

MCR.11 The combined MCR of the undertaking is calculated as follows:

$$MCR_{combined} = \{\min[\max(MCR_{linear}; 0.25 \cdot (SCR)); 0.45 \cdot (SCR)]\}$$

MCR.12 The MCR of the undertaking should be calculated as follows:

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[61] Motor vehicle liability; Aircraft liability; Liability for ships (sea, lake and river and canal vessels); General liability; Credit; Suretyship

$$MCR = \max\{MCR_{combined}; AMCR\}$$

MCR.3. Linear formula – General considerations

MCR.13   The volume measures referred to in the linear formula should be allocated between the two components MCR_{NL}, MCR_L without double counting.

MCR.14   For the purpose of the calculation of the linear formula, technical provisions net of reinsurance is the difference between the gross technical provisions and the reinsurance recoverables. Recoverables should not include recoverables from finite reinsurance.

MCR.15   For the purpose of the calculation of the linear formula, premiums net of reinsurance are the premiums written less the reinsurance premiums which correspond to these premiums. The reinsurance premiums should not include payments of reinsurance premiums for finite reinsurance.

MCR.16   For consistency with the volume measures used in the SCR standard formula, the technical provisions volume measures in the linear formula are understood to be without the risk margin (i.e. the best estimate technical provision should be used)

MCR.4. Linear formula component for non-life insurance or reinsurance obligations

Input

MCR.17   The following input information is required:

TP_j	=	technical provisions (not including the risk margin) for each line of business, net of reinsurance, subject to a minimum of zero
P_j	=	written premiums in each line of business over the last 12-month period, net of reinsurance, subject to a minimum of zero

Output

MCR.18   The calculation delivers the following output:

MCR_{Nl}	=	the linear formula component for non-life insurance or reinsurance obligations

Calculation

MCR.19   The linear formula component MCR_{NL} for non-life insurance or reinsurance obligations is calculated by the following function:

$$MCR_{NL} = \sum_j \max(\alpha_j \cdot TP_j; \beta_j \cdot P_j)$$

MCR.20   The segmentation of lines of business for the above formula and the calibration of the factors α_j and β_j is the following:

j	Line of business	α_j	β_j
A.1	Motor vehicle liability and proportional reinsurance	12%	13%
A.2	Motor, other classes insurance and proportional reinsurance	13%	9%
A.3	Marine, aviation, transport insurance and proportional reinsurance	18%	22%
A.4	Fire and other property damage insurance and proportional reinsurance	14%	13%
A.5	General liability insurance and proportional reinsurance	14%	20%
A.6	Credit and suretyship insurance and proportional reinsurance	25%	28%
A.7	Legal expenses insurance and proportional reinsurance	12%	9%
A.8	Assistance and proportional reinsurance	14%	7%
A.9	Miscellaneous financial loss insurance and proportional reinsurance	20%	17%
A.10	NP reinsurance – property	26%	23%
A.11	NP reinsurance – casualty	26%	22%
A.12	NP reinsurance – MAT	26%	21%
A.13	Medical expense	13%	5%
A.14	Income protection	18%	11%
A.15	Workers compensation	14%	7%
A.16	NP reinsurance – health	26%	22%

MCR.5. Linear formula component for life insurance or reinsurance obligations

Input

MCR.21   The following input information is required:

TP_j =   technical provisions (not including the risk margin) for each segment included in this component, net of reinsurance, subject to a minimum of zero

CAR	=	capital-at-risk, i.e. the sum of financial strains for each policy on immediate death or disability where it is positive. The financial strain on immediate death or disability is the amount currently payable on death or disability of the insured and the present value of annuities payable on death or disability of the insured less the net technical provisions (not including the risk margin) and less the increase in reinsurance recoverables which is directly caused by death or disability of the insured. As a starting point, the calculation should be based on a policy-by-policy approach, but reasonable actuarial methods and approximations may be used in accordance with the calculation of the best estimate.

Output

MCR.22 The calculation delivers the following output:

MCR_L	=	the linear formula component for life insurance or reinsurance obligations

Calculation

MCR.23 The linear formula component MCR_L for life insurance or reinsurance obligations is calculated by the following function:

$$MCR_L = \max\{\alpha_{C.1.1} \cdot TP_{C.1.1} + \alpha_{C.1.2} \cdot TP_{C.1.2}; \; WP\_floor \cdot TP_{C.1.1}\} +$$
$$+ \sum_{j \in \{C.2.1, C.2.2, C.3\}} \alpha_j \cdot TP_j + \alpha_{C.4} \cdot CAR.$$

MCR.24 The floor for profit participation business *WP_floor* is equal to 1.6%. The technical provision segments taken into account in this component and the calibration of the factors α_j are as follows:

Index (j)	Segment	α_j
Contracts with profit participation:		
C.1.1	technical provisions for guaranteed benefits	5%
C.1.2	technical provisions for future discretionary benefits	-8.8%
Contracts where the policyholder bears the investment risk, such as unit-linked business:		
C.2.1	technical provisions for contracts without guarantees	0.5%
C.2.2	technical provisions for contracts with guarantees	1.8%
Contracts without profit participation:		
C.3	technical provisions for contracts without profit	2.9%

	participation	

MCR.25   Technical provisions for reinsurance accepted should be apportioned according to the segmentation of direct classes, using the same factors as for direct business. The technical provisions of reinsurance accepted of profit participation business should be completely assigned to segment C.1.1.

MCR.26   Capital-at-risk is treated as a single volume measure in the linear formula with no granularity, with the following risk factor:

Index	Segment	$\alpha_{C.4}$
C.4	capital-at-risk for all contracts	0.1%

MCR.6. Linear formula component for composite insurance undertakings

MCR.27   In order to calculate a notional non-life and notional life MCR, composite undertakings should calculate a linear MCR for life insurance activities and for non-life activities.

MCR.28   A linear formula with four components should be calculated as follows:

$$MCR_{linear} = MCR_{NLnl} + MCR_{NLl} + MCR_{Ll} + MCR_{Lnl}$$

Input

MCR.29   The following input information is required:

MCR_{Nlnl}	=	the linear formula component for non-life insurance or reinsurance obligations relating to non-life activities
MCR_{NLl}	=	the linear formula component for non-life insurance or reinsurance obligations relating to life activities
MCR_{Ll}	=	the linear formula component for life insurance or reinsurance obligations relating to life activities
MCR_{LNl}	=	the linear formula component for life insurance or reinsurance obligations relating to non-life activities
SCR	=	the SCR of the undertaking
$AMCR_{NL}$	=	the non-life absolute floor, i.e. the amount set out in point (i) of MCR.6
$AMCR_{Life}$	=	the life absolute floor, i.e. the amount set out in point (ii) of MCR.6

MCR.30   Where a composite undertaking provides information both on its SCR calculated using the standard formula and its SCR calculated using a full or partial internal model, the calculation should be carried out twice, first using the SCR standard formula and second using the internal model SCR.

MCR.31   The calculation delivers the following outputs:

$NMCR_{NL}$ =   the notional non-life MCR of the undertaking

$NMCR_{Life}$ =   the notional life MCR of the undertaking

MCR.32   The following intermediate outputs are also calculated:

$NMCR_{linear\_NL}$ =   the notional non-life component of the linear formula

$NMCR_{linear\_Life}$ =   the notional life component of the linear formula

$NSCR_{NL}$ =   the notional non-life component of the SCR

$NSCR_{Life}$ =   the notional life component of the SCR

$NMCR_{combined\_NL}$ =   the notional non-life combined MCR result

$NMCR_{combined\_Life}$ =   the notional life combined MCR result

Calculation

MCR.33   The linear formula result of a composite insurance undertaking (i.e. the insurance undertakings referred to in Article 73(2) and (5) of the Solvency II Framework Directive – is split between notional non-life and life components as follows:

$$NMCR_{linear\_NL} = MCR_{NLnl} + MCR_{Lnl}$$

$$NMCR_{linear\_Life} = MCR_{Ll} + MCR_{NLl}$$

MCR.34   The notional split of the SCR (needed to calculate the corridor for the notional non-life and life MCR) into non-life and life components is determined according to the ratio of the notional non-life and life linear formula components as follows:

$$NSCR_{NL} = \frac{NMCR_{linear\_NL}}{MCR_{linear}} \cdot SCR$$

$$NSCR_{Life} = \frac{NMCR_{linear\_Life}}{MCR_{linear}} \cdot SCR$$

MCR.35   The notional non-life and life SCR results do not constitute a capital requirement on their own: they are regarded as interim results of the notional non-life and life MCR calculations.

MCR.36   The notional combined non-life and life MCR results are calculated from the above results by the following formula:

$$NMCR_{combined\_NL} = \left\{ \min\left[\max\left(NMCR_{linear\_NL}; 0.25 \cdot NSCR_{NL} \right); 0.45 \cdot NSCR_{NL} \right] \right\}$$

$$NMCR_{combined\_Life} = \left\{ \min\left[\max\left(NMCR_{linear\_Life}; 0.25 \cdot NSCR_{Life} \right); 0.45 \cdot NSCR_{Life} \right] \right\}$$

MCR.37   For the purpose of QIS5, the capital add-on, which is required (if relevant) to be included in the calculation of the MCR corridor, is considered to be zero for all undertakings.

MCR.38   From the results of the above calculation steps, the notional non-life MCR and the notional life MCR of a composite insurance undertaking are determined as follows:

$$NMCR_{NL} = \max\left\{ NMCR_{combined\_NL}; AMCR_{NL} \right\}$$

$$NMCR_{Life} = \max\left\{ NMCR_{combined\_Life}; AMCR_{Life} \right\}$$

SECTION 5 – OWN FUNDS

OF.1. Introduction

OF.1. This section provides specifications for the classification and eligibility of own funds.

OF.2. All items should be determined in accordance with the section on valuation. QIS5 will operate on the basis of applying Solvency II to all existing items of own funds i.e. classification based on compliance with Solvency II criteria and in addition, undertakings will be asked to analyse own funds on the basis that transitional provisions exist for certain capital instruments.

OF.2. Classification of own funds into tiers and list of capital items:

OF.3. The lists below identify basic own funds and ancillary own funds, with their relevant characteristics and which tier they fit within, for QIS5 purposes.

OF.2.1. Tier 1 – List of own-funds items

OF.4. The following basic own-funds items should be classified as Tier 1 provided that they meet the criteria set out in paragraph OF.8 and where applicable paragraphs OF.9 and OF.10:

1. Unless otherwise stated, the excess of assets over liabilities and subordinated liabilities, valued in accordance with subsection V.1:

   a) Paid up and called up common equity, known as ordinary share capital less own shares held by the undertaking;

   b) The initial fund, members' contributions or the equivalent basic own-funds item for mutual and mutual-type undertakings less any items of the same type held by the undertaking;

   c) Share premium account;

   d) Reserves, being:
      i. retained earnings, including profit for the year and net of forseeable dividends. A dividend is foreseeable at least when it is declared or approved by the directors regardless of any requirement for formal approval at the annual general meeting;
      ii. other reserves; and
      iii. a reconciliation reserve, being an amount representing the total excess of assets and liabilities reduced by the basic own-fund items included in Tier 2, Tier 3 and elsewhere in Tier 1

e) Surplus funds that fall under Article 91 (2) of the Solvency II Framework Directive (Directive 2009/138.EC);

f) Expected profit included in future premium (see subsection OF.2.4.);

g) Other paid in capital instruments
   i. Preference shares
   ii. Subordinated liabilities
   iii. Subordinated mutual member accounts

OF.5. Items included in 1(a) – (f) and (1)(g)(i) and (iii) (i.e. all items other than subordinated liabilities ((1)(g)(ii))) form part of the excess of assets over liabilities.

OF.6. The purpose of the reconciliation reserve is to ensure that the value of all individual basic own fund items are equal to the total of excess of assets over liabilities and subordinated liabilities.

OF.7. The total of the above amounts will be reduced by adjustments in respect of the following items:

a) the own funds in excess of amounts being used to cover related risks in the case of restricted reserves (see subsection OF.2.3)

b) participations the undertaking holds in financial and credit institutions (see subsection SCR.15)[62]

c) the excess own funds over the notional SCR of ring-fenced funds (see subsection SCR.11)

d) net deferred tax assets (i.e. Net deferred tax assets = max (0; DTA-DTL), where DTA denotes deferred tax assets and DTL denoted deferred tax liabilities)

OF.2.2.   Tier 1 Basic Own-Funds – Criteria for classification

OF.8. The criteria for classification as Tier 1 are as follows:

(a) The item should be the most deeply subordinated or in the case of other paid in capital instruments (OF.4(1)(g)) senior only to the most deeply subordinated Tier 1 item in a winding up.

(b) The item should not cause or accelerate the insolvency of the insurance or reinsurance undertaking.

The holder of the instrument must not be in a position to petition for the insolvency of the issuer. The instrument should not be taken into account for the purposes of determining whether the institution is insolvent (either because

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[62] These are the participations referred to in Article 92 (2) of the Solvency II Framework Directive (Directive 2009/138/EC).

it is treated as shareholders' equity or it is not treated as a liability in determining balance sheet insolvency – i.e. whether liabilities exceed assets). The undertaking must be able to cancel coupon dividend payments without the risk of investors invoking default and triggering legal insolvency.

(c) The item is immediately available to absorb losses.

(d) The item absorbs losses at least when the insurance or reinsurance undertaking breaches its Solvency Capital Requirement and it should not hinder its re-capitalisation.

(e) The item is undated or has an original maturity of at least 10 years. The maturity date is deemed to be the first opportunity to repay or redeem the basic own-funds item unless there is a contractual obligation to replace the item with an own-fund item of the same or higher quality capital.

(f) The item is only repayable or redeemable at the option of the insurance or reinsurance undertaking, subject to approval from the supervisory authority and must not include any incentives to redeem or repay that item. Incentives to redeem can include but are not limited to step-ups associated with a call option.

(g) The item must provide for the suspension of the repayment or redemption if the insurance or reinsurance undertaking breaches its Solvency Capital Requirement or would breach it if the instrument is repaid or redeemed. The supervisory authority may waive the suspension of repayment or redemption of the item provided that it is exchanged for or converted into another own-fund item of equivalent or higher quality and the Minimum Capital Requirement is complied with.

(h) The insurance or reinsurance undertaking has full discretion over payment of coupon/dividend or other similar payments. For items in OF.4(1)(a) and (b) (ordinary share capital and equivalent items for mutuals) the level of distribution is not in any way tied or linked to the amount paid in at issuance and is not subject to a cap and there is no preference as to distribution of income or capital.

(i) In respect of other paid in capital instruments OF.4(1)(g), the item must provide for the cancellation of coupon/dividend or other similar payments if the insurance or reinsurance undertaking breaches its Solvency Capital Requirement or if paying the coupon/dividend would breach its Solvency Capital Requirement. The supervisory authority may waive the cancellation of the payment of interest or dividend provided that the payment does not further weaken the solvency position of the undertaking and the Minimum Capital Requirement is complied with.

(j) Where an insurance or reinsurance undertaking exercises its discretion or is required (because of actual or potential breach of the SCR) to cancel a coupon/dividend payment, there must be no requirement or entitlement to settle that payment at a future date. Alternative coupon satisfaction mechanisms (ACSM) may be permitted under the terms of the instrument only

in the case of "other paid in capital instruments"(OF.4(1)(g)) where they provide for coupons/dividends to be settled through the issue of ordinary shares. The use of ASCM is only acceptable if it achieves the same economic result as the cancellation of the coupon (i.e. there is no decrease in own funds because the reduction of reserves by the amount of the coupon/dividend is matched by an increase in share capital). To meet this condition, any coupons not paid in cash should be satisfied without delay using unissued ordinary shares which have already been approved or authorised under national law or the appropriate statutes of the undertaking.

(k)   The item must be free of any encumbrances and must not be connected with any other transaction, which when considered with the item could undermine the characteristics and features of that item.

Examples of potential encumbrances include, but are not limited to: rights of set off, restrictions, charges or guarantees. Where an investor subscribes for capital in an undertaking and at the same time that undertaking has provided financing to the investor, only the net financing provided by the investor is considered as eligible own funds. In addition, adopting an economic approach and applying the principle of substance over form, where there is evidence of a group of connected transactions whose economic effect is the same as the holding of 'own shares', the assets that those transactions generate for the undertaking should be deducted from its own funds, to the extent necessary to guarantee that own funds reliably represent the net financial position of its shareholders, further to other allowed items.

OF.9.   Items in other paid in capital instruments (OF.4(1)(g)) must possess one of the following principal loss absorbency mechanisms for which the trigger event is a significant breach of the Solvency Capital Requirement.

(a)   the item automatically converts into either ordinary share capital or the initial fund at the trigger event; or

(b)   at the trigger event, the principal amount of the item is written down *pari passu* with retained earnings, by the amount of the breach of the Solvency Capital Requirement. The item can only be written back up again from future profits and on a pari passu basis once the undertaking complies with the Solvency Capital Requirement.

(c)   a principal loss absorbency mechanism that achieves an equivalent outcome to the principal loss absorbency mechanisms set out in points (a) and (b).

OF.10. A significant breach of the Solvency Capital Requirement is defined as the earlier of the following events:

(a)   Own funds are equal to or less than 75% of the Solvency Capital Requirement.

(b)   A breach of the Solvency Capital Requirement is not resolved within a two month period.

OF.11. Undertakings are asked to provide further information about the current features of items included in other paid in capital instruments (OF.4(1)(g)) by answering the relevant questions in the questionnaire.

OF.2.3. Reserves the use of which is restricted

OF.12. In certain jurisdictions, reserves may be required, under national law or under the specific statutes / articles of an undertaking, to be established and used only for certain prescribed purposes. These will form part of other reserves in the financial statements. These specific reserves should be distinguished from equalisation provisions which may appear in the financial statements but which are superseded by the valuation of technical provisions under Solvency 2 and which would therefore form part of "the reconciliation reserve – see paragraph OF.4(1)(d) (iii). Reserves of this nature should only be eligible for inclusion in own funds in relation to the risks they cover.

OF.13. Any amount in excess of that covering the related risks should therefore be excluded from own funds if it is not available at all or deducted from Tier 1 and included in Tier 2 if it would be available for all risks/losses in a winding up. The treatment will therefore need to have regard to the legal restrictions on the use of the reserve and in particular whether these continue to apply in the case of a winding up. Where the amount of the reserve is less than the elements of the SCR for which the reserve could be used, no adjustment is necessary.

OF.14. In addition, undertakings are asked to answer the relevant questions on restricted reserves in the questionnaire.

OF.2.4. Expected profits included in future premiums

Definition

OF.15. Expected profits included in future premiums (EPIFP) result from the inclusion in technical provisions of premiums on existing (in-force) business that will be received in the future, but that have not yet been received.

OF.16. Any premiums already received by the undertaking are not included within the scope of EPIFP. Single premium contracts where the premium has already been received are excluded. Multi premium contracts where all the premiums have already been received are also excluded. In determining whether all premiums have been received under the terms of the contract undertakings should apply the same approach as that adopted in subsection V.2.2.

OF.17. EPIFP should be calculated in accordance with the methodology below, which makes use of the Solvency II approach to technical provisions and the calculation of the lapse risk of the SCR (including the definitions). The approach applies equally to life and non life business.

OF.18. It is acknowledged that EPIFP changes over time. As with other market consistent values of assets and liabilities the calculation of EPIFP should be as at the balance sheet date.

Methodology

OF.19. **Step 1** – The undertaking calculates the technical provisions using the best estimate assumptions (NB: this is not an additional calculation, but refers to the technical provisions that the undertaking has already computed).

OF.20. **Step 2** – The undertaking calculates the technical provisions assuming that no more premiums are received in the future. This is done by using a lapse rate equal to 100% with all the other assumptions remaining unchanged and on the basis that all policies can be lapsed. In this calculation, it is important that policies are effectively treated as paid up rather than being set to surrender value in order to achieve the objective of isolating the effect of EPIFP.

OF.21. The use of a surrender value could also capture profits relating to past (including single) premiums and that is not the purpose of this calculation. A paid up treatment should be adopted regardless of whether this is required or permitted under the policy terms

OF.22. This calculation should be carried out at the same level of granularity used in the calculation of technical provisions in step 1.

OF.23. **Step 3** – The value of profits included in the future premiums is equal to:

$$EPIFP = \sum_i \max\{0; \Delta TP_i\}$$

OF.24. Where *EPIFP* denotes expected profits included in future premiums, ΔTP_i denotes technical provisions calculated in Step 2 minus technical provisions calculated in Step 1 and *i* denotes the homogeneous risk groups for which the calculation of the technical provisions is carried out (i.e. level of granularity as described above).

OF.25. The amount of EPIFP should for the purposes of QIS5 be assumed to meet the criteria in paragraph OF.8 and undertakings should include the amount in Tier 1.

OF.2.5.   Tier 2 Basic own-funds – List of own-funds items

OF.26.   The following items that are not included in Tier 1 should be classified as Tier 2 provided that they meet the criteria set out in subsection OF.2.6.

1. Unless otherwise stated, the excess of assets over liabilities and subordinated liabilities valued in accordance with section V.1:

    (a) Called up ordinary share capital;

    (b) The own funds in excess of amounts being used to cover related risks in the case of restricted reserves;

    (c) Other capital instruments:

i. Other called up capital instruments that absorb losses first or rank pari passu, in going concern, with capital instruments that absorb losses first.

ii. Other paid-in capital instruments including preference shares, subordinated mutual members accounts and subordinated liabilities, that do not have the features required for Tier 1 but that meet the criteria below.

OF.2.6. Tier 2 Basic own-funds – Criteria for Classification

OF.27. The following criteria apply:

(a) The item should rank after the claims of all policyholders and beneficiaries and non-subordinated creditors.

(b) In the case of a capital instrument that is called up but not paid up, the instrument should meet the criteria for Tier 1 other than the item being fully paid in and being immediately available to absorb losses.

(c) The item should not cause or accelerate the insolvency of the insurance or reinsurance undertaking.

The holder of the instrument must not be in a position to petition for the insolvency of the issuer. The instrument should not be taken into account for the purposes of determining whether the institution is insolvent. The undertaking must be able to defer/cancel coupon dividend payments without the risk of investors invoking default and triggering legal insolvency.

(d) The item is undated or has an original maturity of at least 5 years. The maturity date is deemed to be the first opportunity to repay or redeem the basic own-funds item unless there is a contractual obligation to replace the item with an own-fund item of the same or higher quality capital.

(e) The item is only repayable or redeemable at the option of the insurance or reinsurance undertaking, subject to approval from the supervisory authority and can include moderate incentives to redeem or repay that item. Incentives to redeem can include but are not limited to step-ups associated with a call option. Step-ups must not apply before 5 years from the issue date and must not exceed either the higher of 100bps or 50% of the initial credit spread in order to be considered moderate.

(f) The item must provide for the suspension of its repayment or redemption if the insurance or reinsurance undertaking breaches its Solvency Capital Requirement or would breach it if the instrument is repaid or redeemed. The supervisory authority may waive the suspension of repayment or redemption of the item as long the instrument is exchanged for or converted into an own-fund item of the same or higher quality capital and the Minimum Capital Requirement is complied with.

(g) The item must provide for the deferral of payments of interest or dividends or other similar payments if the insurance or reinsurance undertaking breaches its Solvency Capital Requirement or if paying the interest, dividends or other

similar payments would breach the Solvency Capital Requirement. The supervisory authority may waive the deferral of the payment of interest or dividend provided that the payment does not further weaken the solvency position of the undertaking and the Minimum Capital Requirement is complied with.

(h) The item should be free of any encumbrances and must not be connected with any other transaction, which when considered with the item could undermine that characteristics and features of that item.

Examples of potential encumbrances include, but are not limited to, rights of set off, restrictions, charges or guarantees. Where an investor subscribes for capital in an undertaking and at the same time that undertaking has provided financing to the investor, only the net financing provided by the investor is considered as eligible own funds.

OF.2.7. Tier 3 Basic own-funds– List of own-funds items

OF.28. The following items should be classified as Tier 3:

(a) Net deferred tax assets; and

(b) Other capital instruments including preference shares, subordinated mutual members accounts and subordinated liabilities.

OF.2.8. Tier 3 Basic own-funds– Criteria

OF.29. Any basic own-funds item that is not classified as Tier 1 or Tier 2 should be classified in Tier 3 provided that it meets the following criteria:

(a) The item should rank after the claims of all policyholders and beneficiaries and non-subordinated creditors.

(b) The item should not cause or accelerate the insolvency of the insurance or reinsurance undertaking.

(c) The item should be undated or have an original maturity of at least 3 years. The maturity date should be deemed to be the first contractual opportunity to repay or redeem the item unless there is a contractual obligation to replace the item with an own-fund item of the same or higher quality capital.

(d) The item must provide for the suspension repayment or redemption if the insurance or reinsurance undertaking breaches its Solvency Capital Requirement or would breach it if the instrument is repaid or redeemed. The supervisory authority may waive the suspension of repayment or redemption of the item as long the instrument is exchanged for or converted into an own-fund item of the same or higher quality capital and the Minimum Capital Requirement is complied with.

(e) The item must be able to provide for the deferral of coupon/dividends payments if the insurance or reinsurance undertaking breaches its Minimum Capital Requirement or paying the coupon would breach the Minimum Capital Requirement.

(f)   The item should be free of any encumbrances and must not be connected with any other transaction, which could undermine that instrument's classification as an item of basic own-funds.

Examples of potential encumbrances include, but are not limited to, rights of set off, restrictions, charges or guarantees. Where an investor subscribes for capital in an undertaking and at the same time that undertaking has provided financing to the investor, only the net financing provided by the investor is considered as eligible own funds.

OF.2.9.   Tier 2 Ancillary own-funds

OF.30. Ancillary own funds are items of capital other than basic own-funds which can be called up to absorb losses. They can comprise the following items to the extent they are not basic own-funds items:

(a)   Unpaid share capital or initial fund that has not been called up;

(b)   Letters of credit or guarantees;

(c)   Any other legally binding commitments received by insurance and reinsurance undertakings.

OF.31. For QIS5 purposes, the following ancillary own fund items which are currently used to meet solvency requirements under Solvency I should be classified as Tier 2 ancillary own funds at the amounts at which they are currently recognised or approved:

a.   Letters of credit and guarantees which are held in trust for the benefit of insurance creditors by an independent trustee and provided by credit institutions authorised in accordance with Directive 2006/48/EC.[63]

b.   Any future claims which mutual or mutual-type associations of ship owners with variable contributions solely insuring risks to ships (sea, lake and river and canal vessels), liability for ships (sea, lake and river and canal vessels) and the legal expenses and costs of litigation, that may have against their members by way of a call for supplementary contributions, within the next 12 months.[64]

c.   Any future claims which mutuals or mutual-type associations with variable contributions may have against their members, within the following 12 months, that does not fall under (b) above and which are currently eligible to meet solvency requirements under the Solvency I regime.

OF.32. If any other item is currently eligible to meet solvency requirements and could constitute ancillary own funds under Solvency II then it may also be classified as Tier 2 ancillary own funds provided that it represents own fund items which, if called up and paid in, would be classified in Tier 1. Otherwise the item should be classified as Tier 3 ancillary own funds. Details of the current arrangement should be

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[63] Classified as Tier 2 under Article 96 of the Solvency II Framework Directive (Directive 2009/138/EC)
[64] Classified as Tier 2 under Article 96 of the Solvency II Framework Directive (Directive 2009/138/EC

given together with an explanation as to why this item should be treated as ancillary own funds, subject to supervisory approval, once Solvency II is in force.

OF.33. Items or arrangements which currently exist but which do not count towards the available solvency margin may in the future be approved as ancillary own funds. These should not be included in own funds for QIS5 purposes but information should be supplied in response to the relevant questions in the questionnaire.

OF.34. In addition information should be provided as to those arrangements into which undertakings may enter and for which approval as ancillary own funds may be sought.

OF.2.10.   Tier 3 Ancillary own-funds

OF.35. Existing arrangements currently eligible to meet solvency requirements which would constitute ancillary own funds under Solvency II, but which would not be eligible as Tier 2 ancillary own funds because that item would not be classified in Tier 1 if it were called up and paid in.

OF.3. Eligibility of own funds

Eligibility and limits applicable to Tiers 1, 2 and 3

OF.36. To meet the Solvency Capital Requirement:

(a)   the proportion of Tier 1 items must be at least 50% of the SCR;

(b)   the amount of Tier 3 items must be less than 15% of the SCR.

OF.37. To meet the Minimum Capital Requirement only Tier 1 items and Tier 2 basic own funds items are eligible. At least 80% of the MCR should be met by Tier 1 items. Tier 3 basic own fund items and ancillary own funds are not eligible for the MCR. Undertakings should note that for composites a notional MCR applies in respect of each of the life and non-life activities of an undertaking and that the basic own funds covering each of these must be identified.

OF.38. Within the limits above, other paid in capital instruments (paragraph OF.4(1)(g)) should be no greater than 20% of total Tier 1 own funds.

OF.39. An insurance or reinsurance undertaking may include in a lower tier of own-funds an item which would have been eligible to be included in a higher tier of own-funds which exceeded the limits for the higher tier item. Where an own-funds item is included in a tier of own-funds that item may not at the same time be included in another tier.

OF.4. Transitional provisions

OF.40. QIS5 will test the impact on the basis that Solvency II is fully implemented and what the position would be on initial implementation i.e. assuming the grandfathering of

capital instruments. The grandfathering criteria set out below aim to make grandfathering practicable for the purposes of QIS 5 only and are not indicative of the content of the final transitional provisions.

OF.41. The grandfathering criteria differ from the Solvency II criteria in two respects:

> (1) References to the SCR or MCR are excluded;

> (2) To be grandfathered as Tier 1 the paid in capital instrument must be undated (dated instruments should be grandfathered as Tier 2); and

> (3) Several criteria have been modified in order to include current instruments which are widely used and satisfy most, but not all, Solvency II criteria. The differences between the grandfathering criteria to be adopted for QIS5 purposes and the Solvency II criteria for Tier 1 items and Tier 2 basic own fund items are summarised in the table in Annex Q.

OF.42. The grandfathering criteria for QIS5 have been drawn up to address the issue of mapping from one regime to another. A key part of QIS5 will be the gathering of data to establish the extent to which particular criteria under Solvency II are not met by current issuance. For QIS5 purposes, undertakings are asked to complete the attached questionnaire in respect of each instrument (or group of the same instruments) for which a grandfathering treatment is adopted. The quantitative results plus the feedback on the questionnaire will then form a basis for assessing the need for grandfathering and detailing the grandfathering criteria.

OF.4.1.　　　Criteria for grandfathering into Tier 1

OF.43. Basic own funds items listed in OF.4(1)(g) may be classified as Tier 1 provided they meet the following criteria:

> a. The item should rank after the claims of all policyholders and beneficiaries and non-subordinated creditors.

> b. The item should not cause or accelerate the insolvency of the insurance or reinsurance undertaking.
>
>   The holder of the instrument must not be in a position to petition for the insolvency of the issuer; and the instrument is not taken into account for the purposes of determining whether the institution is insolvent (either because it is treated as shareholders' equity or it is not treated as a liability in determining balance sheet insolvency – i.e. whether liabilities exceed assets). The undertaking must be able to cancel or defer coupon/ dividend payments without the risk of investors invoking default and triggering legal insolvency.

> c. The item is fully paid in and is immediately available to absorb losses.

d. The item is undated and the item is only repayable or redeemable at the option of the insurance or reinsurance undertaking, subject to approval from the supervisory authority.

e. Any incentives to redeem are moderate. Incentives to redeem can include but are not limited to step-ups associated with a call option. Step-ups must not apply before 10 years from issue date and must not exceed the higher of 100bps or 50% of the initial credit spread in order to be considered moderate.

f. The undertaking must be able to cancel or defer coupon/ dividend or other similar payments in a period of stress.

Instruments may have a range of provisions relating to the waiver of coupon/dividend or other similar payments. These may range from full discretion at all times to mandatory cancellation under certain conditions.

g. The item must be free of any encumbrances and must not be connected with any other transaction, which when considered with the item could undermine the characteristics and features of that item.

Examples of potential encumbrances include, but are not limited to: rights of set off, restrictions, charges or guarantees. Where an investor subscribes for capital in an undertaking and at the same time that undertaking has provided financing to the investor, only the net financing provided by the investor is considered as eligible own funds. In addition, adopting an economic approach and applying the principle of substance over form, where there is evidence of a group of connected transactions whose economic effect is the same as the holding of 'own shares', the assets that those transactions generate for the undertaking should be deducted from its own funds, to the extent necessary to guarantee that own funds reliably represent the net financial position of its shareholders, further to other allowed items.

OF.4.2.   Criteria for grandfathering into Tier 2

OF.44. Basic own funds items listed in OF.26(1)(c)(ii) (or items deemed equivalent to those basic own fund items under national law) may be classified as Tier 2 provided they meet the following criteria:

  i. The item should rank after the claims of all policyholders and beneficiaries and non-subordinated creditors.

 ii. The item is fully paid in.

iii. The item is undated or has an original maturity of at least 5 years. The maturity date is deemed to be the first opportunity to repay or redeem the basic own-funds item unless there is a contractual obligation to replace the item with an item of the same or higher quality capital.

 iv. The item is only repayable or redeemable at the option of the insurance or reinsurance undertaking, subject to review from the supervisory authority.

v. Any incentives to redeem are moderate. Incentives to redeem can include but are not limited to step-ups associated with a call option. Step-ups must not apply before 5 years from the issue date and must not exceed the higher of 100bps or 50% of the initial credit spread in order to be considered moderate.

vi. The item must be free of any encumbrances and must not be connected with any other transaction, which when considered with the item could undermine the characteristics and features of that item.

> Examples of potential encumbrances include, but are not limited to: rights of set off, restrictions, charges or guarantees. Where an investor subscribes for capital in an undertaking and at the same time that undertaking has provided financing to the investor, only the net financing provided by the investor is considered as eligible own funds.

OF.4.3.   Limits for grandfathering

OF.45. The limits set out below aim to make grandfathering practicable for the purposes of QIS 5 and should not be relied upon as indicative of final transitional provisions.

i. Items which satisfy the criteria in paragraph OF.43 may be included in Tier 1 own funds provided that the total of Tier 1 grandfathered basic own fund items and the other paid in capital instruments referred to in paragraph OF.5(1)(g) is no greater than 20% of total Tier 1 own funds.

ii. Items in excess of the limit referred to in paragraph 1 and items which satisfy the criteria in paragraph OF.44 may be counted as Tier 2 basic own funds subject to the limit in **OF.3**.

SECTION 6 – GROUPS

G.1. Introduction

G.1.1. Aim

G.1. This section provides specifications for calculating and reporting group capital requirements and group own funds. The main objective of QIS5 is to measure the overall impact from Solvency I to Solvency II and to test the appropriateness of the methods set out under Solvency II.

G.2. As specified in V.1. the reporting date to be used by all groups should be **end December 2009.** Balance sheet items should be valued in accordance with the QIS5 specifications on valuation.

G.3. As in QIS4, the supervisory authority responsible for group supervision (the current lead supervisor appointed by each college of supervisors) will manage the QIS5 process for each of their groups.

G.1.2. Calculation of the group solvency: description of the methods

G.4. Groups participating in QIS5 should calculate their Solvency Capital Requirement and their group own funds according to the methods listed below and further detailed in the following sections :

Accounting Consolidation based on the standard formula - Method 1: Solvency II Default method (required)

G.5. The standard formula for the calculation of the Solvency Capital Requirement (SCR) applied to the consolidated assets and liabilities.

G.6. For mutual groups, combined accounts should be used instead of consolidated accounts.

Deduction & Aggregation (D&A) - Method 2: Solvency II Alternative method(required)

G.7. The sum of the standard formula solo SCR and solo own funds of the participating insurance undertaking[65] and the proportional share of each related insurance undertaking in the group with the necessary adjustments:

   i. Solvency II rules applied to EEA (European Economic Area) and non-EEA entities (*required*)

   ii. Solvency II rules applied to EEA and local requirements in non-EEA entities (*required if relevant*)

Combination of default and alternative methods (optional)

G.8. Where the exclusive application of method 1 would not be appropriate, groups may apply a combination of methods 1 and 2.

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[65] In these specifications any reference to insurance undertaking also includes reinsurance undertaking.

Group solvency capital on the basis of a group internal model (required where relevant)

G.9. Groups should provide the results of any internal models which they may use to calculate the group solvency capital requirement.

Group solvency capital requirement currently in force (required)

G.10. Groups are asked to report the group capital requirements and capital resources under the regime currently in force, as calculated under the Insurance Groups Directive.[66]

G.11. The table below summarises the methods of calculations which are required, required if relevant, or optional. Further detail as regards the different methods of calculations is described in the following relevant paragraphs and guidance.

Summary of methods which are required /optional			
	EEA groups without non-EEA entities	EEA groups with non- EEA entities	EEA subgroup(s) of non-EEA groups
S1 - current calculations	**Already available**	**Already available**	**Already available**
S2 – default method	**Required**	**Required**	**Required**
S2 – D&A (SII applied to the non-EEA entities)	**Required**	**Required**	**Required**
S2 – D&A (local rules applied to the non-EEA entities)		**Required if relevant**	
S2 – combination of methods	Optional	Optional	Optional
S2 – IntMod	Required if relevant	Required if relevant	Required if relevant
S2 – default and D&A - subgroup calculation	Optional	Optional	

G.1.3.   Comparison of the methods

G.12. It is important that the same set of group entities is included in all the calculations to ensure the comparability of the results of the different methods applied.

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[66] Insurance groups Directive (Directive 98/78/EC) as amended by the Financial Conglomerates Directive (Directive 2002/87/EC) and Reinsurance Directive (Directive 2005/68/EC).

G.13. The consolidated group solvency ratio as calculated under the default method will be compared with the solvency ratio stemming from the application of the rules currently in force in order to measure the overall impact of the move from the Solvency I to the Solvency II regime.

G.14. The consolidated group SCR as calculated under the default method will be compared with the results of the D&A method to have a measure of diversification benefits.

G.1.4.   Scope

G.15. Calculations should be carried out at the level of the ultimate EEA participating insurance undertaking or insurance holding company (i.e. the EEA entity which normally issues consolidated accounts) and encompass the "group" as defined in Article 212(1)(c) Solvency II Framework Directive (Directive 2009/138/EC). In general, the scope of the group for QIS5 should be the same as for its consolidated accounts unless the lead/group supervisor already requires adjustments to that scope pursuant to Article 3.3 of the Insurance Group Directive (IGD) (i.e. exclusion from group supervision of a non-EEA undertaking if there are legal impediments to the transfer of the necessary information or if the inclusion of an undertaking - both EEA and non-EEA - would be of negligible interest, inappropriate or misleading). For a solvency assessment, participations in entities that are excluded from the scope of the group supervision according to Article 3.3 of the IGD should be deducted from the own funds for the group solvency.

G.16. All parts of the group necessary to ensure a proper understanding of the group and the potential sources of risks within the group have to be included within the scope of group for the purpose of properly assessing group solvency.

G.1.5.   Availability of group own funds

G.17. In order to assess group solvency, it is necessary to determine the amount of group own funds which are eligible to cover the group SCR. This assessment has to be made after the elimination of double use of eligible own funds among the different insurance or reinsurance undertakings taken into account in the calculation and for both calculation methods (default or deduction/aggregation).

G.18. The assessment needs, in particular, to consider the availability of the own funds of each entity within the scope of group solvency. This means that own funds that can not be made both fungible (i.e. absence of dedication to a certain purpose) and transferable (i.e. absence of significant obstacles to moving assets from one entity of the group to another) for the group within a maximum of 9 months can not be considered effectively available at group level.

G.1.6.   QIS5 assumptions for the treatment of third country related insurance undertakings and non-EEA groups

G.19. The Solvency II Framework Directive (Directive 2009/138/EC) provides for specific treatments for non-EEA insurance activities in the following cases:

   iii.   EEA groups that have a related (re)insurance third country undertaking;

   iv.   non-EEA groups that have a related (re)insurance undertaking in the EEA;

v.   reinsurance activities of non-EEA undertakings that reinsure EEA undertakings or groups.

G.20.   These three scenarios are subject to an equivalence assessment as laid out in the Solvency II Framework Directive (Directive 2009/138/EC). However, the equivalence assessments and any decisions thereof will not be available for the purposes of QIS 5. Paragraphs G.21-24 give guidance on the required treatments.

a.   EEA groups that have a related third county (re)insurance undertaking

G.21.   When using the deduction and aggregation method for the inclusion of third country (re)insurance undertakings, groups should:

vi.   calculate the solo requirements of the related third country (re)insurance undertaking(s) using the Solvency II rules as laid out in this technical specifications, sections 1, 2, 4 and 5; and also

vii.   use the local solo requirements that apply to the related third country (re)insurance undertaking(s).

b.   Non-EEA headquartered groups that have an EEA subgroup

G.22.   Where a group which has its head office outside the EEA has a sub-group in the EEA, the group should calculate its group solvency using the Solvency II rules at the level of the EEA subgroup.

G.23.   The group calculations should be performed at the level of the ultimate participating undertaking in the Community. Where more than one subgroup exists within the EEA, groups should undertake a group calculation for each subgroup.

c.   Reinsurance activities of non-EEA undertakings that reinsure EEA undertakings or groups

G.24.   As regards risk mitigation provided by non-EEA reinsurers, this should for the purposes of QIS5 be considered if it were risk mitigation provided by EEA reinsurers when doing the calculations either with the standard formula or an internal model.

G.2.   Accounting consolidation-based method

G.2.1.   Group technical provisions

G.25.   The group best estimate of insurance liabilities should be the sum of solo best estimate of insurance liabilities with only the elimination of the part of the best estimate resulting from internally reinsured activities in order to avoid double counting of commitments as in the consolidated accounts.

G.26.   The risk margin of technical provisions for a group should be equal to the sum of the following:

(a)   the risk margin of the participating insurance or reinsurance undertaking;

(b)   the proportional share of the participating undertaking in the risk margin of the related insurance or reinsurance undertakings.

### G.2.2.   Treatment of participations in the consolidated group SCR

G.27. This subsection describes the calculation of the group SCR according to the accounting consolidation-based method (default method).

G.28. The treatment of participations at group level should be based on the following criteria:

-     the assessment of the participation should be based on economic principles, not just on legal grounds. Control and influence should always be assessed at a group level to determine the significance of participations. This ensures that situations where several entities of a group have small participations in the same undertaking are not overlooked;

-     in general, the consolidation approach used for accounting purposes should be used for solvency purposes to the extent that consolidation is based on economic principles suitable for a solvency assessment.

G.29. The component of group SCR in respect of the controlled (dominant influence) insurance entities, SPVs, insurance holding companies and ancillary entities is denoted SCR^*. This component is calculated by applying the standard formula to the consolidated data as if it were a single entity and based on QIS5 solo specifications. This means that diversification benefits are recognised between these groups' entities, including between EEA and non-EEA insurance entities and participating business.

G.30. The group SCR – denoted as SCR_{group} - is then calculated as the sum of SCR^*, the capital requirement for other financial sectors assessed on the basis of sectoral rules, including IORPs (CR_{OFS}), and the SCR for non-controlled (significant influence) participations (SCR_{NCP}).This can then be shown as a sum of the SCR components as in the diagram below:
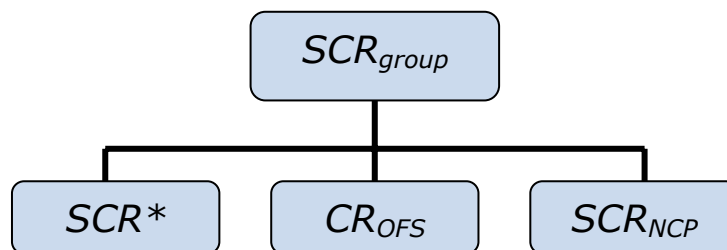
G.31. Further details on specific elements of SCR^*, CR_{OFS} and SCR_{NCP} are set out below.

a. Participations in insurance entities

G.32. When the group's participation in a (re)insurer is regarded as a dominant influence, according to the definition of the Solvency II Framework Directive (Directive 2009/138/EC), this will imply a full integration of the participation in the accounts or a proportional integration (if there is jointly shared control). In case of a fully integrated participation, minority interests would in turn contribute to cover part of the group SCR, with some limitations. The same treatment applies to an SPV over which dominant influence is exercised.

G.33. When the group's participation in a (re)insurer is regarded as a significant influence, according to the definition of the Solvency II Framework Directive (Directive 2009/138/EC), the contribution to the group SCR in respect of the participation should be calculated as the group's share in the participation multiplied by the solo SCR of this participation. This approach is considered consistent with the equity accounting method described in IAS 28. Where data from the previous year are not available, Solvency I data may be used as a proxy. The contribution of the participation in an SPV is calculated following the IFRS consolidation rules. The contribution of the insurance undertakings and SPV in which the group has a significant influence will form SCR_{NCP} (SCR of non controlled participations) which is to be added to SCR^* without recognition of any diversification effects.

G.34. If groups deem that following the IFRS consolidation rules for the treatment of SPV leads to inappropriate outcomes they can remove the SPV from the consolidated accounts. Groups would then need to perform the deconsolidation and provide confirmation that the SPV does not provide a source of risk. Groups are invited to comment on the method applied and on any problems/instances encountered following IFRS consolidation, in particular with reference to its effect on the group own funds and to the group SCR (please, refer to question QG.5).

G.35. When the group's interest in a (re)insurer is lower than 20% and is not regarded as a significant influence, the contribution to the group SCR should be calculated by applying the relevant capital charges (inter alia equity risk charge and the concentration risk charge) to the value of the group's interest.

b. Participation in insurance holding companies

G.36. Controlled insurance holding companies should be consolidated. This means a full integration of the participations in the intermediate insurance holding company and the insurance undertakings in which the intermediate insurance holding company holds participations is required.

G.37. The insurance holding company will, for the purpose of the calculation of the group solvency capital requirement and group own funds, be treated as an insurance entity.

c. Participation in ancillary services undertakings

G.38. Controlled ancillary services undertakings should be consolidated through a full integration of the participation in the accounts.

G.39. Ancillary services undertakings are entities whose principal activity consists of:

- owning or managing property

- managing data-processing services

- or any other similar activity which is ancillary to the principal activity of an insurance undertaking.

G.40. Ancillary services undertakings that are subject to a significant influence should be consolidated through the equity method.

G.41. Ancillary services undertakings which are not a subsidiary undertaking should be treated according to the provisions set out in the section SCR.5.

d. Participations in other financial sector entities and IORPs

G.42. The contribution to the group SCR of participations (both dominant and significant influence) which are held in other financial sectors should be determined according to the requirements of that other financial sector.

G.43. In case of financial non-regulated entity a notional solvency requirement should be calculated. The notional solvency requirement should be the capital requirement with which such an entity would have to comply with under the relevant sectoral rules as if it were a regulated entity of that particular financial sector.

G.44. When participations in another financial sector form a group for which a specific capital requirement exists, the latter, (instead of the sum of the requirements of each solo entity) should be used.

G.45. The same criteria (use of sectoral rules) should be applied as regards the assessment of the contribution of participations in institutions for occupational retirement provision (IORPs)[67].

G.46. The sum of the capital requirements of participations in other financial sectors and IORPs will form CR_{OFS} which is to be added to $SCR*$ without recognition of any diversification effects.

e. Participations in non financial sector

G.47. As a general principle, participations in entities outside the financial sector (both dominant and significant influence) should be consolidated through the equity method, this means that the relevant capital requirements (inter alia equity risk capital requirement and the concentration risk capital requirement) are to be calculated on the value of that participation on the basis of the provisions set out in the section SCR.5.

G.2.3. Additional guidance for the calculation of the consolidated group SCR

a. Market risk (currency risk)

G.48. Currency risk at group level needs to take into account the currency risk towards the currency of the group's consolidated accounts. Therefore, the local currency referred to

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[67] Regulated under Directive 2003/41/EC.

in the currency risk calculation of the standard formula is the currency used for the preparation of the group's consolidated financial statements.

b.   Adjustment for the loss-absorbing capacity of technical provisions

G.49. See subsection G.6 on participating business and ring fenced funds.

c.   Double use of the loss absorbing capacity of technical provisions

G.50. The double counting of the loss-absorbing capacity of technical provisions should be avoided. This double counting occurs because the standard formula SCR is calculated according to a modular approach. The overall risk that the undertaking is exposed to is divided into several sub-risks. The capital requirement for each sub-risk is quantified separately and then aggregated to arrive at the solvency requirement for the overall risk.

G.51. Undertakings should pay attention to the adjustment done in the standard formula to ensure that there is no double use of the loss absorbing capacity of technical provisions. In the case of a group that includes several entities with participating business, ensuring that there is no double use is even more complex. For example, where there are several entities writing with-profit contracts within a group, a comparison with the overall value of future discretionary bonuses may not detect a double counting of the risk-mitigating effect relating to one kind of benefits. The limitation of the loss-absorbing effect of future profit participation to the amount of Future Discretionary Benefits (FDB) on the pre-stressed balance sheet needs to be applied to both the loss-absorbing effect at the group level and at the solo level.

d.   Adjustment for the loss-absorbing capacity of deferred tax liabilities and assets

G.52. Where the taxation regime applicable to insurance groups does not allow them to benefit from tax integration for all the entities which are part of the group (e.g. groups that are not part of the same fiscal group), the adjustment for the loss-absorbing effect of deferred taxes at group level should be corrected to take this into account. For entities included in the calculation of SCR^* (for which diversification is recognised), groups may use the following simplification to assess the adjustment for the loss-absorbing effect of deferred taxes at group level:

$$Adj_{DT}^{Group} \;=\; \sum_i Adj_{DT,i}^{solo} \;\times\; \frac{SCR^*}{\sum_i SCR_i^{solo}}$$

where:

the index (i) covers all entities of the group included in the calculation of the SCR* and

$Adj_{DT,i}^{solo}$ is the solo Adjustment for the loss-absorbing effect of

deferred taxes of entity i (at solo level)

SCR_i^{solo} is the solo SCR of entity i (at solo level), after adjustment for the risk absorbing capacity of technical provisions and before adjustment for loss absorbing capacity of deferred taxes

$\dfrac{SCR^*}{\sum_i SCR_i^{solo}}$ the ratio should be considered as a proportional adjustment due to diversification effects

G.53. Whenever possible, the above mentioned simplification should be calculated net of intra-group transactions as regards the solo SCR and the adjustment for deferred taxes at solo level in order to improve the accuracy of the simplification.

G.2.4. Floor to the group SCR

a. General considerations

G.54. A group SCR floor applies when using the default method (not when using the D&A method) and is equal to the sum of the of the following:

    a) the MCR of the participating insurance and reinsurance undertaking

    b) the proportional share of the MCR of the related insurance undertakings.

G.55. The solo MCR used for the group SCR floor calculation should be the MCR determined after applying the corridor referred to in Article 129(3) of the Solvency II Framework Directive or after applying the absolute floor referred to in Article 129(1) (d) of the Solvency II Framework Directive (see section 4. of these technical specifications on the MCR).

G.56. The calculation b) above should consider the proportional share of the related undertaking that is included in the consolidated accounts (i.e. covered with minority interests when these are included as group own funds).

G.57. Therefore, when the proportional share used in the consolidated accounts is 100% for a related undertaking (either corresponding group participation or minority interests participations treated as group own funds), the proportional share should be 100 per cent.

G.58. The contribution of non-EEA entities to the group SCR floor should be the local capital requirement corresponding to the final intervention point of the local supervisor.

G.59. The floor SCR so calculated only applies to SCR^* (see paragraph G.29).

b.   Guidance for the calculation of the equivalent of the MCR for non- EEA entities

G.60.   The local MCR for non-EEA entities to be taken into account when calculating the group floor should be the legal level under which the authorisation will be withdrawn in the third country.

G.61.   Some jurisdictions include a formulaic approach to measure available and required capital and hence derive a mathematical result that could be compared to the MCR. The local triggers for some of these jurisdictions are suggested below for QIS5. Comments are welcomed on the appropriateness of these local MCR (level under which the authorisation will be withdrawn in the non EEA jurisdiction). The suggestions below do not of course pre-judge the outcome of any eventual work on determination of equivalence:

- Japan: 200% of the Solvency Margin Ratio (SMR). The SMR ratio is multiplied by a factor of two. So, to ascertain the real solvency ratio, all reported values should be halved. Therefore twice the SMR should be used as the MCR (consistent with a ratio of available capital to required capital at 100%).

- United States: the US regulator has defined 5 action levels to the RBC calculation; for the purpose of QIS5 the Authorized Control Level should be used as the MCR (100% of the Authorized Control level - first point where the ability of the company to write new business is affected- the regulations also allow the supervisor to take over control of the entity).

- Switzerland: the Swiss Solvency Test (SST) defines three intervention thresholds based on the SST ratio. Only the threshold 3 implies that ultimate action will be taken by the regulator to protect policyholders. Where it is not possible for an insurance undertaking to initiate suitable measures and where the measures ordered by the regulator do not also result in success in the short term, the regulator will revoke the insurance undertaking's authorisation. Therefore threshold 3 (33% of the Target Capital) should be used as the MCR

G.2.5.   Consolidated group own funds

G.62.   When applying the default method, eligible own funds at group level should be assessed as follows.

a. Step 1 - Balance sheet according to accounting consolidation rules

G.63.   The balance sheets of all entities belonging to the group, including both EEA and non-EEA entities, should be consolidated according to the accounting consolidation rules. As a result, intra-group transactions and internal creation of capital should be eliminated.

b. Step 2 - Balance sheet according to Solvency II rules

G.64.   Balance sheet items should be valued in accordance with the specifications on valuation set out for the solo insurance and reinsurance undertakings of the group.

G.65. Own funds related to other financial sectors and IORPs should be valued according to the relevant sectoral rules, consistent with the Financial Conglomerates Directive.

c. Step 3 - Contribution of non available own funds of the related undertakings to group own funds (Minority interests are treated separately)

G.66. In addition to surplus funds and any subscribed but not paid-up capital, other own funds could also be considered as not effectively available to cover the SCR of the participating insurance undertaking for which the group solvency is calculated. Such non-available own funds may cover the group SCR only in so far as they are eligible to cover the SCR of the related undertaking.

G.67. The group should pay particular attention to own funds which are indicated in subsection G.2.6 below when assessing their availability at group level.

G.68. For each related undertaking, the global amount of solo non-available own funds should be considered available for covering the group SCR up to the contribution of solo SCR to group SCR.

G.69. In order to assess the contribution of solo SCR to group SCR from entity j $(Contr_j)$ included in the calculation of SCR^* (the entities for which diversification is recognised), the following proxy should be used:

$$Contr_j = SCR_j \times \frac{SCR^*}{\sum_i SCR_i^{solo}}$$

where:

- the index (i) covers all entities of the group included in the calculation of the SCR^*

- SCR_i^{solo} is the solo SCR of entity i

- SCR_J is the SCR of undertaking j

- the ratio can be considered as a proportional adjustment due to diversification effects

G.70. Without such a limitation of availability of solo own funds, own funds available to cover the SCR^* would be overestimated, as shown in the example in Annex R.

G.71. This proposed approach results in a simplification, since there is no specific reason for which diversification benefits should come 'equally' from each undertaking of the group (that is to say that the possible reduction of the SCR obtained at group level comes equally from each undertaking, in proportion of their solo SCR). The effect of such limitation of availability of solo own funds (using the theoretical contribution of the solo SCR to the group SCR) may affect the extent to which eligible own funds in subsidiaries are included in group available own funds.

G.72. As regards undertakings operating in other financial sectors, the same non available own funds can contribute to the coverage of the group SCR only in so far as they are eligible to meet capital adequacy requirements as established in the applicable sectoral legislation, and only within the limits provided therein.

G.73. As a result, the global amount of non available solo own funds which are available to cover the group SCR is equal to the amount up to the sum of the contributions to group SCR at solo level, after the elimination of double use of eligible own funds (according to Article 222 of the Solvency II Framework Directive (Directive 2009/138/EC)), and it does not stem directly from the consolidated balance sheet.

G.74. For undertakings using an internal model the attribution of diversification can be carried out using the internal model. Groups should explain the method used for allocating diversification effects when using an internal model.

d. Step 4 - Available group own funds

G.75. The available group own funds to cover the group SCR can be calculated by deducting from the group own funds the sum of non available solo excess own funds (determined for each entity included in the consolidated balance sheet).

e. Step 5 - Eligible group own funds

G.76. In order to be considered eligible to cover the SCR^* and SCR_{NCP} the available group own funds must comply at group level with the tier limits applied at solo level.

G.77. As regards the undertakings operating in the other financial sectors, consistent with method 1 of the Financial Conglomerate Directive, the elements eligible at group level are those that qualify in accordance with the relevant sectoral rules.

G.2.6. Availability of certain own funds for the group

G.78. As mentioned above, there may be restrictions on availability of certain own funds which have to be considered when assessing the available own funds at group level.

G.79. Groups should consider whether own funds available to cover the SCR at solo level cannot effectively be made available for the group on the basis of the following criteria:

- The national legal or regulatory provisions applicable to those own funds are such that they are dedicated to absorb only certain losses;

- The national legal or regulatory provisions applicable to the assets representing those own funds are such that transferring those assets to another insurance or reinsurance undertaking is not allowed;

- Making those own funds available for the group would not be possible within a maximum of 9 months.

For each of the points listed above, groups should provide information on the amounts and indicate the relevant national or regulatory provisions.

According to the criteria set out in this paragraph, any **equalization reserves** established at solo level should be admitted to contribute to the coverage of the group SCR only in so far as they are admitted for covering the SCR of the related undertaking and up to the contribution of the related undertaking to the group SCR.

In addition to conditions set out in paragraph G.79, groups should pay particular attention to at least the following items:

a. Eligible own funds related to participating business and ring fenced funds

G.80. See the subsection G.6. on participating business and ring fenced funds.

b. Eligible ancillary own funds

G.81. Under Solvency II, any ancillary own funds of a related insurance undertaking for which the group solvency is calculated may only be included in the calculation in so far as the ancillary own funds have been duly authorised by the supervisory authority responsible for the supervision of that related undertaking.

G.82. For the purpose of QIS5, ancillary own funds may be included in the group calculation only in so far as they are eligible for covering the SCR of the related undertaking according to the specifications set out in section 5 (Own Funds) of these technical specifications and up to the contribution of the related undertaking to the group SCR.

c. Hybrid capital and subordinated liabilities

G.83. Hybrid capital and subordinated debts cannot, in principle, be considered as available to cover the SCR of the participating undertaking if they are not issued or guaranteed by the ultimate parent undertaking of the group. This depends on the rights of the subscribers to the revenues from these instruments. In particular, subordinated liabilities issued by group undertakings are normally only available to support the business of the issuing undertaking because of its legal liability to subscribers to those debts.

G.84. Hybrid capital instruments and subordinated liabilities issued by undertakings other than the ultimate parent undertaking should be admitted to contribute to the coverage of the group SCR only in so far as they are admitted for covering the SCR of the related undertaking and up to the contribution of the related undertaking to the group SCR.

G.85. The same instruments issued by an undertaking operating in another financial sector can contribute to the coverage of the group SCR only in so far as they are eligible to meet capital adequacy requirements as established in applicable sectoral legislation, and only within the limits provided therein.

G.86. If the subordinated liabilities contribute to the group SCR for a total in excess of their contribution to the solo SCR, groups are requested to indicate the amount of such contribution, explain the methods applied to derive the contribution and indicate the relevant national rules.

d. Eligible own funds related to deferred tax assets

G.87. Where the taxation regime applicable to insurance groups does not allow them to benefit from tax integration for all the entities part of the group (e.g. groups that are not part of the same fiscal group), eligible own funds related to deferred tax assets may be included in the calculation of the group own funds only in so far as they are eligible for covering the SCR of the related undertaking and up to the contribution of the related undertaking to the group SCR.

e. Participations in non-EEA (re)insurance entities

G.88. All (re)insurance undertakings of the group are captured in the group SCR calculations, including any non-EEA insurance undertakings.

G.89. As regards the calculation of group own funds, there may be specific cases where the own funds in excess of the solo SCR are effectively non available for use elsewhere in the group within a maximum period of time of 9 months

G.90. In such cases, eligible own funds in non-EEA (re)insurance entities are available to meet the SCR of the participating undertaking only in so far as they are admitted for covering the SCR of the non-EEA undertaking and any excess own funds is not available at group level.

f. Minority interests

G.91. Any minority interests in the available own funds exceeding the SCR of a related undertaking should not be considered as effectively available for the group.

G.92. Given that the SCR of the group is less than the sum of the solo requirements due to the recognition of some diversification benefits, it will not be possible to calculate directly the contribution of minority interest of a subsidiary to the group SCR.

G.93. In order to calculate such a contribution from the minority interests of subsidiary j, $Contr_{mi-j}$ for which diversification is recognised, the following proxy should be used:

$$Contr_{mi-j} = SCR_{mi-j} \times \frac{SCR^*}{\sum_i SCR_i^{solo}}$$

where:

- the index (i) covers all entities of the group included in the calculation of the SCR^*

- SCR_{mi-j} refers to the contribution of the minority interest of the subsidiary j to the solo SCR

- the ratio $\dfrac{SCR^*}{\sum_i SCR_i^{solo}}$ can be considered as a proportional adjustment due to diversification effects

G.94. The effect of such theoretical assessment of the contribution to the group SCR may affect the inclusion within eligible group own funds of a minority interest in the SCR of a subsidiary. Groups are invited to suggest any alternative method for allocating diversification effects when using an internal model.

G.3. Deduction and aggregation method

G.95. This section details the application of the deduction and aggregation (D&A) method for calculating group solvency (alternative method). Under this method, rather than applying the standard formula to the consolidated accounts, group solvency is assessed through the sum of the solo solvency capital requirements and own funds of the participating undertaking and of the proportional share of its related undertakings.

G.96. This should include non-EEA insurance undertakings, financial regulated entities as well as insurance holding companies.

G.97. When using the deduction and aggregation method for the inclusion of third country (re)insurance undertakings, groups:

- are expected to calculate the solo requirements of the related third country (re)insurance undertaking(s) using the Solvency II rules as laid out in this technical specifications, sections 1, 2, 4 and 5;

- are also invited to use the local solo requirements that apply to the related third country (re)insurance undertaking(s).

G.98. The treatment of participations in particular types of entities at solo level will be reflected in the aggregated group SCR. For participations in non-financial entities, the equity risk charge as described on section SCR.5 in the solo SCR of the participating entity should be applied to ensure a consistent approach with the accounting consolidation method. Any risks arising from non-financial entities (which will have neither an SCR nor notional SCR) should be assessed in the context of group-specific risks.

G.3.1. Aggregated group SCR

G.99. The aggregated group SCR is the sum of the following:

- the SCR of the participating undertaking;

- the proportional share of the SCR of the related undertakings.

G.100. The unadjusted sum of the solo SCRs of each group entity will be calculated from the output of the QIS5 solo spreadsheets in order to identify any intra-group diversification effects when comparing this method with the accounting consolidation method.

$$\text{unadjusted}\,\text{SCR}_{\text{group}} = \sum \text{SCR}_{\text{solo-unadjusted}} + \text{CR}_{\text{ot}}$$

G.101. $SCR_{solo\text{-}unadjusted}$ is the SCR of each solo undertaking that has not been adjusted to account for any intra-group transactions. CR_{ot} is defined as the sum of the capital

requirements for all other group businesses where a solo-unadjusted SCR cannot be readily calculated.

G.102. However, the D&A method needs to be adjusted for intra-group transactions in order to produce an accurate group solvency position. When the default method is applied, these transactions are eliminated automatically, but not where a pure aggregation approach is applied. In the deduction and aggregation method adjustments are needed to eliminate any intra-group transactions in the aggregated group SCR to ensure that those risk charges are not added twice (i.e. there is no double charge by adding the risk charges in both the participating and related undertaking).

$$SCR_{group} = \sum SCR_{solo-unadjusted} + CR_{ot}$$

G.103. Therefore, there should be two results for the aggregated group SCR – the unadjusted aggregated group SCR and the adjusted aggregated group SCR.

G.104. In practice, the 'solo adjusted' SCR would be calculated for SCR_{Mkt}, SCR_{def}, SCR_{op}, SCR_{Life} and $SCR_{Non-Life}$ in the following manner:

- Regarding SCR_{Mkt}, the underlying assumption is that the shocks prescribed in a scenario based approach do not affect the intra-group transactions.

- Regarding SCR_{def} the capital charge stemming from default risk of intra-group cedants (that is risks transferred into another entity of the group) should be taken to be equal to zero.

- Regarding SCR_{op} the capital charge stemming from internal reinsurance accepted should be taken to be equal to zero.

- Regarding SCR_{Life} and $SCR_{Non-Life}$, no capital requirement stemming from intra-group accepted reinsurance should be taken into account. Capital requirements should be calculated on volume measures gross of intra-group reinsurance in the ceding undertakings.

G.105. Groups may take into account materiality considerations in calculating the adjustment for intra-group transactions. In that case, groups should explain what materiality rule was used, as well as its rationale. Groups may wish to focus on the most material intra-group transactions, e.g. financial reinsurance arrangements, loans, etc.

G.3.2.   Aggregated group own funds

G.106. The aggregated group eligible own funds are the sum of the following:

- the own funds eligible for the SCR of the participating undertaking;

- the proportional share of the participating undertaking in the own funds eligible for the SCR of the related undertakings.

G.107. In order to eliminate the potential for double gearing, the own funds in each group entity should be based on an assessment of the solo own funds after the deduction of participations and subsidiaries and removal of other intra-group arrangements. As

under this option no diversification benefits are being considered in assessing the group SCR, there should be no adjustments in the capital resources reflecting diversification benefits.

G.4. Use of an internal model to calculate the group SCR

G.108. Under Solvency II groups are permitted to calculate the group SCR using a full or partial internal model. As well as providing the information requested above on the different options on the group SCR standard formula, groups are also invited to provide information on the calculation of the group SCR using a full or partial internal model. If an internal model has been used to calculate the group SCR or to calculate any elements of it, please refer in addition to the questions specific to internal models at the end of the section of technical specifications on internal models.

G.5. Combination of methods (optional)

G.109. As anticipated in subsection G.1.2. groups may choose to perform an optional calculation which combines the accounting consolidation and deduction and aggregation methods. In practice, this means that at least one entity within the scope of the group is subject to a different method. The objective of this option is to test the discretionary provision in Article 220(2) of the Solvency II Framework Directive (Directive 2009/138/EC) that allows the group supervisor to ask, after consulting the other supervisors concerned and the group itself, for the use of the deduction and aggregation method or a combination of both the methods. Possible situations where supervisors would assess the use of the alternative method, include issues around:

- the quality and amount of information available in relation to a related undertaking in order for it to be subject to the accounting consolidation method

- the extent to which a related undertaking is covered by the group risk management and internal control systems and the group reporting procedures as set out in Article 246 of the Solvency II Framework Directive (Directive 2009/138/EC)

- entities that fall within the scope of an internal model

- the level of complexity in the calculation arising from a combination of methods, such that the accounting consolidation method would be overly burdensome and the use of the deduction and aggregation method does not materially affect the quality of the group calculation.

G.110. In QIS5, groups are free to decide, in consultation with the group supervisor, which entities are subject to each method.

G.111. When using the combination of both admissible methods, the group SCR floor should be applied. In such case, the group SCR floor defined in subsection G.2.4 should only apply to the (re)insurance part of the group covered by the consolidated method (i.e. by comparing the sum of the MCR of the entities covered by the consolidated method to the part of the group SCR calculated with that method).

G.6. Treatment of participating businesses and ring fenced funds

G.6.1. General comments on group SCR calculation and loss absorbing capacity of technical provisions

G.112. On the loss-absorbing capacity of technical provisions, groups should refer to the relevant section of these technical specifications (section SCR.2).

G.113. Where undertakings within a group write participating business and there are restricted own funds items that can only be used to cover the liabilities for a limited set of policyholders within a legal entity, then it is important to identify those items at group level. As a result, the straight application of the standard formula to the consolidated accounts is complex and requires specific attention as there can exist several participating businesses stemming from different countries with their own specificities.

G.114. If an arrangement is considered as ring-fenced fund at solo level, it has also to be considered ring fenced in the consolidated accounts. As a consequence, any adjustment done for the calculation of the capital requirement and own funds at solo level for those funds will apply, mutatis mutandis, at group level when calculating the group SCR and own funds. Therefore, as far as ring-fenced funds are concerned, groups should refer to section SCR.11 of these QIS5 specifications.

G.115. The group net calculation should include the allowance of realistic management actions at the group level and consistent management actions at the solo level in relation to future bonus rates in response to the scenario being tested.

G.116. Groups should in particular consider whether the loss-absorbing effect of technical provisions may be limited to certain parts of the group because of contractual or legal constraints (e.g. the legal entity of origin). When calculating the adjustment for the loss-absorbing effect of technical provisions at group level, groups should ensure that the assumptions they make are consistent with any such contractual or legal constraints in this regard (see example below).

G.6.2. General comments on available own funds

G.117. Where the default method is applied the group will need to identify any subsidiary for which a ring fenced fund exists in accordance with section SCR.11 of these technical specifications. Under the deduction & aggregation method the effects of adjustment due to the existence of a ring-fenced fund will automatically be carried forward to the group calculations and no further adjustments are required.

G.118. If at solo level the only adjustment due to the existence of a ring-fenced fund is the recognition of the impact of a profit participation mechanism in respect of the outcome of bi-directional scenarios, the same methodology as applied at solo level should be adopted at group level (see SCR.11). However, in the group calculation this would have regard to the worst case scenario for the group as a whole.

G.119. Where at solo level in addition to the SCR impact described, own funds within a ring fenced fund are restricted so that only the amount meeting the notional SCR calculated for the ring fenced fund is treated as available, the same approach will need to be adopted at group level. Own funds within a solo ring fenced fund can be regarded as available group own funds to the extent they are meeting the notional SCR for the ring

fenced fund. The notional SCR will need to be adjusted from that calculated at solo level so that it represents the relevant contribution to the consolidated group SCR. The adjustment methodology set out in step 3 of group own funds calculations should be applied as a proxy to establish the contribution of the notional SCR of the ring fenced fund to the group SCR i.e. the ratio of *SCR** to the sum of all solo SCRs should be applied to the notional SCR of the ring fenced fund.

G.120. Under both the accounting consolidation and deduction & aggregation methods however there will be a need to identify any undertakings which do not have adjustment due to the existence of a ring-fenced fund at solo level but for which restrictions on own funds of this kind exist at group level. This might only arise where the whole of the business of the solo undertaking comprises one ring fenced fund. The solo methodology would then apply as though that undertaking was a ring fenced fund and the group the undertaking of which it forms a part, in respect of the accounting consolidation method. If this situation were to apply in the case of a deduction and aggregation calculation the amount of own funds in excess of the solo SCR would be excluded from available group own funds.

G.121. It follows from the above that groups will need to ensure that they are aware of the nature of arrangements and the national specificities which apply in the jurisdictions in which their related undertakings operate and which might give rise to ring fenced funds in one jurisdiction even if they do not have the same effect in the jurisdiction of the parent undertaking.

G.6.3.   Example for the calculation of the group SCR with the consolidated method in the case of several participating businesses

G.122. The following example aims at drawing the attention of groups on the calculation of sub-modules or modules of the standard formula via a scenario in a group context.

G.123. Example: a group has 3 insurance undertakings and one insurance holding company. The only activity of the insurance holding company is to hold the 3 insurance undertakings: NL, L1 and L2:

- NL is a non-life insurance undertaking in country X

- L1 is a life undertaking writing participating business attributing to policyholders the maximum of the minimum guaranteed rate of 2% and 90% of its financial products of L1 in country Y

- L2 is a life insurance undertaking also writing participating business attributing to policyholders 95% of the return on assets of L2 in country Z.

G.124. The following scheme illustrates the structure of the group where no intra-group transactions occur.
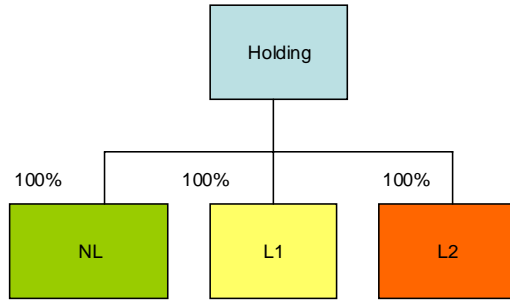
G.125. For the purpose of the example, the interest rate risk sub-module will be considered.

G.126. The table below summarises the impact for the solo undertakings and the group of the interest rate shock.

		NL	L1	L2	Group
FDB at t=0	FDB	**0**	**40**	**10**	**50**
Up shock	Delta NAV IR up gross	-50	-20	+60	-10
	Delta NAV IR up net*	-50	+10	+50	+10
	Demand for FDB	0	30	-10	20
	Offered FDB	0	40	10	50
	Resulting FDB	0	10	20	30
	Resulting Delta NAV IR up net**	**-50**	**+10**	**+50**	**+10**
Down shock	Delta NAV IR down gross	+20	+10	-45	-15
	Delta NAV IR down net*	+20	-5	-25	-10
	Demand for FDB	0	-15	20	5
	Offered FDB	0	40	10	50
	Resulting FDB	0	55	0	55

	Resulting Delta NAV IR down net**	**+20**	**-5**	**-35**	**-20**
IR capital charge	Delta NAV IR	**-50**	**-5**	**-35**	**-20**

* before FDB limit applied

** after FDB limit applied

G.127. The example illustrates a case where the impact of the interest rate shock is much lower at group level than at solo level as the undertakings within the group have opposing sensitivities to that risk within the group. It also shows the importance being sure that the offsets between positive and negative effects which arise from different part of the groups as observed in the example are fully justified.

G.128. Looking at the calculation of the down shock in more detail, the global decrease of 20 for the group comes from:

- an increase of 20 for the non life business coming from NL

- a decrease of 5 for the business of L1

- a decrease of 25 for the business of L2, however the loss-absorbency capacity of the FDBs within L2 is limited to 10 and hence a decrease of 35 for the business of L2 applies.

It should be ensured that all the legal and contractual commitments and appropriate management actions have been included for business of the group underwritten by L1 and L2.

G.129. It would not seem appropriate not to distinguish the change of net asset value for the assets and liabilities coming from L1, L2 and the rest of the group (NL here). For example, the down shock on interest rate on the business of L2 will have an impact on the liability coming from that entity that depends not only on the change of the discount rate but also on future discretionary benefits for L2 policyholders. Those future discretionary benefits depend only on the return on assets of L2 (and not of the others assets of the group) and that has therefore to be reassessed separately. The rationale also applies when an equivalent scenario is used for group calculation.

G.130. Once those calculations have been done for each participating business and the rest of the business ensuring that all relevant constraints have been taken into account, then potential offsetting of positive and negative effects can be done to find the global impact of the decrease of interest rate at the group level.

G.7. Guidance for firms that are part of a subgroup of a non-EEA headquartered group

G.131. Undertakings that are part of a wider third country group (i.e. where the ultimate worldwide parent undertaking is located outside the EEA) and that are also part of an EEA subgroup are expected to participate in the QIS5 exercise.

G.132. Where a subgroup exists in the EEA, the group calculations should apply with respect to that subgroup. The EEA subgroup is expected to apply the group calculations in the same manner as an EEA group. Firms should look to where any current Insurance Groups Directive calculations apply as an indicator of where the calculations should be performed.

G.133. There might also be circumstances where more than one subgroup of a non-EEA group exists within the EEA. Where such a situation arises, each subgroup should apply the group calculations separately at the level of the ultimate parent in the EEA.

G.134. It is recommended that the sub-groups use only the two admissible methods (the accounting consolidation method and the deduction & aggregation method). The other optional calculations as mentioned in section "Description of the methods" are not required from the sub-groups.

G.135. Where the subgroup undertakes the group calculations on the basis of a group internal model, such calculations should be provided to the group supervisor(s) of that subgroup(s).

G.136. All other parts of group technical specifications should be applied *mutatis mutandis* at the level of the subgroup.

G.8. Guidance for running the QIS5 exercise at a national or regional sub-group level

G.137. The Solvency II Framework Directive (Directive 2009/138/EC) provides for the possibility to apply group supervision to the ultimate parent undertaking at a national or regional level. Such sub-group supervision can be optionally implemented by a Member States; in that case, the competent supervisory authority then exercises the group supervision at the level of the ultimate parent undertaking at a national or regional level.

G.138. Since the supervision of sub-group solvency is one of the key elements of sub-group supervision, it is useful to test the calculation at the sub-group level during the QIS5 exercise. The calculation might be helpful for both the sub-group to assist with the preparation for future implementation of Solvency II and for the relevant supervisory authority to get a picture about the impact of a sub-group SCR calculation. This calculation is however optional.

G.139. During the preparation of the QIS5 exercise the supervisory authorities should approach the ultimate parent undertakings at national level which are on top of such sub-groups and discuss with them the possibility of running the QIS5 exercise at the level of the sub-group. Where agreement is reached that a subgroup calculation will be carried out for QIS5, the group supervisor should be informed. Consensus should be reached amongst relevant national supervisors if a regional subgroup calculation is sought.

G.140. To be clear, national and regional subgroup calculations are only required for QIS 5 where they are agreed upon by national supervisors and the ultimate parent undertakings at national level.

G.8.1. Scope of the sub-group at a national or regional level

G.141. The scope of the subgroup should be the same as prescribed in the introduction in the part related to the scope so that consolidation is undertaken at the level of the ultimate parent undertaking at national or regional level. Firms should look to where any current IGD calculations apply as an indicator of where the calculations may be performed.

G.8.2. Methods

G.142. Since the Solvency II Framework Directive (Directive 2009/138/EC) does not foresee any specific requirements to be applied by the sub-groups, the technical specifications should be followed by the sub-groups. In order to minimise the burden of calculations on several levels, it is recommended that the sub-groups use only the accounting consolidation method and the deduction & aggregation method (and not the other optional calculations).

G.143. If the whole group also submits the QIS5 results based on group internal model and this model enables to calculate the sub-group's SCR, such calculation should be provided to the group and national supervisors.

G.144. All other parts of group technical specifications should be applied mutatis mutandis at the level of the subgroup.