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ANNEX to the Draft advice on proportionality

Proportionality in the Pillar I provisions

of the QIS4 technical specifications

(based on final QIS 4 technical specifications published by the EC on 31 March 2008)

This Annex compiles for ease of reference the simplifications and proxies that have been included in the QIS4 technical specifications.

The page numbers and paragraph numbers, contained in brackets in the titles and table of content, refer to the QIS 4 technical specifications published by the EC on 31 March 2008 (Markt/2505/08) – in case any discrepancy exists, the QIS4 technical specifications prevail.

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1. Simplifications and proxies for the calculation of technical provisions

1.1 General criteria for using the simplifications for the calculation of technical provisions (page 16)

TS.II.A.32. According to the proportionality principle, undertakings may use simplified methods and techniques to calculate insurance liabilities, using actuarial methods and statistical techniques that are proportionate to the nature, scale and complexity of the risks they face.

TS.II.A.33. A continuum of methods is suggested ranging from low to high complexity to determine the value of (re)insurance liabilities. In accordance with the proportionality principle, an undertaking may choose a simplified method if it is proportionate to the underlying risk.

TS.II.A.34. The use of a simplification is not directly linked to the size of the insurance or reinsurance undertaking but to the nature, scale and complexity of the risks supported by the undertaking.

TS.II.A.35. Simplified methods may be applied in the valuation of the (re)insurance liabilities where the result so produced is not material or not materially different from that which would result from a more accurate valuation process.

TS.II.A.36. However participants are not required to re-calculate the value of their technical provisions using a more accurate method in order to demonstrate that the difference between the result of the simplified method and the result of a more accurate method is immaterial. It is sufficient to have reasonable assurance that the difference between those two amounts is likely to be immaterial.

TS.II.A.37. Participants may use simplified actuarial methods and statistical techniques if the criteria outlined in TS.II.A.38 are satisfied or are likely to be met. Of course, as indicated in TS.II.A.36, it is not necessary to re-calculate the best estimate using a more appropriate approach in order to demonstrate that the absolute / relative quantitative criteria set out below are met. It is sufficient to meet those quantitative criteria when using the simplified method. All criteria should be applied on a best effort basis.

TS.II.A.38. Simplified actuarial methods and statistical techniques may be used if:

- the types of contracts written for each line of business or homogenous group of risk is not complex (e.g. path dependency does not have a significant effect; for example: life contract that doesn't include any options or guarantees, non-life insurance that doesn't include options for renewals);

  and

- the line of business or homogenous group of risk written is simple by nature of the risk (e.g. insured risks are stable and predictable in a sense that the amount of the claims paid could be predicted with a great certainty, or that the future claims-related cash flows can be

projected with a high level of confidence). For example: term assurance, insurance of damage to land - property or motor vehicles, etc.;

and

- any additional nature and complexity standards set out for each liability are met

and

- the liability that is valued is not material in absolute terms or relative to the overall size of the total best estimate. For the purpose of QIS4, please use the following guidance on materiality to determine when simplifications may be used for the technical provisions:
    - the result from the simplified approach (sum of all best estimates of liabilities determined with simplified actuarial methods and statistical technique) is no more than 50 million Euro for life business, and 10 million Euro for non-life business;

    or

    - the value of best estimate determined with simplified actuarial methods and statistical technique for each homogenous group of risks where simplified method is used is no more than 10% of the total gross best estimate;**and**
    - the sum of all best estimates determined with simplified actuarial methods and statistical technique is no more than 30% of the total gross best estimate.

This guidance on materiality is applicable for using simplification to determine the value of best estimate and/or risk margin.

TS.II.A.39. If a participant (e.g. a captive (re)insurer) does not meet the threshold indicated, but nevertheless thinks it should be allowed to apply a simplified approach because of the specificities of its situation, it can do so provided that it (1) explains the reasons for this and (2) indicates the criteria it considers relevant in its situation. The participant is also invited to carry out the more accurate calculation to allow CEIOPS to benchmark the simplified calculation.

All participants are invited to comment on the level of threshold.

1.2 Criteria for using proxies (page 18)

TS.II.A.41. Proxies for the valuation of technical provisions come into play where there is insufficient company-specific data of appropriate quality to apply a reliable statistical actuarial method for the determination of the best estimate. Proxies can be regarded as special types of simplified methods which are positioned at the "lower end" of continuum of methods that could be applied.

TS.II.A.42. Under the future Solvency II regime, proxy methods will be needed whenever a lack of sufficiently credible own data cannot be avoided. This is the case, for example:

- for entirely new types of insurance in the market that won't have any historic data to act as a guide (e.g. cyber risks);
- for classes of business that are being written for the first time by an insurer;
- where due to legislative or significant underwriting changes the characteristics of the terms of the insurance contracts are changed in such a manner that historic data is rendered useless; or
- when the insurer (or the class of business in question) is too small to allow the build-up of credible historic claims data.

TS.II.A.43. Under the Solvency II framework, proxies can be used to determine technical provisions if:

- the proxy is compatible with the general principles underlying the valuation of technical provisions under Solvency II; and
- the use of the proxy is proportionate to the underlying risks..

TS.II.A.44. An appropriate valuation of technical provisions under the Solvency II principles (including the use of proxies) will require sufficient actuarial expertise. Consistent with this, the Framework Directive Proposal requires insurers to provide an actuarial function to ensure the appropriateness of the methodologies and underlying models used as well as the assumptions made in the calculation of technical provisions1. However, it should be acknowledged that currently a significant number of insurers have not yet built up their actuarial expertise to the level which will be required under Solvency II, especially in non-life insurance where in some markets the use of actuarial techniques has traditionally been less widespread than in life insurance. In the light of this, and in order to increase the participation of the insurance industry in QIS4, the QIS 4 package includes a technical tool which is intended to facilitate the "best estimate" valuation of technical provisions in non-life insurance.

TS.II.A.45. [Section TS.IV of the QIS4 specifications] contains a description of a range of proxy valuation techniques for technical provisions, including criteria under which these proxies could be applied.

TS.II.A.46. When applied with sufficient actuarial expertise and professional judgement, these techniques (or parts of these techniques) can in certain circumstances be regarded as sound actuarial techniques. It should be noted, however, that over-reliance on any one proxy method would seem inappropriate, considering that each may, at a point in time, produce sensible estimates, but changing circumstances may render its accuracy and validity of limited use. Therefore, to the extent this is practicable, participants should not rely on a single proxy method, thought to be appropriate, but rather consider a range of approaches before making a final decision on which method they take.

TS.II.A.47. When using proxy techniques, participants are also requested to provide additional qualitative information. In particular, participants are invited to comment on the appropriateness and suitability of the

[1] Cf. Article 47 of the Framework Directive Proposal.

proposed proxy techniques, including the extent to which these techniques are consistent with the overall philosophy of Solvency II. Such information will allow for the further development of proxy techniques (including technical descriptions as well as application criteria) for the valuation of technical provisions under Solvency II.

1.3 Criteria for using simplification to measure the expected loss in the value of a reinsurance asset because of counterparty default (page 24)

TS.II.B.31. Reinsurance recoverables – simplification

A simplified calculation of the expected loss may be made, if the following conditions are met:

- the expected loss according to the simplified calculation is less than 5% of the recoverables before adjustment for counterparty default; and
- the approximation is proportionate to the nature, scale and complexity of the risks supported by the undertaking, in particular there are no indications that the simplified formula significantly underestimate the expected loss.

The simplified calculation shall be made as follows:

$$EL = -LGD_{\%} \cdot BE_{\mathrm{Re}\,c} \cdot \max(Dur_{\mathrm{mod}};0) \cdot \frac{PD}{1-PD},$$

where

EL adjustment for expected loss;

$LGD_{\%}$ relative loss-given-default of the counterparty, for instance 50% if no reliable estimate of the loss-given-default is available;

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.[2]

The adjustment for expected loss shall be calculated separately for each counterparty. If the estimates of the probability of default and the loss-given-default of several counterparties coincide, no separate calculation is necessary under the simplified approach.

1.4 Simplification for calculating the risk margin, and more precisely, the future SCRs (page 27 ff.)

TS.II.C.19 *Estimating counterparty default risk*

Counterparty default risk charge with respect to reinsurance ceded can be calculated directly from the definition for each segment and each year. If the

[2] Under the assumption $LGD_{\%}$=100%, PD/(1-PD) is an estimate of the credit spread of the counterparty and the expected loss can be estimated applying the duration approach

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.

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.

TS.II.C.20 *Estimating non-life underwriting risk*

Underwriting risk charge for non-life business (other than catastrophe risk) can be calculated directly from the formula using best estimate for outstanding claims provision net of reinsurance (other than annuities) and earned premiums net of reinsurance as input parameters. Renewals and future business are not taken into account. For simplicity it can be assumed that the undertaking-specific estimate of the standard deviation for premium risk remains unchanged throughout the years.

Underwriting risk charge for catastrophe risk (CAT) is taken into account only with respect to the insurance contracts that exist at $t = 0$. If no better estimate of the catastrophe risk charge for a segment in year y is accessible then the size of the risk charge can be assumed to be in direct proportion to the earned premiums net of reinsurance in that segment.

If it is not possible to differentiate the catastrophe risk charges in between segments then it can be assumed that the exposure is proportionate to the net earned premiums.

Usually the periods of insurance are not very long in non-life insurance so that the earned premiums differ from zero only for the first few years. This provides for a further simplification. Since there does not exist any premium or catastrophe risk for the years when earned premiums are zero the underwriting risk module for non-life consist only of the reserve risk. The risk charge for the reserve risk in a segment is simply of the form constant times the best estimate of the outstanding claims provision net of reinsurance.

TS.II.C.21 *Estimating health underwriting risk*

In short term health insurance, the lifetime of the obligations is short by definition. Typically the capital charge for the first 12 months will suffice ($t=0$). If there are obligations that are not negligible beyond the first year, simplifications similar to those in non-life underwriting risk can be used. For simplicity it may be assumed that the overall standard deviation σ remains the same over time.

Similarly, the underwriting risk charge for the workers' compensation general module should be calculated using the guidelines proposed for non-life underwriting risk. However, the workers' compensation annuities risk charge should be calculated using the methods proposed for the life underwriting risk charge.

TS.II.C.22 *Estimating life underwriting risk*

As an approximation, the future SCRs for sub-modules can be calculated using the simplified SCR approaches **(**See paragraphs TS.XI.B.10, TS.XI.C.9, TS.XI.D.8, TS.XI.E.10, TS.XI.F.6 and TS.XI.G.5**)**. Future SCRs should then be calculated using inputs projected into the future required to calculate the simplified SCRs.

TS.II.C.23 *Estimating* the risk-absorbing effect of future profit sharing

Undertakings should project the SCR net of the risk-absorbing effect of profit sharing (see TS.VI.H). Profit sharing may be ignored where this is largely a result of risks which have been excluded from the projection (e.g. market risk).

Alternatively, the effect of profit sharing can be approximated by calculating the SCR at future periods calculated gross of profit sharing multiplied by the ratio of the SCR net of profit sharing at t=0 (excluding market risk) divided by the SCR gross of profit sharing at t=0 (excluding market risk).

1.5 Criteria and content of "simpler" simplification for calculating the risk margin (page 29 ff.)

Risk Margin Simplifications (2)

TS.II.C.24 *If participants are unable to use above simplifications, then the following can be used.*

The simplified calculations shall be made per segment. They may only be applied if the standard formula is applied to calculate the SCR. For those segments which include risks calculated by the non-life, life and/or health methods below, the overall risk margin is calculated by combining the results from the simplifications by means of the aggregation method of the SCR standard formula.

TS.II.C.25 *Non-life insurance*

The Cost-of-Capital risk margin for a LoB is determined using the formula

$$CoCM \approx CoC \cdot \left(\frac{SCR_{lob}^{tf}(0) +}{\left(Dur_{\mathrm{mod},lob} - 1\right) \times (3 \cdot \sigma_{(res,lob)} \cdot PCO_{lob}^{net} + 0.02 \cdot PCO_{lob}^{gross} + Def_{re,lob})} \right)$$

where

CoCM	Cost-of-Capital margin;
CoC	Cost-of-Capital rate
$SCR_{lob}^{tf}(0)$	the current SCR for the line of business, excluding market risk and default risk for financial derivatives;
Dur_{mod}	modified duration of PCO_{lob}^{net};

$\sigma(res,lob)$	standard deviation for reserve risk of the line of business LoB, as defined in the SCR standard formula premium and reserve risk module;
PCO_{lob}^{net}	net best estimate provision for claims outstanding in the LoB;
PCO_{lob}^{gross}	gross best estimate provision for claims outstanding in the LoB;
$Def_{re,lob}$	current capital charge for reinsurance default risk assigned to the LoB.

If the portfolio of the line of business LoB contains treaties with a contract period that exceeds the following year, an amendment of the above result for the premium and catastrophe risk for the time after the following year shall be made.

In order to simplify the determination of $SCR_{lob}^{tf}(0)$, the current SCR for premium and reserve risk in the line of business may be estimated as follows:

$$NL_{pr,lob} \approx 3 \cdot \sqrt{\begin{matrix}(\sigma_{(prem,lob)} \cdot P_{lob}^{existing})^2 + (\sigma_{(res,lob)} \cdot PCO_{lob}^{net})^2 \\ + 2 \cdot \alpha \cdot \sigma_{(prem,lob)} \cdot P_{lob}^{existing} \cdot \sigma_{(res,lob)} \cdot PCO_{lob}^{net}\end{matrix}},$$

where

$\sigma(prem,lob)$	standard deviation for premium risk of the LoB, as defined in the SCR standard formula premium and reserve risk module;
$\sigma_{(res,lob)}$	is the standard deviation for reserve risk of the LoB, as defined in the SCR standard formula premium and reserve risk module;
$P_{lob}^{existing}$	net earned premium in the individual LoB during the forthcoming year relating to contracts closed before the valuation date;
α	= 0.5 (correlation factor between premium risk and reserve risk as specified I the premium and reserve risk sub-module).

TS.II.C.26 *Life insurance*

The Cost-of-Capital risk margin for a segment is determined using the formula

$$CoCM \approx CoC \cdot Dur_{\mathrm{mod},lob} \cdot SCR_{lob}^{tf}(0),$$

where

CoCM	Cost-of-Capital margin;
CoC	Cost-of-Capital rate

$SCR_{lob}^{tf}(0)$	the current SCR for the segment excluding market risk and default risk for financial derivatives;
Dur_{mod}	modified duration of the best estimate provision in the segment (net of reinsurance)

In order to determine $SCR_{lob}^{tf}(0)$, a recalculation of the life underwriting SCR restricted to the segment may be necessary. This may be simplified by redistributing the sub-risk charges (mortality, longevity etc.) for the whole portfolio to the segments proportionally to appropriate exposure measures.

The following exposure measures may be taken into consideration:

Sub-risk	exposure measure
Mortality	(capital at risk) · (duration of treaties under mortality risk)
Longevity	best estimate of treaties under longevity risk
Disability	(capital at risk) · (duration of treaties under disability risk)
Lapse	(best estimate of treaties under lapse risk) – (surrender values of treaties under lapse risk)
Expenses	(renewal expenses) · duration
Revision	Best estimate of annuities exposed to revision risk
CAT	capital at risk of treaties under mortality and disability risk

The formula is based on the assumption that the relative loss-absorbing capacity is constant over the run-off of the portfolio. Amendments to the estimation shall be made if this assumption does not hold. For example, when the simplified calculation is applied, attention should be given to the appropriate allowance for the loss-absorbing capacity of future discretionary benefits.

TS.II.C.27 *Health insurance*

The Cost-of-Capital risk margin for health insurance that is practiced on a similar technical basis to that of life assurance is determined using the formula

$$CoCM \approx CoC \cdot \sum_{t \geq 0} SCR_{lob}^{tf}(0) \frac{L(t)}{(1+r_t)^t \cdot L(0)},$$

where

CoCM = Cost-of-Capital margin;

CoC = Cost-of-Capital rate

$SCR_{lob}^{tf}(0)$ = the current SCR for the line of business, excluding market risk and default risk for financial derivatives;

$L(t)$ = expected benefits, allowing for claim inflation, paid in year t;

r_t = risk free interest rate for the maturity t.

The formula is based on the assumption that the relative loss-absorbing capacity is constant over the run-off of the portfolio. Amendments to the estimation shall be made if this assumption does not hold. For example, when the simplified calculation is applied, attention should be given to the appropriate allowance for the loss-absorbing capacity of future discretionary benefits.

The risk margin for health short term and workers compensation general modules should be calculated using the guidelines proposed for non-life underwriting risk margin.

Workers' compensation annuities risk margin should be calculated using the methods proposed for life underwriting.

Alternatively to the simplifications provided in previous paragraphs, companies may derive future SCR values for each segment assuming that the ratio of SCR for that segment at t=0 (incorporating only the appropriate risks) over the best estimate at t=0 (or other exposure measure deemed appropriate as a reflection of the underlying risks) is constant throughout the whole run-off period of liabilities. For example, the calculation of future SCRs for the profit sharing business may be based on a projection of guaranteed benefits if this is appropriate.

For a more accurate calculation, the approach can be applied at the sub-module level.

TS.II.C.28 *Overall SCR estimate simplification*

Alternatively to the simplifications provided in previous paragraphs, companies may derive future SCR values for each segment assuming that the ratio of SCR for that segment at t=0 (incorporating only the appropriate risks) over the best estimate at t=0 (or other exposure measure deemed appropriate as a reflection of the underlying risks) is constant throughout the whole run-off period of liabilities. For example, the calculation of future SCRs for the profit sharing business may be based on a projection of guaranteed benefits if this is appropriate.

For a more accurate calculation, the approach can be applied at the sub-module level.

1.6 Simplification for the calculation of with-profit life insurance contracts similar to those in Italy (page 44)

TS.II.D.76 *Best estimate simplification*

Description

The following simplification is based on profit sharing life insurance Italian system[3]. It could be extended to other profit sharing systems if the profit sharing mechanism follows a similar approach. In particular, the simplification can be used for the Countries where the revaluation clauses of the sum insured are defined in the insurance contracts or in the national law. Moreover, an additional simplification is proposed, for policies where annual bonuses are determined by an insurer's decision.

Following the proportionality principle the simplification can be used only by undertakings with a low risk profile. In this application, the assets portfolio shall have a small component of equity investment (that is, the simplified formula shall be limited to funds where the percentage invested in equity is lower than 20%) and shall not contain financial derivatives.

Input

The following input information is required separately for each fund and at least for different minimum guaranteed rates and for different maturities:

S_0 = the total sum insured at the valuation date

T = the average maturity of the policies

R = the technical interest rate

δ = the minimum guaranteed spread over r

β = the participation coefficient$^{(*)}$

w_E = the fraction of the fund invested in equity

[3] Italian with profit contracts provide benefits which are explicitly linked to the return of a reference fund, in which the technical provisions must be invested. The investment fund, usually referred to as "segregated fund", is managed by the insurer under specified accounting rules; in particular assets are valued at "historical cost". Moreover the insurer can decide the assets mix of the fund. This features allow the undertakings to partially influence the amount of return over the minimum guaranteed to be attributed to policyholders. Such type of contracts as well as all contracts where the benefits are linked to the return of an investment fund are similar to a derivative contract having the investment return as the underlying. The future discretionary benefits can be interpreted as a "call option" written on the segregated fund's return.

(*) For policies where annual bonuses are determined by an insurer's decision the same approach could be used for deriving an assessment of Future Discretionary Benefits. In this case β could be set equal to the average participation coefficient over the last three years.

Output

The simplification delivers the following output:

BE = best estimate of with profit contracts

FDB = value of future discretionary benefits

Calculation

In order to calculate the best estimate of the technical provisions of a profit sharing policy, let us consider a benefit Y_T to be paid at date T. The benefit will be determined as follows:

$$Y_T = S_0 \prod(1+R_t),$$

where

R_t is the revaluation rate in year $t=1,2, \ldots, T$.

R_t is a function $R_t=m(I_t)$ of the return I_t on the investments in year t.

As a simple example:

$$m(I_t)=\max[(\beta I_t - r)/(1+r), \delta].$$

By this rule, the value of the minimum guaranteed benefit is:

$$BE_{guaranteed} = S_0 (1+\delta)^T v_T ,$$

where v_T is the risk-free discount factor for maturity T.

The Intrinsic Value (IV) of Y_T is defined as:

$$IV = S_0 \, v_T \prod [1+m(f_t)] \, ,$$

where $f_t = v_t/v_{t-1} - 1$ is the forward rate for the period $[t\text{-}1, t]$ derived from the risk-free interest rate term structure. As it is well-known, *IV* provides an underestimation of the best estimate *BE* of Y_T (the difference being the Time Value of Y_T).

Therefore, the simplification for the best estimate is equal to:

$$BE \approx S_0 \, v_T \prod [1+m(f_t^*)] \, ,$$

where

f_t^* is a projection rate obtained by incrementing the forward rate:

$$f_t^* = f_t + \Delta f_t \, .$$

Considering that the calibration of the increment Δf_t shall take into account the nature, scale and complexity of the risks borne by insurance undertakings, f_t^* is calculated as follows:

$$f_t^* = f_t + [\sigma_B \, (1\text{-}w_E) + \sigma_E \, w_E]/\sqrt{t} \, ,$$

where $\sigma_B = 2{,}5\%$ and $\sigma_E = 15\%$.

The value of Future Discretionary Benefits is equal to:

$$FDB = BE - BE_{guaranteed}.$$

1.7 Simplification for the calculation of non-life best estimate premium provisions (page 48)

TS.II.E.17 *Simplification*

As a simplified approach, the "Expected Loss Based Proxy" with a combined ratio estimated from the firm's own data and other information could be used to derive a best estimate for the premium provision (cf. QIS4 TS.IV.F for a description of such a method).

1.8 Simplification for the calculation of non-life technical provisions (outstanding claims provisions) (page 49)

TS.II.E.22 A simplified approach would be to use a "case-by-case" estimation to stipulate the best estimate for claim amounts related to the reported but not settled claims (the RBNS provisions). However, the "case-by-case" estimation of RBNS provisions must be supplemented by a (simplified) method for stipulating the claim amounts related to incurred but not reported claims (IBNR claims) .[4] In cases like this, a simplified method for calculating the IBNR-provisions could be given by a pre-specified percentage applied to the sum of cumulated claims payments and the RBNS-provisions or as the difference between the estimated overall claims costs (stipulated by an appropriate method) and the sum of cumulated claims payments and the RBNS-provisions. It should be noticed that with this approach the stipulation of the IBNR-provisions must be carried out per occurrence/ accident year (or underwriting year)

TS.II.E.23 A simplified method for calculating the IBNR claims could be based on the total of paid claims and the RBNS-amount (e.g. as a given percentage of this total) or on an estimate of the total claims costs (e.g. as a residual given by the difference between the estimated overall claims cost and the total of paid claims and the RBNS-amount)..

[4] Cf. the description of a 'Case-by-case Proxy" for claims provisions in annex 2.

1.9 Proxies for calculating non-life best estimates and criteria for application (Annex 2, page 67-92)

TS.IV.A Range of techniques

This section gives a range of techniques for the best estimate valuation of technical provisions. These techniques are defined as proxy methods in the context of QIS4, where proxies could be applied in circumstance where there is insufficient company specific-data of appropriate quality to apply a reliable statistical actuarial method for the determination of the best estimate.

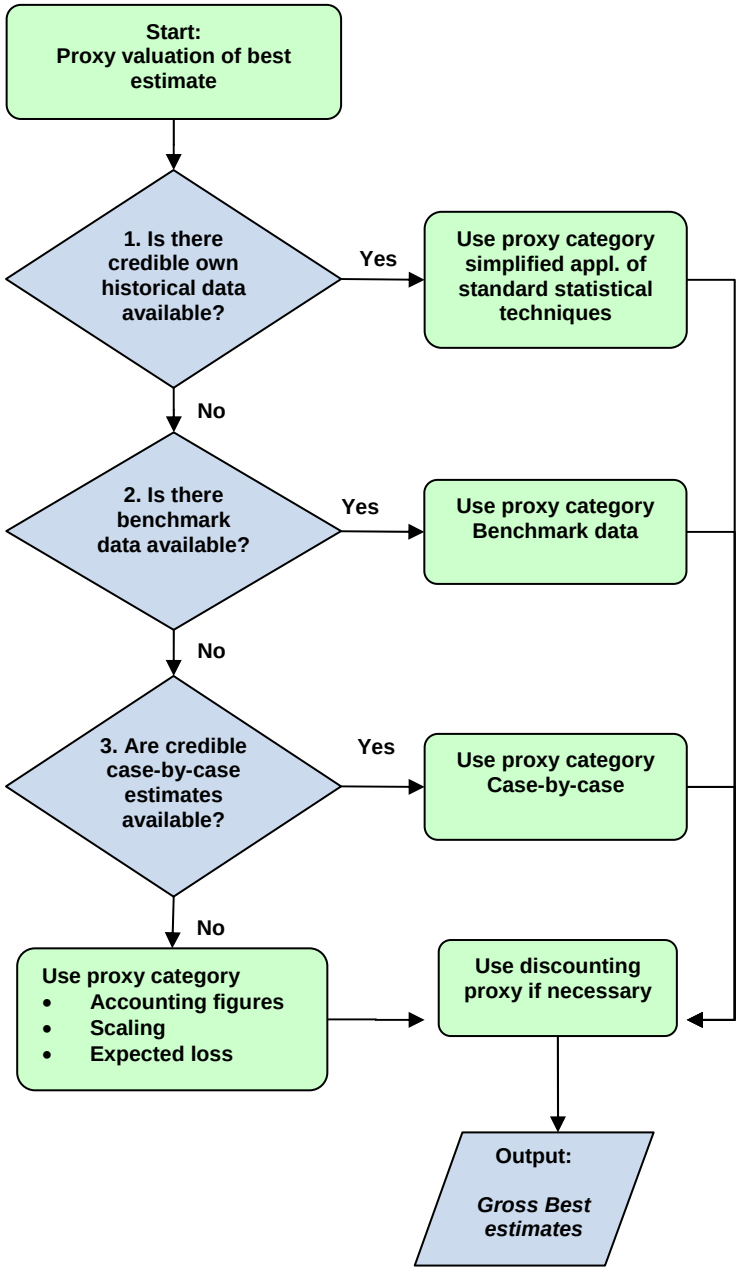
TS.IV.A.1 Proxies for the best estimate of claims or premium provisions can be classified into:

- **Development patterns proxies**: Benchmark proxies using information of market or other reference portfolios representing characteristics similar to the own portfolio of the company in order to approximate the development of own claims over the development years.
- **Frequency-severity proxies**: Benchmark proxies using information of market or other appropriate portfolios by separate approximations of the development of the severity of claims and of the frequency of claims.
- **Other benchmark proxies**: These proxies use some information from benchmark portfolios, other own (similar) portfolios or market-representative portfolios. They are normally used within actuarial methods in order to complete these approaches.
- **Case-by-Case proxies**: these are proxies based on case estimate information, in some cases adjusted for further effects, e.g. discounting or IBNR claims
- **Expected Loss proxies**: these use expected ultimate loss ratios to set provisions, e.g. based on initial pricing or business plan assumptions about likely level of claims experience
- **Scaling-to-completion proxies**: these proxies attempt to estimate the best estimate of the whole portfolio by 'scaling to completion' the estimate for the modelled part
- **Simplified application of standard statistical techniques**: this refers to an application of statistical reserving methods (e.g. chain ladder) without carrying out full actuarial 'checks and balances' analysis
- **Premium based proxies**: proxies based on local accounting figures, e.g. unearned premium reserves

TS.IV.A.2 These proxies are often combined with either:

- **Discounting proxies**: These transform an estimate of the undiscounted expected value of future cash flows into a discounted estimate; or
- **Gross-to-Net proxies**: These transform a gross of reinsurance estimate into a net estimate.

TS.IV.A.3 The following proxy decision tree illustrates how these different classes of proxies would typically relate to another within a best estimate valuation of gross (non-life) technical provisions. It is to be used when the participant needs to carry out a proxy valuation, i.e. when the participant has only insufficient credible historical data and / or relevant actuarial knowledge.



(...) For the detailed description of the non-life and life proxies for the calculation of the best estimate, please refer to pages 68-92 of the QIS4 Technical Specifications.Simplifications for the calculation of the SCR standard formula

2. Simplifications for the calculation the SCR standard formula

2.1 General criteria for being allowed to use simplifications for calculating the SCR standard formula (page 115)

TS.IV.G. Simplifications in SCR

TS.VI.G.1 According to the proportionality principle the undertakings may use simplified methods and techniques to calculate the SCR, using actuarial methods and statistical techniques that are proportionate to the nature, scale and complexity of the risks they support.

TS.VI.G.2 Simplified methods may be employed in the valuation of SCR where the result so produced is not material or not materially different from that which would result from a more complex valuation process. If the criteria outlined in the following paragraph are satisfied, i.e. the criteria are expected to be met, simplified actuarial methods and statistical techniques may be used. Of course participants, who are unable to calculate the value using the standard method, are not required to do it to demonstrate that the difference as compared to the simplified method is immaterial

TS.VI.G.3 Simplified actuarial methods and statistical techniques may be used if:

- the types of contracts written for each line of business is not complex (e.g. path dependency does not have a significant effect; for example: life contract that doesn't include any options or guarantees, non-life insurance that doesn't include options for renewals);

  and

- the line of business is simple by nature of the risk (e.g. insured risks are stable and predictable; for example: term assurance, insurance of damage to land motor vehicles)

  and

- any additional nature and complexity standards set out for each SCR calculation are met

  and

- the SCR that is valued in the simplified approach is not material in absolute terms or relative to the overall size of the total SCR. For the purpose of QIS4, please use the following guidance on materiality for when simplifications may be used for the SCR:

  - the SCR resulting from the simplified approach is no more than 50 million Euro for life business, and 10 million Euro for non-

life business; for composites the same threshold apply on each part of the business, life and non-life;

or

- the value of each capital charge (pre-diversification) determined with simplified methods for each risk is no more than 10% of the total SCR; **and**
- the sum of the capital charges (pre-diversification) determined with simplified methods is no more than 30% of the total SCR

TS.VI.G.4 If a participant (e.g. a captive (re)insurer) does not meet the threshold indicated, but nevertheless thinks it should be allowed to apply a simplified approach because of the specificities of its situation, it can do so provided that it 1) explains the reasons for this and 2) indicates the criteria it considers relevant in its situation. The participant is also invited to carry-out the more accurate calculation to allow CEIOPS to benchmark the simplified calculation.

TS.VI.G.5 All participants are invited to comment on the level of the threshold.

TS.VI.G.6 Additional criteria can be set for a specific simplification, in relation to the nature of the simplification itself. For example, in order to determine the interest rate sub-module in the market risk, a simplified calculation according to the duration approach can be made on the value of assets and liabilities other than technical provisions if they have no embedded options and the convexity of the curve does not lead to a material error.

2.2 Simplification for the calculation of the reduction in profit sharing of with-profit life insurance contracts similar to those in Italy (page 129 – link with page 44)

TS.VIII.C.7 Simplification

When undertakings use the simplified method based on the profit sharing life insurance Italian system described in the in paragraph TS.II.D.76 to calculate the best estimate, they will apply the following formula to evaluate the Reduction for Profit Sharing:

$$RPS = 0{,}1 \bullet FDB.$$

Therefore $BSCR = \sqrt{\sum_{rxc} CorrSCR_{r,c} \bullet SCR_r \bullet SCR_c} - RPS$.

2.3 Alternative method for loss absorbing capacity of future profit sharing and deferred taxes (page 129)

TS.VIII.C.8

Firms should use the following scenario-based method to calculate the adjustment for the loss absorbing capacity of technical provisions and deferred taxes, where they suspect that those effects are not linearly correlated between risk-modules as assumed in the calculation set out in section TS.VI.H. The approach involves replacing the application of the SCR Standard Formula by a single scenario test (covering all of the risks included in the SCR Standard Formula). The particular combination of simultaneous shocks to be used by the participant is determined using the spreadsheet provided for this purpose as part of the QIS4 package. This single scenario is referred to as "the single equivalent scenario". The single equivalent scenario derives a linear approximation of the BSCR standard formula, taking into account the specific risk profile of the firm, and uses this approximation to identify a scenario underlying the SCR (See Annex SCR 7 - TS.XVII.I) for more information on the rationale for use of and the derivation of the single equivalent scenario).

In order to calculate the adjustment for the loss-absorbing capacity of technical provisions and deferred taxes using the single equivalent scenario, participants should carry out the following five steps:

1) The participant should first calculate the capital charge for each sub-risk module in the SCR standard formula using the relevant sections of this document. The calculation should be calculated assuming that assumptions about future bonus rates (reflected in the valuation of future discretionary benefits in technical provisions) remain unchanged before and after the shocks being tested (i.e. the sub-module SCRs).
2) The participant should then determine the single equivalent scenario it should apply using the spreadsheet provided for this purpose as part of the QIS4 package, by introducing in the "input" sheet the capital charges calculated in step 1. The spreadsheet, first, calculates the relative importance (weightings) of each of the sub-risks in the participant's overall SCR. Then the spreadsheet uses those weightings to determine what simultaneous shocks (e.g. interest rates, equity, etc) should be used by the participant in the single equivalent scenario. The single equivalent scenario to be used is automatically displayed in the output tab of the spreadsheet. Please note that since the relative importance of each of the sub-risks will vary from company to company, the single equivalent scenario applied will also vary from company to company[5].

[5] Where a participant believes that the calculation of the capital charge for each sub-risk module used in step 1 does not provide the most accurate view of the relative importance of each sub-risk, the participant may

3) The participant should consider what management actions they would take in the single equivalent scenario and in particular how their assumptions regarding future bonus rates would change in the event that such a scenario would occur.

4) The participant should then calculate the change in the undertaking's net asset value in the face of the equivalent scenario, taking into account management actions identified in step 3 as well as the loss-absorbing capacity of deferred taxes. The calculation of the change in net asset value should be performed on the assumption that all the shocks making up the single equivalent scenario occur simultaneously and that the undertaking makes an operational risk loss equal to SCR_{op} within the equivalent scenario (in order to ensure that the loss absorbing capacity of deferred taxes is properly captured).

5) Finally, the participant should calculate the "Adjustment for the loss absorbing capacity of technical provisions and deferred taxes" as follows:

   $Adj = BSCR + SCR_{op} - SCR_{net}$

   Where :

   BSCR is calculated as in TS.VIII.C.4 (i.e. the aggregation of the capital charges referred to in step 1)

   SCR_{op} is calculated as in TS.VIII.B.4

   SCR_{net} is the change in the undertaking's net asset value in the face of the equivalent scenario calculated in step 4.

For the calculation of some risk modules (interest rate risk, currency risk and lapse risk), undertakings are required to consider both an increase and a decrease in parameters. Undertakings should satisfy themselves that the direction of the change in parameters continues to be appropriate within the scenario test. This may be done by further sensitivity testing or by another method e.g. considering more than one scenario.

As defined from TS.VI.H.8 to TS.VI.H.15, undertakings are also requested to calculate the change in the undertaking's net asset value in the face of the single equivalent scenario on the basis of the following extreme assumption used in the determination of the "lower boundary SCR".

In response to the scenario, the management of the undertaking is assumed to decide to reduce the benefits paid to the policyholder as much as possible in order that the impact of the simultaneous shocks on

use an alternative set of weights to derive the single equivalent scenario. In this case it should justify its choice of weights and explain how they were derived. For example, empirical studies in one Member State indicate that using the capital charges for the individual SCR risks including changes in future bonus rates (i.e. the nSCRs) provides a more accurate picture of the relative importance of risks. However the participant should, on a best efforts basis, still make the default calculation in this case and disclose the result. In particular, they should disclose the BSCR and the value of future discretionary bonuses.

the amount of own funds is minimised.

2.4 Simplification for the calculation of the SCR market risk module – interest rate risk (page 137)

TS.IX.B.9 Simplification

In order to determine the interest rate scenario effect on the value of assets and liabilities, a simplified calculation may be used whereby changes in value are estimated as the yield curve change multiplied by the relevant modified duration separately for the assets and for the liabilities. The condition to be met for using this simplification is that the cash-flows of the item are not interest-rate sensitive, in particular the item has no embedded options.

This simplification may be used for assets, non-life technical provisions and other liabilities. This simplification should not be used for life technical provisions.

The shocks are parallel yield stress, at all durations of:

Downward shock: -40%

Upward shock: +55%

2.5 Simplification for the calculation of the SCR market risk module – equity risk (page 140)

TS.IX.C.20 Simplification: Factor-based approximations for Mkt_{eq} equity risk

The determination of the capital charge $Mkt_{eq,i}$ with respect to an individual index i could be carried out by taking into account hedging and risk transfer mechanisms using a two step process.

The first step relates to the level of the individual equity. If there are hedging instruments for single equities they have to be taken into account at the level of the single equity. The hedge reduces the stress with the change in market value of the instrument itself. The impact has to be determined by the companies itself.

The calculations within this first step would be carried out as follows:

For each index *i* the market value of individual equities allocated to *i* in the event of the stress scenario *equity shock*$_i$ would be calculated, taking into

account hedging instruments[6]. The "stressed" market values would be calculated as follows:

$$Equity\_stress_{i,j} = Equity_{i,j} * (1 - volafactor_i) + Hedge_{i,j}$$

Where

$Equity_{i,j}$	=	Market value of the equity *j* allocated to index *i*
$Equity\_stress_{i,j}$	=	Market value of $equity_{i,j}$ after stress
$Hedge_{i,j}$	=	The change in Market value of hedges per individual $equity_{i,j}$ under stress
$volafactor_i$	=	Prescribed volatility factor depending on the confidence level and standard deviation of the index *i*

and where the volatility factors (consistent with the specification of the scenarios *equity shock*$_i$) are determined as follows:

	Global	*Other*
$volafactor_i$	32%	45%

In a second step, hedging instruments for sub-portfolios e.g. indices or special funds would be taken into account. The risk mitigation would be reflected by the change in market value of the hedging instrument per index (which stands for the sub-portfolio). If there would be a global hedge for all equity positions in force, it would be allocated on a market value weighted basis to the relevant equity indices (excluding Alternative investments).

Within this second step, the changes in market value for all equities under index *i* would be aggregated to a capital charge taking into account hedging instruments for equity risk for the individual index *i* as follows:

$$\text{ChangeInEquityValue}_i = \sum_j (\text{Equity}_{i,j} - \text{Equity\_stress}_{i,j}) - \text{Hedge}_i$$

Where

$ChangeInEquityValue_i$	=	Risk capital charge for equity risk for index *i*

[6] Note that in the two level process of reflecting hedging, the instrument has to be taken into account on the relevant step: single equity or index.

$Hedge_i$ = The change in Market value of hedges per individual index *i* under stress

The overall value of equities under stress would be derived by combining the $ChangeInEquityValue_i$ for the individual indices using a correlation matrix as described above to provide *AggregateChangeInEquityValue*. This should be converted into a revised stress test and this stress test should be applied to the liabilities:

$$RevisedEquityStressTest = 1 - \frac{AggregateChangeInEquityValue}{PreStressEquityValue}$$

where

PreStressEquityValue = Current market value of all investments in equities and hedges.

PostStressLiabilityValue = Change in the value of the liabilities following a change in the value of equities/hedges of RevisedEquityStressTest.

Finally, the capital charge ($Mkt_{eq,i}$) is calculated as change in the net asset value of the undertaking as follows:

Mkteq,I = max(PostStressLiabilityValue - AggregateChangeInEquityValue,0).

2.6 Simplification to the Dampener approach (page 143)

TS.IX.F.13

Undertakings may use as an approximation for the duration of their liabilities an average, weighted by the share of the technical provisions held by line of business that they write, of market average durations per line of business as specified in "National guidances".

2.7 Simplification for the calculation of the SCR market risk module – spread risk (page 149)

TS.X.A.22 Simplification

The following simplification may be used provided:

a) The average credit rating for long duration bonds (10 year and above) is not less than one rating below the credit rating for short duration bonds (5 years or below).

b) The general criteria for simplifications are followed:

For bonds: $Mkt_{sp}^{bonds} = MV * Dur^{bonds} * \Sigma (\%Mv_i^{bonds} F(rating_i)) + \Delta Liab_{ul}$

For structured credit products: $Mkt_{sp}^{struct} = MV * Dur^{struct} * \Sigma (\%Mv_i^{struct} G(rating_i))$

For credit derivatives: $Mkt_{sp}^{cd} = \Sigma (Mv_i^{cd}) * Dur^{cd}$

$Mkt_{sp} = Mkt_{sp}^{bonds} + Mkt_{sp}^{struct} + Mkt_{sp}^{cd}$

where:

MV = Total market value of non-government bond portfolio

Dur^{bonds} = Modified duration of non-government bond portfolio

Dur^{struct} = Modified duration of structured credit portfolio

Dur^{cd} = Modified duration of credit derivatives portfolio

$\%Mv_i^{bonds}$ = Proportion of non-government bond portfolio held at rating i

$\%Mv_i^{struct}$ = Proportion of structured credit portfolio held at rating i

$\%Mv_i^{cd}$ = Proportion of credit derivatives portfolio held at rating i

Where $\Delta Liab_{ul}$ = 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 (except government bonds referred in TS.IX.F.3) used as the reference to the valuation of the liabilities by $MV * Dur^{bonds} * \Sigma (\%Mv_i^{bonds} F(rating_i))$

$F(rating_i)$: as for non-simplified approach.

$G(rating_i)$: as for non-simplified approach

2.8 Simplification for the calculation of the SCR Counterparty default risk module (page 159)

TS.X.A.23 Simplification

If it is proportionate to the underlying risk, participants may determine the loss-given default LGD_i and the requirements Def_i on the level of rating classes rather than on the level of counterparties.

2.9 Simplification for the calculation of the SCR life underwriting risk module – mortality risk (page 163)

TS.XI.B.10 Simplification

The following simplification may be used provided:

a) There is no significant change in the capital at risk over the policy term of the contract

b) the general criteria for simplications are followed

Mortality capital requirement = (Total capital at risk) * q(firm-specific) * n * 0.10 * (Projected Mortality Increase)

Where:

n = modified duration of liability cash-flows

q = Expected deaths over the next year weighted by sum assured

Projected Mortality Increase = $1.1^{((n-1)/2)}$

2.10 Simplification for the calculation of the SCR life underwriting risk module – longevity risk (page 165)

TS.XI.C.9 Simplication

The following simplification may be used provided:

a) The average age of policyholders within the portfolio is 60 years or over.

b) The general criteria for simplifications are followed.

Longevity capital requirement = 25% * q *$(1.1)^{((n-1)/2)}$ * n * (Technical provisions for contracts subject to longevity risk)

Where:

n = modified duration of liability cash-flows

q = Expected deaths over the next year weighted by sum assured

2.11 Simplification for the calculation of the SCR life underwriting risk module – disability risk (page 166)

TS.XI.D.8 Simplification

The following simplification may be used provided:

a) There is no significant change in the capital at risk over the policy term of the contracts.

b) The general criteria for simplifications are followed.

Disability capital requirement = (total disability sum at risk) * i(firm-specific) * 0.35 * (Projected Disability Increase) * n

Where:

n = Modified duration of liability cash-flows

i = Expected movements from healthy to sick over the next year weighted by sum assured/annual payment

Projected Disability Increase = $1.1^{((n-1)/2)}$

2.12 Simplification for the calculation of the SCR life underwriting risk module – lapse risk (page 168)

TS.XI.E.10 Simplifications

If it is proportionate to the nature, scale and complexity of the risk, the comparison of surrender value and best estimate provision in the above calculations may be made on the level of homogeneous risk groups instead of a policy-by-policy basis. In particular, if the conditions are met this simplification may be applied if technical provisions are not calculated on a policy-by-policy basis (see TS.II.D.9).

A simplified calculation of $Lapse_{down}$ and $Lapse_{up}$ may be made if the following conditions are met:

a) The simplified calculation is proportionate to nature, scale and complexity of the risk.

b) The undertaking is small or the capital charge for lapse risk under the simplified calculation is less than 5% of the overall SCR before adjustment for the loss-absorbing capacity of technical provisions.

The simplified calculations are defined as follows:

$Lapse_{down} = 0.5 \cdot l_{down} \cdot n_{down} \cdot S_{down}$ and

$Lapse_{up} = 1.5 \cdot l_{up} \cdot n_{up} \cdot S_{up}$,

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, 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

2.13 Simplification for the calculation of the SCR life underwriting risk module – expense risk (page 170)

TS.XI.F.6 Simplification

Expense risk capital requirement = (Renewal expenses in the 12 months prior valu. date) * n(exp) **(0.1 + 0.005*n(exp))*

Where (n(exp)) = average period over which risk runs off, weighted by renewal expenses

2.14 Simplification for the calculation of the SCR life underwriting risk module – revision risk (page 171)

TS.XI.H.5 Simplification

Revision capital requirement = 3% * Total net technical provisions for annuities exposed to revision risk.

2.15 Simplification for the calculation of the non-life CAT risk module (page 172)

TS.XI.H.6 Simplification

The following formula may be used as a simplification for the Life catastrophe risk sub-module: the input data is required for each policy where the payment of benefits (either lump sum or multiple payments) is contingent on either mortality or disability:

$$Life_{CAT} = \sum_i 0.0015 \bullet Capital\_at\_Risk_i$$

Where the subscript *i* denotes each policy where the payment of benefits (either lump sum or multiple payments) is contintent on either mortality or disability, and where *Capital_at_Risk*$_i$ is determined as

$$Capital\_at\_Risk_i = SA_i + AB_i \bullet Annuity\_factor - TP_i$$

And,

TP_i	=	Technical 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 or disability. Otherwise, zero.
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. Otherwise, zero.
Annuity_factor	=	Average annuity factor for the expected duration over which benefits may be payable in the event of a claim

2.16 Simplification for the calculation of the SCR non-life underwriting risk module for captives also satisfying additional criteria (page 204)

TS.XIII.B.39 Simplification

Insurance and reinsurance captives defined as an (re)insurance undertaking owned either by a financial undertaking other than an insurance or a reinsurance undertaking or a group of insurance or reinsurance undertakings to which Directive 98/78/EC applies, or by a non-financial undertaking, the purpose of which is to provide (re)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 the captive (re)insurance undertaking is a member, are allowed to apply a simplification, provided that they satisfy the general criteria for simplifications (see para TS.VI.G.6) .

If a captive does not meet the threshold indicated, but nevertheless thinks it should be allowed to apply a simplified approach, it can do so provided that it justifies the reason for this and stating the criteria it considers relevant in its situation. The participant is also expected to do the full calculation to allow CEIOPS to benchmark the simplified calculation. All participants are invited to comment on the level of threshold.

Under these circumstances, the following simplification can be applied to the NL_{pr}:

$$NL_{pr} = 0.45 * (Rt - Pt, earned)$$

where

- Pt, earned = estimate of net earned premium during the forthcoming year
- Rt = contractually agreed maximum annual claims net of reinsurance.