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Guidelines on Valuation of Technical Provisions - Consolidated Version with Explanatory Text

European Insurance and Occupational Pensions Authority

Section 0 - Proportionality

Guideline 0 – Proportionality

Insurance and reinsurance undertakings should apply the Guidelines on valuation of technical provisions in a manner that is proportionate to the nature, scale and complexity of the risks inherent in their business. This should not result in a material deviation of the value of the technical from the current amount that insurance and reinsurance undertakings would have to pay if they were to transfer their insurance and reinsurance obligations immediately to another insurance or reinsurance undertaking

Explanatory text

1. All new guidelines on expert judgement are identical to the guidelines on expert judgement included in the Guidelines on the use of internal models[1] except for Guideline 24a – Materiality in assumptions setting, which has been slightly adapted to best estimate valuation.

2. Moreover, insurance and reinsurance undertakings usually have more data for best estimate valuation than for solvency capital requirement valuation. Thus, even if the principles that are applicable for expert judgment in best estimate valuation and within internal models are similar, their implementation might slightly differ. For instance, it is expected that insurance and reinsurance undertakings mainly focus on the identification of material assumptions where expert judgment is needed and implement a proportionate framework in terms of documentation, governance or validation process for those assumptions only. In particular, the governance and validation process might involve internal committees, senior executive committees or the administrative management and supervisory body depending on the predefined framework and the sensitivity of the best estimate calculation to some material assumptions relying on expert judgment.

3. It is not possible to define specific criteria for assessing materiality of any expert judgment use case. However, this could usually be based on sensitivity tests with a percentage of variation of technical provisions or future profits. It could either be considered at portfolio level or for the whole calculation, depending on the nature of the assumption. One criteria might also be defined based on the users (e.g. would a significant change in an assumption set by expert judgment influence decisions taken by the management body - change in the program of reinsurance, change in the activities/products sold, etc.).

[1] https://www.eiopa.europa.eu/document-library/guidelines/guidelines-use-of-internal-models_en

4. Finally, the validation process regarding expert judgment might usually not be independent from the general validation process that insurance and reinsurance undertakings implement to validate the calculation of the technical provisions in order to maintain and promote homogeneity and convergence. Thus, use of expert judgments should be fully integrated in the different steps of validation (e.g. internal committees, "clearance" committees or management committees) depending on the nature, complexity and materiality of the cases where expert judgment has been applied.

Section 1: Data quality

Clarification of the concepts of completeness and appropriateness of data

Guideline 1 – Completeness of data

Insurance and reinsurance undertakings should ensure that data used in the calculation of technical provisions cover a sufficiently large period of observations that characterise the reality being measured.

To perform the calculation of premium provisions for non-life obligations, undertakings should ensure that sufficient historical information is available on the total cost of claims and their actual trends at a sufficiently granular level.

To perform the calculation of provisions for claims outstanding, undertakings should ensure that sufficient data are available to allow for the identification of relevant patterns on the claims development, and with sufficient granularity, in order to permit analysis of such patterns within homogeneous risk groups.

Explanatory text

5. A sufficiently large period of observations is necessary to enable the identification of relevant trends or cycles in the data.

6. To project the cash-flows arising from life provisions, sufficient data needs to be available to allow for the projection of, namely: - the behaviour of the biometric factors, such as mortality and morbidity rates; - the probabilities associated to the policyholders' exercise of contractual options (lapses and surrenders); - all types of expenses incurred in servicing insurance and reinsurance obligations.

7. For example, where only one run-off triangle of paid claims, containing 5 years of historical information is available to be used as input in the calculation of claims provision for Motor

Third Party Liability Line of Business these data is not considered complete for, at least, the following reasons:

8. There are not sufficient years of information available that allow for the identification of the relevant trends in the development pattern of claims, independently of the methodology chosen to calculate technical provisions. There is not sufficient granularity in this data because it comprises observations associated to different homogeneous risk groups, which are not identified in this data set. For instance, there is a mix in this triangle of body injury liabilities (long term feature) with material damages (short term feature)

Guideline 2 – Appropriateness of data

Insurance and reinsurance undertakings should ensure that data relating to different time periods is used consistently.

Undertakings should apply adjustments to historical data, if necessary, to increase its credibility or enhance its quality as an input to determine more reliable estimates of technical provisions and to better align it with the characteristics of the portfolio being valued and with future expected development of risks.

Explanatory text

9. Inconsistencies could arise due to changes in contract design, changes in underwriting or administration procedures, changes in IT systems or changes in risk characteristics.

10. Another point that needs to be highlighted is the introduction of adjustments to historical data processed under Solvency I framework, in order to achieve the compliance with Solvency II requirements, when necessary. When converting data for this purpose, the impact that such transformations may have on the quality of data after the adjustments have been introduced needs to be considered.

11. The following is a non-exhaustive list of situations that are likely to require adjustments to the historical data:

    a) unusually heavy or light experience in a given period;
    b) reflection of claims cycles;
    c) reflection of future expected trends;
    d) reflection of changes in risk;
    e) reflection of changes in cover;

f) reflection of changes in the reinsurance policies;
g) occurrence of large or exceptional claims.

12. The analysis of the source and impact of unusual observations is necessary in order to decide which weights need to be assigned to these observations. There may be cases where these observations are treated as outliers or even removed if they are the result of any operational errors, in order to ensure the accuracy of the observations considered for the intended purpose. In other cases such observations are important to understand the nature of the underlying risks and, for this reason, are being considered and documented.

Review and validation of data quality

Guideline 3 – Data checks

Insurance and reinsurance undertakings should ensure that the actuarial function assesses the accuracy and completeness of data through a sufficiently comprehensive series of checks to meet the criteria set out in the previous Guidelines and to allow the detection of any relevant shortcomings.

Insurance and reinsurance undertakings should ensure that the actuarial function carries out this assessment at an appropriately granular level.

Explanatory text

13. Examples of possible checks include:
    - A comparison with data used for a previous calculation;
    - Checking that data values lie within reasonable limits;
    - Checking that the data are consistent with data from other sources;
    - Spot checks (e.g. random samples compared with raw data).

Guideline 4 – Consideration of other analysis conducted

Insurance and reinsurance undertakings should ensure that the actuarial function takes into account the conclusions of any relevant analysis performed in an external review, where data quality in the context of calculating technical provisions is reviewed.

Guideline 5 - Consideration of the methodologies to be applied

Insurance and reinsurance undertakings should ensure that the actuarial function takes into account the relation between the conclusions of the analysis of the data quality and the selection of the methodologies to be applied to value the technical provisions.

Undertakings should ensure that the actuarial function analyses the extent to which data used is adequate to support the assumptions underlying the methodologies to be applied to value the technical provisions. If data does not adequately support the methodologies, then the undertaking should select an alternative methodology.

In the assessment of completeness of data, undertakings should ensure that the actuarial function considers whether the number of observations and granularity of available data is sufficient and adequate to meet the input requirement for the application of the methodology.

Explanatory text

14. It is important to highlight the link associated to the criterion of completeness (captured by the third paragraph). What is meant by this link is the fact that the data can be considered as complete assuming that the actuarial function intends to apply a particular method to calculate technical provisions but if the selected method requires more information (e.g. a longer data series than available) data would not satisfy this criterion.

15. The link between data quality and methodologies also applies on reverse: depending on the characteristics of the data available, the actuarial function may base its decision of applying a relevant method instead of another that could also lead to an adequate reflection of the undertaking's risk profile, if the data available does not fulfil all the inputs required to implement the method. Also, depending on the result of the assessment of the data quality, the actuarial function shall gain insights that will influence the selection of the most appropriate methodology to reproduce the underlying risks being measured.

Guideline 6 – Source and use of data

Insurance and reinsurance undertakings should require the actuarial function to take into account the source and the intended use of data in the data validation process.

Guideline 7 – Source and use of data

Insurance and reinsurance undertakings should ensure that the use of expert judgment in assessing accurate, appropriate and complete data for use in the calculation of technical provisions does not replace the appropriate collection, processing and analysis of data but supplements these where required.

Guideline 8 – Validation and feedback process

Insurance and reinsurance undertakings should ensure that the actuarial function, within the remits of the coordination of technical provisions, also coordinates the assessment and validation of relevant data to be used in the valuation process.

The coordination task should include at least:

a) the selection of data to be used in the valuation, having regard to the criteria of accuracy, appropriateness and completeness of data considering the methodologies which are most appropriate to be applied in the calculation. For this purpose, relevant tools should be used to check any material differences that may be found in data from a single year and within other relevant analysis;

b) the reporting of any recommendations on the implementation of improvements in the internal procedures that are considered relevant to improve the compliance with the criteria as set out in point a);

c) the identification of cases where additional external data are needed;

d) an assessment of the quality of external data, as performed for internal data, focusing on whether market data are required or when they should be used to improve the quality of internal data and if and how enhancements to the available data should be applied;

e) an assessment of whether any adjustments need to be applied to available data, as part of actuarial best practice, to improve the goodness-of-fit and the reliability of the estimates derived from actuarial and statistical provisioning methodologies based on these data;

f) the recording of any relevant insights that have been gained in the assessment and validation process that may become relevant to the other steps of calculation of technical provisions, and that relate to the understanding of the underlying risks and also to the knowledge of the quality and limitations of available data.

Limitations of data

Guideline 9 – Identification of the source of material limitations

Insurance and reinsurance undertakings should ensure that the actuarial function assesses the data accuracy, completeness and appropriateness in order to identify any material limitations of the data. If material limitations are identified, the sources of those limitations should also be identified.

Explanatory text

16. Some generic examples of different sources of material limitations are given for instance in the Explanatory text of Guideline 11 on Data Adjustments.

Guideline 10 – Impact of shortcomings

In order to identify and assess the impact of any possible shortcomings that could affect the compliance with the requirements of data quality, insurance and reinsurance undertakings should ensure that the actuarial function considers all relevant available documentation related to internal processes and procedures of collection, storage and validation of data used

for the valuation of technical provisions and, where necessary, search for more specific information by contacting the personnel involved in these processes.

Additionally, undertakings should ensure that the actuarial function coordinates any relevant task that may be performed in order to assess the impact of the shortcomings identified on the available data to be used in the calculation of technical provisions to obtain findings on whether the available data should be used for the intended purpose or if alternative data should be sought.

Guideline 11 – Data adjustments

Where data deficiencies are identified, insurance and reinsurance undertakings should ensure that the actuarial function assesses whether the quality of data considering its purpose can be improved by adjusting or supplementing it.

Insurance and reinsurance undertakings should ensure that they implement appropriate measures to overcome limitations of data arising from the exchange of information with business partner.

When external data is used, undertakings should ensure that data remain compliant with the standards set in these guidelines regarding the quality of data.

Undertakings should decide whether it is possible to adjust data to overcome the shortcomings which affect the quality of data and, if applicable, what specific adjustments should be introduced.

Undertakings should ensure that the adjustments are limited to the level strictly necessary to enhance compliance with the criteria set out in the previous guidelines and do not distort the identification of trends and any other characteristics regarding the underlying risks reflected in the data.

Explanatory text

17. Where data is identified as deficient, a way in which data can be adjusted is the substitution of average values for invalid or missing entries.

18. The shortcomings covered by this guideline which are the result of lack of completeness may arise from the own nature and size of the portfolio, for instance, due to the low

frequency of claims, the cases of a new insurance company or a new line of business, the small volume of the portfolio, the introduction of legal or other changes in the operating environment that may affect the adequacy of the historical data for the purpose of valuation of technical provisions or due to the heterogeneity in the information that may distort the identification of claims patterns on the basis of which a reliable estimate could be derived.

19. Undertakings should ensure that, if needed, the actuarial function uses appropriate approximations, including case by case approaches, which could imply the use of assumptions relying on expert judgment to data in order to allow valuation of technical provisions.

20. Some examples of the shortcomings in the internal processes of collecting, storing or validating data quality are: the presence of deficiencies in the internal processes due to IT mistakes, the high cost of collecting or maintaining existent data or a misinterpretation of what is necessary in achieving an appropriate valuation.

21. The role of the actuarial function towards the correction of the shortcomings is limited to the identification of its source and to investigate how the deficiency can be solved or at least attenuated and convey the conclusions obtained by specifying any relevant actions that could be carried out envisaging this purpose. Therefore, it is not expected that the actuarial function is required to carry out such actions

Guideline 12 – Recommendations of the actuarial function

Insurance and reinsurance undertakings should ensure that the actuarial function delivers recommendations to the management body on the procedures that could be performed in order to increase the quality and the quantity of available data. To accomplish this task, the actuarial function should identify the sources of material limitations and propose possible solutions considering their effectiveness and the time necessary to implement them.

Guideline 13 – Application of expert judgment upon material limitations

Where there are material limitations to the data that cannot be remedied without undue complexity, insurance and reinsurance undertakings should ensure that expert judgment is applied to overcome these limitations to ensure that technical provisions are appropriately

calculated. The calculation of technical provisions should not be impaired as a result of inaccurate or incomplete data.

Explanatory text

22. Even if the portfolio of an undertaking is big enough to derive statistically valid evidence regarding lapse and biometrics, market and competitor's developments, trends, as well as information provided by national actuarial associations, trade bodies, etc. may be considered in the valuation of technical provisions. Expert judgment accompanies this process to decide if data has to be adjusted.

23. To overcome data limitations, expert judgment can be applied to modify data, exclude outliers as well as to supplement data. Careful attention shall be paid to data outliers with a view to deciding that they are not relevant to consideration of future models and assumptions, or ensuring that the models and assumptions for the future make adequate provision for the possibility of such events occurring again, or other rare events occurring, with appropriate regard to frequency and severity.

24. The application of expert judgment is always applied in conjunction with available internal and external information. Where expert judgment is used to overcome material data limitations, the data source that is available also needs to be analysed as a source of information.

Guideline 14 – Validation and feedback process

Insurance and reinsurance undertakings should ensure that the actuarial function documents data limitations, including at least:

a) A description of the shortcomings comprising its causes and any references to other documents where they were identified;

b) A summary explanation on the impact of the shortcomings in the scope of the calculation of technical provisions regarding its materiality and how it affects this process;

c) A description of the actions taken by the actuarial function to detect the shortcomings, complementarily or not with other sources and documents;

d) A description of how such situations can be remedied in a short term for the intended purpose and any relevant recommendations to be applied to enhance data quality in the future.

Market data

Guideline 15 – Use of market data

When valuing liabilities which depend directly on the behaviour of financial markets or in cases where the calculation of technical provisions requires the input of data from an external source, insurance and reinsurance undertakings should be able to demonstrate that external data are more suitable than internal data for the intended purpose. Undertakings should ensure that external data supplied by third parties or market data complement the internal data available.

Notwithstanding the level of dependencies of the liabilities on market conditions or the level of quality regarding the available internal data, undertakings should consider relevant external benchmarks where appropriate. External data should be part of the analysis to assess the general compliance with requirements on data quality.

Explanatory text

25. This will be the case, for instance, for inflation indices and other information that effectively contributes to the understanding of the risks underlying the liability portfolio and to the setting of realistic and credible assumptions.

26. It is important to complement the reserving analysis and enhance the understanding of the risks that undertakings are subjected to and their position in the market, which is relevant information in the scope of the calculation of technical provisions

Guideline 16 **– Conditions on market data**

To carry out the assessment of the level of accuracy, appropriateness and completeness of external data, insurance and reinsurance undertakings should ensure that the actuarial

function knows and considers in its analysis the reliability of the sources of information and the consistency and stability of its process of collecting and publishing information over time.

Moreover, undertakings should ensure that the actuarial function considers all the realistic assumptions and relevant methodologies applied to derive data, including any adjustments or simplifications applied to raw data. The actuarial function should be aware of and take into consideration if any changes that have been applied over time to external data, whether those changes relate to assumptions or associated methodologies or any other procedures regarding the collection of external data.

Moreover, whenever it is accessible and adequate, undertakings should ensure that the actuarial function measures the quality of available data in the context of provisioning analysis in regard to available industry or market data which is deemed comparable, and in particular to the requirements set in Article 76(3) of Solvency II. Any material deviations should be identified and understood by the actuarial function. This analysis could refer to the specificities of the particular homogeneous risk group being valued.

Explanatory text

27. The actuarial function needs to consider any adjustments that may have been introduced in raw market data (data actually observed without any type of corrections or adjustments) and be aware of the materiality of the difference between the raw observations and the final data set collected in order to evaluate the potential impact that such differences would have in the result of technical provisions and if material, whether it improves how well the undertaking's risk profile is represented. Furthermore, the actuarial function has to know the main motivations for this introduction, meaning that the actuarial function is supposed to understand the information to be given as input in the calculation of technical provisions comprising the main relevant processes of data transformation that it may have been through in order to perform a realistic assessment of the level of quality of this information.

28. The adjustments may be the result of several motivations, e.g., the increase of consistency between different periods of time. Such adjustments may be the result of the application of assumptions in line with the methodologies to be applied or be introduced more or less independently of the methods to be used, and related to data themselves (which is the case of the example given above).

Section 2: Segmentation and unbundling

Guideline 17 – Segmentation of insurance or reinsurance obligations stemming from health and other non-life insurance contracts

Insurance and reinsurance undertakings should ensure that insurance or reinsurance obligations stemming from health and other non-life insurance contracts should be segmented to life lines of business where such obligations are exposed to biometrical risks (i.e. mortality, longevity or disability or morbidity) and where the common techniques that are used to assess such obligations explicitly take into consideration the behaviour of the variables underlying these risks.

Where health insurance or reinsurance obligations are calculated according to the conditions set out in Article 206 of Solvency II, insurance and reinsurance undertakings should ensure that these obligations are considered to be pursued on a similar technical basis to that of life insurance and therefore assigned to life lines of business.

Guideline 18 – Change in the segmentation of non-life insurance or reinsurance obligations

Insurance and reinsurance undertakings should ensure that insurance or reinsurance obligations that were originally segmented into non-life lines of business and, as a result of the occurrence of an insured event turn into life insurance or reinsurance obligations, should be assessed using life techniques that explicitly take into consideration the behaviour of the variables underlying biometrical risks and assigned to the relevant life lines of business as soon as there is sufficient information to assess those obligations using life techniques.

Guideline 19 – Determining and assessing appropriateness of a homogeneous risk group

Insurance and reinsurance undertakings should calculate technical provisions using homogeneous risk groups in order to derive assumptions.

A homogeneous risk group encompasses a collection of policies with similar risk characteristics. In selecting a homogeneous risk group, undertakings should achieve an appropriate balance between the credibility of data available, to enable reliable statistical

analyses to be performed, and the homogeneity of risk characteristics within the group. Undertakings should define homogeneous risk groups in such a manner that those are expected to be reasonably stable over time.

Where necessary, undertakings should for the derivation of risks inter alia take into account the following items:

a) underwriting policy;

b) claims settlement pattern;

c) risk profile of policyholders;

d) product features, in particular guarantees;

e) future management actions.

Undertakings should ensure consistency between the homogeneous risk groups it uses to assess its gross of reinsurance technical provisions and its reinsurance recoverables.

Explanatory text

29. Key factors in assessing credibility of data within a potential homogeneous risk group include availability of sufficient historical information to identify trends and assess the characteristics of the underlying risks.

30. Homogeneous risk groups may change in the long run as the portfolio composition changes and requires further granularity of treatment.

31. Some policies may have different coverage, e.g. a motor policy may cover own damage and liability which requires allocation into separate homogeneous risk groups.

32. Homogeneous risk groups for outwards reinsurance business are expected to be consistent with underlying business but this does not imply that the same homogeneous risk groups need to be used for both.

Guideline 20 – Calculations at the level of grouped policies

In order to calculate the technical provisions and carry out cash-flow projections, insurance and reinsurance undertakings should apply the assumptions derived at the level of

homogeneous risk groups to individual policies or grouped policies, where the groupings may be more granular than homogeneous risk groups.

Explanatory text

33. Key factors in assessing credibility of data within a potential homogeneous risk group include availability of sufficient historical information to identify trends and assess the characteristics of the underlying risks. 2.26. Homogeneous risk groups may change in the long run as the portfolio composition changes and requires further granularity of treatment. 55/95 2.27. Some policies may have different coverage, e.g. a motor policy may cover own damage and liability which requires allocation into separate homogeneous risk groups. 2.28. Homogeneous risk groups for outwards reinsurance business are expected to be consistent with underlying business but this does not imply that the same homogeneous risk groups need to be used for both.

Guideline 21 – Unbundling of insurance or reinsurance contracts covering multiple risks

Where an insurance or reinsurance contract covers risks across different lines of business, unbundling of the obligations is not required where only one of the risks covered by the contract is material. In this case, the obligations relating to the contract should be segmented according to the major risk driver.

Guideline 22 – Granularity of segmentation

Insurance and reinsurance undertakings should analyse whether the granularity of the segmentation of insurance or reinsurance obligations adequately reflects the nature of the risks. This segmentation should consider the policyholder's right to profit participation, options and guarantees embedded in the contracts and the relevant risk drivers of the obligations.

Explanatory text

34. Contracts with different guarantee level might require further segmentation.

35. In order to ensure that appropriate assumptions are used, it is important that the assumptions are based on homogeneous 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.

36. 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 homogeneous 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.

37. For example, the grouping has to consider whether policies containing financial guarantees which are "significantly in the money" (i.e. where the intrinsic value is positive) need to be separated from policies which contain financial guarantees that are "significantly out of the money".

Guideline 23 – Segmentation in respect of premium provisions and claims provisions

Insurance and reinsurance undertakings should consider both the nature of the underlying risks being evaluated together and the quality of data in selecting the homogeneous risk groups for the calculations of the premium provisions and claims provisions.

Explanatory text

38. Premium provisions need to be valued based on the most appropriate subsets of data available. Data used does not necessarily have to be segmented into the same homogeneous risk groups as that used in calculating the claims provisions. For example, if data is sparse for a particular risk group, it may be combined with another, similar, risk group in order to obtain a more meaningful data set for valuation purposes.

Section 3: Assumptions

Guideline 24 – Consistency of assumptions

Insurance and reinsurance undertakings should ensure that assumptions used in the determination of technical provisions, own funds and solvency capital requirement are consistent.

Expert judgement

Explanatory text

39. All new guidelines on expert judgement are identical to the guidelines on expert judgement included in the Guidelines on the use of internal models[2] except for Guideline 24a – Materiality in assumptions setting, which has been slightly adapted to best estimate valuation.

40. Moreover, insurance and reinsurance undertakings usually have more data for best estimate valuation than for solvency capital requirement valuation. Thus, even if the principles that are applicable for expert judgment in best estimate valuation and within internal models are similar, their implementation might slightly differ. For instance, it is expected that insurance and reinsurance undertakings mainly focus on the identification of material assumptions where expert judgment is needed and implement a proportionate framework in terms of documentation, governance or validation process for those assumptions only. In particular, the governance and validation process might involve internal committees, senior executive committees or the administrative management and supervisory body depending on the predefined framework and the sensitivity of the best estimate calculation to some material assumptions relying on expert judgment.

41. It is not possible to define specific criteria for assessing materiality of any expert judgment use case. However, this could usually be based on sensitivity tests with a percentage of variation of technical provisions or future profits. It could either be considered at portfolio level or for the whole calculation, depending on the nature of the assumption. One criteria might also be defined based on the users (e.g. would a significant change in an assumption set by expert judgment influence decisions taken by the management body - change in the program of reinsurance, change in the activities/products sold, etc.).

42. Finally, the validation process regarding expert judgment might usually not be independent from the general validation process that insurance and reinsurance undertakings implement to validate the calculation of the technical provisions in order to maintain and promote homogeneity and convergence. Thus, use of expert judgments should be fully integrated in the different steps of validation (e.g. internal committees, “clearance” committees or management committees) depending on the nature, complexity and materiality of the cases where expert judgment has been applied.

[2] https://www.eiopa.europa.eu/document-library/guidelines/guidelines-use-of-internal-models_en

Guideline 24A – Materiality in assumptions setting

Insurance and reinsurance undertakings should set assumptions and use expert judgment, in particular taking into account the materiality of the impact of the use of assumptions with respect to the following Guidelines on assumption setting and expert judgement.

Insurance and reinsurance undertakings should assess materiality taking into account both quantitative and qualitative indicators and taking into consideration binary events, extreme events, and events that are not present in historical data. Insurance and reinsurance undertakings should overall evaluate the indicators considered.

Explanatory text

43. It is necessary to consider all potential events, including 'events not in data' and extreme events, also known as binary events within a financial context, to ensure that the best estimate reflects an expected value of the outcomes of all possible scenarios, as opposed to something less, such as an expected value of the outcomes of all reasonably foreseeable scenarios.

44. Examples of such events would include environmental issues such as global warming and legislative or political changes that might impact the sustainability of the business model – either by increasing claim amounts or by reducing the volumes of new business.

45. Where there is a short history of representative data, the expert judgment on the amount of weight to be placed on events that are not in that data is more likely to be material.

Guideline 24B – Governance of Assumptions setting

Insurance and reinsurance undertakings should ensure that all assumption setting and the use of expert judgement in particular, follows a validated and documented process.

Insurance and reinsurance undertakings should ensure that the assumptions are derived and used consistently over time and across the insurance or reinsurance undertaking and that they are fit for their intended use.

Insurance and reinsurance undertakings should approve the assumptions at levels of sufficient seniority according to their materiality, for most material assumptions up to and including the administrative, management or supervisory body.

Guideline 24C – Communication and uncertainty in assumptions setting

Insurance and reinsurance undertakings should ensure that the processes around assumptions, and in particular around the use of expert judgement in choosing those assumptions, specifically attempt to mitigate the risk of misunderstanding or miscommunication between all different roles related to such assumptions.

Insurance and reinsurance undertakings should establish a formal and documented feedback process between the providers and the users of material expert judgement and of the resulting assumptions.

Insurance and reinsurance undertakings should make transparent the uncertainty of the assumptions as well as the associated variation in final results.

Guideline 24D – Documentation of assumptions setting

Insurance and reinsurance undertakings should document the assumption setting process and, in particular, the use of expert judgement, in such a manner that the process is transparent.

Insurance and reinsurance undertakings should include in the documentation the resulting assumptions and their materiality, the experts involved, the intended use and the period of validity.

Insurance and reinsurance undertakings should include the rationale for the opinion, including the information basis used, with the level of detail necessary to make transparent both the assumptions and the process and decision-making criteria used for the selection of the assumptions and disregarding other alternatives.

Insurance and reinsurance undertakings should make sure that users of material assumptions receive clear and comprehensive written information about those assumptions.

Guideline 24E – Validation of assumptions setting

Insurance and reinsurance undertakings should ensure that the process for choosing assumptions and using expert judgement is validated.

Insurance and reinsurance undertakings should ensure that the process and the tools for validating the assumptions and in particular the use of expert judgement are documented.

Insurance and reinsurance undertakings should track the changes of material assumptions in response to new information, and analyse and explain those changes as well as deviations of realisations from material assumptions.

Insurance and reinsurance undertakings, where feasible and appropriate, should use validation tools such as stress testing or sensitivity testing.

Insurance and reinsurance undertakings should review the assumptions chosen, relying on independent internal or external expertise.

Insurance and reinsurance undertakings should detect the occurrence of circumstances under which the assumptions would be considered false.

Biometric risk factors

Guideline 25 – Modelling biometric risk factors

Insurance and reinsurance undertakings should consider whether a deterministic or a stochastic approach is proportionate to model the uncertainty of biometric risk factors.

Insurance and reinsurance undertakings should take into account the duration of the liabilities when assessing whether a method that neglects expected future changes in biometrical risk factors is proportionate, in particular in assessing the error introduced in the result by the method.

Insurance and reinsurance undertakings should ensure, when assessing whether a method that assumes that biometric risk factors are independent from any other variable is proportionate, and that the specificities of the risk factors are taken into account. For this purpose, the assessment of the level of correlation should be based on historical data and expert judgment.

Explanatory text

46. For large portfolios where it could be assumed that the law of large numbers causes the variation to be rather narrowly spread around the mean, except possibly for the trend forecast for which the error is not diversifiable within a line of business, a deterministic approach could be proportionate to model the uncertainty of biometric risk factors.

47. The consideration of expected future changes in biometrical risk factors is particularly relevant for contracts with long term or long tail liabilities. Therefore, the application of a simplification neglecting expected future changes in biometrical risk factors to insurance contracts with short/medium term or short/medium liabilities should, in principle, not give rise to any material error. However, if the undertaking has a large portfolio of long term contracts, e.g. annuities, or contracts with long tail liabilities, then simply neglecting expected future changes or, more specifically future trends, will not be appropriate. This does not mean however that the undertaking needs to follow a stochastic approach to model trends, as other simpler alternatives may be available.

48. The decision under which situation it will be appropriate to use a simplification assuming that biometric risk factors are independent from any other variable will depend on the specific risk factors it is referring to. If two risk factors are highly correlated then assuming independence will potentially give rise to a material error. But for risk factors which have a low impact on biometric risk factors, assuming independence can be considered appropriate.

49. Further examples of simplified methods for biometric risk factors are the use of group of cohorts or period data to analyse biometric risk factors or the application of current tables in use adjusted by suitable multiplier functions.

Guideline 26 – Expenses for hedging

For insurance and reinsurance undertakings using a hedging program to mitigate risks, the expenses of the hedging program should be taken into account in the valuation of technical

provisions. The expected incurrence of such expenses should be reflected in the projected cash in-flows and cash outflows required to settle the insurance and reinsurance obligations.

Explanatory text

50. Regard should be given to the expenses of any hedging program, which include, inter alia, infrastructure expenses such as IT and quantitative analyst staff, transaction costs of hedging instruments, costs of service level agreements where trading is outsourced. Particular regard should also be given to the expense of the hedging program in turbulent or illiquid markets.

Guideline 27 – Availability of market data

Insurance and reinsurance undertakings should assess the availability of relevant market data on expenses by considering the representativeness of market data relative to the portfolio of insurance or reinsurance obligations, and the credibility and reliability of data.

Explanatory text

51. The assessment of the expenses that will be incurred in servicing insurance and reinsurance obligations consider data from external sources such as average industry or market data.

52. Where average market information is used, consideration needs to be given as to the representativeness of the data used to form that average. For example, market information is not deemed to be sufficiently representative where the market information has material dispersion in representativeness of the portfolios whose data have been used to calculate such market information.

53. The assessment of credibility considers the volume of data underlying the market information.

54. The actuarial guideline on data quality standards gives further guidance on the concepts of credibility and reliability.

Guideline 28 – Expenses taken into account on contractual terms

Insurance and reinsurance undertakings should ensure that expenses that are determined by contracts between the undertaking and third parties are taken into account based on the terms of the contract. In particular, commissions arising from insurance contracts are considered based on the terms of the contracts between the undertakings and the sales persons, and expenses in respect of reinsurance are taken into account based on the contracts between the undertaking and its reinsurers.

Explanatory text

55. Expenses that will be incurred in servicing insurance and reinsurance obligations also include commissions that will have to be paid or commissions that are being returned in the case of cancellation (claw back) of the insurance contract. The assessment of these expenses should be carried out based on the agreement between the insurance undertaking and the sales persons.

56. Expenses that relate to the internal processes of the insurer for reinsurance and special purpose vehicles should be taken into account when calculating technical provisions.

Guideline 28A – Investment Management Expenses

Insurance and reinsurance undertakings should include in the best estimate administrative and trading expenses associated with the investments needed to service insurance and reinsurance contracts.

In particular, for products whose terms and conditions of the contract or the regulation requires to identify the investments associated with a product (e.g. most unit linked and index linked products, products managed in ring-fenced funds and products to which matching adjustment is applied), insurance and reinsurance undertakings should consider the investments.

For other products, insurance and reinsurance undertakings should base the assessment on the characteristics of the contracts.

As a simplification, insurance and reinsurance undertakings may also consider all investment management expenses.

Reimbursements of investment management expenses that the fund manager pays to the undertaking should be taken into account as other incoming cash flows. Where these reimbursements are shared with the policyholders or other third parties, the corresponding cash out flows should also be considered.

Explanatory text

57. Investment management expenses could include administration expenses (expenses of recordkeeping of the investments' portfolio, salaries of staff responsible for investments, remunerations of external advisers, expenses connected with an investment trading activity and in some cases also remuneration for custodial services) and trading expenses (buying and selling of the portfolio securities).

58. In case of most unit linked and index linked products, products managed in ring-fenced funds and products to which matching adjustment is applied, the amount of investments related to a particular product are clearly identified as a consequence of the terms and conditions of the contract or requirements from Solvency II framework or other relevant regulation. In these cases, undertakings are expected to consider in the best estimate the expenses related to these investments.

59. For products other than those mentioned in point 3.36, neither the contract terms nor the applicable regulatory framework requires to identify the investments, hence insurance and reinsurance undertakings need to determine the amount of investments related to a product or obligation. In some cases, insurance and reinsurance undertakings may still be able to clearly identify the investments related to a product or obligation as part of their ALM policy, but in other cases it may be necessary to use drivers to estimate the amount of investments related to a product as if the product were a ring fenced fund. The appropriate driver to be used depends on the product or obligation, but since Solvency II framework follows an economic valuation, the Best Estimate might not be an accurate driver (due to EPIFP among others). In some cases, local GAAP technical provisions may be used as drivers, e.g. for with profits products where the profit sharing mechanism is linked to local GAAP technical provisions.

60. When projecting the expense cash flows, insurance and reinsurance undertakings should use assumptions and calculation models that reflect the expense assumptions at the valuation date.

61. Sometimes the fund manager pays back commissions to the asset manager (often called kick-backs). If the kick-backs are left to the undertakings and not directed further to e.g.

policyholders or sales organisations, the kick-backs should be considered as other incoming cash flows of the policy.

Expense allocation

Guideline 29 – Granularity of allocation of expenses

Insurance and reinsurance undertakings should allocate the expenses into homogeneous risk groups, as a minimum by line of business, according to the segmentation of their obligations used in the calculation of technical provisions.

Explanatory text

62. Expenses that are pertinent to the valuation of technical provisions would usually include both allocated and overhead expenses. Allocated expenses are those expenses which could be directly assignable to the source of expense that will be incurred in servicing insurance and reinsurance obligations. Overhead expenses comprise all other expenses which the undertaking incurs in servicing insurance and reinsurance obligations.

63. The first paragraph of Article 31 of the Implementing Measures explicitly list expenses which relate to recognised insurance and reinsurance obligations.

64. Administrative expenses are expenses which are connected with policy administration including expenses in respect of reinsurance contracts and special purpose vehicles. Some administrative expenses relate directly to the insurance contract or the contract activity (e.g. maintenance cost) such as the cost of premium billing, the cost of sending regular information to policyholders and the cost of handling policy changes (e.g. conversions and reinstatements). Other administrative expenses relate directly to insurance contracts or contract activities but are a result of activities that cover more than one policy such as salaries of staff responsible for policy administration.

65. Investment management expenses are usually not allocated on a policy by policy basis but at the level of a portfolio of insurance contracts. Investment management expenses could include expenses of recordkeeping of the investments' portfolio, salaries of staff responsible for investments, remunerations of external advisers, expenses connected with an investment trading activity (i.e. buying and selling of the portfolio securities) and in some cases also remuneration for custodial services.

66. Claims management expenses are expenses that will be incurred in processing and resolving claims, including legal and adjuster's fees and internal costs of processing claims payments.

Some of these expenses could be assignable to an individual claim (e.g. legal and adjuster's fees), while others are a result of activities that cover more than one claim (e.g. salaries of staff of claims handling department).

67. Acquisition expenses include expenses which can be identified at the level of individual insurance contract and have been incurred because the undertaking has issued that particular contract. Theseinclude commission costs, costs of selling, underwriting and initiating an insurance contract that has been issued.

68. Overhead expenses include salaries to general managers, auditing costs and regular day-to-day costs i.e. electricity bills, rents for accommodations, IT costs. These overhead expenses also include expenses related to the development of new insurance and reinsurance business, advertising insurance products, improvement of the internal processes such as investment in system required to support insurance and reinsurance business (e.g. buying new IT system and developing new software).

69. Expenses connected with activities which are not linked with servicing insurance and reinsurance obligations should not be taken into account when calculating technical provisions. Such expenses could include for example company pension scheme deficits, holding companies' operational expenses connected with expenses linked to entities which are not insurance or reinsurance undertakings.

Guideline 30 – Apportionement of Expenses

Insurance and reinsurance undertakings should allocate and project expenses in a realistic and objective manner and should base the allocation of these expenses on their long-term business strategies, on recent analyses of the operations of the business, on the identification of appropriate expense drivers and on relevant expense apportionment ratios.

Without prejudice to the proportionality assessment and the first paragraph of this guideline, insurance and reinsurance undertakings should consider using, in order to allocate overhead expenses over time, the simplification outlined in Technical Annex I, when the following conditions are met:

a) the undertaking pursues annually renewable business;

b) the renewals must be reputed to be new business according the boundaries of the insurance contract;

c) the claims occur uniformly during the coverage period.

Explanatory text

70. According to Article 31(2) of the Delegated Regulation "overhead expenses shall be allocated in a realistic and objective manner and on a consistent basis over time to the parts of the best estimate to which they relate". This provision should also be applied to all expenses where the expenses may not be directed to one single cost centre.

71. The process of apportionment of expenses between the existing and the future business should be done in realistic and objective manner. This can be achieved by analysing the operations of the business. Expenses are calculated on the assumption of an on-going business basis. Based on these factors, the identification of appropriate expense drivers and relevant expense apportionment ratios can be determined.

72. In order to consider expense data to be complete and appropriate, sufficient historical data should be available at a sufficiently granular level.

73. Regarding long-term business strategies, when setting the undertaking itself or a specific portfolio into run-off, the undertakings should amend the expense assumptions accordingly. It is also possible that the insurance market has changed, so some insurance lines are no longer sold, in which case the change of the product portfolio should be taken into account in setting the assumptions. However, the expense assumptions should be based on recent analysis of the operations of the business. Expense assumptions should be realistic and not materially deviate from short term business strategies. Expert judgement may be needed when determining the split between expenses before and after the valuation date.

74. The undertakings should assume that there are extraordinary expenses every now and then. The allocation of future recurrent one-off expenses requires use of expert judgement because the historical costs seldom reflect the future expense allocations. For example, there are almost always IT projects going on in insurance undertakings, but the annual contributions and cost centres vary.

Guideline 31 – Changing the approach to the split of overhead expenses

Insurance and reinsurance undertakings should allocate overhead expenses to existing and future business on a consistent basis over time, and should only change the basis of allocation if a new approach better reflects the current situation.

Projection of Expenses

Guideline 32 – Consistency of expenses with other cash-flows

Insurance and reinsurance undertakings should allocate expenses in the cashflow projection so that the timing of expense cash-flows is consistent with the timing of other cash in-flows and cash out-flows required to settle the insurance and reinsurance obligations.

Explanatory text

75. For example premium billing expenses should be aligned with the time when the premium payment is due or expenses connected with the conversion should be aligned in time with the conversion of a policy. Similarly expenses connected with the lapse of a policy or with claims should be aligned in time with the relevant lapse or claim event.

Guideline 33 – Changes in expenses

Insurance and reinsurance undertakings should ensure that assumptions with respect to the evolution of expenses over time, including future expenses arising from commitments made on or prior to the valuation date, are appropriate and consider the nature of the expenses involved. Insurance and reinsurance undertakings should make an allowance for inflation that is consistent with the economic assumptions made and with dependency of expenses on other cash flows of the contract.

Explanatory text

76. Future expense cash flows are usually assumed to vary with assumed rates of general level of expense inflation in a reasonable manner.

77. Relevant market data should be used to determine expense assumptions that include an allowance for future cost increases. When determining correlation between inflation rates and interest rates, use of expert judgement is often needed. An undertaking should ensure that the allowance for inflation is consistent with the economic assumptions made, which could be achieved if the probabilities for each inflation scenario are consistent with probabilities implied by market interest rates.

78. Furthermore, expense inflation should be consistent with the inflation expectations in the country in concern and the types of expenses being considered. For example, when

considering the overall expense inflation of a homogeneous risk group, different levels of inflation might be expected regarding office space rents, salaries of different types of staff, IT systems, medical expenses, etc.

79. In some cases, explicit inflation expenses may not be needed. For example, investment management expenses may be defined as a percentage of the value of the underlying investment funds and the product may not require explicit assumptions on inflation as inflation does not affect the expense assumptions.

80. When determining the inflation rate, proportionality principle can be used taking into account the materiality of the expense inflation assumption and prudency requirement in accordance with Article 56(4) of the Delegated Regulation.

Guideline 34 – Simplifications in respect of expenses

When assessing the nature, scale and complexity of risks underlying the expenses which are taken into account in the calculation of the technical provisions, insurance and reinsurance undertakings should take into account, inter alia, the uncertainty of future expense cash-flows, and any event that can change the amount, frequency and severity of expense cash-flows.

Undertakings should also take into account the type of expenses and the degree of correlation between different types of expenses.

When using a simplification for the projection of expenses based on a model which uses information on current and past expense loadings to project future expense loadings including inflation, undertakings should analyse current and historical expenses, giving consideration to, inter alia, where expenses occur and the factors that influence the expenses. Undertakings should include in the proportionality assessment an analysis of how the expenses are related to the size and nature of insurance portfolios. Undertakings should not apply the simplification where expenses have substantially changed or are expected not to cover all but only part of the expenses required to service insurance and reinsurance obligations.

Explanatory text

81. The approach to value the expense liability relies on the existence of a model that projects the expenses into the future consistently with other cash-flows. This may require rather sophisticated modelling that might not be justified for all undertakings.

82. Under a stochastic simulation approach the expenses to be incurred should be explicitly included in the simulation and the future expense inflation needs to be consistent with what is assumed in the interest rate assumptions and other relevant factors influencing the expenses. In many cases, both the future expenses and the expense loadings may be sensitive to changes in inflation. However, one cannot assume these to be equal to each other unless there is proper evidence of such matching. The reference for expense inflation needs to be based on the published prediction of an appropriate inflation-index.

83. For the attribution of overhead expenses, a possible simplification is the method described in Technical Annex II.

Treatment of financial guarantees and contractual options

Guideline 35 – Charges for embedded options

Insurance and reinsurance undertakings should explicitly take into account amounts charged to policy holders relating to embedded options.

Explanatory text

84. Charges from embedded options should be taken into account in the best estimate valuation of technical provisions and should be calculated separately from expense loadings. For example a surrender charge could possibly be seen as a charge to offset the uncollected charges on average, but could also be seen as a way to force the policyholder to continue the contract and hence it would not directly be related to the cost of embedded options.

85. Some charging structures for embedded options are disclosed in the valuation basis for a product, whereas some charging structures are disclosed in an undertaking's principles and practices to run the business.

86. Possible simplifications for other charges are to assume that:
    - other charges are a constant share of extra benefits; or
    - a constant charge (in relative terms) from the policy fund.

Guideline 36 – Appropriateness of assumptions

Insurance and reinsurance undertakings should ensure that the assumptions used in the valuation of contractual options and financial guarantees are consistent with current market data, current market practice, policyholder and management behaviour specific to the characteristics of the business and the undertaking. Undertakings should also consider the impact of adverse market conditions and trends and establish a regular process for updating and ensuring that those assumptions are still realistic taking into account all additional information since the last calculation of technical provisions.

Explanatory text

87. Contractual options are present where there is the right to change the benefits, to be taken at the choice of its holder (generally the policyholder), on terms that are established in advance.

88. A financial guarantee is present when there is the possibility to pass losses to the undertaking or to receive additional benefits8 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.).

89. In order to trigger an option, a deliberate decision of its holder is necessary. 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.

90. Some non-exhaustive examples of contractual options which may be predetermined in a contract and do not require again the consent of the parties to renew or modify the contract include the following:
    a) Surrender value option, where the policyholder has the right to fully or partially surrender the policy and receive a pre-defined lump sum amount; 8 This has to be interpreted as also including the potential for reduction of the level of premiums that would be charged in the future.
    b) Paid-up policy option, where the policyholder has the right to stop paying premiums and change the policy to a paid-up status;
    c) 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;
    d) Policy conversion option, where the policyholder has the right to convert from one policy to another at pre-specific terms and conditions;

e) 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.

91. 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;
    - Minimum guaranteed benefits.

Guideline 37 – Assumptions on policyholder behaviour

Insurance and reinsurance undertakings should ensure that the assumptions relating to policyholder behaviour are founded in statistical and empirical evidence, where available. Undertakings should consider the extent to which policyholders exercise contractual options in a financially rational manner when deriving such assumptions. For this purpose, undertakings should give consideration to policyholders' awareness of the value of policy options and to policyholders' possible reactions to the changing financial position of the undertaking.

Explanatory text

92. Assumptions on policyholder behaviour are based on an analysis of past and likely future policyholder behaviour, from a general market perspective and from the particular perspective of the undertaking. Assumptions are based on the experience of the undertaking in relation to the exercise of contractual options, where appropriate, but reflect the likely trends in experience as a result of any change in the circumstances of the company and its customers, changing market conditions and other external factors.

93. In case of significantly rising interest rates in the capital market, impacts on the persistence of the business in force should be analysed. It should be examined whether the impact varies by product type or target group (e.g. contracts where the policyholder does not bear the investment risk, contracts with profitparticipation clauses).

94. The impact of adverse developments in financial markets on the exercising of lump-sum options of deferred pension policies should also be considered.

Guideline 37A – Dynamic policyholder behaviour

Insurance and reinsurance undertakings should base their assumptions on the exercise rate of relevant options on:

- statistical and empirical evidence, where it is representative of future conduct, and
- expert judgment on sound rationale and with clear documentation.

The lack of data for extreme scenarios should not be considered alone to be a reason to avoid dynamic policyholder behaviour modelling and/or the interaction with future management actions.

Explanatory text

95. The most commonly modelled dynamic policyholder behaviour relates to surrender options. For example, in this case, undertakings can measure the financial gain/loss that the policyholder would face by surrendering the contract early or keeping the contract on, by comparing the current credited return with the benchmark return after recognizing any surrender penalties and future discretionary profit sharing. It should be acknowledged that the average policyholder may not actively manage their insurance products as part of an investment portfolio under such a purely economic view. On the other hand, the projection horizon for savings product can be relatively long (several tens of years) and the hypothesis that the future behaviour will remain identical to the past might be subject to discussion.
96. Dynamic lapse is path-dependent and so varies within the stochastic scenarios, where it is particularly relevant. The benchmark return should be defined with reference to the investment conditions that prevail in the given scenario being considered.
97. At the same time, since there is usually little or no evidence in terms of the experienced reaction of policyholders to extreme financial conditions as the ones included in the set of stochastic scenarios, the lack of this data should not be considered alone to be a good reason to avoid dynamic policyholder behaviour modelling. In such cases, expert judgement can complement the available data to model the dynamic behaviour.
98. Moreover, as part of an adequate dynamic modelling, undertakings should properly consider the interaction between the relevant future management actions and the policyholder behaviour (e.g. policyholder behaviour in terms of surrender levels can be linked to the comparison between contract return and a return offered by the market, where contract return is directly influenced by management actions).

Guideline 37B – Bidirectional assumptions

When setting the assumptions on dynamic policyholder behaviour, insurance and reinsurance undertakings should consider that the dependency on the trigger event and the exercise rate of the option is usually bidirectional, i.e. both an increase and a decrease should be considered depending on the direction of the trigger event.

Guideline 37C – Option to pay additional or different premiums

Insurance and reinsurance undertakings should model all relevant contractual options when projecting the cash flows, including the option to pay additional premiums or to vary the amount of premiums to be paid that fall within contract boundaries.

Future management actions

Guideline 38 – Allowance for future management actions

Insurance and reinsurance undertakings should be able to provide adequate justification where future management actions are ignored on the grounds of materiality.

Guideline 39 – Consistency of management actions with other assumptions

Insurance and reinsurance undertakings should take into account the impact of assumed management actions on other assumptions within a certain valuation scenario. In particular, undertakings should take into account the effects of a certain management action on policyholder behaviour or on the related expenses. Undertakings should take account of relevant legal or regulatory constraints on management action. Moreover, for a given scenario undertakings should ensure that the assumed future management actions reflect the balance, which is consistent with the corporate planning, between the degree of competitiveness and the risk of dynamic lapses.

Guideline 40 – Interrelation with cedant undertaking

Insurance and reinsurance undertakings should consider the future management actions of the cedant undertaking as policyholder behaviour, and estimate its technical provisions based on reasonable assumptions for the cedant's behaviour.

Guideline 40A – Comprehensive management plan

Insurance and reinsurance undertakings should ensure that the comprehensive future management actions plan that is approved by the administrative, management or supervisory body is either:

- a single document listing all assumptions relating to future management actions used in the best estimate calculation; or
- a set of documents, accompanied by an inventory, that clearly provide a complete view of all assumptions relating to future management actions used in best estimate calculation.

Explanatory text

99. The comprehensive management plan mentioned in Article 23(2) of the Delegated Regulation should provide to the administrative, management or supervisory body all the needed information to evaluate the consequences of the retained assumptions for each future management actions and the interaction between those actions.

100. To guarantee that requirement, the administrative, management or supervisory body should have a comprehensive view of all future management actions. For that purpose, the approval of such plan should be done including a single document listing all assumptions relating to future management actions or providing a set of documents that clearly provide a complete view of all future management actions. In the latter case, a summary listing all assumptions and pointing to the detailed documents that provides all the necessary information should be established.

Guideline 40B – Consideration of new business in setting future management actions

Insurance and reinsurance undertakings should consider the effect of new business in setting future management actions and duly consider the consequences on other related assumptions. In particular, the fact that the set of cash-flows to be projected through the application of Article 18 of the Delegated Regulation on contract boundaries is limited should not lead insurance and reinsurance undertakings to consider that assumptions only rely on this projected set of cash-flows without any influence of new business. This is particularly the case for assumptions on the allocation of risky assets, management of the duration gap or application of profit sharing mechanisms.

Explanatory text

101. Future business can be split into three categories: Future business within contract boundaries (i.e. included in best estimate), future business related to current contracts but falling beyond contract boundaries (e.g. premiums to be received after the contract boundary and therefore no included in best estimate) and future business related to new contracts. Even if only the first category is included in best estimate, all of the categories may need to be considered when setting best estimate assumptions and, in particular, assumptions linked to future management actions.

102. This is particularly relevant for with profit contracts when profit sharing mechanisms in the future will apply to both the existing and the new business combined. In those cases, the interdependency of the new business and the existing business on the value of options and guarantees should be duly taken into account for valuing best estimates. Realistic assumptions based on the historical practices of the insurance or reinsurance undertakings should apply, independently of the fact that the application of principles on contract boundaries limit the set of cash flow to be projected.

103. For example, If the assumption of writing new business (linked to existing contracts or linked to new contracts) in the future leads to different investment profits than the assumption of having no business after the contract boundary, undertakings should project investment profits based on the assumption of writing new business. This does not mean that undertakings need to estimate and project future profits linked to new business.

104. Similarly, insurance and reinsurance undertakings should consider a balanced approach when setting up assumptions on the projection of future investments. Indeed, as those undertakings usually continue writing new business, their past experience is based on relatively stable allocation on risky assets and duration of bond portfolio – with potential adjustment on duration gap. However as the set of cash flow to be projected is limited,

insurance undertakings do not have historical evidence of assumptions for such a "run-off" projection. Thus, insurance and reinsurance undertakings should adopt a balanced approach to define assumptions so that those are realistic, based on empirical evidences without exacerbating the fact that the cash flows are limited.

105. For instance, a large reduction of risky assets to reinvest in cash or cash equivalent will usually not be considered as realistic as it reduces the volatility of the assets – and the values of options and guarantees - across the projection without any empirical justification. A large reduction of the duration of assets in the first years of projection is also unrealistic if contracts are projected over decades.

Future discretionary benefits

Guideline 41 – Allowance for future discretionary benefits

Insurance and reinsurance undertakings should take into account future discretionary benefits which are expected to be made, whether or not such payments are contractually guaranteed. Undertakings should ensure that the assessment of the value of future discretionary benefits considers all relevant legal and contractual restrictions, existing profit participation arrangements as well as any plans for distribution of profits.

Explanatory text

106. Payments that relate to surplus funds which possess the characteristics of Tier 1 basic own funds need not to be taken into account. Surplus funds are accumulated profits which have not been made available for distribution to policyholders and beneficiaries (cf. Article 91 of Solvency II). Payments that relate to future profits attributable to shareholders in respect of profit participation arrangements do not form part of technical provisions.

107. When calculating technical provisions, the value of future discretionary benefits needs to be separately identifiable, as this amount is used as an input for the calculation of the minimum capital requirement and for the loss-absorbing capacity of technical provisions in the standard formula to capture the solvency capital requirement.

108. Some examples of assumptions for distributing discretionary benefits are given below. The undertaking should consider whether they are relevant and material for the valuation of future discretionary benefits and thus are taken into account, applying the principle of proportionality.

a) How is a profit/loss divided between owners of the undertaking and the policyholders and furthermore between different policyholders? What are the planned reattributions of ownership of the surplus between policyholders and shareholders?
b) Are there any restrictions to allocate the profits of certain assets?
c) How will the mechanism for discretionary benefits be affected by a large profit or loss?
d) How will policyholders be affected by profits and losses from other activities?
e) What is the target return level set by the firm's owners on their invested capital? What is an undertaking's investment strategy? What is the asset mix driving the investment return?
f) What is an expected level (inclusive of any distribution of excess capital, unrealised gains etc.) of discretionary benefits? How will the experience from current and previous years affect the level of discretionary benefits?
g) 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?
h) 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?

Guideline 42 – Assumptions on future discretionary benefits

Insurance and reinsurance undertakings should ensure that assumptions regarding the distribution of future discretionary benefits are derived in an objective, realistic and verifiable manner encompassing the principles and practices adopted by the undertaking to provide insurance contracts with profit participation. Where the distribution of future discretionary benefits is related to the financial position of the undertaking, the assumptions should reflect the interaction between the assets and liabilities of the undertaking.

Guideline 43 – Assumptions in respect of modelling distribution of future discretionary benefits

Insurance and reinsurance undertakings should consider a comprehensive analysis of past experience, practice and distribution mechanism when assessing the proportionality of a simplified method used for determining the future discretionary benefits.

Section 4: Methodologies to calculate technical provisions

Proportionality assessment

Guideline 44 – General principle of proportionality

Insurance and reinsurance undertakings should, in order to have an overall assessment of the risks underlying their insurance and reinsurance obligations, take into account the strong interrelation among the nature, scale and complexity of these risks.

Undertakings should ensure that the actuarial function is able to explain which methods are used to calculate the technical provisions and the reason why such methods have been selected.

Explanatory text

109. The principle of proportionality is intended to support the consistent application of the principles-based solvency requirements to all (re)insurance undertakings.

110. The undertaking should ensure that they determine the technical provisions by using appropriate a proportionate method taking into account the nature, scale and complexity of the risks, which affect the amount, timing or value of the cash in-flows and cash out-flows required to settle the insurance and reinsurance obligations over their lifetime.

Guideline 45 – Assessment of nature and complexity of the risks

When assessing the nature and complexity of the risks underlying the insurance contracts as referred to in Article 56 (2)(a) of Commission Delegated Regulation 2015/35, insurance and reinsurance undertakings should take into account, at least, the following characteristics, where applicable:

a) the degree of homogeneity of the risks;

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

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

d) the level of uncertainty i.e. the extent to which future cash flows can be estimated;

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

f) the type of the development of claims payments over time;

g) the extent of potential loss, including the tail of the claims distribution;

h) the type of business from which the risks originate, i.e. direct business or reinsurance business;

i) the degree of dependency between different risk types, including the tail of the risk distribution;

j) the risk mitigation instruments applied, if any, and their impact on the underlying risk profile.

Explanatory text

111. Generally, the proportionality of any given valuation technique will depend on the individual risk situation of the insurer. Therefore, the criteria laid out in this guideline are intended to give guidance to the actuarial function in their assessment of the appropriateness of a given technique. It cannot provide a definite decision whether the technique is admissible as this also depends on the undertaking's specificities.

112. During the process of determining a valuation of its technical provisions, the actuarial function will need to make multiple decisions to set assumptions based on available information and actuarial knowledge (using internal or external sources), having regard to the materiality, nature, scale and complexity of the insurance.

Guideline 46 – Identification of complex risk structures

Insurance and reinsurance undertakings should identify factors which indicate the presence of complex risks. This should be at least the case where:

a) the cash-flows are highly path dependent;

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

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

d) risks have a significant asymmetric impact on the value of the cash-flows, in particular if contracts include material embedded options and guarantees or if there are complex reinsurance contracts in place;

e) the value of options and guarantees is affected by the policyholder behaviour;

f) the undertaking uses a complex risk mitigation instrument;

g) a variety of covers of different nature are bundled in the contracts;

h) the terms of the contracts are complex, inter alia, in terms of franchises, participations, inclusion and exclusion criteria of the cover.

Explanatory text

113. Nature and complexity of risks are closely related, and for the purposes of an assessment of proportionality could best be characterized together. Indeed, complexity could be seen as an integral part of the nature of risks, which is a broader concept.

114. The degree of complexity and/or uncertainty of the risks are 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.

115. Therefore, to appropriately analyse and quantify more complex and/or less predictable risks, more sophisticated and elaborated tools will generally be required as well as sufficient actuarial expertise.

Guideline 47 – Assessment of scale of the risks

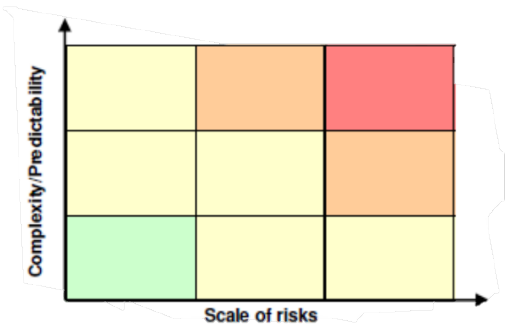
Insurance and reinsurance undertakings should identify and use an interpretation of scale which is best suited to the specific circumstances of the undertaking and to the risk profile of its portfolio. Nevertheless, the assessment of “scale” should lead to an objective and reliable assessment.

To measure the scale of risks undertakings should establish an undertaking-specific benchmark or reference level which leads to a relative rather than an absolute assessment number. For this purpose, risks may be considered in a range from small to large relative to the established benchmark.

Explanatory text

116. In assessing what is proportionate, the focus must be on the combination of all three criteria - nature, scale and complexity - to arrive at a solution that is adequate to the risk an undertaking is exposed to. For instance, a business may be small-scale but could still include complex risk-profiles, or, on the contrary, it may be large-scale with a simple risk profile. In the first case, it cannot be allowed to use simplified methods while the possibility may be considered in the second case under very specific circumstances.

117. The three indicators are strongly interrelated, and for the purpose of assessing their combination, it may be helpful to broadly categorize the risks according to the two dimensions “scale” and “complexity/predictability”:



Guideline 48 – Granularity of materiality assessment

Insurance and reinsurance undertakings should determine the most appropriate level at which an assessment of materiality for the purposes of the calculation of the technical provisions is to be carried out, which could be the individual homogeneous risk groups, the individual lines of business or the business of the insurer as a whole.

Undertakings should consider when assessing the materiality that a risk which is immaterial with regard to the business of the insurer as a whole may still have a significant impact within a smaller segment.

In addition, undertakings should not analyse technical provisions in isolation but any effect on own funds and thus on the total solvency balance sheet as well as on the Solvency Capital Requirement should be taken into account in this assessment.

Explanatory text

118. 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 (or model error). Where simplified approaches are used to value technical provisions, this could potentially introduce additional uncertainty because they are generally based on some kind of simplifying assumptions regarding the risk which are modelled (e.g. independency of some risks, proportionality between different risk-factors, neglecting future development, etc.).

119. As prescribed in Recital (16) of the of the Implementing Measures, undertakings are not required to specify the precise amount of the error, which would be in practice not easy to achieve. Hence, the actuarial function is not required to re-calculate the value of its technical provisions using a more complex method in order to demonstrate that the difference between the result of the chosen method and the result of a more complex method is immaterial. However, in some circumstances it could be appropriate to carry out such a calculation.

120. Instead, it is sufficient to demonstrate that there is reasonable assurance that the error implied by the application of the chosen method (and hence the difference between those two amounts) is immaterial.

121. For example, if the method is based on a simplifying assumption to ignore one or more risk drivers, an assessment of their impact on the best estimate (e.g. in percentage terms) could be sufficient to justify the non-materiality of the error introduced by the simplified assumption.

122. An assessment of the model error may be carried out, by:
    a) Sensitivity analysis in the framework of the applied model: this means to vary the parameters and/or data thereby observing the range where a best estimate might be located;
    b) 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;
    c) Descriptive statistics: in some cases the applied model allows the derivation of descriptive statistics on the estimation error contained in the estimation. Such information may assist in quantitatively describing the sources of uncertainty;
    d) Back-testing: comparing the results of the estimation against experience may help to identify systemic deviations which are due to deficiencies in the modelling;
    e) Stress test scenario as benchmark.

Guideline 49 – Consequences of material error identified in the proportionality assessment

Where it is unavoidable for the insurance and reinsurance undertaking to use a method which leads to material level of error, the undertaking should document this and consider the implications with regard to the reliability of the calculation of technical provisions and its overall solvency position. In particular the undertaking should assess whether the material level of error is adequately addressed in the determination of the Solvency Capital Requirement and hence in the setting of the risk margin in technical provisions.

Explanatory text

123. In some circumstances, it may be unavoidable for the undertaking to apply a valuation method which leads to an increased level of estimation uncertainty in the valuation. This could e.g. be the case where there is only insufficient pertinent past experience data available to derive or validate assumptions or in case of portfolios with high-severity-low-frequency claims

Methods applied for calculations of technical provisions during the year

Guideline 50 – Simplified calculation of technical provisions during the year

Insurance and reinsurance undertakings may use simplifications, for example the simplification outlined in Technical Annex VI, subject to the proportionality assessment, in the quarterly calculations of technical provisions.

Explanatory text

124. According to Article 129(4) of Solvency II, the MCR needs to be calculated quarterly. This necessitates a quarterly calculation of technical provisions to derive the input values for the calculation of the MCR and to derive the own funds.

125. The calculation of technical provisions between the annual reporting dates may give rise to additional practicability issues. For example, the data basis of the undertaking may not be adequate for this task. In non-life insurance, undertakings often collect data on an annual basis, i.e. ordered per accident year, underwriting year, run-off year etc.

126. Another example are calculations which are so resource intensive that – compared to a partial recalculation – their full repetition during the year may not be in proportion with the

additional information the calculation provides. In these cases, it may be appropriate to update the key variables of the calculations (like interest rates) while other variables with little influence on the results may be approximated.

127. It can be appropriate to base the simplified calculations of the risk margin to be carried out during the year on the risk margin calculated at the beginning of the year. Since no full calculations of the SCR are carried out during the year, a possible simplifications may be to fix the risk margin at a given point in time (t) during the forthcoming year (i.e. CoCMlob(t)) basing on the assumption that the ratio of the risk margin to the best estimate technical provisions (net of reinsurance) will stay constant during the year.

128. The formula for the application of this simplification is described in Technical Annex.

129. It may be inappropriate to apply this formula in cases where the best estimates are expected to decrease, in relative terms to the business, e.g. in cases of negative best estimates or best estimates close to zero. Furthermore, there may be situations, such as run-off undertakings, that may deserve specific analysis.

130. Another situation where this approach may not be appropriate is when an undertaking's business is expected to strongly increase in the short term, leading to both a lower best estimate (due to allowance for profit at inception) and a higher duration of the obligations: in this case, in fact, this simplification leads to a lower risk margin, while an increased risk margin would be expected due to the increased duration of the liabilities.

131. Moreover, the assumption of stability of the SCR to the best estimate over time could not be met if the undertaking has commuted a reinsurance treaty or when a purchase of a book of business causes a change in the proportional split.

132. Accordingly, in cases where the above simplification is not appropriate, it may be a better approximation to let the risk margin stay unchanged during the year (i.e. CoCM(t) = CoCM(0)).

133. A combination of the two approaches described above is also possible, e.g. by fixing the risk margin at the beginning of the year as a floor for the risk margin to be used during the year, that is:

134. $CoCM(t) = \max\{(CoCM(0)/BENet,(0)) \cdot BENet,(t); CoCM(0)\}$.

135. In some circumstances, it may be unavoidable for the undertaking to apply a valuation method which leads to an increased level of estimation uncertainty in the valuation. This could e.g. be the case where there is only insufficient pertinent past experience data available to derive or validate assumptions or in case of portfolios with high-severity-low-frequency claims.

Guideline 51 – Computation of the best estimate for life and non-life quarterly technical provision

For the quarterly calculation of the best-estimate of technical provisions, insurance and reinsurance undertakings can perform a roll-forward calculation, taking into account the cash-flows that have occurred during the quarter and the new obligations arising during the quarter. The undertaking should update assumptions of the roll-forward calculation method when the actual versus expected analysis indicates that significant changes have occurred during the quarter.

Guideline 52 – Computation of the best estimate for life quarterly technical provision

For the quarterly roll-forward calculation of the best-estimate of life technical provisions for index-linked, unit-linked, with-profit contracts or contracts with financial guaranties, insurance and reinsurance undertakings should make use of the sensitivity analysis as required in Article 272(5) of Commission Delegated Regulation 2015/35 to assess the sensitivity of the best estimate to the relevant financial parameters. They should document the choice of the set of financial parameters and their on-going adequacy to their portfolio of assets, as well as the relevance and the accuracy of the sensitivity analysis.

Explanatory text

136. Sensitivity analyses are not required when technical provisions for such contracts are calculated as a whole. However when technical provisions for such contracts are calculated as a best estimate + risk margin (for example for expenses according to art. 40(2)(c) of draft delegated acts), future fees charged from a fund or asset (fees may be a given percentage of the value of fund or of the premium received) and future investment management expenses with regard to fund or asset strongly depends of future value of fund or asset. So substantial increase or decrease of value of fund or asset may lead to change of future cash-flows concerning fees and investment management expenses and it may lead to change of best estimate of technical provisions for such cash-flows.

Methodologies for the valuation of contractual options and financial guarantees

Guideline 53 – Decision on methodology

Insurance and reinsurance undertakings should ensure that the valuation of contractual options and financial guarantees is based on adequate, applicable and relevant actuarial and statistical methodologies taking into account the developments in this field.

Undertakings should ensure that at least the following aspects are considered when deciding on a methodology to determine the value of contractual options and financial guarantees:

a) The nature, scale and complexity of the underlying risks and their interdependence during the lifetime of the contracts;

b) Possible insights into the nature of options and guarantees and their main drivers;

c) A thorough examination on the necessity to include additional and intricate computational complexity;

d) Justification on the appropriateness of the method.

Guideline 53A – Use of stochastic valuation

Insurance and reinsurance undertakings should use stochastic modelling for the valuation of technical provisions of contracts whose cash flows depend on future events and developments, in particular those with material options and guarantees.

When assessing whether stochastic modelling is needed to adequately capture the value of options and guarantees, insurance and reinsurance undertakings should, in particular but not only, consider the following cases:

- any kind of profit-sharing mechanism where the future benefits depend on the return of the assets;

- financial guarantees (e.g. technical rates, even without profit sharing mechanism), in particular, but not only, where combined with options (e.g. surrender options) whose dynamic modelling would increase the present value of cash flows in some scenarios.

Explanatory text

137. Stochastic modelling of options and guarantees intends to capture their time value, which is not captured following deterministic valuation. The time value of options and guarantees can be captured in any case using simulation methods, but in some simple cases it can also be measured accurately with closed-formula approaches. In addition, considering the high costs of stochastic valuation and following the proportionality principle, for non-material options and guarantees simplified approaches may be used when available.

138. Profit sharing usually works under asymmetric basis: profits are shared with the policyholders while losses are completely assumed by the undertaking. Under such circumstances, stochastic valuation is particularly relevant, since a set of scenarios might lead to a significantly higher best estimate than a single average scenario under a deterministic approach.

139. The combined effect of financial guarantees and surrender options might also be particularly relevant. A guaranteed rate might increase the value of surrender option: the policyholder would keep its policy in unprofitable low interest rates environment and surrender it in high interest rates environment. Therefore, the average present value of the liabilities may significantly increase compared to a deterministic calculation.

Guideline 54 – Methodologies for the valuation of contractual options and financial guarantees

Insurance and reinsurance undertakings should apply the proportionality assessment referred to in Article 56 of Commission Delegated Regulation 2015/35 when considering the use of a closed formula approach or a stochastic approach for the valuation of contractual options and financial guarantees included in the insurance contracts.

Whenever neither method is possible, undertakings may use as a last resort an approach consisting in the following steps:

a) Analysis of the characteristics of the option or guarantee and of how it would affect the cash-flows;

b) Analysis of the amount the option or guarantee is expected to be currently in-the-money or out-of-the-money;

c) Determination of the cost of the option or guarantees is expected to vary with time;

d) Estimation of the probability that the option or guarantee would become more or less costly in the future.

Economic Scenario Generators (ESG)

Guideline 55 – Documentation of the ESG

Insurance and reinsurance undertakings should stand ready to share the following documents with supervisors on request:

a) the mathematical models on which the ESG is based and the reason for their choice;

b) the assessment of quality of data;

c) the calibration process;

d) the parameters resulting from the calibration process (especially those corresponding to the volatility and correlation market risk drivers);

Guideline 56 – General understanding of the ESG

Where the ESG is outsourced, insurance and reinsurance undertakings should ensure that they have an appropriate understanding of the mathematical models on which the ESG is based and of the calibration process, with a particular emphasis on the methods and assumptions used and its limitations and they should be informed of any material changes on an on-going basis.

Guideline 57 – Calibration process: market data and choice of the financial instruments

Insurance and reinsurance undertakings should ensure that the calibration process of an ESG used for a market consistent valuation is based on data from financial markets that are deep, liquid and transparent as defined in Article 1 of Commission Delegated Regulation 2015/35 and that reflect the current market conditions. Where this is not possible, undertakings should

use other market prices paying attention to any distortions and ensuring that adjustments to overcome those distortions are made in a deliberate, objective and reliable manner.

Insurance and reinsurance undertakings should be able to demonstrate that the choice of financial instruments used in the calibration process is relevant given the characteristics of the insurance or reinsurance obligations (e.g. embedded options and financial guarantees).

Guideline 57A – Market risk factors needed to deliver appropriate results

When assessing whether all the relevant risk factors are modelled with respect to the provisions of Articles 22(3) and 34(5) of the Delegated Regulation, insurance and reinsurance undertakings should be able to demonstrate that their modelling adequately reflects the volatility of their assets and that the material sources of volatility are appropriately reflected (e.g. spreads and default risk).

In particular, insurance and reinsurance undertakings should use models that allow for the modelling of negative interest rates.

Explanatory text

140. Insurance and reinsurance undertakings should ensure that any risk factor that could have a material impact on the outcome of the stochastic valuation is properly modelled. In particular, negative interest rates usually have a material impact and therefore the models used should allow them in any case. However, other risk factors as spreads and default risk only have a material impact in some specific cases (e.g. where the investment strategy includes a material part of high-yield bonds) and it may not be necessary to model them.

Guideline 58 – Tests (accuracy, robustness and market-consistency)

When insurance or reinsurance undertakings use an ESG for the stochastic modelling of the technical provisions, they should be able to demonstrate to the relevant supervisory authorities the accuracy, robustness and market consistency properties of the ESG. A measure of the accuracy of the ESG (at least a Monte Carlo error analysis) should be assessed.

To demonstrate the robustness of the ESG, insurance and reinsurance undertakings should test the sensitivity of the valuation of some typical liabilities to the variation of some parameters in the calibration process.

To demonstrate the market consistency properties of the ESG, at least some of the following tests should be carried out on the set of scenarios generated by the ESG used for valuation:

a) Calibration tests: verify that the requirements set out in Article 22(3) of Commission Delegated Regulation 2015/35 are met;

b) Martingale tests: verify the Martingale test for the asset classes (equity, bonds, property, exchange rates, etc.) that have been used in the calibration process of the ESG, and for some simple portfolio investment strategies;

c) Correlation tests: comparison of the simulated correlations with the historical correlations.

Insurance and reinsurance undertakings should ensure that the tests of accuracy, robustness and market consistency of the ESG are performed on a regular basis and at least annually.

Guideline 59 – Random and pseudo random number generators

Insurance and reinsurance undertakings should ensure that (pseudo)random number generators used in an ESG are properly tested.

Guideline 60 – On-going appropriateness of an ESG

Insurance and reinsurance undertakings should have adequate procedures in place to ensure that an ESG remains appropriate for the calculation of the technical provisions on an ongoing basis.

Calculation of the risk margin

Guideline 61 – Methods to calculate the risk margin

Insurance and reinsurance undertakings should assess whether a full projection of all future Solvency Capital Requirements is necessary in order to reflect the nature, scale and complexity of the risks underlying the reference undertaking's insurance and reinsurance obligations in a proportionate manner. In such case, undertakings should carry out these calculations. Otherwise, alternative methods may be used to calculate the risk margin, ensuring that the method chosen is adequate to capture the risk profile of the undertaking.

Where simplified methodologies are used to calculate the best estimate, the undertakings should assess the consequent impact that the use of such methodologies may have on the methods available to calculate the risk margin, including the use of any simplified methods for projecting the future SCRs.

Guideline 62 – Hierarchy of methods for the calculation of the risk margin

When deciding which level of the hierarchy set out below is most appropriate, insurance and reinsurance undertakings should ensure that the complexity of the calculations does not go beyond what is necessary in order to reflect the nature, scale and complexity of the risks underlying the reference undertaking's insurance and reinsurance obligations in a proportionate manner.

Undertakings should apply the hierarchy of methods consistently with the framework set out when defining the proportionality principle and the necessity of assessing risks properly.

Insurance and reinsurance undertakings should use the following hierarchy as a decision making basis regarding the methods to be used for projecting future Solvency Capital Requirements:

Method 1

To approximate the individual risks or sub-risks within some or all modules and sub-modules to be used for the calculation of future Solvency Capital Requirements as referred to in Article 58(a) of Commission Delegated Regulation 2015/35.

Method 2

To approximate the whole Solvency Capital Requirement for each future year as referred in Article 58 (a)of Commission Delegated Regulation 2015/35, inter alia by using the ratio of the best estimate at that future year to the best estimate at the valuation date.

This method is not appropriate when negative best estimate values exist at valuation date or subsequent dates.

This method takes into account the maturity and the run-off pattern of the obligations net of reinsurance. Consequently, some considerations should be given regarding the manner in which the best estimate of technical provisions net of reinsurance has been calculated. Further consideration should be given as well as to whether the assumptions regarding the risk profile of the undertaking can be considered unchanged over time. This includes:

a) For all underwriting risks, to consider if the composition of the subrisks in underwriting risk is the same;

b) For counterparty default risk, to consider if the average credit standing of reinsurers and special purpose vehicles is the same;

c) For market risk, to consider if the material market risk in relation to the net best estimate is the same;

d) For operational risk, to consider if the proportion of reinsurers' and special purpose vehicles share of the obligations is the same;

e) For adjustment, to consider if the loss absorbing capacity of the technical provisions in relation to the net best estimate is the same.

If some or all of these assumptions do not hold, the undertaking should carry out at least 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 this method can be used. Otherwise the undertaking should either adjust the formula appropriately or be encouraged to use a more sophisticated method.

Method 3

To approximate the discounted sum of all future Solvency Capital Requirements in a single step without approximating the Solvency Capital Requirements for each future year separately as

referred in Article 58 (b) of Commission Delegated Regulation 2015/35, inter alia by using the modified duration of the insurance liabilities as a proportionality factor.

When deciding on the application of a method based on the modified duration of the insurance liabilities, attention should be paid to the value of modified duration to avoid meaningless results for the Risk Margin. This method takes into account the maturity and the run-off pattern of the obligations net of reinsurance. Consequently, some considerations should be given regarding the manner in which the best estimate of technical provisions net of reinsurance has been calculated. Further consideration should be given as to whether the assumptions regarding the risk profile of the undertaking can be considered unchanged over time. This includes:

a) For basic SCR, to consider if the composition and the proportions of the risks and sub-risks do not change over the years;

b) For counterparty default risk, to consider if the average credit standing of reinsurers and SPVs remains the same over the years;

c) For operational risk and counterparty default risk, to consider if the modified duration is the same for obligations net and gross of reinsurance;

d) To consider if the material market risk in relation to the net best estimate remains the same over the years;

e) For adjustment, to consider if the loss absorbing capacity of the technical provisions in relation to the net best estimate remains the same over the years.

An undertaking that intends to use this method should consider to what extend these assumptions are fulfilled. If some or all of these assumptions do not hold, the undertaking should carry out at least 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 be encouraged to use a more sophisticated method.

Method 4

To approximate the risk margin by calculating it as a percentage of the best estimate.

According to this method, the risk margin should be calculated as a percentage of the best estimate technical provisions net of reinsurance at valuation date. When deciding on the

percentage to be used for a given line of business, the undertaking should take into account that this percentage is likely to increase if the modified duration of the insurance liabilities – or some other measure of the run-off pattern of these liabilities - increases.

Undertakings should give due consideration to the very simplistic nature of this approach; it should be used only where it has been demonstrated that none of the more sophisticated risk margin approaches in the above hierarchy can be applied.

When undertakings rely on this method for the calculation of the risk margin, they will need to justify and document the rationale for the percentages used by line of business. This justification and rationale should consider any specific characteristics of the portfolios being assessed. Undertakings should not use this method when negative best estimate values exist.

Without prejudice to the proportionality assessment and the provisions in Article 58 of Commission Delegated Regulation 2015/35, insurance and reinsurance undertakings may use the simplifications defined in Technical Annex IV when applying the hierarchy of methods.

Explanatory text

141. It is noted that the distinction between the levels in the hierarchy sketched in the respective Guideline 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).

142. The use of a simplification does not allow not considering all material market risk other than interest rate risk and not quantifying all such non-hedgeable risk in the calculation of the risk margin. In circumstances where undertakings hedge their financial guarantees, material market risk will often pertain. This could, for example, include tracking error or timing error. Also, if a hedging program has been devised based on assumed future policyholder behaviour, then changes from this expected future policyholder behaviour can be identified as an example of material market risk.

143. With respect to **Method 1):** This approach would require focusing on the individual modules or sub-modules in order to approximate the individual risks and/or sub-risks being relevant for the following modules:
    a) underwriting risk (life, health and non-life, respectively);

b) counterparty default risk with respect to ceded reinsurance and special purpose vehicles (SPVs);
c) material market risk.

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

144. With respect to **Method 2):** Simplifications classified as belonging to this level of the hierarchy are in general based on an assumption that the future SCRs for a given line of business are proportional to the best estimate technical provisions for this line of business and the relevant year – the proportionality factor being the ratio of the present SCR to the present best estimate technical provisions for the same line of business (as calculated by the reference undertaking).

145. This simplification is not considered proportionate for negative best estimate values at valuation date or at following dates, as it would lead to meaningless results for the Risk Margin (i.e. negative Risk Margin).

146. With respect to **Method 3):** A representative example of a simplification belonging to this level of the hierarchical structure is using information regarding the modified duration of the liabilities in order to calculate the present and all future SCRs in one single step.

147. This approach applies also to SLT and some non-life obligations (e.g. non-life annuities).

148. The simple example below has been put forward to show that even in case of reasonable in- and outgoing cash-flows the calculated value of the modified duration may be meaningless.

Year	Premiums	Claims	Cash flows	Time * cash flows	BE begin. of year		Discount rate	3%
1	20	0	-20	-20	19,09			
2	20	0	-20	-40	39,63			
3	20	0	-20	-60	60,82		**BE**	19,06
4	20	0	-20	-80	82,65		**Duration**	301,42
5	20	0	-20	-100	105,13			
6	20	0	-20	-120	128,28			
7	20	0	-20	-140	152,13			
8	20	0	-20	-160	176,69			
9	20	0	-20	-180	201,99			
10	20	0	-20	-200	228,05			
11	20	0	-20	-220	254,89			
12	20	0	-20	-240	282,54			
13	20	0	-20	-260	311,02			

14	20	0	-20	-280	340,35			
15	20	0	-20	-300	370,56			
16	20	0	-20	-320	401,67			
17	20	30	10	170	433,72			
18	20	30	10	180	436,74			
19	20	30	10	190	439,84			
20	20	30	10	200	443,03			
21	0	30	30	630	446,32			
22	0	30	30	660	429,71			
23	0	30	30	690	412,61			
24	0	30	30	720	394,98			
25	0	30	30	750	376,83			
26	0	30	30	780	358,14			
27	0	30	30	810	338,88			
28	0	30	30	840	319,05			
29	0	30	30	870	298,62			
30	0	30	30	900	277,58			
31	0	30	30	930	255,91			
32	0	30	30	960	233,58			
33	0	30	30	990	210,59			
34	0	30	30	1020	186,91			
35	0	30	30	1050	162,52			
36	0	30	30	1080	137,39			
37	0	30	30	1110	111,51			
38	0	30	30	1140	84,86			
39	0	30	30	1170	57,40			
40	0	30	30	1200	29,13			

149. With respect to **Method 4):** As the fixed percentage αlob 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.

Guideline 63 **– Allocation of the overall risk margin**

Where it is overly complex to calculate the contribution of the individual lines of business to the overall Solvency Capital Requirement during the lifetime of the whole portfolio in an

accurate manner, insurance and reinsurance undertakings should be allowed to apply simplified methods to allocate the overall risk margin to the individual lines of business which are proportionate to the nature, scale and complexity of the risks involved. The methods applied should be consistent over time.

Explanatory text

150. As set out in Article 37 of the Implementing Measures, the risk margin shall be calculated taking into account diversification effect between lines of business. Consequently, the sum of the risk margin per line of business has to be equal to the risk margin for the whole business.

151. A straightforward 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.

152. The allocation of the risk margin to the lines of business can also be done according to the contribution of the lines of business to the overall SCR during the lifetime of the business.

153. 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:

$$CoCM_{lob} = \frac{SCR_{RU,lob}(0)}{\sum_{lob} SCR_{RU,lob}(0)} * CoCM,$$

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

154. If it is not possible to argue that the SCR-ratios are reasonably stable over time, it may be necessary to carry out some more detailed calculations. A possible approach may be to use the simplifications described to risk margin calculations (see Guideline 62) for the individual lines of business as well. If this approach is chosen, it will in general be necessary to introduce an additional adjustment (i.e. find a scaling factor) in order to ensure that the sum of risk margins allocated to the individual lines of business equals the overall risk margin.

Calculation of technical provisions as a whole

Guideline 64 – Capturing uncertainty

Insurance and reinsurance undertakings should understand by the consideration of the uncertainty in order to reliably replicate the future cashflows associated with insurance or reinsurance obligations that 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.

Guideline 65 – Reliable replication

Insurance and reinsurance undertakings should not consider future cash-flows associated with insurance or reinsurance obligations to be reliably replicated if:

a) One or several features of the future cash-flow, inter alia its expected value, its volatility or any other feature, depend on risks whose specific pattern in the undertaking cannot be found in instruments actively traded in financial markets;

b) Current trade and price information are not normally readily available to the public, due to the fact that one or several features of the future cash-flow depend to any extent on the development of factors specific to the undertakings, such as expenses or acquisition costs; or,

c) One or more features of the future cash-flow depend on the development of factors external to the undertaking for which there are no financial instruments for which reliable market values are observable.

Explanatory text

155. Today no reliable market exists for the replication of the characteristics of biometric-dependent cash-flows.

156. The following examples do not intend to be an exhaustive list. The treatment of non-listed cases need to be assessed in the light of the relevant legal provisions, the guidelines specific to the calculation of technical provisions as a whole and the criteria illustrated with the following examples, avoiding interpretations ‘a sensu contrario’.

157. Considering the insurance contract, the following examples show different cases and the treatment to be applied:

Example	Have requirements in Article 77(4), second paragraph, of the Level 1 text been met?	Technical provisions shall be calculated:
The insurance undertaking shall pay the market value of an equity portfolio or shall deliver an equity portfolio (matching an index or not) at the payment date.	Yes, 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 shall 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)
Term-assurance contracts and withprofits contracts.	No: 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
Pure Unit-linked contract (without any additional guarantees)	Yes: regarding to the number of units guaranteed, and No: expense cash-flows associated with the fact that the contract will be managed till it ends.	• For the calculation of the technical provisions, these two aspects of the contract must be unbundled: • As a whole; Best Estimate + Risk Margin (only for the expenses)[3]

[3] 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 stress 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.

The insurance undertaking shall pay the market value of an OTC derivative or portfolio or shall deliver an OTC derivative or portfolio at the payment date.	No: Per definition, it is not possible to find a reliable market value for an OTC derivative.	Best Estimate + Risk Margin.

158. Considering the method for replication, the following examples present some cases and the corresponding treatment:

Example	Have requirements in Article 77(4), second paragraph, of the Level 1 text been met?	Technical provisions shall be calculated:
An insurance undertaking investing in assets replicating his future cash-flows provided by a third party (e.g. investment bank).	No: This case introduces counterparty and concentration risks with regard to the issuer of the replicating asset.	Best Estimate + Risk Margin
An insurance undertaking signs a contract with a reinsurer to replicate his future cash-flows.	No: a reinsurance contract is not a financial instrument.	Best Estimate + Risk Margin
An insurance undertaking investing in assets replicating his future cash-flows according to a dynamic hedging strategy.	No: the use of a dynamic hedging strategy implies that the cash-flows of the financial instruments do not always provide the same expected amount as the cash-flows associated with insurance or reinsurance obligations and the same patterns of variability.	Best Estimate + Risk Margin

Guideline 66 – Short term disruptions

Where an active and transparent market does not temporarily satisfy one or more of the conditions of being deep and liquid and it is reasonably expected to meet again the conditions during the following three months, insurance and reinsurance undertakings should use prices that were observed during that period for the purposes of these Guidelines.

Undertakings should asses that the use of these prices does not result in a material error in the valuation of the technical provisions.

Guideline 67 – Unbundling of obligations valued as a whole

Where under the same contract a number of future cash-flows exist which meet all the conditions in order to calculate the technical provision as whole and other future cash-flows which do not meet some of those conditions, insurance and reinsurance undertakings should unbundle both sets of cash-flows. For the first set of cash-flows, no separate calculation of the best estimate and the risk margin should be required but undertakings should be required to carry on a separate calculation for the second set of cash-flows. If the proposed unbundling is not feasible, in particular when there is significant interdependency between the two sets of cash flows, undertakings should be required to carry on separate calculations of the best estimate and the risk margin for the whole contract.

Future premiums

Guideline 68 – Future premium cash-flows versus premium receivable

Insurance and reinsurance undertakings should establish the future premium cash-flows contained within the contract boundaries at the valuation date and include within the calculation of its best estimate liabilities those future premium cash-flows which fall due after the valuation date.

Insurance and reinsurance undertakings should treat premiums which are due for payment by the valuation date as a premium receivable on its balance sheet until the cash is received.

Calculation of claims provisions

Guideline 69 – Methods to calculate provisions for outstanding reported claims

Insurance and reinsurance undertakings should not include the incurred but not reported provision (IBNR) and should not include unallocated loss adjustment expenses (ULAE) in the calculation of the outstanding reported claims provision, which represent the component of the claims provision where events giving rise to the claim have been notified to the insurer.

Two possible methods to estimate the provision for outstanding reported claims are:

- consideration of the number of claims reported and their average cost;
- case-by-case estimation.

Explanatory text

159. The situations in which each of these may be appropriate are set out below:

a) Analysis of the number of claims reported and their average cost.
This method may be appropriate for claims which have a short time lag to settlement and where the ultimate claim severities are reasonably stable. The stability of the ultimate claim severity could be demonstrated by an analysis of the variance of the size of claims at final settlement. In order to obtain a reliable estimate of the average cost, a sufficient number of origin and development years will need to be available.

b) Case-by-case estimation.
Where a case-by-case approach is applied, this should include an estimation of each individual provision for a single claim based upon up-to-date and credible information and realistic assumptions. Furthermore the following aspects should be considered:
   (a) These case estimates should take future inflation into account according to a reliable forecast of the payment pattern;
   (b) The future inflation rates should be market consistent and suitable for each line of business and company;
   (c) Individual valuations should be revised as information is updated;
   (d) 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.

160. In assessing the degree of model error introduced by a case-by-case approach, undertakings should assess the reliability of the information to support these assumptions at the relevant cohort level.

161. Moreover, the undertaking should provide written documentation on at least:
    a) The 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;
    b) The method to include inflation, discounting and direct expenses;
    c) The frequency of the valuations review which must be at least quarterly;
    d) The procedure to take into account the changes in both entity specific, legal, social, or economic environmental factors;
    e) The requirements in order to consider the claim to be settled.

162. A case-by-case approach may be considered suitable where there are relatively low numbers of claims to estimate and where there is significant variability in claim sizes.

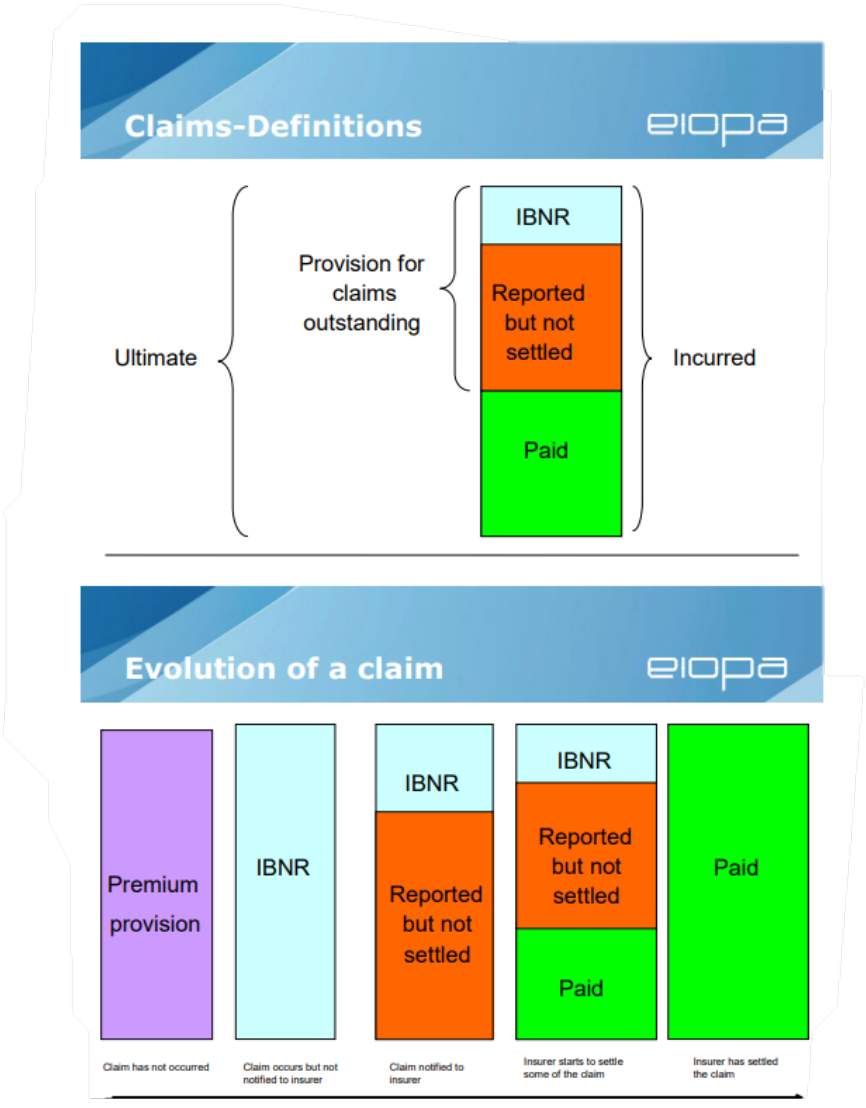
163. Obviously this method only applies where the incurred and reported claims provision has been valued without considering IBNR, for example it has been assessed using some of the aforementioned simplifications.

Concepts related to claims provisions, i.e. all claims occurring on or before the valuation date

- **Claims paid**: Claims payments already made.
- **Reported But Not Settled (RBNS)**: Claims in respect of claim events that have happened and reported to the insurer, but have not yet been settled. These could represent estimates from claims handlers, mechanical estimates, factor based approaches etc. The key is consistency in strength over time, it does not include IBNR
- **Pure IBNER**: 'Incurred but not enough reported', claim events have happened and reported to the insurer but the amount set up for these may need to be adjusted. Can be positive or negative.
- **Pure IBNR**: 'Incurred but not reported', claim events have happened but the insurer has not yet been informed of any claims.
- **IBNR:** A term which is commonly used to describe the sum of the IBNER and IBNR components across a portfolio of claims; i.e. this number represents the difference between the total ultimate and incurred amount reported to the insurer for claims which have already occurred.

- **Provision for claims outstanding from Article 77 of Solvency II also referred to as claims provisions**: Relates to the amounts insurers are holding for claim events that have already occurred regardless of whether the claims arising from these events have been reported or not. Will include the direct expenses which can be assigned to individual claims.
- **Incurred**: Paid + RBNS, i.e. claims that have been reported to the insurer.
- **Ultimate claims**: Paid + RBNS + IBNR, i.e. final amounts that the insurer will need to pay.

164. An overview about the interactions between the different "Concepts" can be found in the following chart



Guideline 70 – Methods to calculate provisions for incurred but not reported claims

Where actuarial techniques (e.g. chain ladder techniques) are used to estimate incurred but not reported provision (IBNR), insurance and reinsurance undertakings should pay a specific consideration to whether the assumptions behind the technique hold, or whether adjustments to development patterns are required to appropriately reflect the likely future development.

Explanatory text

165. The consideration of the variance of the size of claims incurred in a year and the number of claims incurred in a given year is helpful as to determine whether there is a stable and reliable basis to ensure that the average claim size is representative.

166. In non-life insurance, the actuarial methods used to determine best estimates and risk margins can be expected to range in complexity but will usually require granular company-specific internal data, particularly for lines of business with pay-out periods of several years (so-called "long-tailed" lines of business).

167. In cases where only few development years or occurrence years respectively are available, 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 necessary data are not available.

168. A simplified method for the calculation of outstanding reported claims provision based on a 'case-by-case approach' may be appropriate in case of: a) high-severity-low-frequency claims, or b) new (re)insurance company or new line of business, although only temporarily until achieving sufficient information to apply standard methods.

169. 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 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 judgments.

170. Another two possible methods to estimate the provision for incurred but not reported (IBNR) claims are:
    a) analysis of the number of claims expected and their average cost;
    b) ratios of IBNR to outstanding claims provisions.

171. The situations in which each of these may be appropriate are set out below:

a) Analysis of the number of claims expected and their average cost.
This method may be appropriate for short tail business where there is no material observed change in claims frequency or where delay tables are available to determine the number of claims expected in future periods. An example of a practical implementation of such a method is given in the Technical Annex.

b) Ratios of IBNR to outstanding claims provisions.
This method will be appropriate where the ratio of IBNR to outstanding claims provision is expected to be stable for a given point in the claims development, the strength of case estimation is stable over time and reliable data are available to assess what a suitable ratio may be. This method may be used where robust data are not available to use other estimation methods.

Guideline 71 – Methods for the valuation of claims settlement expenses – unallocated loss adjustment expenses (ULAE)

When insurance and reinsurance undertakings apply a simplified method for the provision for claims settlement expenses based on an estimate as a percentage of the claims provision, as outlined in Technical Annex II, this should only be considered when expenses can reasonably be assumed to be proportionate to provisions as a whole, where this proportion is stable in time and where the expenses distribute uniformly over the lifetime of the claims portfolio as a whole.

Explanatory text

172. 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.

Calculation of premium provisions

Guideline 72 – Cover

Insurance and reinsurance undertakings should ensure that premium provisions at the valuation date include the valuation of all recognised obligations within the boundary of insurance or reinsurance contracts, for all exposure to future claims events, where:

a) Cover has incepted prior to the valuation date;

b) cover has not incepted prior to the valuation date, but the insurance or reinsurance undertaking has become party to the insurance or reinsurance contract providing the cover.

Without prejudice to the Proportionality Assessment and the provisions in Article 36(2) of Commission Delegated Regulation 2015/35, undertakings may apply the simplification outlined in Technical Annex III.

Guideline 73 – Considerations for claims costs projections

Insurance and reinsurance undertakings should ensure that the assessment of the claims cash-flows included in the premium provisions give appropriate consideration to the expected incidence and cost of future claims, including consideration of the likelihood of infrequent, high severity claims and latent claims.

Explanatory text

173. The assessment of premium provisions need to give due consideration to the expected incidence and cost of infrequent and high-severity claims as well as high volume and low-severity claims. For some class of business it will be appropriate to give separate consideration to the likelihood and cost of future claims falling within more than one of the following categories of claims:
    - Attritional claims: high volume of low cost claims that are routinely expected to occur;
    - Large claims: less frequent, higher cost claims that are routinely expected to occur but where the frequency of such claims can vary materially from period to period;
    - Aggregation claims: a large frequency of claims arising from single event that occur less than annually;
    - Binary events: very low frequency events giving rise to very large claims settlements;
    - Latent claims: claims that materialise many years after the original coverage period on risk-attaching policies.

Guideline 74 – Uncertainty of policyholder behaviour

Insurance and reinsurance undertakings should ensure that the valuation of premium provisions includes an allowance for the possibility that policyholders will exercise options to extend or renew a contract or to cancel or lapse a contract prior to the end of the cover term provided.

Explanatory text

174. Factors affecting policyholder behaviour include but are not limited to:
    - Quality of sales advice;
    - Quality of claims handling service;
    - Scale and nature of policyholder contract from inception.

175. Policyholders' option to lapse non-life insurance may be dependent on the change of policyholders' status such as the ability to further pay the premium; however, it may also depend on an adjustment to their cover such as a change in vehicle or moving house. Similarly commercial covers may no longer fit the needs of the business due to restructuring, growth, redundancies or closure.

176. It is important to consider whether the presence of policyholder options could materially change the economic nature of the risk covered under the terms of the contract if exercised, i.e. where they have an option to exercise an extension or lapse anti-selection issues may arise. In such circumstances the cash-flow projection has to take into account of the proportion of policyholders that are expected to take up the options and the expected deterioration in net future cash-flows arising from anti-selection by policyholders.

Guideline 75 – Negative premium provision

Insurance and reinsurance undertakings should ensure that, where the present value of future cash in-flows exceeds the present value of future cash outflows the premium provision, excluding risk margin, is negative.

Explanatory text

177. Where premium provisions are negative, it is also possible that the technical provisions may be negative, particularly for classes of business with short settlement patterns. Where this is the case a negative value has to be recorded in the balance sheet for Solvency II.

178. However, this does not imply that the risk margin has to be also negative or zero. The risk margin measures the cost of capital across the entire run-off until the settlement of all claims and, for insurance business, the capital requirement will exceed the present value of future profits for some or all of this period, unless the contracts have been designed to avoid insurance risk transfer. Thus, the risk margin cannot be negative.

179. Where negative premium provisions are not immaterial, estimating the risk margin using the simplification based on taking a proportion of technical provisions is unlikely to be an appropriate method. Having established an appropriate valuation of the risk margin, using the proportion of technical provisions proxy to estimate the risk margin for interim reporting purposes, may be appropriate if consideration is given to any changes in the relative proportion of negative premium provision in the total valuation of technical provisions.

Calculation of Expected Profits in Future Premiums (EPIFP)

***Guideline 76* – Separation of insurance obligations**

For the purpose of the calculation set out in Article 260 of Commission Delegated Regulation 2015/35, insurance and reinsurance undertakings should split its insurance obligations into those attributable to already paid-in premiums and those attributable to premiums in respect of business in force which are receivable in the future.

Guideline 77 – Assumptions used to calculate EPIFP

For the purpose of calculating the technical provisions without risk margin under the assumption that the premiums relating to existing insurance and reinsurance contracts that are expected to be received in the future are not received, insurance and reinsurance undertakings should apply the same actuarial method used to calculate the technical provisions without risk margin in accordance with Article 77 of the Solvency II Directive, with the following changed assumptions:

a) policies should be treated as though they continue to be in force rather than being considered as surrendered;

b) regardless of the legal or contractual terms applicable to the contract, the calculation should not include penalties, reductions or any other type of adjustment to the theoretical actuarial valuation of technical provisions without a risk margin calculated as though the policy continued to be in force.

All the other assumptions (e.g. mortality, lapses or expenses) should remain unchanged. This means that the insurance and reinsurance undertakings should apply the same projection horizon, future management actions and policyholder option exercise rates used in best estimate calculation without adjusting them to consider that future premiums will not be received. Even if all assumptions on expenses should remain constant, the level of some expenses (e.g. acquisition expenses or investment management expenses) could be indirectly affected.

Explanatory text

180. As stated in Article 260(2) of the Delegated Regulation, EPIFP is determined as the difference between the official calculation of technical provisions without risk margin and a calculation of technical provisions without risk margin under the assumption that future premiums (and related benefits) expected to emerge from existing contracts will not occur.

181. The methodology described is based on a difference between two different calculations of technical provisions without risk margin, so it is crucial that both terms of the subtraction are calculated following the same approach and technical hypothesis, with the only exception that in the additional technical provisions without risk margin calculation no future premiums will be included.

182. As written above, the technical hypothesis should remain unchanged to guarantee coherence among the official technical provisions without risk margin and technical provisions without risk margin under the assumption that future premiums (and related benefits) expected to emerge from existing contracts will not occur.

183. This means that the projection of future cash flows should not change when valuating EPIFP, i.e. the calculation should be only a matter of identifying the cash flows related to future premiums and taking them out from the calculation without altering the remaining cash flows.

184. In order to avoid divergent practices on expenses projection applied on technical provisions without risk margin without future premiums, it is important to underline the following considerations:

- expenses directly related to future premiums should be excluded since the underlying assumption is that no future premiums will be received (e.g. some acquisition expenses);
- fixed costs should remain unchanged (e.g. no hypothesis on lower costs – such as salaries - should be used because no future premiums will be received);
- variable expenses should be influenced only indirectly because without future premiums, the invested reserve will not increase as planned (e.g. for investment management expenses, using the same management fee percentage as in the official technical provisions without risk margin but applied to lower amounts).

185. EPIFP calculation is directly connected to best estimate valuation. It therefore requires sound actuarial knowledge and deep understanding of best estimate modelling. For this reason, the staff in charge of best estimate valuation is expected to have a role on EPIFP calculation (e.g. validation by the actuarial function).

186. For example, EPIFP calculation can be simulated using existing options for the contract, mainly the paid-up option. However, in this case insurance and reinsurance undertakings should adjust the calculation to comply with Guideline 77, in particular not considering any material penalty in the calculation. Contracts without paid-up option can also follow the approach described in Guideline 77, although this will probably require further adjustments to the calculation system.

187. Alternatively, insurance and reinsurance undertakings can use the approach described in Guideline 77a.

Guideline 77A – Alternative approach to calculate to calculate EPIFP

Insurance and reinsurance undertakings may identify EPIFP as the part of present value of future profits related to future premiums in case the outcome does not materially deviate from the value that would have resulted from the valuation described in Guideline 77. This approach may be implemented using a formula design.

Methodologies to calculate recoverables from reinsurance contracts and special purpose vehicles

Guideline 78 – Extent of allowance for future reinsurance purchase

Insurance and reinsurance undertakings should recognise future cash-flows relating to future reinsurance purchasing covering obligations already recognised in the balance-sheet - to the extent that it is replacing any expiring reinsurance arrangements and if it can be demonstrated that it meets the conditions stated below:

a) the insurance or reinsurance undertaking has a written policy on the replacement of the reinsurance arrangement;

b) the replacement of the reinsurance arrangement does not take place more regularly than every 3 months;

c) the replacement of the reinsurance arrangement is not conditional on any future event which is outside of the control of the insurance or reinsurance undertaking. Where the replacement of the reinsurance arrangement is conditional on any future event, that is within the control of the insurance or reinsurance undertaking, then the conditions should be clearly documented in the written policy referred to in point (a);

d) the replacement of the reinsurance arrangement shall be realistic and consistent with the insurance or reinsurance undertaking's current business practice and business strategy. The insurance or reinsurance undertaking shall be able to verify that the replacement is realistic through a comparison of the assumed replacement with replacements taken previously by the insurance or reinsurance undertaking;

e) the risk that the reinsurance arrangement cannot be replaced due to capacity constraints is immaterial;

f) an appropriate estimate of the future reinsurance premium to be charged is made which reflects the risk that the cost of replacing existing reinsurance arrangements may increase;

g) the replacement of the reinsurance arrangement is not contrary to the requirements that apply to future management actions set out in Article 236 of Commission Delegated Regulation 2015/35.

Explanatory text

188. In the calculation of the best estimate at the valuation date, undertakings can allow for future management actions to enter into reinsurance contracts protecting their in force business. The calculation of the benefits will require that undertakings identify in respect of the reinsurance contract to be entered into:
    a) the amount of premium to be charged;
    b) the coverage to be provided;
    c) the risk of counterparty default that results from the arrangement.

189. We expect that the inclusion of future reinsurance would increase the net of reinsurance technical provisions, as we would expect that the reinsurance premium to be paid would be greater than the reinsurance recoveries obtained on a best estimate basis.

190. The premium to be charged for the reinsurance arrangement should include the future business falling within the contract boundary of the insurance and reinsurance contracts to which the amounts recoverable relate.

191. The approach for dealing with future reinsurance for the purposes of estimating the technical provisions needs to be consistent with the treatment of future reinsurance for the purposes of the SCR calculation

Guideline 79 – Simplified calculation of recoverables from reinsurance contracts and special purpose vehicles – premium provisions

In order to estimate the amount of reinsurance recoverable from the gross of reinsurance premium provision amount where a simplified calculation is applied, insurance and reinsurance undertakings should apply a separate gross to net factor to the cash outflow and potentially undertakings should apply a different gross to net factor for the cash inflow. Undertakings should base the gross to net factor for the cash outflow on an examination of past claims events with consideration of the future reinsurance programme applicable. The gross to net factor for the cash inflow should be based on consideration of the relative gross and reinsurance premiums expected to be received and paid.

Without prejudice to the provisions in the first paragraph of this guideline and the proportionality Assessment undertakings may apply the simplifications outlined in Technical Annex V.

Explanatory text

192. Estimates of premium provisions comprise terms relating to future claim events and terms relating to future premium receipts.

193. In estimating reinsurance recoverables in respect of premium provisions, it may be appropriate to estimate separate gross to net factors for each of these components. Therefore:

$PP_{Gross,k} = Claims_{Gross,k} - Premiums_{Gross,k}$

$Claims_{Net,k} = GN_k(c_{Claims,k}) \times Claims_{Gross,k}$

$Premiums_{Net,k} = GN_k(c_{Premiums,k}) \times Premiums_{Gross,k}$

$PP_{Net,k} = Claims_{Net,k} - Premiums_{Net,k}$

194. Where $PP_{Gross,k}$ and $PP_{Net,k}$ represent the premium provisions, on a gross and net of reinsurance basis respectively. The gross-to-net factor may be derived for the claims and premium components of the premium provision separately.

195. Where $c_{Claims,k}$ is a parameter representing the relevant characteristics of the reinsurance programme covering future claims events falling within the contract boundaries related to line of business k at the balance sheet day and

196. $c_{Premiums,k}$ is a parameter representing the relationship between the gross and net of reinsurance future premiums for the line of business k at the balance sheet day.

Guideline 80 – Simplified calculation of recoverables from reinsurance contracts and special purpose vehicles – provisions for claims outstanding

With respect to the provisions for claims outstanding for reinsurance recoverables, insurance and reinsurance undertakings should use separate gross-to-net techniques either for each accident year or for each underwriting year not finally developed for a given line of business or homogeneous risk group if appropriate.

Explanatory text

197. Accordingly, the relationship between the best estimate on a gross basis ($PCO_{Gross,k,i}$), the best estimate 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) k and accident year i can be represented in a somewhat simplified manner as follows:

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

198. 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.

199. 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 payments on a gross basis) will differ between development years or groups of development years.

200. 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 have accordingly to 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-tonet 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.

201. 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 net 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 gross 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.

Guideline 81 – Simplified calculation of the counterparty default adjustment

The simplified calculation of the adjustment for counterparty default given in Article 61 of Commission Delegated Regulation 2015/35 being based on the assumption that the probability of default of the counterparty remains constant over time, insurance and reinsurance undertakings proposing to use this simplification should consider whether this assumption is realistic, taking into account the credit quality step of the counterparty and the modified duration of the amounts recoverable from reinsurance contracts and special purpose vehicles.

Explanatory text

202. 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. At the same time, a sophisticated calculation of the adjustment can be a very complex task. In order to reduce the burden of the calculation of the adjustment on the undertaking, Article 73 of the Implementing Measures provides a simplification for the calculation of the adjustment.

General Principles in respect of methodologies to calculate technical provisions

Guideline 82 – The projection period

When assessing whether the projection period and the timing of cash-flows to the policyholders during the year is proportionate, insurance and reinsurance undertakings should at least take into account the following characteristics:

a) the degree of the homogeneity of the cash-flows;

b) the level of uncertainty i.e. the extent to which future cash flows can be estimated;

c) the nature of the cash-flows.

Explanatory text

203. Where expert judgment is applied to derive assumptions or to decide on a method to be used to calculate technical provisions, the available data source needs to be taken into account in this respect. In particular, where expert judgment was used to overcome data limitations, expert judgment applied when deciding on a method ensures that technical provisions are calculated accurately in a realistic, verifiable and justifiable manner.

204. Expert judgment in respect of assumptions on segmentation may be based on deep knowledge of statutory and regulatory terms, contractual terms (including options and guarantees included in the contracts) and reasonable policyholder expectations.

205. Possible simplifications are to assume that:
- the projection period is one year or that;
- cash-flows to the policyholders occur either at the end of the year or in the middle of the year.

206. The proposed simplification is considered proportionate if the cash in-flows and out-flows are equally distributed over the year.

Section 5: Validation

Guideline 83 – Proportionality of technical provisions validation

Insurance and reinsurance undertakings should require the actuarial function to ensure that the validation process is proportionate, considering the significance of the impact, both in isolation and in combination, of assumptions, approximations and methodologies on the value of technical provisions.

Guideline 84 – Selection of validation approaches and processes

Insurance and reinsurance undertakings should require the actuarial function to consider which validation approaches and processes are most appropriate depending on the characteristics of the liability and intended use for the approach or process.

Explanatory text

207. A combination of validation techniques needs to be used to cross verify each other. Each validation test will tell the actuarial function something specific and will have strengths, weaknesses and limitations. It is important that the user of the tests understands the test being used. Different tests will be selected to avoid systematic failure in the validation approach and to ensure that material errors and identified.
208. Expert judgment also needs to be validated and more details are included in the overarching paper on expert judgment.
209. The following is a non-exhaustive list of possible approaches and processes:

1. Examples of approaches which may support identifying emerging features, trends and distortions in the historical data:

a) Percentiles and analysis of residuals to detect influential observations, outliers or clustering of claims;
b) Ratios to detect the drivers or causes for certain patterns. For example, average cost per claim ratios;

c) Analysis of settled vs. reported or paid over incurred claims ratios;
d) Graphs to validate the use of a pattern. For example, the accident year patterns may be plotted against the final selected patterns;
e) Identifying the existence of any biases or other distorting effects within data which are not representative of current expectations. For example, a company may have recently merged with another. As a result, a specific line of business may produce a distribution of reserves which is significantly skewed in comparison to the distribution prior to the merger. This may suggest the need to separate both portfolios, even if they are within the same line of business.

2. Examples of approaches and processes that may help to understand the sensitivity of the technical provisions to the underlying assumptions:

- Stress and scenario testing in order to:

a) Understand any non-linearity between different assumptions;
b) Ensure that the estimation is robust and weaknesses/uncertainty have been addressed;
c) Get further insight into the tail of the loss distribution.
    - Sensitivity analysis can be used in order to assess the extent to which results are sensitive to the underlying assumptions and models. This can be performed by introducing small and large changes to parameters or additional data points.
    - The sensitivity to changes in assumptions has to be explored one change at a time in order to identify their importance.

3. Examples of approaches that may help to test the quality of fit and/or appropriateness of the model for valuing technical provisions:

a) Produce several sets of estimators (curves of distribution of the estimators) and assess how well they describe the data. There are several ways undertakings can do this before they calculate the best estimate of the provisions. For example, they can plot age to age factors against the estimators. From this they will be able to assess which curve fits best;
b) Test different curves and extrapolate a tail factor if necessary;
c) Statistical diagnostics techniques such as goodness of fit tests, including analysis of residuals, sum of squares, Akaike information criterion and non parametric smoothing, etc.;
d) Where individual contracts have been grouped into model points, tests for the goodness of fit of the grouped model points compared with the individual policy data records should be carried out. This should also include considering the impact of grouping under different scenarios.

4. Examples of approaches or processes that may be used in the validation of the outputs of models are:

- Analysis of movement: this is a comparison of actual surplus over the year with the expected surplus. The analysis can be grouped according to the drivers of surplus such as initial adjustments (impact of changes to model, methodology and data as well as any corrections made), new business effect (this will occur when the best estimate liability of the new business is not the same as the assets backing the new business), economic and insurance variances (impact of difference between best estimate assumption and experience), capital injections and any unexplained movements. The following process would be one way to undertake an analysis of movement:

    i. Re-run the model used to calculate position at the beginning of this period;
    ii. Re-run model allowing for any initial adjustments (the difference between two runs is the impact of opening adjustments);
    iii. Re-run model updated for changes in non-economic assumption, the difference between subsequent runs is the impact of assumption change;
    iv. Roll forward model allowing for actual non-economic parameters, the difference between the last two runs is insurance variance;
    v. Roll forward model allowing for actual economic parameters, the difference between the last two runs is economic variance;
    vi. Re-run model updated for new business volumes, the difference between the last two runs is the impact of new business;
    vii. The difference between the results of the last run and the previous run is unexplained movements. The undertaking should be able to demonstrate the understanding of the causes of any deviation from expected experience and the underlying drivers of this deviation.
    Note that this method only tests the assumptions being varied and not the design of the model. Note that changing the order will change the size of the impact of each individual step.

- Parallel testing: this involves using simple but independent calculations to check the reasonableness of an output. An example of this is using a closed form formula such as Black-Scholes to calculate the cost of guarantee and compare it to the cost of guarantee produced by the model. Another example is independently calculating the value of simple liabilities (such as asset shares) and comparing it with that calculated by the model;

- Cash-flow checks: this involves (re)insurance undertaking's checks on sample cash-flows for reasonableness;

- The assumptions used to estimate best estimate liabilities can be grouped into economic and non-economic (insurance) assumptions. Economic assumptions can be in the form of an Economic Scenario Generator (ESG) file or a set of deterministic scenarios.

Guideline 85 – Qualitative and quantitative approaches

Insurance and reinsurance undertakings should require the actuarial function to ensure that the validation process covers both quantitative and qualitative aspects and goes beyond a comparison of estimates with outcomes. It should also include qualitative aspects such as assessment of controls, documentation, interpretation and communication of results.

Guideline 86 – Regular and dynamic validation process

Insurance and reinsurance undertakings should require the actuarial function to perform a regular and dynamic process in which it periodically refines validation approaches to incorporate experience gained from carrying out the previous validations and in response to changing market and operating conditions.

Guideline 87 – Comparison against experience – deviations

Insurance and reinsurance undertakings should ensure that the actuarial function:

a) identifies the total deviation between expected and actual claims experience;

b) splits the total deviation into its main sources and analyses the reasons behind the deviation;

c) if the deviation does not appear to be a temporary aberration, makes recommendations on the changes to the model or assumptions used.

Undertakings should ensure that relevant market data and trends are considered as a part of the comparison against experience.

Explanatory text

210. Frequently used assumptions in the calculations of technical provisions are set based on an analysis of historical data on the presumption that past performance is a good indicator of future performance. Experience analysis and analysis of change may be used to assess the validity of this underlying assumption.

Guideline 88 – Comparison against market for contracts with options and guarantees

Insurance and reinsurance undertakings should consider whether there is a range of market instruments that are available to approximately replicate the contracts with inherent options and guarantees. Where available, the price of such portfolios should then be compared against the value of the Technical Provisions, calculated as the sum of the best estimate (calculated using cashflow projections) and risk margin.

Compliance and Reporting Rules

211. This document contains guidelines issued under Article 16 of Regulation (EU) No 1094/2010. In accordance with Article 16(3) of that Regulation, competent authorities and financial institutions are required to make every effort to comply with guidelines and recommendations.

212. Competent authorities that comply or intend to comply with these Guidelines should incorporate them into their regulatory or supervisory framework in an appropriate manner.

213. Competent authorities are to confirm to EIOPA whether they comply or intend to comply with these Guidelines, with reasons for non-compliance, within two months after the issuance of the translated versions.

214. In the absence of a response by this deadline, competent authorities will be considered as non-compliant to the reporting and reported as such.

Final provision on review

215. These Guidelines will be subject to a review by EIOPA.

Technical Annex I- Simplification for the attribution of the overhead expenses

The recurrent overhead expenses are defined in the following manner:

$$ROA_t = RO_{last} \cdot \left(\frac{RO_{next}}{RO_{last}}\right)^{\frac{1}{2}} \cdot \frac{s + 13 - t}{12(s + 12)}$$

Where:

s = expected duration in months to fully settle any obligation arising from the insurance contract, since the start of insurance cover
$t = 1, \ldots, 12$ month of the projection period
RO_{last} = recurrent overhead expenses observed during last 12 months
RO_{next} = recurrent overhead expenses anticipated for next 12 months
ROA_t = recurrent overhead expenses attributable to month t

Technical Annex II- Simplification for claims settlement expenses

Simplification for the provision for claims settlement expenses based on an estimate as a percentage of the claims provision:

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

$$Provision\ for\ ULAE = R\ \times \left[IBNR + a\ \times PCO_{reported}\right]$$

where:

R = Simple or weighted average of R_i over a sufficient period of timeR_i = Paid Claims settlement expenses / (gross claims + subrogations).
$IBNR$ = provision for IBNR
$PCO_{reported}$ = gross of reinsurance provision for reported claims outstanding
a = Percentage of claim provisions

Technical Annex III - Simplification for premium provisions

Simplification to derive the best estimate for premium provision based on an estimate of the combined ratio in the line of business in question:

The following input information is required:

(a) estimate of the combined ratio (CR) for the line of business during the run-off period of the premium provision;
(b) present value of future premiums for the underlying obligations (as to the extent to which future premiums fall within the contract boundaries);
(c) volume measure for unearned premiums; it relates to business that has incepted at the valuation date and represents the premiums for this incepted business less the premiums that have already been earned against these contracts (determined on a pro rata temporis basis).

The best estimate is derived from the input data as follows:

$$BE = CR \cdot VM + (CR - 1) \cdot PVFP + AER \cdot PVFP$$

where:

BE = best estimate of premium provision.

CR = estimate of combined ratio for line of business on a gross of acquisition cost basis i.e. CR = (claims + claim related expenses) / (earned premiums gross of acquisition expenses).

VM = volume measure for unearned premium. It relates to business that has incepted at the valuation date and represents the premiums for this incepted business less the premium that has already been earned against these contracts. This measure should be calculated gross of acquisition expenses.

$PVFP$ = present value of future premiums (discounted using the prescribed term structure of risk-free interest rates) gross of commission.

AER = estimate of acquisition expenses ratio for line of business.

The combined ratio for an accident year (= occurrence year) is defined as the ratio of expenses and incurred claims in a given line of business or homogeneous 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, that is they should be the total for losses occurring in year y of the claims paid (including claims expenses) during the year and the provisions established at the end of the year. 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 line of business or homogeneous group of risks should be determined as the ratio of the ultimate loss of incurred claims over earned premiums.

Technical Annex IV - Hierarchy of simplifications for the risk margin

With respect to level (1) of the hierarchy:

Life Underwriting Risk

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 risk margin calculations. Health Underwriting Risk The simplifications allowed for the SCR calculations in respect of health mortality, health longevity, medical expense disability-morbidity, income protection disability morbidity, health expense and SLT health lapse risks carry over to the risk margin calculations.

Non-life Underwriting Risk

The calculation of the future SCRs related to premium and reserve risk could be somewhat simplified if 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 the 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.

The aggregated standard deviation for reserve risk $\sigma_{(res,mod)}$ could be calculated using the aggregation steps as described in Articles 117 of Commission Delegated Regulation 2015/35, assuming all the amounts relating to premium risk are equal to zero.

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

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

Counterparty Default Risk

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.

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.

With respect to level (2) of the hierarchy:

By using a representative example of a proportional method the reference undertaking's SCR for the year t could be fixed in the following manner:

$$SCR_{RU}(t) = SCR_{RU}(0) \cdot \frac{BE_{Net}(t)}{BE_{Net}(0)} \qquad t = 1,2,3, \ldots$$

where

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

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

The simplification described above can be applied also at a more granular level, i.e. for individual modules and/or submodules. However, it is noted that the number of calculations to be carried out will in general be proportional with the number of modules and/or submodules for which this simplification is applied. Moreover, it needs to 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.

With respect to level (3) of the hierarchy:

With respect to life insurance the duration approach implies that the risk margin $CoCM$ could be calculated according to the following formula:

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

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.

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 material market risk), the calculation can often be improved by

- excluding these subrisks from $SCR_{RU}(0)$ for the above calculation;
- calculating the contribution of these subrisks to the risk margin separately;
- aggregating the results (where practicable allowing for diversification).

With respect to level (4) of the hierarchy:

According to this simplification the risk margin $CoCM$ is 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 within the given line of business;

α_{lob} = a fixed percentage for the given line of business.

Technical Annex V - Simplified calculation of recoverables from reinsurance contracts and special purpose vehicles

With respect to premium provisions:

The Gross-to-Net simplifications referred to below in respect of provisions for claims outstanding, 2), could also be used for the calculation of recoverables in respect of premium provisions, i.e. the provisions for (covered but not incurred) claims related to the current accident year (where i=n+1), by using the (anticipated) proportional part of the reinsurance cover for this year. This will be a conservative approach for the ceding (re)insurance undertaking, since the impact of the non-proportional reinsurance for the current accident (business) year is not taken into account.

With respect to provisions for claims outstanding:

1) Gross-to-Net simplification based on provisions for RBNS-claims ("case reserves") This simplification uses a ratio of net over gross provisions of an available portfolio A in order to estimate the net provisions of another portfolio B (NPB) based on the observable gross provisions of portfolio B (GPB). In other words, the Gross-to-Net simplification (GN) is stipulated as:

$$GN = \frac{NPA}{GPA}$$

where NPA and GPA represents the net and gross provisions of portfolio A, respectively. Then this simplification is applied to calculate the net provisions for portfolio B as follows:

$$NPB = GN\ x\ GPB$$

The following criteria need to be fulfilled in order to apply this simplification:

- The benchmark portfolio (A) is similar to the portfolio (B) for which the simplification is used, cf. the principle of substance over form.
-
- The ratio (GN) is established by means of credible and sustainable data. This requires a data set exceeding at least two years.

Ceded reinsurance varies with the size, the financial soundness and the risk aversion of a company, so that particular care is required when applying a ratio of net over gross from another benchmark portfolio. Such an approach can therefore only be used in cases where the benchmark portfolio is known to have a very similar nature as the own portfolio. Even if this is the case, however, the cession percentage for non-proportional reinsurance will heavily depend on the actual occurrence of large losses, and therefore be very volatile.

2) Gross-to-Net simplification based on cumulated paid claims (cumulated cash-flows) This simplification derives an estimate of net provisions for claims outstanding by using the gross

provisions for claims outstanding in combination with an estimate of the impact of the reinsurance covers for the individual accident years.

With respect to the rationale for using this simplification, it is noticed that for past accident years the reinsurance structure for an individual year is known and will (likely) not change retroactively. Accordingly, a comparison of net over gross cumulated cash flows per line of business in the past – differentiated by accident year – may be used to derive an estimate of the impact of proportional and nonproportional reinsurance for the individual accident year (i.e. a Gross-to-Net simplification for the individual accident year).

For each line of business the Gross-to-Net simplifications for the accident years not finally developed (GNi) are stipulated as follows:

$$GNi = \frac{ANet, i, n-i}{AGross, i, n-i}$$

where $AGross, i, n-i$ and $ANet, i, n-i$ represent the cumulated paid claims gross and net of reinsurance, respectively, and n is the latest accident year with observed values of these cash-flows. These simplifications are then used to calculate the net provisions for claims outstanding for the individual accident years, that is

$$PCONet, i = GNi \times PCOGross, i$$

where $PCOGross, i$ and $PCONet, i$ represent the gross and net provisions for claims outstanding for accident year i, respectively. In order to apply this simplification both gross and net cumulated paid claims (gross and net cash flows) per accident year need to be available for each line of business. For newer accident years and especially the last accident year (where i=n) the stipulated simplification might be a bit too high due to the fact that the IBNR claims are likely to constitute a large part of the provisions for claims outstanding. Accordingly, the stipulated simplification is likely to lead to an overestimation of the net provisions in these cases.

Technical Annex VI - Simplified calculation during the year for the risk margin

The Risk Margin at a given point in time during the forthcoming year (i.e. $CoCMlob(t)$) could be calculated as follows:

$$CoCM(t) = CoCM(0) \cdot \frac{BE_{Net}(t)}{BE_{Net}(0)} \quad , \quad 0 < t < 1$$

where:

$CoCM(0)$ = risk margin as calculated at time $t = 0$ for the reference undertaking's portfolio of (re)insurance obligations,

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