



Valuation of the non-life Best Estimate using simplified methods

- Issues to consider regarding level 2 measures -

**CEIOPS – Groupe Consultatif
Coordination Group**

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Introduction

Purpose

1. This paper analyses simplified methods in the valuation of technical provisions in non-life insurance, and discusses how the use of these methods can be appropriately aligned with the Solvency II Framework.
2. It is intended to support CEIOPS' work on providing advice to the European Commission on the drafting of level 2 implementing measures under the Solvency II Framework Directive.

About this paper

3. This paper was drafted by the Coordination Group on Non-life Best Estimate (formerly Coordination Group on Proxies) which was established jointly by CEIOPS and the Groupe Consultatif.
4. **This paper is a working draft reflecting the current and preliminary state of the discussion in the Coordination Group. It does not necessarily reflect the views of individual working group members.**
5. **This paper does not seek to give definitive recommendations; rather, it is intended to develop a preliminary analysis and to stimulate discussions with the main stakeholders in this early stage of development. It is not intended to replace any further consultation period about the issues covered.**
6. All references to the draft Solvency II Framework Directive are with respect to the General approach on the Solvency II Directive proposal adopted by the ECOFIN Council on 2 December (hereafter referred to as "Level 1 text").
7. The paper is divided into two broad sections:
 - **Section 1** describes different simplified methods with their characteristics and explores their role under the Solvency II framework.
 - **Section 2** addresses general topics about actuarial and statistical methodologies for the assessment of appropriateness of the level of the best estimate, about the application of the proportionality principle in the valuation of technical provisions and about standards for data quality.

Simplified methods

A Reinsurance recoverables and net provisions

A.1 Introduction

- A.1 This sub-section sets out some recommendations regarding implementing measures concerning the use of simplified approaches (“proxies”) for the determination of non-life reinsurance recoverables and technical provisions net of reinsurance. The approaches considered represent Gross-to-Net techniques meaning that it is presupposed that an estimate of the technical provisions gross of reinsurance (compatible with the Solvency II valuation principles) is already available. The techniques are applied to derive estimates of reinsurance recoverables and the provisions net of reinsurance on basis of the gross estimates and it is assumed that these gross estimates are best estimates within the meaning of Article 76 of the Level 1 text calculated either by means of actuarial and statistical methods or by using estimates based on simplified approaches or “proxies”.
- A.2 A special feature of the Gross-to-Net techniques is that they represent an indirect approach for calculating the value of reinsurance recoverables (the reinsurance assets), since following such techniques the value of reinsurance recoverables is derived in a subsequent step as the excess of the gross over the net estimate. Accordingly, this paper considers how such an indirect approach could be designed to be compatible with the Solvency II Framework and in particular Article 80 of the Level 1 text.
- A.3 It should be noticed that the technical discussion on simplified gross-to-net calculation approaches contained in this sub-section deals mainly with the determination of the best estimate. Whereas it seems likely that Gross-to-Net techniques could also be used in the context of calculating the risk margin, e.g. as a part of the simplified approaches for projecting future SCRs, a full discussion of this aspect is beyond the scope of the present sub-section.
- A.4 Notwithstanding, this sub-section is also intended to provide a conceptual framework for the use of Gross-to-Net techniques under Solvency II, and in this context takes a more broader perspective considering how the individual “building blocks” of the valuation (including risk margins) should be defined with regard to reinsurance recoverables.
- A.5 Finally, it should be noted that where this sub-section addresses the issue of recoverables (and corresponding net valuations), this is restricted to recoverables from reinsurance contracts, and does not include consideration of recoverables from SPVs.¹

¹ Which are also in the scope of Article 80 of the Level 1 text.

A.2 Legal Framework

A.2.1 Extracts from the Level 1 Text

- A.6 According to the last paragraph of Article 76(2) (regarding the calculation of technical provisions) of the Level 1 text,
- "[t]he best estimate shall be calculated gross, without deduction of the amounts recoverable from reinsurance contracts and special purpose vehicles. Those amounts shall be calculated separately, in accordance with Article 80."*
- A.7 In addition, the first paragraph of Article 80 states that
- "the calculation by insurance and reinsurance undertakings of amounts recoverable from reinsurance contracts and special purpose vehicles shall comply with Articles 75 to 79."*
- A.8 Hence the Level 1 text foresees that the calculation of technical provisions gross of reinsurance and the calculation of reinsurance recoverables (reinsurance assets) should be carried out separately (by applying compatible methodologies).
- A.9 It should also be noticed that the second paragraph of Article 80 refers to the time difference between direct payments and recoveries, requiring that
- "[w]hen calculating amounts recoverable from reinsurance contracts and special purpose vehicles, insurance and reinsurance undertakings shall take account of the time difference between recoveries and direct payments."*
- A.10 Moreover, the third paragraph of Article 80 stipulates that
- "The result from that calculation shall be adjusted to take account of expected losses due to default of the counterparty. That adjustment shall be based on an assessment of the probability of default of the counterparty and the average loss resulting therefrom (loss-given-default)."*

A.2.2 Relevant Implementing Measures

- A.11 The legal basis for implementing measures regarding simplified approaches for calculating technical provisions are given in Article 85 of the Level 1 text. According to point (h) of this Article, the Commission shall adopt implementing measures laying down,
- "where necessary, simplified methods and techniques to calculate technical provisions, in order to ensure the actuarial methods and statistical techniques referred to in point (a) are proportionate to the nature, scale and complexity of the risks supported by insurance and reinsurance undertakings."*
- A.12 It is noted that Article 85(a) refers back to Article 76(2) which covers the calculation of the best estimate gross of reinsurance. However, as stated in the previous sub-section A.2.1, Article 80 stipulates that the determination of reinsurance recoverables shall comply with Articles 75 to 79. This implies that any implementing measure specifying further the requirements under these Articles should also have regard to the determination of reinsurance recoverables. This would include the specification of any simplified methods as referred to under Article 85(h).
- A.13 The only direct reference to reinsurance recoverables among the implementing measures for the valuation of technical provisions is given in Article 85(g) which

refers to *“the methods to be used when calculating the counterparty default adjustment”* required under Article 80.

- A.14 The list of implementing measures as given in Article 85 does not refer directly to the calculation of the best estimate of technical provisions net of reinsurance. In particular, there is no reference to the (possibly simplified) methods to be applied when converting best estimates of technical provisions gross of reinsurance to best estimates of technical provisions net of reinsurance.
- A.15 However, any such method to determine technical provisions net of reinsurance gives rise to a method to determine reinsurance recoverables (as the difference between gross and net provisions, see previous sub-section A.2.1) which are implicitly covered by the implementing measures under Article 85 as explained above.

A.3 Background Information

A.3.1 The Report on Proxies

- A.16 Issues related to the use of Gross-to-Net proxies are discussed in some detail in the “Report on Proxies” elaborated by CEIOPS/Groupe Consultatif Coordination Group.² At the outset Gross-to-Net proxies are defined as proxies that “transform a gross of reinsurance estimate into a net estimate”³ and as such used in combination with proxies for stipulating the technical provisions gross of reinsurance. Moreover, it is stated in the report that

“Gross-to-net proxies are used to convert best estimates of claims or premium provisions into best estimates net of reinsurance, in cases where there is not enough (technically feasible) data to directly derive net estimates.”⁴

- A.17 The report on proxies contains a list of 10-12 Gross-to-Net proxies that have been considered by the national proxy expert groups.⁵ A majority of the considered Gross-to-Net proxies is based on accounting data (in a broad sense), including:

- (1) Historic accounting figures.⁶
- (2) Gross and net cumulated cash-flows (paid claims) per accident (or underwriting) year.
- (3) Gross and net provisions for reported but not settled (RBNS) claims (also referred to as case reserves) per accident (or underwriting) year.⁷

² CEIOPS/Groupe Consultatif Coordination Group: “Report on Proxies”, July 2008.

³ “Report on Proxies”, page 36.

⁴ “Report on Proxies”, page 76. This statement may be interpreted as if the ultimate goal is to derive an estimate of the technical provisions net of reinsurance in a direct manner. It should, however, be clarified that this approach is in line with the last paragraph of Article 76(2) and Article 80.

⁵ “Report on Proxies”, page 76-79.

⁶ It is not (always) explained what is meant by historic accounting figures in this context, i.e. whether these figures comprise gross and net technical provisions only or also gross and net claims cost.

⁷ In the following all references to accident years apply to underwriting years as well – unless otherwise stated explicitly

- A.18 The considered proxies based on accounting figures include also combinations of case (2) and (3), e.g. proxies where cumulated paid claims and RBNS-provisions, both gross and net of reinsurance, are applied when calculating the IBNR-provisions net of reinsurance.
- A.19 The application criteria for the various Gross-to-Net proxies referred to in the report are not always explained. However, some comments regarding these criteria may be given:
- With respect to the Gross-to-Net proxies based on historic accounting figures only it is in general not possible to distinguish between the individual accident years. However, it may be possible to distinguish between insurance classes or lines of business (depending on e.g. the reporting requirements in force).
 - Therefore, in order for these proxies to lead to reasonable results, it would be necessary to assume that the reinsurance programme and probably also the composition of the portfolio is stable over time.
 - On the other hand, Gross-to-Net proxies based on cumulated claims payments or provisions for RBNS claims (or both) can be stipulated for individual lines of business as well as for individual accident years (for a given line of business). In these cases it is not necessary to presuppose that the reinsurance programme is stable over time.
 - The considered Gross-to-Net proxies are first and foremost designed for calculating provisions for claims outstanding (“post claims”) net of reinsurance – whether these calculations distinguish between RBNS-provisions and IBNR-provisions or not. However, some of the considered proxies may be used when calculating the premium provisions (“pre claims”) net of reinsurance, although the degree of accuracy/ precision may be less in these cases, cf. also the alternative proxies (i.e. case (4) and (5) referred to below) and sub-section A.3.2.
 - It is tacitly assumed that the accounting figures referred to in cases (1)–(3) above are undertaking-specific and as such must be available for undertakings that want to apply these Gross-to-Net proxies. However, it should be possible to use market data (e.g. risk statistics for the overall market) – in combination with some basic characteristics of (simplified) reinsurance treaties – in order to establish Gross-to-Net proxies for individual lines of business and individual accident years (for a given line of business), cf. e.g. case (5) referred to below.
- A.20 The list of Gross-to-Net proxies referred to in the report on proxies comprises also two proxies that go beyond the application of accounting data:
- (4) The first of these alternative proxies applies the premium model for the line of business in question (based on e.g. separate estimation of claim frequencies and claim severities) in order to derive the percentage of the expected claims costs being reinsured and uses this information as a basis for stipulating the Gross-to-Net proxy.
 - (5) The other alternative proxy is using available market data (per line of business) regarding the (empirical) distribution of single claim amounts to establish ratios between:
 - i. the expected value of a (random) single claim net of reinsurance and
 - ii. the expected value of a (random) single claim gross of reinsurance

for a prescribed set of excess points of a simplified (pure) excess-of-loss treaty.

These ratios are then used in combination with e.g. suitable interpolation-techniques to stipulate Gross-to-Net proxies for the following cases:

- i. excess-of-loss covers only,
- ii. combinations of proportional reinsurance covers and excess-of-loss covers.

A.21 These alternative Gross-to-Net proxies could be applied for the individual lines of business as well as for the individual accident years (for a given line of business).

A.3.2 The QIS4 Technical Specifications

A.22 With respect to QIS4, the report on proxies proposed to test only two different designs of the Gross-to-Net proxies, both of them based on accounting data (in a broad sense):⁸

- one based on the provisions for RBNS claims (“case reserves”) and
- one based on cumulated cash flows (i.e. cumulated claims payments).

These testing proposals were incorporated into the Technical Specifications (TS) without further changes.⁹

A.23 This choice to narrow down the range of Gross-to-Net techniques for the purposes of QIS4 was made in order to keep the technical specifications sufficiently simple and practical.

A.24 The main aspects of these testing proposals are summarised below.

Gross-to-Net-proxy based on provisions for RBNS-claims (“case reserves”)

A.25 This proxy uses a ratio of net over gross provisions of an available portfolio A in order to estimate the net provisions of another portfolio B (NP_B) based on the observable gross provisions of portfolio B (GP_B). In other words, the Gross-to-Net proxy (GN) is stipulated as

$$GN = NP_A / GP_A,$$

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

$$NP_B = GN \times GP_B.$$

A.26 However, it is not clear from the QIS4 TS whether the purpose of this proxy is to calculate the overall net provisions for claims outstanding or only the net provisions for RBNS-claims

A.27 The following criteria should be fulfilled in order to apply this proxy:

- The benchmark portfolio (A) should be similar to the portfolio (B) for which the proxy is used, cf. the principle of substance over form.

⁸ “Report on Proxies”, page 79.

⁹ QIS4 Technical Specifications (MARKT/2505/08), page 85-88.

- The ratio (GN) should be established by means of credible and sustainable data. This requires a data set exceeding at least two years.

A.28 With respect to the properties of this proxy the QIS4 TS state that¹⁰

“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 should 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.”

Gross-to-Net-proxy based on cumulated paid claims (cumulated cash-flows)

A.29 This proxy 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.¹¹

A.30 With respect to the rationale for using this proxy, 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 non-proportional reinsurance for the individual accident year (i.e. a Gross-to-Net proxy for the individual accident year).

A.31 For each line of business the Gross-to-Net proxies for the accident years not finally developed (GN_i) are stipulated as follows:

$$GN_i = A_{Net,i,n-i} / A_{Gross,i,n-i}$$

where $A_{Gross,i,n-i}$ and $A_{Net,i,n-i}$ 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.

A.32 These proxies are then used to calculate the net provisions for claims outstanding for the individual accident years, that is

$$PCO_{Net,i} = GN_i \times PCO_{Gross,i}$$

where $PCO_{Gross,i}$ and $PCO_{Net,i}$ represent the gross and net provisions for claims outstanding for accident year i , respectively.

A.33 In order to apply this proxy both gross and net cumulated paid claims (gross and net cash flows) per accident year need to be available for each line of business.

A.34 The QIS4 TS briefly explain some of the properties of this proxy:

- For newer accident years and especially the last accident year (where $i=n$) the stipulated proxy 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

¹⁰ QIS4 Technical Specifications, page 86.

¹¹ The following description is somewhat simplified and shortened compared to the description given in QIS4 TS.

outstanding.¹² Accordingly, the stipulated proxy is likely to lead to an overestimation of the net provisions in these cases.

- The Gross-to-Net proxies referred to above concern the provisions for claims outstanding. For the premium provisions, i.e. the provisions for (covered but not incurred) claims related to the current accident (business) year (where $i=n+1$), a Gross-to-Net proxy can be stipulated by using the (anticipated) proportional part of the reinsurance cover for this year. This will be a conservative approach for the ceding insurer, since the impact of the non-proportional reinsurance for the current accident (business) year is not taken into account.

A.3.3 The QIS4 Results

A.35 The use of Gross-to-Net proxies in QIS4 is summarised as follows in CEIOPS' QIS4-report (see the sub-section 7.2.5 on simplifications and proxies):¹³

"Concerning reinsurance, only few undertakings were able to determine amounts relating to reinsurance recoverables (or net figures) by applying actuarial reserving techniques based on reinsured or net triangular claims data. Instead, many participants used triangle analysis techniques only for the calculation of best estimates gross of reinsurance, and derived the reinsurer's part of gross provisions by applying one of the two Gross-to-Net proxies. The wide use of Gross-to-Net proxies underlines that it is difficult for the undertakings to get data net of reinsurance.

However, some undertakings remarked that an application of this proxy¹⁴ may lead to poor results in the case of excess loss covers, where the risk mitigating effect of the reinsurance cover would be underestimated. It was also remarked that the use of both types of Gross-to-Net proxies described in the specifications on the same portfolio sometimes resulted in materially different valuations.

A similar situation could be observed with regard to the determination of premium provisions, where only a few participants were capable of carrying out an actuarial projection of future cash flows arising from future claim events. ..."

A.36 Some further comments are given regarding the participating undertakings' experience with the Gross-to-Net proxies stipulated for QIS4-purposes (see sub-section 7.3.3 on best estimates in non-life insurance):¹⁵

"The gross-to-net proxy was used by some undertakings as net claims data triangles are unsuitable for immediate application of actuarial reserving techniques since they often contain irregularities.

Undertakings within one country commented that it is difficult to use actuarial techniques to calculate the best estimate reinsurance provision taking into account all contractual details.

¹² The underlying assumption seems to be that the gross amounts of IBNR-claims on average are higher than the average gross amounts of paid claims and RBNS-claims. Accordingly, the impact of the reinsurance cover is likely to be larger for IBNR-claims than for paid claims and RBNS-claims.

¹³ "CEIOPS' Report on its fourth Quantitative Impact Study (QIS4) for Solvency II", page 80.

¹⁴ CEIOPS' Report on QIS4 does not state which of tested proxies that these undertakings refer to.

¹⁵ CEIOPS' Report on QIS4, page 107.

...

More guidance should be developed concerning the valuation of reinsurer's shares in technical provisions. To avoid over-reliance on very simple techniques such as the Gross-to-Net Proxy, guidance on other more sophisticated actuarial techniques which would be better aligned with the true risk mitigating effect of reinsurance covers should be sought."

- A.37 As a general summary regarding the experiences from QIS4, it may be stated that the need for Gross-to-Net proxies has been confirmed, cf. the statement that many insurance undertakings have problems with determining the cash flows related to reinsurance recoverables.
- A.38 On the other hand, the experience from QIS4 highlights the need to introduce clear admissibility criteria for the use of such Gross-to-Net techniques in order to ensure that the valuation of technical provisions net of reinsurance will lead to consistent results across different insurers and markets. Also, it seems necessary to develop actuarial guidance on a range of techniques for determining net provisions to avoid an over-reliance on a few proxy techniques.
- A.39 In this context it should also be noticed that the problems of identifying the cash flows related to reinsurance arrangements seem to apply to all kinds of (non-life) insurance undertakings (i.e. independent of their size) – a fact that should be taken into account when deciding on the scope of Gross-to-Net techniques for Solvency II purposes.

A.4 Key Questions to Be Considered

- A.40 With respect to the framing of implementing measures regarding Gross-to-Net techniques, the following issues (key questions) should be considered:
- How can it be ensured that the use of Gross-to-Net calculations (whereby reinsurance recoverables are calculated as the difference between the value of technical provisions gross and net of reinsurance) is in line with the Level 1 text

In order words: Can this approach be considered as an adequate simplification in order to meet the requirements of the Level 1 text?
 - What is the scope of Gross-to-Net techniques?
 - In which circumstances and under which conditions should non-life insurance undertakings be allowed to apply simplified Gross-to-Net techniques?
 - What degree of detail should be required when stipulating simplified Gross-to-Net techniques (and which principles and criteria should be applied in this context)?
 - What kind of requirements should be raised regarding the quality of the data applied when stipulating Gross-to-Net techniques?
 - Should any adjustments be introduced in order to cope with aspects of the Level 1 text not captured by the Gross-to-Net techniques? (E.g. the requirements laid down in Article 80 (second and third paragraph).)
 - Should the implementing measures contain detailed descriptions of allowed/available Gross-to-Net techniques and how should such a list be amended on a regular basis? (Or is this an issue for the supervisory guidelines on level 3?)

- Should a distinction be introduced between quota-sharing and other reinsurance covers?

Issue for discussion

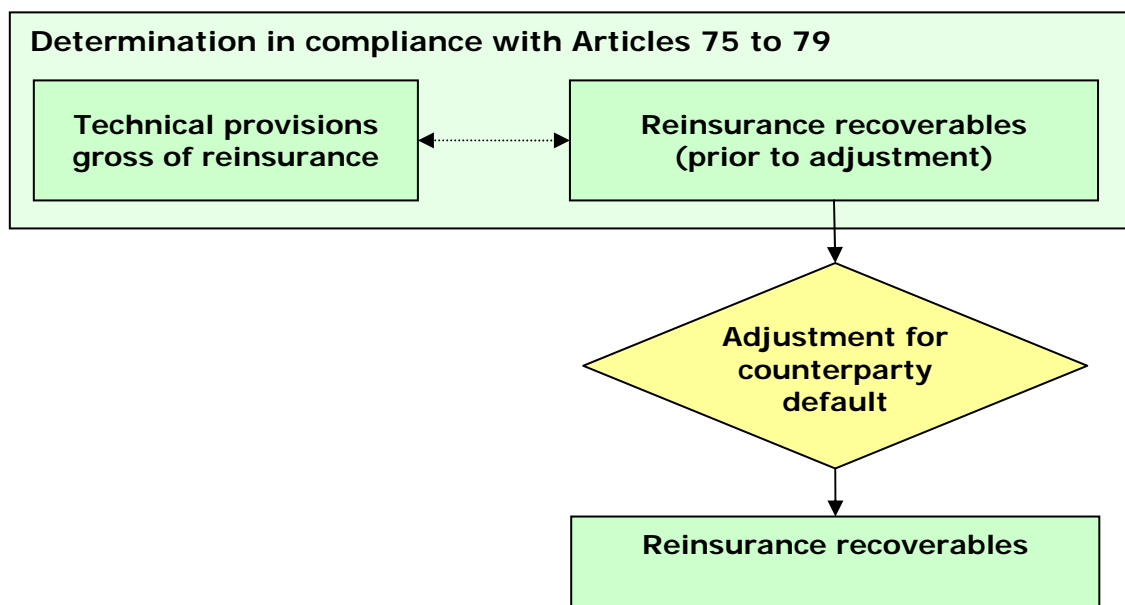
Are there further questions which should be addressed?

A.5 Analysis and Recommendations

A.5.1 Compatibility of Gross-to-Net Calculations with the Level 1 Text

Reinsurance recoverables and net technical provisions

A.41 As laid out in sub-section A.2.1, the determination of reinsurance recoverables should follow the same principles as for the determination of gross technical provisions (i.e. it shall comply with Articles 75 to 79 of the Level 1 text), with an additional adjustment (imposed by Article 80) to take into account of expected losses due to counterparty defaults, as illustrated in the following diagram:



A.42 In this context, the technical provisions net of reinsurance are given (defined) as the difference between the technical provisions gross of reinsurance and the reinsurance recoverables:

$$\text{Net provisions} = \text{gross provisions} - \text{reinsurance recoverables}$$

A.43 It is noted that the relevant articles of the Level 1 text (i.e. Article 76(2) and Article 80) contain no direct references to the best estimate of technical provisions net of reinsurance. Likewise, none of the implementing measures as listed under Article 85 explicitly refers to a net of reinsurance valuation of technical provisions.

A.44 However, it is likely that within Pillar 1 of the Solvency II framework the value of technical provisions net of reinsurance will be needed, for example as an input parameter for the determination of the SCR using the standard formula. Hence, under this framework it will be necessary to specify both the value of reinsurance recoverables and of technical provisions net of reinsurance in accordance with the approach outlined above.

Role of gross-to-net techniques in Solvency II Framework

A.45 The technical “gross-to-net” methods considered in this sub-section are designed to calculate the value of net technical provisions in a direct manner, by converting best estimates of technical provisions gross of reinsurance to best estimates of technical provisions net of reinsurance. The value of the reinsurance recoverables is then given as the excess of the gross over the net valuation:

$$\text{Reinsurance recoverables} = \text{gross provisions} - \text{net provisions}$$

A.46 It is noted that the level 1 text contains no direct reference to any such gross-to-net methods. However, since a determination of the value of technical provisions net of reinsurance gives rise to a determination of reinsurance recoverables (and vice versa), an application of gross-to-net valuation techniques – and more broadly of any methods to derive net valuations of technical provisions – may be integrated into the Solvency II Framework by using a three-step approach as follows:

- **Step 1:** Derive valuation of technical provisions net of reinsurance.
- **Step 2:** Determine reinsurance recoverables as difference between gross and net valuations.
- **Step 3:** Assess whether valuation of reinsurance recoverables is compatible with Article 80.

In the following, these steps are examined in more detail.

Step 1: Derivation of technical provisions net of reinsurance

A.47 The starting point for this step is a valuation of technical provisions gross of reinsurance. For non-life insurance obligations, the value of gross technical provisions would generally be split into the following components per homogeneous group of risk or (as a minimum) lines of business:¹⁶

$$\begin{aligned} PP_{\text{Gross}} &= \text{the best estimate of premiums provisions gross of reinsurance;}^{17} \\ PCO_{\text{Gross}} &= \text{the best estimate of claims provisions gross of reinsurance;} \text{ and} \\ RM &= \text{the risk margin.}^{18} \end{aligned}$$

A.48 From this, a valuation of the best estimate technical provisions net of reinsurance within a given homogeneous risk group or line of business may be derived by applying Gross-to-Net techniques to the best estimates components referred to above.¹⁹

A.49 The technical provisions net of reinsurance in the given homogeneous risk group or line of business would then exhibit the same components as the gross provisions, i.e.

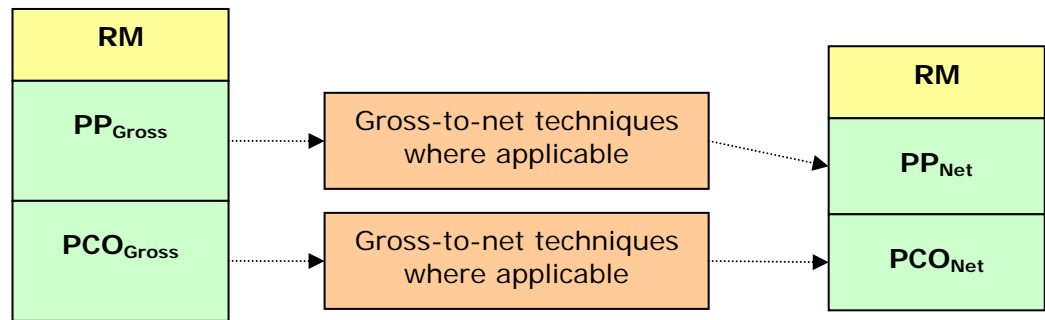
¹⁶ Note that according to Article 79 insurers shall segment their insurance obligations into homogeneous risk groups or – as a minimum – lines of business when calculating their technical provisions.

¹⁷ Concerning premium provisions we refer to section B of this paper.

¹⁸ This analysis assumes that the risk margin is not split further into a premium provision part and a claims provision part (following QIS4 specifications). It also assumes that the risk margin is calculated net of reinsurance.

¹⁹ Alternatively, the best estimates net of reinsurance may also be derived directly, e.g. on basis of triangles with net of reinsurance claims data.

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



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

A.50 On basis of the results of step 1, the reinsurance recoverables (RR) per homogenous risk groups (or lines of business) may be calculated as follows (using the notation as introduced above):

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

A.51 Note that implicitly this calculation assumes that the value of reinsurance recoverables does not need to be decomposed into best estimate and risk margin components.

Step 3: Assessment of compatibility of reinsurance recoverables with Article 80

A.52 In this step, it would need to be assessed whether the determination of the reinsurance recoverables in step 2 is consistent with Article 80 of the Level 1 text.

A.53 In particular, this would require an analysis as to whether the issues referred to in the second and third paragraph of Article 80, i.e. the time difference between direct payments and recoveries and the expected losses due to counterparty risks, were taken into account

A.54 To achieve consistency with the required adjustment related to expected losses due to counterparty defaults, it would generally be necessary to integrate an analogous adjustment into the determination of net of reinsurance valuation components in step 1. Such an adjustment would need to be treated separately (in the context of Article 85(g) as well as the relevant aspects of the SCR counterparty risk module) and would not be covered by one of the gross-to-net techniques discussed in this sub-section.

First draft recommendations²⁰

A.55 For non-life insurance obligations, the value of gross technical provisions would generally be split into the following components per homogeneous group of risk or (as a minimum) lines of business:

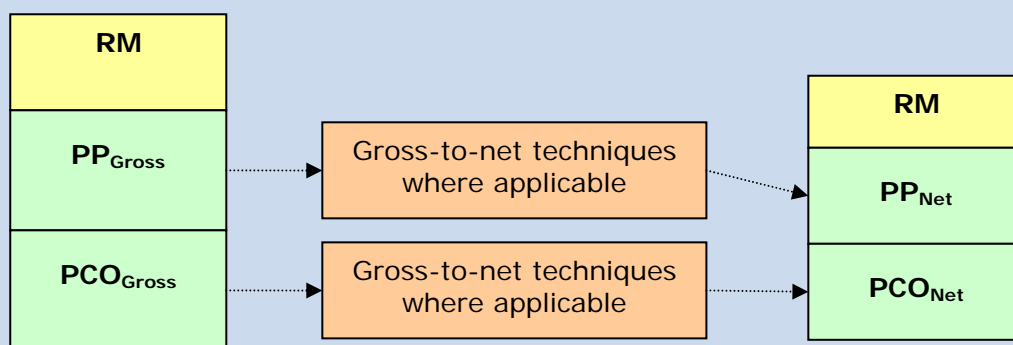
PP_{Gross} = the best estimate of premiums provisions gross of reinsurance;
 PCO_{Gross} = the best estimate of claims provisions gross of reinsurance; and
 RM = the risk margin.²¹

²⁰ The following are first draft recommendations reflecting the current state of discussion in the Coordination Group. The Group intends to develop final recommendations until June 2009.

A.56 From this, a valuation of the best estimate technical provisions net of reinsurance within a given homogeneous risk group or line of business may be derived by applying Gross-to-Net techniques to the best estimates components referred to above.

A.57 The technical provisions net of reinsurance in the given homogeneous risk group or line of business would then exhibit the same components as the gross provisions, i.e.

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



A.58 This assumes that for the valuation of technical provisions both gross and net of reinsurance the same risk margin (on basis of a net calculation) would be used.

A.59 The reinsurance recoverables (RR) per homogenous risk groups (or lines of business) can then be calculated as follows:

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

A.60 This implicitly assumes that the value of reinsurance recoverables does not need to be decomposed into best estimate and risk margin components.

A.61 It would need to be assessed whether the determination of the reinsurance recoverables as outlined above is consistent with Article 80 of the Level 1 text. In particular, this would require an analysis as to whether the issues referred to in the second and third paragraph of Article 80, i.e. the time difference between direct payments and recoveries and the expected losses due to counterparty risks, were taken into account. For the net technical provisions this would mean that they should reflect the average default amount of the reinsurance recoverables.

A.5.2 The Scope of Gross-to-Net Techniques

A.62 It follows from the summary of the QIS4-results that Gross-to-Net techniques have been extensively used by all kind of participating non-life insurance undertakings (irrespective of their size). This illustrates clearly the present difficulties of applying Article 80 to calculate reinsurance recoverables (reinsurance assets) in a direct manner.

²¹ This assumes that the risk margin is not split further into a premium provision part and a claims provision part.

- A.63 Accordingly, it seems reasonable that an option to use simplified gross-to-net techniques – following their integration under the Solvency II Framework as illustrated in the previous sub-section A.5.1 – should apply to all non-life insurance undertakings, including undertakings being able to stipulate the best estimate of technical provisions on a gross basis by using adequate actuarial methods and statistical techniques.
- A.64 However, any gross-to-net valuation technique to be used would need to lead to a valuation which is compatible with the Solvency II valuation principles and proportionate to the underlying risks. Therefore it can be expected that the Gross-to-Net methods to be applied would in general need to be more sophisticated than the Gross-to-Net proxies tested in QIS4. (This is especially the case for the proxy based on the ratio of net to gross provisions for RBNS-claims of a reference portfolio.)
- A.65 Moreover, non-life insurance undertakings would be expected to use of Gross-to-Net methods in a flexible way by applying them to either premium provisions or provisions for claims outstanding or to a subset of lines of business or accident (underwriting) years, having regard to e.g. the complexity of their reinsurance programmes, the availability of relevant data, the importance (significance) of the sub-portfolios in question or by using other relevant criteria.
- A.66 With respect to the need for setting general (high level) criteria to be followed by an undertaking using a simplified technique to estimate the technical provisions net of reinsurance or the reinsurance recoverables (reinsurance assets), the following recommendations may be provided.
- A.67 An undertaking would typically use a simplified Gross-to-Net technique when e.g.
- The undertaking has not directly estimated the net best estimate
 - The undertaking has used a case by case approach for estimating the gross best estimate.
 - The undertaking cannot ensure the appropriateness, completeness and accuracy of the data.
 - The underlying reinsurance programme has changed

A.5.3 Degree of Detail and Corresponding Principles/Criteria

- A.68 It seems unlikely that a Gross-to-Net simplified technique being applied to the overall portfolio of a non-life insurance undertaking would give reliable and reasonably accurate approximations of the best estimate of technical provisions net of reinsurance.²² Accordingly, non-life insurance undertakings should in general carry out the Gross-to-Net calculations at a sufficiently granular level. In order to achieve this level of granularity a suitable starting point may be
- to distinguish between homogenous risk groups or as a minimum lines of business,

²² A possible exception may be a monoline insurer that has kept its reinsurance programme unchanged over time.

- to distinguish between the premiums provisions and provisions for claims outstanding (for a given homogenous risk group or line of business), and
- with respect to the provisions for claims outstanding, to distinguish between the accident years not finally developed and – if the necessary data is available and of sufficient quality – to distinguish further between provisions for RBNS-claims and IBNR-claims, respectively.

A.69 Moreover, a further refinement that may be applied when stipulating the Gross-to-Net techniques could be to take into account the type of reinsurance cover and especially the relevant (i.e. most important) characteristics of this cover.

A.70 Below, the technical options being available to carry out Gross-to-Net valuations at a more granular level are analysed in more detail.

A.71 When applying such refinements, the following general considerations should be made:

- Whereas increasing the granularity of Gross-to-Net techniques will generally lead to a more risk-sensitive measurement, it will also increase their complexity, potentially leading to additional implementation costs for the undertaking. Therefore, following the principle of proportionality, a more granular approach should only be chosen where this is necessary regarding the nature, scale and complexity of the underlying risks (and in particular the corresponding reinsurance program).
- For certain kinds of reinsurance covers (e.g. in cases where the cover extends across several lines of business, so that it is difficult to allocate the effect of the reinsurance risk mitigation to individual lines of business or even homogeneous groups of risk, or where the cover is only with respect to certain perils of a LOB), increasing the granularity of Gross-to-Net techniques as described below will not suffice to derive an adequate determination of provisions net of reinsurance. In such cases, individual approaches tailored to the specific reinsurance cover in question would need to be used.
- As an alternative to Gross-to-Net calculations, it may be contemplated to use a direct calculation of net provisions based on triangular claims data on a net basis. However, it should be noted that such a technique would generally require adjustments of the underlying data triangle in order to take into account changes in the reinsurance program over time, and therefore would generally be rather resource intensive. Also, an application of such "direct" techniques may not yield a better quality valuation than an application of more granular Gross-to-Net techniques as discussed below.

A.5.3.1 Distinguishing between lines of business

A.72 There are several reasons for distinguishing between lines of business when stipulating Gross-to-Net techniques:

- An insurance undertaking's reinsurance programme may differ substantially between lines of business (where the undertaking is operating).
- Even if the undertaking's reinsurance programme is the same for all lines of business, the impact of this programme on the technical provisions may differ substantially between the lines of business due to e.g. differences between the relevant claims distributions and especially whether the line of business is exposed to large claims or not.

A.73 All five types of Gross-to-Net techniques briefly described in sub-section A.3.1 should in principle be able to capture the distinction between lines of business.

However, for the Gross-to-Net technique based on historic accounting data only (i.e. type (1)), this is likely to depend on the reporting requirements in force. Moreover, the Gross-to-Net technique based on the premium model (i.e. type (5)) applies – for obvious reasons – only to the premium provisions.

A.5.3.2 Distinguishing between premium provisions and provisions for claims outstanding

A.74 For both the premium provisions and the provisions for claims outstanding it is assumed at the outset that the Gross-to-Net methods should be stipulated for the individual lines of business.

Premium provisions

A.75 With respect to the premium provisions, the relationship between the provisions on a gross basis ($PP_{Gross,k}$), the provisions on a net basis ($PP_{Net,k}$) and the Gross-to-Net “factor” ($GN_k(\mathbf{c}_k)$) – for line of business (or homogeneous risk group) no. k – can be represented in a somewhat simplified manner as follows:²³

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

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

A.76 With respect to the various types of Gross-to-Net techniques briefly described in section A.3.1, it is only the alternative approaches (4) and (5) that in general are able to stipulate Gross-to-Net techniques to be used for converting best estimates of gross premium provisions to best estimates of net premiums provisions.

A.77 However, if the reinsurance programme for the current accident year (the current business year) is the same as the programme for the preceding year(s), type (2) or (3) – or a combination of these – may also be used in this context, cf. also the comments given in last paragraph of section A.3.2.

A.78 For lines of business where premiums, claims and technical provisions are related to the underwriting year (and not the accident year), the distinction between premium provisions and provisions for claims outstanding is not clear-cut. In these cases the technical provisions related to the last underwriting year comprise both premiums provisions and provisions for claims outstanding²⁴ and the distinction between Gross-to-Net techniques for the two kinds of technical provisions makes no sense.

Provisions for claims outstanding

A.79 With respect to the provisions for claims outstanding, separate Gross-to-Net techniques should be stipulated for each accident year not finally developed (for

²³ For the sake of simplicity it is assumed that the Gross-to-Net techniques in question can be represented by a multiplicative factor to be applied on the gross provisions.

²⁴ If the line of business in question contains multiyear contracts this will be the case for several of the latest underwriting years.

a given line of business (or homogenous risk group)). Accordingly, the relationship between the provisions on a gross basis ($PCO_{Gross,k,i}$), the provisions on a net basis ($PCO_{Net,k,i}$) and the Gross-to-Net "factor" ($GN_{k,i}(c_{k,i})$) for line of business (or homogeneous risk group) no. k and accident year no. i, can be represented in a somewhat simplified manner as follows:²⁵

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

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

A.80 With respect to the types of Gross-to-Net approaches described in sub-section A.3.1, type no. (2), (3) and (5) can be applied to stipulate techniques proxies for the individual accident years (for a given line of business), cf. also the description of the most advanced Gross-to-Net technique tested in QIS4.

A.81 However, some refinements of these methods may be considered in order to make the Gross-to-Net techniques more sophisticated:

- a) stipulation of separate Gross-to-Net techniques for individual development years or a suitable grouping of the development years (for a given accident year);
- b) stipulation of separate Gross-to-Net techniques for RBNS-claims and IBNR-claims;²⁶
- c) stipulation of separate Gross-to-Net techniques for "large" claims and "small" claims ("frequency" claims) – given some suitable thresholds for the separation of "large" and "small" claims; and
- d) stipulation of separate Gross-to-Net techniques for proportional and non-proportional reinsurance programs.

A.82 A rationale for introducing separate techniques for the individual development years or groups of development years may be that claims reported and settled at an early stage (after the end of the relevant accident year) in general have a claims distribution that differs from the distribution of claims reported and/or settled at a later stage. Accordingly, the impact of a given reinsurance programme (i.e. the ratio between expected claims payments on a net basis and expected claims on a gross basis) will differ between development years or groups of development years.

A.83 A rationale for introducing separate techniques for RBNS-claims and IBNR-claims may be that the insurance undertakings in general will have more information regarding the RBNS-claims and should accordingly be able to stipulate the Gross-to-Net technique to be applied on the gross best estimate for RBNS-provisions in a more accurate manner. On the other hand the Gross-to-Net technique to be applied on the gross best estimate for IBNR-provisions is then likely to be stipulated in a less precise manner, especially if more sophisticated techniques are not available.

²⁵ Cf. footnote 23.

²⁶ For this purpose it should be clarified whether the so-called IBNER-claims should be included in the RBNS-claims or the IBNR-claims.

A.84 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.

A.85 None of the Gross-to-Net techniques briefly described in sub-section A.3.1 and A.3.2 are able to capture all these refinements, even if some aspects related to refinements (a) and (b) are touched upon (in an indirect manner) when discussing the properties of the most advanced Gross-to-Net techniques tested in QIS4. Moreover, it would be relatively straightforward to adjust type no. (5) in order to capture refinement (c) and to some extent also refinement (a).

A.86 However, in order to take into account these (possible) refinements it will in general be necessary to develop more sophisticated techniques than those being described in sub-sections A.3.1 and A.3.2. On the other hand, these refinements should only be introduced if they in fact lead to an increased accuracy of the best estimate of provisions for claims outstanding net of reinsurance.

A.87 In this context, it may be argued that refinement (c) should be prioritised as this may be relevant for at least some of the commercial lines of business and is probably also the easiest refinement to implement. Before introducing this refinement it should also be considered whether the thresholds to be fixed in order to separate “large” and “small” claims could depend on the size of the undertaking (or the size of undertaking’s portfolio within the line of business in question) or the nature of the reinsurance programme.

Issues for discussion

- Are the refinements outlined above appropriate to achieve more adequate net valuations?
- Which requirements should be included in level 2 to ensure a sufficiently refined/granular calculation of reinsurance recoverables and net provisions?

A.5.4 Requirements regarding Data Quality

A.88 In general the data applied when stipulating Gross-to-Net techniques have to fulfil the standards of data quality to be established in accordance with Article 85(f) of the Level 1 text. With respect to these techniques it should also be distinguished between

- requirements related to the quality of accounting data to be applied for Gross-to-Net techniques based (mainly) on accounting figures, and
- requirements related to the quality of e.g. risk statistics needed for more sophisticated Gross-to-Net techniques, including the refinements (a)-(c) briefly described in sub-section A.5.3.

A.89 An undertaking using Gross-to-Net techniques for calculating the best estimate of technical provisions net of reinsurance should be able to document that the

accounting data and/or risk statistics applied for this purpose comply with the general quality standards and are adapted to the degree of accuracy sought for by the applied the Gross-to-Net methodology.

- A.90 If the undertaking needs to implement a more sophisticated Gross-to-Net technique in order to ensure that the technique applied is still proportionate to the underlying risks, where necessary it should seek to enlarge its data base in order to include the additional accounting data and/or risk statistics being necessary for stipulating the new Gross-to-Net technique.
- A.91 More generally, it should be taken into account that the more sophisticated Gross-to-Net techniques an insurance undertaking intends to implement, the more detailed accounting data and/or risk statistics are needed. Therefore, an undertaking should not be obliged to implement more advanced techniques where this would not be necessary in view of the underlying risk profile of its contractual obligations.
- A.92 For a more detailed analysis of the issue of data quality, we refer to sub-section G of this paper.

Issue for discussion

Are there specific requirements regarding the quality of the data to be used for an application of Gross-to-Net techniques which should be included in level 2?

A.5.5 Further issues to be covered

- A.93 As already indicated in e.g. sub-section A.2.1 it may be necessary to make adjustments to the best estimate provisions on a net basis that follow from the use of Gross-to-Net techniques, in order to take into account the aspects referred to in the second and third paragraph of Article 80, namely the time difference between direct payments and recoveries and especially the expected losses due to counterparty defaults.
- A.94 Concerning the time difference between recoveries and direct payments, it may be useful to introduce a distinction between cases of direct calculation of net best estimate and cases where Gross-to-Net techniques are used.
- A.95 Regarding counterparty default these adjustments should be in line with the implementing measures adopted in respect of Article 85(g) of the Level 1 text. A reference to the QIS4 TP should be included. It may also be relevant to refer to the relevant paragraphs of IFRS4.]
- A.96 Moreover, an insurance undertaking that apply Gross-to-Net techniques should consider to what extent it is necessary to make adjustments due to aspects of the reinsurance programmes that are not captured by these techniques, e.g. the impact of aggregate annual deductibles, aggregate annual limits, possible reinstatements premiums etc.
- A.97 A further complication may be how to cope with the fact that some parts of the reinsurance programme (e.g. the proportional treaties) may be related to underwriting years while other parts of the programme (e.g. the excess-of-loss treaties) may be related to accident or calendar years.

Issue for discussion

- Are there further issues to be considered?

- Which of these are relevant for Level 2?

A.5.6 Descriptions of admissible Gross-to-Net techniques

- A.98 As already mentioned, the QIS4-results indicate that there is likely to be a permanent need for Gross-to-Net techniques. However, any Gross-to-Net technique to be applied under the Solvency II Framework should comply with the overall valuation principles and would need to be proportionate to the underlying risks.
- A.99 In any case, it may be desirable to encourage the insurance undertakings using Gross-to-Net techniques to move to more sophisticated techniques (including simulations) and finally – if possible – to a direct calculation of the reinsurance recoverables (reinsurance assets) or the technical provisions net of reinsurance that is fully in line with the wording of Article 80 of the Level 1 text.
- A.100 It should also be an option (for either supervisory authorities or industry associations) to elaborate Gross-to-Net techniques based on market data (including risk statistics) for the whole or a major part of the individual lines of business. These techniques could be applied e.g. by small undertakings (or for small portfolios) where the available data may be too sparse in order to stipulate reliable Gross-to-Net techniques.
- A.101 Two possible approaches can be sketched with respect the description of allowed available Gross-to-Net techniques:
- Approach A: An overarching description of Gross-to-Net techniques for Solvency II purposes could refer in general terms to the kinds of proxies that will be allowed, e.g.
 - techniques based on cumulated gross and net paid claims or gross and net RBNS-provisions or a combination of the two,
 - techniques based on more detailed risk statistics applied in a manner that capture the main aspects of the reinsurance programmes.
 - Approach B: An alternative may be to carry out a more detailed inventory than the one summarised in sub-sections A.3.1 and A.3.2, cf. page 76-83 of the proxy report. However, this approach is likely to be more relevant for the level 3 guidance.
- A.102 If it is decided that detailed descriptions of Gross-to-Net techniques (and other simplifying techniques for that matter) should not be an integral part of the implementing measures (which seems rather likely), these descriptions could in any case be included as an annex to the Coordination Group's recommendations on implementing measures and be used as a starting point for the supervisory guidelines on this issue.

A.5.7 Structure and scope of recommendations for Level 2

- A.103 The recommendations concerning Level 2 implementing measures should cover the following issues:
- A recommendation regarding the use of simplifications in order to calculate the reinsurance recoverables (the reinsurance assets) in an indirect manner, i.e. as the difference between the best estimate of gross technical provisions and the best estimate of net technical provisions.

- A recommendation clarifying the criteria to be applied by the non-life insurance undertaking when using the option to calculate net technical provisions (and reinsurance assets) with Gross-to-Net techniques.
- A proposal for some (minimum) requirements regarding the degree of detail to be followed by insurance undertakings using the option to apply Gross-to-Net techniques.
 - With respect to premium provisions: The applied Gross-to-Net techniques should distinguish between lines of business.
 - With respect to provisions for claims outstanding: The applied Gross-to-Net techniques should distinguish between lines of business and – for a given line of business – between each accident year not finally developed.
- If possible: Recommendations to ensure that any allowance for simplified valuation techniques would not discourage insurers from improving their risk management and from moving to more sophisticated valuation over time.
- A proposal for some general requirements regarding the quality of the data (accounting data and risk statistics) to be used when stipulating Gross-to-Net techniques.
- A proposal for how to treat the aspects related to reinsurance programmes and reinsurance recoverables that the applied Gross-to-Net techniques are not able to capture (in full). This proposal should be coordinated with proposals for implementing measures related to Article 80.

B Premium Provisions

B.1 Introduction

- B.1 This sub-section explores issues and sets out recommendations regarding the use of simplified approaches for the determination of premium provisions in non-life reinsurance.
- B.2 As a basis for such an analysis of calculation techniques and their application criteria, the sub-section also contains some broader conceptual considerations regarding the definition of premium provisions and their valuation.
- B.3 We note that the issue of future premiums (and, more generally, the issue as to how the “boundaries” of the cash flows to be included in the valuation should be defined) is already addressed in separate papers by CEIOPS and the Groupe Consultatif and is therefore outside the scope of this sub-section. The same applies to the issue of segmentation.
- B.4 We note that up to now there does not seem to exist any commonly accepted methods for calculating premium provisions. Up to now only simplified methods have been described. This makes it more difficult to discuss requirements pertaining to statistical and actuarial analysis in this context.

B.2 Legal framework

B.2.1 Extracts from Level 1 Text

- B.5 The following identifies extracts of the Level 1 text which are relevant for premium provisions and considers which implications these extracts have on the calculation of such provisions:

Article 74 – Valuation of assets and liabilities:

- B.6 This Article sets out that:

“liabilities shall be valued at the amount for which they could be transferred, or settled, between knowledgeable willing parties in an arm’s length transaction”

Implication

- B.7 This principle can be regarded as applying to “premium provisions” with the remaining period on-risk, under existing policies, deemed to be transferred in the transaction as described.

Article 75 – General Provisions

- B.8 This Article sets out that technical provisions:

“... be based on their current exit value”

“... shall make use of and be consistent with information provided by the financial markets and generally available data on insurance and reinsurance technical risks (market consistency)

“... prudent, reliable and objective ...”

Implication

- B.9 Current exit value and market consistency are phrases that suggest that premium provisions should be calculated in the manner as would be adopted by a valuer for purchase. Such a valuer would take account of expected profit (premiums exceeding costs) during remaining periods on risk. Also such a valuer would take account of the time value of money where risks in the remaining period would give rise to claims settlements into the medium term future.
- B.10 Additionally a valuer for purchaser may wish to take account of future policyholder behaviour such as likelihood of policy lapse during the remaining period (where that has a material effect).
- B.11 The 'premiums written', 'unearned premiums' and 'unexpired risk provision' conventions seem not always to be appropriate in view of the principles set out in Article 75.

Article 76 – Calculation of Technical Provisions

"... sum of the best estimate and risk margin shall value the best estimate and the risk margin separately"

"... probability-weighted average of future cash-flows, taking account of the time value of money"

"... shall take account of all the cash in- and out-flows required to settle the insurance and reinsurance obligations over the lifetime thereof"

"... the risk margin shall be calculated by determining the cost of the SCR necessary to support the insurance and reinsurance obligations over the lifetime thereof"

Implication

- B.12 Article 76 implies the same best estimate and risk margin approach will apply for "premium provisions" in the same way as for outstanding claims provisions (for completed periods in the past where an insurer has been on-risk).
- B.13 Account should be taken of the time value of money and ideally a statistical analysis of the premium provision cashflows should precede the estimation of the probability-weighted average.
- B.14 The cost of solvency capital approach to risk margin implies that it is unnecessary to make a separate explicit assessment of the portion of risk margin related to premiums provision.

Article 77 – Other elements

"... all expenses ... in servicing insurance obligations"

"... take account of inflation, including expenses and claims inflation"

Implication:

- B.15 These have obvious direct bearing on the "premiums provisions" cashflows.

Article 78 – Contractual options

"... shall take account of any contractual options ..."

Implication:

- B.16 “Premiums provisions” should, in the non-life context, be increased to reflect where an insurer has committed itself to permit renewal by customer on a tariff which may not cover the insurer’s future claims and expenses outgoings.

Article 79 – Segmentation

“... shall segment [by] .. homogeneous risk groups ...”

Implication:

- B.17 This applies equally to outstanding claims provisions and “premiums provisions”. Segmentation will have a particular bearing where, in a section of an insurer’s portfolio, the future premiums are insufficient to cover future claims and expenses.
- B.18 The extent to which this may be offset by other parts of the portfolio (where premiums are adequate) might be determined by the risk groups (a value in one risk group could not be offset against the opposite number in a different risk groups). Level 2 guidance should clarify whether such offsets will be allowed. However, such consideration is outside the scope of this paper.²⁷

Article 82 – Comparison against experience

“... regularly compared against experience ...”

Implication:

- B.19 It will be an important validation to compare the “premiums provision” from a previous year – with the corresponding cash movements plus outstanding claims plus un-utilised premiums provision one year later.
- B.20 However, this may be difficult to accomplish noting that the cashflows under consideration belong to contracts with a large variety of expiring dates. Also, such an analysis may not be consistent with the one-year horizon used in the calculation of the SCR and would require consideration of periods of less than a year.
- B.21 Therefore it would be helpful to develop further techniques to assess the appropriateness of premium provisions.

Article 83 – Appropriateness of the level technical provisions

“Upon request from the supervisory authorities, insurance and reinsurance undertakings shall demonstrate the appropriateness of the level of their technical provisions, as well as the applicability and relevance of the methods applied, and the adequacy of the underlying statistical data used.”

B.2.2 Relevant implementing measures

Article 85 – Implementing measures

“The Commission shall adopt implementing measures inclusive of actuarial methods and statistical techniques for the “premiums provision” portion of the best estimate (Article 85(a))”

²⁷ Cf. the introductory remarks to this section.

B.3 Background information

B.3.1 Excerpts from QIS4 Technical Specification

B.22 Listed below is additional items from the QIS4 TS which go further than the Level 1 text. To avoid unnecessary repetition, QIS4 TS content is not reproduced where it does not more than restate principles from the Level 1 text. However, as can be seen below, the TS added more details:

TS.II.E.8 The valuation of the best estimate for claims outstanding provisions and for premium provisions should generally be carried out separately. However, if such a separate treatment is not practical, participants may value these provisions together.

TS.II.E.14 Premium provisions substitute current unearned premium provisions and unexpired risk provisions. Premium provisions relate to the coverage period when the insurer provides the service of accepting and managing the risks to its policyholders. During the coverage period, the insurer is at risk of insured events occurring with varying severity

TS.II.E.15 The calculation of the best estimate of the premium provision relates to all future claim payments arising from future events post the valuation date that will be insured under the insurer's existing policies that have not yet expired, administrative expenses and to all expected future premiums.

TS.II.E.16 Premium provision is determined on a prospective basis taking into account the expected cash-in and cash-out flows and time value of money. The expected cash flows should be determined by applying appropriate methodologies and underlying models and using assumptions that are deemed to be realistic for the line of business or homogenous groups of risk. Please see paragraphs TS.II.B.1 – TS.II.B.34 on the premiums to which this should be applied.

TS.II.E.17 Simplification

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

B.23 Appendices A and B reproduce the two premiums provisions proxies supplied in the QIS4 Technical Specification. We should analyse and discuss here any relevant learning from QIS4 (and previous QIS3).

B.3.2 Extracts of the QIS4 report on premium provision

B.24 *"The Premium provisions were often calculated using proxy techniques based on the unearned premium reserve and the provisions for unexpired risks as shown under local GAAP with further adjustment for the expected loss ratio if required. In some cases it was not clear whether undertakings had made any adjustment to the unearned premium reserve."*

B.25 *"A similar situation could be observed with regard to the determination of premium provisions, where only a few participants were capable of carrying out an actuarial projection of future cash flows arising from future claim events. Therefore, most participants had to rely on one of the two proxy techniques described in the specification. As to these two options, most participants used*

the simple Premium-Based Proxy. However, some participants remarked that an application of the Premium-Based proxy would often lead to valuations that would materially differ from more economic valuations. The Expected-Loss-Based proxy would better match with the insurer's internal perceptions on the riskiness and profitability of its business."

- B.26 *"Some participants remarked that the current methodology would open the door for redefining the **composition of lines of business** in such a way that losses on some policies may be compensated by profits on other policies (whereas positive and negative effects should be added, to avoid arbitrage).*
- B.27 *Many undertakings in different countries thought that further guidance was required in the valuation of premium provisions. Most undertakings used the premium based proxy (unearned premium reserve plus local GAAP provision for unexpired risk) or expected loss based proxy. Those participants pointed out that a proper actuarial valuation would either not be possible for them, or would have been too time-consuming in the context of QIS4. Among those insurers that attempted a more economic valuation of premium reserves, some used the Expected-Loss-Based proxy described in the technical specification, and reported that this would lead to a better approximation of the Solvency II standard than the Premium-Based-proxy. [...]*
- B.28 *Some participants suggested that additional guidance should be given on the treatment of **acquisition costs** when calculating the best estimate of premium reserves. [...]*
- B.29 *Supervisors noted that further **discussion and guidance** on appropriate methods for the valuation of premium provisions seems necessary. For example, simplified methods should also be made available for **the** premium provision, especially with regard to small insurers or it should be clarified whether negative premium provisions in individual LoBs (or even for the insurer's portfolio as a whole) should be accepted.*
- B.30 A supervisor pointed out that the premium-based proxy does not deliver an adequate approximation to the **Solvency II** valuation principles and would not be consistent with more sophisticated valuation techniques for premium provisions."

B.3.3 QIS4 Q&A document

- B.31 In the following, extracts from the Q&A document of QIS4 relevant to the calculation of premium provisions are given. This does not include questions and answers specific to the issue of future premiums, which is not covered in this sub-section.

Question:

This question concerns non-life bonuses and rebates. Typically, such bonuses and rebates are paid for claims-free policies following contractual terms. In our current local regulation there is also a special type of technical provision for future bonuses and rebates. Regarding QIS4:

- Should future cashflows arising from such bonuses taken into account as part of premium provisions or as part of claims provisions (in the latter case, treating claims-free status as a special type of claim)?
- When calculating historical loss ratios, should historical earned premiums be adjusted for the change of provisions for bonuses and rebates (i.e. for the change in expected bonuses and rebates)?
- Do participants have a choice depending on their accounting policies?

Answer:

- If it is a rebate, it should be included in the premium provisions.
- If rebates are included in the premium provisions, such an adjustment should be made.
- In principal yes, but any double counting should be avoided.

Question:

The proxy for the premium best estimate in TS.IV.G uses unearned premium + unexpired risk as the basis. Doesn't this include, in a proxy approach, expected profit at the level of the deferred acquisition costs that appears as assets in the balance sheet? Those deferred acquisition costs being set to nil in the QIS4 balance sheet, a coherent proxy would be instead: $BE = (\text{Provision for unearned premiums} + \text{Provision for unexpired risks} - \text{deferred acquisition costs}) / (1 + i/3)$

Answer:

The premium-based proxy described in TS.IV.G uses the provision of unearned premiums (plus, if applicable, the provision for unexpired risks) as a proxy for future claims costs that will be incurred under existing contracts. It is true that, where acquisition costs have been incurred upfront, these costs would not be part of these future cash flows, and should therefore not be taken into account for the valuation. However, in order to decide how this can be achieved for the use of the premium-based proxy, one has to bear in mind that the accounting directive allows for three different options with respect to treating acquisition expenses (cf. Article 18 of Directive 91/674/EEG):

- (i) Option 1: Acquisition Costs are deferred in accordance with Article 18 of Directive 78/660/EEC, and a corresponding asset (DAC) is shown in the balance sheet
- (ii) Option 2: Unearned premium provisions are shown with acquisition costs implicitly deducted
- (iii) Option 3: Unearned premium provisions are not adjusted for acquisition costs and acquisition costs are not booked as assets

The treatment of acquisition costs for the premium-based proxy would need to distinguish between those cases:

- under option 1, the DAC may indeed be deducted from the provision of unearned premiums as indicated in the formula proposed in the question
- under option 2, the formula in the QIS4 specifications (cf. TS.IV.G.4) would already automatically take into account acquisition costs, so no further adjustment would be needed
- under option 3, a deduction could be made if the amount of upfront acquisition costs would be known

However, overall it is important to note that the premium-based proxy is the most simple valuation method for premium provisions described in the QIS4 and is based on statutory accounting figures. As is pointed out in the specifications using the provision for unearned premiums as a volume measure may only inadequately reflect the need to incorporate all expected cash flows under the economic-based valuation of premium provisions envisaged in Solvency II (compare TS.I.A.2 (iv), TS.I.B.12). Therefore, this method should rather be seen as a practical solution for the purposes of QIS4, and participants are encouraged to move to valuation methods that are closer in line with the Solvency II principles.

B.3.4 Current conventions used to derive premium provisions in balance sheets

B.32 The following current conventions are frequently used to derive "premium provisions" in insurance balance sheets:

- 'Premiums written basis' – a full year of premium is entered into the balance sheet as if it had been received before the valuation date. Premiums receivable between valuation date and expiry / renewal are accounted for as an additional asset on the balance sheet in addition to the cash received. When this approach is adopted the premium income cashflow is not offset against the claims and expenses outgoings in the "premium provisions".
- 'Unearned premiums' – instead of explicitly valuing the cashflows related to the remaining period on-risk between valuation date and expiry / renewal date, the 'premium provision' is calculated as a proportion of the policy. The proportion is calculated most typically as the remaining period on risk, divided by the total period on risk. However the typical calculation relies on an assumption of an even spread of risk over the policy year. Where this is not the case (e.g. seasonality such as due to weather or hurricane season) the proportion should be adjusted. The 'unearned premiums' convention will tend to overstate the "premiums provision" where the premium tariff is profitable in that the claims and claims management expenses will be less than the premiums (producing return on capital plus excess profit to the insurer owner / shareholder).
- 'Unexpired risk provision'. In situations where premiums are not high enough to cover expected claims and claims management expenses, the 'unearned premium' convention will understate the "premiums provision". Therefore an 'unexpired risk provision' in addition to the unearned premium reserve will be included in the valuation of liabilities.
- 'Undiscounted'. The premiums written, unearned premiums and unexpired risk provision conventions do not typically embrace discounted. The exception is to the extent that premium tariffs may take account of the time value of money, since unearned premiums and unexpired risk provisions calculations incorporate tariff figures.
- 'Deterministic'. Premiums provisions are seldom, in conventional valuations, based on first attributing any statistical distribution before arriving at point estimates.

B.4 Key Questions to be considered

B.4.1 Overall guidance

- What guidance should be provided for insurer's calculation of premiums provisions to amplify the principles set out at Level 1?
- What guidance should be given in relation to use (or not – or adaptation) of conventions such as 'premiums written', 'unearned premiums' and 'unexpired risk provision'?
- Is specific Level 2 guidance appropriate, for premiums provisions, relating to discounting or the interpretation of 'probability-weighted average'?

B.4.2 Simplifications

- What was learned from the simplifications in QIS4?
- Should these simplifications be included in future guidance? Should their inclusion be on a temporary or permanent basis? Should they be incorporated at Level 2 or Level 3 or in national / professional guidance?

- Should CEIOPS advise the Commission to include any other simplifications or proxies in relation to premiums provisions?

B.5 Analysis and Recommendations

B.5.1 Definition and description of premium provisions

B.33 'Premium provisions', in a non-life context, relate to the valuation of future net cashflows into and out from the insurer, being a combination of:

- **outgoings** due to claims events occurring during the remaining in-force periods of policies which an insurer holds (within its portfolio of existing business) at the valuation date;
- **premium cash income** in respect of the remaining in-force periods of policies which an insurer holds.

B.34 **Outgoings** due to claims events include:

- Cashflows resulting from claims occurring between the valuation date and the expiry / renewal of existing policies. The timing of such cashflows will depend on the timing of the event(s) giving rise to the claim; delays between claim event and claim settlement date and the timing of relevant (reinsurance) recoveries associated with such claims.
- Cashflows arising from claims management expenses directly associated with claims occurring between the valuation date and the expiry / renewal of existing policies. These will include directly allocable internal management costs, allocable payments to outsourced managers, legal fees etc.
- Cashflows arising from unallocated claims management expenses allocated appropriately to claims occurring between the valuation date and the expiry / renewal of existing policies. These will include a share of the insurer's unallocated internal and external claims handling costs that are not allocated directly to specific claims. The calculation of the share should be based on an assessment of claims management activity associated with existing policies, between the valuation date and the expiry / renewal date, as a proportion of the insurer's total unallocated claims management costs.

B.35 Other outgoings to be considered would be cashflows arising from ongoing administration of the inforce policies. These expenses would not be directly related to the settlement of the claims, but to the management of the portfolio as a whole (e.g. expenses for reinsurance, investment expenses).

B.36 **Premium income** in respect of the remaining in-force periods of policies will include:

- For policies of in-force period one year, or for shorter in-force periods, any weekly, monthly, quarterly, etc., payments which will be received between the valuation date and the expiry / renewal of existing policies.
- For policies of in-force period greater than one year, the stream of future premium payments. In this case the cashflows may require to be adjusted to recognise situations where the insurer may alter the premium tariff after an initial period of in-force (most typically one year). If the potential future premium adjustments are taken into account, an evaluation of any cancellation options by the policy holder due to altering the premium should be included.

First draft recommendations²⁸

- B.37 For the valuation of technical provisions in non-life insurance, a distinction should be made between premium provisions and claims provisions.
- B.38 Premium provisions should relate to claims events occurring after the valuation date and during the remaining in-force periods of policies which an insurer holds (within its portfolio of existing business). Claims provisions should relate to claims events which have occurred in the insurer's existing portfolio of business.
- B.39 The valuation of premium provisions should take into account the future net cashflows into and out from the insurer, being a combination of:
- outgoings due to claims events occurring during the remaining in-force periods of policies which an insurer holds (within its portfolio of existing business) at the valuation date;
 - premium cash income in respect of the remaining in-force periods of policies which an insurer holds.
- B.40 Outgoings due to claims events include:
- Cashflows resulting from claims events
 - Cashflows arising from allocated and unallocated claims management expenses
 - Cashflows arising from ongoing administration of the in-force policies
- B.41 Cash flows regarding premium income may require to be adjusted to recognise situations where the insurer may alter the premium tariff after an initial period of in-force and should take into account any cancellation options by the policyholder.
- B.42 The principle expressed in Article 74 should apply to premium provisions with the remaining period on-risk, under existing policies, deemed to be transferred in the transaction as described.
- B.43 Premium provisions should be calculated in accordance with a transfer principle. Such a valuation would take account of expected profit (premiums exceeding costs) during remaining periods on risk. Also such a valuation would take account of the time value of money where risks in the remaining period would give rise to claims settlements into the medium term future.
- B.44 Additionally a valuation of premium provisions should take account of future policyholder behaviour such as likelihood of policy lapse during the remaining period (where that has a material effect).
- B.45 If the effect is material, a statistical analysis of the premium provision cashflows should precede the estimation of the probability-weighted average.

²⁸

The following are first draft recommendations reflecting the current state of discussion in the Coordination Group. The Group intends to develop final recommendations until June 2009.

- B.46 The cost of solvency capital approach to risk margin implies that it is unnecessary to make a separate explicit assessment of the portion of risk margin related to premiums provision.
- B.47 The insurer should validate the approaches and the quality of data accordingly.²⁹

²⁹ Cf. sections E and G of this report.

C Unallocated claims handling costs

C.1 Introduction

- C.1 This sub-section presents implementing measures regarding the simplified method proposed for the claims handling provision in non-life insurance (provision for unallocated loss adjustment expenses (ULAE)).
- C.2 The future costs for incurred claims, reported or yet unreported, may be split between payments to claimants and costs for handling the claims. The former can be linked to the individual claims and, hence, for example to risk groups and incurrence years, and the development of the payments or reported costs can be analysed by chain ladder and other methods.
- C.3 Claims handling costs may be split into
- costs that are directly allocated to individual claims, such as lawyer's fees or surveyor's fees (direct or allocated claims expenses), and are or can be included in the claims payments triangles, and
 - indirect (or unallocated) loss adjustment expenses, i.e. general expenses in connection with claims settlement such as, for example, salaries, facility, material, data processing project expenses. These expenses cannot be allocated to individual claims or accident years according to the cause of cost. Unallocated expenses, hence, can not be estimated in the same way as the claims provisions for example by standard techniques such as chain ladder methods.
- C.4 We note that the limit between allocated and unallocated claims handling costs is not clear-cut: some companies have in-house expertise (unallocated cost) but others hire the expertise from case to case (allocated cost). In view of the principle of proportionality, this detail is not considered further in the following.
- C.5 Where unallocated claims costs are considered separately in the valuation process, they give rise to a separate best estimate provision in addition to the best estimate provision relating to claims costs and allocated loss adjustment expenses.
- C.6 In the following, a simplified method for estimating such a provision for unallocated claims handling costs is considered. Further methods are described in sub-section C.5. It is also discussed whether the bases for the estimation should be the European market, the national market or data relating to the individual undertaking.
- C.7 This sub-section only discusses the claims handling costs provisions for incurred claims, which are part of the overall claims provision. This does not include consideration of claims handling cost provisions for claims not yet incurred which are part of the premium provision.

Issue for discussion

- Is there a need to extend the discussion on simplified methods for the calculation of ULAE also to premium provisions?

C.2 Legal framework

C.2.1 Extracts from Level 1 Text

Article 75 – General Provisions:

"... be based on their current exit value", "... prudent, reliable and objective"

Article 77 - Other elements to be taken into account in the calculation of technical provisions

In addition to Article 76, when calculating technical provisions, insurance and reinsurance undertakings shall take account of the following:

(1) all expenses that will be incurred in servicing insurance and reinsurance obligations;

(2) inflation, including expenses and claims inflation;

(3)

Article 79 – Segmentation

"... shall segment [by] .. homogeneous risk groups ..."

C.8 Interpretation in this context that the calculation is to be performed split by EU class, LOB, or corresponding.

Article 82 – Comparison against experience

"... regularly compared against experience ..."

C.9 Interpretation in this context that the parameters used should be checked with some regularity, and that the outcome of the calculation is judged, i.e. that the resulting claims handling provision is reasonable compared to the number of unsettled and estimated number of unreported claims.

C.2.2 Relevant implementing measures

Article 85 – Implementing measures

The Commission shall adopt implementing measures laying down actuarial methods and statistical techniques to calculate the best estimate (the probability-weighted average of future cash flows), Article 85(a).

C.3 Background information

C.3.1 Excerpt from QIS4 Technical Specification

C.10 In the QIS4 Technical Specification the following advice was given about this proxy:

TS.IV.I.1 Factor-based claims-handling-costs proxy

TS.IV.I.2 Description

This proxy is intended to determine the best estimate of the

claims handling provision. The best estimate of the claims handling provision should then be added to the best estimate of the claims provision (without unallocated claims expenses) to derive the best estimate for the "full" claims provision including all expenses.

This proxy will not be needed if all expenses related to the settlement of claims are already reflected in the best estimate, for example if settlement expenses are separated by year of occurrence and have been taken into account in a claims triangle calculation of the claims provisions.

The proxy may be applied to either gross, net, accounted or undiscounted claims provisions.

TS.IV.1.3 Input

The following input is required:

Best estimate of claims provisions per LOB, without reflecting unallocated claims expenses

Factors for claims handling costs per LOB and per market

TS.IV.1.4 Output

Claims handling provisions per LOB

TS.IV.1.5 Calculation

The calculation of the claims handling provisions is based on the claims provisions per line of business (LOB) and factors applied to them.

TS.IV.1.6 Criteria for application:

To apply the proxy, the following criteria should be met:

- Unallocated claims settlement expenses are not included in the cash flows underlying the best estimate calculation of the claims provision, but are given as a total per LoB for the business year.

The claims portfolio within each LOB is comparable to the average "market" portfolio.

TS.IV.1.7 Other remarks:

The following factors are observed average ratios of claims handling provisions over claims provisions in the Swedish market: Sickness and accident 1.5 %, Private P&C 5.7 %, Commercial P&C 3.2 %, Motor hull 7.9 %, Motor 3rd Party Liability 4.3 %, Marine 5.1 %, Transport 2.5 %, Credit 2.1 %, Discharge 5.5 %, Livestock (including Pet animals) 5.9 %.

A company which can be supposed to have a large share of small claims in a LOB is recommended to use a somewhat higher factor than the above-mentioned, and the contrary if it has a large share of severe claims. As the claims handling provision is fairly small compared to the claims provisions, the principle of proportionality applies.

C.3.2 Country replies to QIS4 report template.

C.11 No specific comments are given in the CEIOPS' QIS4 report.

C.12 One country (Hungary) has reported that it has used a claims handling reserve proxy.

C.4 Key Questions to be considered

C.4.1 Is the simplified method suitable?

C.13 One question is if the calculation, based on market wide factors, is suitable for small companies (which are likely to be the main users of the simplified method) or if they are likely to be less efficient than large companies and, hence, need a higher relative claims handling provision than the average.

C.4.2 Can factors by EU insurance class be obtained?

C.14 The factors given in the QIS4 technical specification were derived from the Swedish market where the statistics is gathered not by EU class but by line of business, which in just a few cases correspond to the classes.

C.4.3 How can changing general conditions and inflation be taken into account?

C.15 The costs may increase because of inflation and also changing general conditions, which can cause a more extensive claims handling.

C.5 Analysis and Recommendations

C.5.1 Comments to the Key Questions

C.5.1.1 Is the simplified method suitable?

C.16 Due to the experience from the Swedish market, small companies do not need a higher relative claims handling provision than larger companies.

C.17 The simplified method specified in the QIS4 specifications may be considered suitable if:

1. there is insufficient data of appropriate quality to apply a reliable actuarial method to estimate the ULAE provision;
2. the amount of ULAE can be assumed to be directly proportional to best estimate of claims provisions;
3. the factors used can be assumed to be appropriate to the portfolio being valued, for example based on experiences from companies writing similar business in the same jurisdiction;
4. the duration of the portfolio is relatively small or the future relevant expense inflation is expected to be relatively in line with the relevant future claims inflation.

Issue for discussion

- Could the simplified method described above be considered suitable under the conditions outlined?
- Should a description of this method be included in the level 2 text?

C.5.1.2 Can factors by EU insurance class be obtained

C.18 The basis for the factors, claims provisions by class split between payments to the claimants and claims handling, however, is likely to exist in at least some jurisdictions.

C.5.1.3 How can changing general conditions and inflation be taken into account?

C.19 It seems to be appropriate to consider those determining factors for the ULAE in the same way as considered for the claims payments, so that the ratio can be assumed to be approximately constant. For example, it is a realistic assumption that inflation affects claims costs and claims handling costs in at least a similar way. Changes in the number of claims affect both the claims provision and the ULAE provision. Potential procedures are shown for example in "Methods for estimating loss and premium reserves" (a report issued by Federal Financial Supervisory Authority (BaFin), German Actuarial Society (DAV), German Insurance Association (GDV) and TU Dresden under the leadership of the German Insurance Association; chapter 6).

C.5.2 Checking the level of the estimated provision

C.20 Companies using the simplified method are recommended to make a rough estimate of how many man/woman years of work the provision obtained corresponds to, and if that is reasonable with respect to the number of unsettled claims.

C.5.3 General comments

C.21 The simplified method described above means that the claims reserve is multiplied by a factor. This method has the advantage that if the claims reserve increases due to inflation, the claims handling reserve will also increase. The relation between the claims handling reserve and the claims reserve has turned out to be fairly stable, which means that it has not to be revised very often (maybe every 5th or 10th year). The relation, however, differs between LOBs or claims types. One reason is that normally it is not 1000 times as expensive to regulate a 10 million € claim than a 10.000 € claim, which means that the factor is higher in LOBs with many small claims (for example motor vehicle) than in LOBs with more severe claims (for example motor third party).

C.22 The size of the claims handling reserve needed, when checking the factors used, can be estimated by considering for example the numbers of payments for different types of claims by payment year and incurrence year (a payment, likely, means that there has been some activity in the claims handling process). Such investigations, however, can be rather cumbersome depending on how this information is organised and hence it is an advantage if they have not to be performed frequently, but just with longer intervals as a check. As

mentioned above, the relation between the claims handling reserve and the claims reserve has turned out to be fairly stable.

C.5.4 Some alternative methods

- C.23 The following paragraphs describe some further methods to calculate claims handling cost provisions. These methods should not be part of the implementing measures of the Level 1 text.
- C.24 Other methods to calculate the claims handling reserve are for example to multiply the number of reported and unsettled claims by a standard amount (the average cost for remaining work) and the estimated number of unreported claims by another standard amount (average total cost for settling a claim). These amounts differ between different LOBs or types of claims.
- C.25 As mentioned in the introduction the ULAE can not be attributed to, for example, incurrence years. Due to the missing direct connection to individual losses, they are only subject to an “artificial” settlement since they are allocated by means of a distribution key.
- C.26 Future average expenses for loss adjustments can be estimated per claim and their frequency can be estimated based on the calendar year. In this case, the expenses for all activities yet to come with respect to settling the claims would have to be estimated and taken into account accordingly. These so-called transaction-based methods focus on the evaluation of expenses for opening, handling and closing claims and on the projection of these costs into the future. Such methods (e.g. “Johnson” or “claim staffing method”) are particularly common in the English-speaking world. Essays on these procedures can be found, amongst others, on the Web site of the Casualty Actuarial Society (www.casact.com) and on the Web site of the International Actuarial Association (www.actuaries.org), which describes the Johnson method by means of an example, in particular.

C.5.5 On which level are factors to be determined?

- C.27 As mentioned, the factors to apply differ between classes or LOBs. It is likely that they differ, too, between jurisdictions. One reason for that is different indemnity legislation, which causes different claims cost levels but not necessarily different levels of the claims handling costs. Another reason is that the policy stipulations may differ between markets leading to different claims size structures.
- C.28 In the German market huge differences in claims handling for the same LoB among companies are observed. There are differences between the companies also in the Swedish market, however without a clear correlation to the size of the companies (i.e. not unequivocally lower factors – “more efficient claims handling” – in larger companies than in smaller).
- C.29 As the simplified method is intended for companies which do not have a statistical basis for an own judgement of the ULAE provision, it is reasonable for them to apply factors based on the experience for the industry in their jurisdiction.

Issue for discussion

- Would it be feasible to derive factors for the simplified method

described above per individual LOB and per individual jurisdiction?

- If yes, should these factors be included in the level 2 text?

D Role and application of case-by-case approaches

D.1 Introduction

- D.1 The Level 1 text states in Article 76 that *“The best estimate (of a technical provision) shall be equal to the probability-weighted average of future cash-flows, taking account of the time value of money (expected present value of future cash-flows), using the relevant risk-free interest rate term structure”*.
- D.2 This implies the need for actuarial knowledge and sufficient data from a quantitative and qualitative point of view. However, not every insurance or reinsurance undertaking will always be able to have an appropriate quality of data to apply adequate methods to all segments of its portfolio. These circumstances are examples when a case-by-case approach may be used.
- D.3 In the following, we consider the definition and scope of application of such case-by-case approaches, and describe how such approaches may be carried out in practice.
- D.4 We note that under QIS 4, Case-by-Case reserving was presented as a proxy method. However, it should be stressed that “case-by-case approaches” should not always be regarded as a “proxy” technique. Indeed, case-by-case may be a “correct” method for small portfolios or for high-severity-low-frequency claims and non life actuarial practice suggest that case-by-case reserving can in certain circumstances be the most appropriate method to assess a specific claims provision.

D.2 Legal framework

- D.5 In later chapters of this paper it will be determined if case-by-case is in line with the following articles of the legal framework of the Level 1 text.

- D.6 **Article 76(2)** sets out that:

“The best estimate shall be equal to the probability-weighted average of future cash-flows, taking account of the time value of money (expected present value of future cash-flows), using the relevant risk-free interest rate term structure.

The calculation of the best estimate shall be based upon up-to-date and credible information and realistic assumptions and be performed using adequate actuarial and statistical methods.

The cash-flow projection used in the calculation of the best estimate shall take account of all the cash in- and out-flows required to settle the insurance and reinsurance obligations over the lifetime thereof.

The best estimate shall be calculated gross, without deduction of the amounts recoverable from reinsurance contracts and special purpose vehicles. Those amounts shall be calculated separately, in accordance with Article 80”.

- D.7 **Article 77** sets out that:

“In addition to Article 76, when calculating technical provisions, insurance and reinsurance undertakings shall take account of the following:

- *Expenses that will be incurred in servicing insurance and reinsurance obligations;*

- *Inflation, including expenses and claims inflation;*
- *All payments to policyholders and beneficiaries, including future discretionary bonuses, which insurance and reinsurance undertakings expect to make, whether or not these payments are contractually guaranteed, unless those payments fall under Article 90”.*

D.8 **Article 79** sets out that:

“Insurance and reinsurance undertakings shall segment their insurance and reinsurance obligations into homogeneous risk groups, and as a minimum by lines of business, when calculating their technical provisions”.

D.9 **Article 83** sets out that:

“Insurance and reinsurance undertakings shall have processes and procedures in place to ensure that best estimates, and the assumptions underlying the calculation of best estimates, are regularly compared against experience.

Where the comparison identifies systematic deviation between experience and the best estimate calculations of insurance or reinsurance undertakings, the undertaking concerned shall make appropriate adjustments to the actuarial methods being used or the assumptions being made”.

D.10 In sub-section D.5 it is shown when case-by-case provisions satisfy the principles mentioned in these four articles. Note that in these articles case-by-case is not explicitly mentioned and therefore case-by-case is included in the application of these articles.

D.11 In **Article 81** case-by-case is explicitly mentioned when it states:

“Member States shall ensure that insurance and reinsurance undertakings have internal processes and procedures in place to ensure the appropriateness, completeness and accuracy of the data used in the calculation of their technical provisions.

Where, in specific circumstances, insurance and reinsurance undertakings have insufficient data of appropriate quality to apply a reliable actuarial method to a set or subset of their insurance and reinsurance obligations, or amounts recoverable from reinsurance contracts and special purpose vehicles, appropriate approximations, including case-by-case approaches, may be used in the calculation of the best estimate”.

D.12 **Article 85** states: “The Commission shall adopt implementing measures laying down the following:

f) the standards to be met with respect to ensuring the appropriateness, completeness and accuracy of the data used in the calculation of technical provisions, and the (...) specific circumstances in which it would be appropriate to use approximations, including (...) case-by-case approaches, to calculate (...) the best estimate;”

D.3 Background information

D.13 In addition to the Level 1 text, the technical specifications of the QIS 4 establishes criteria of application for the case-by-case method which was included there:

TS.IV.E.5 Criteria for application

For an application of this proxy, at least one of the following conditions should hold:

- *No reliable data is available in the structure of a run-off triangle; or*

- *Reliable data is available, but not applicable for statistical portfolio methods (too sparse); or*
- *the portfolio is small in the context of the proportionality principle.*

D.14 About case-by-case provision, the QIS4 Report (November 2008) says:

“Undertakings in several countries have reported that they apply the case-by-case approach for large claims or exceptional claims. For these types of claims it is noticed that the case provisions are often based on expert opinions or set by specialists.

Some other examples have been identified where (at least) some undertakings have explicitly stated that they use the case-by-case approach, e.g.

- (1) *cases where run-off triangles are incomplete, available data (in general) are sparse or aggregate methods are not available; and*
- (2) *cases where the estimation of technical provision are carried out for small portfolios or (specialised) sub-lines of business.*

In a couple of countries some undertakings have reported that they apply the case-by-case approach more generally, e.g. as the main methodology for stipulating the provisions for RBNS claims (in combination with simple methods for the treatment of future inflation and/or discounting).

On the other hand, some supervisors have stated explicitly that the case-by-case approach has not been applied by the majority of the undertakings or applied only in some limited or clearly defined circumstances. It seems reasonable to believe that this is the case for other countries as well.

In the feedback from the undertakings there are only a few references to the case-by-case proxy as described in the QIS4 Technical Specifications. One supervisor stated that the case-by-case proxy was applied for calculating the provisions for RBNS claims.

Other supervisors state clearly that case-by-case valuation is rarely the default method, that the simple case-by-case approach is avoided or that they are sceptical to use case estimates as a stand alone method.

The supervisors in one country state that the case-by-case proxy is applied for calculating the provisions for reported but not settled claims.

Finally, the need for more stringent guidance and criteria regarding the use of the case-by-case approach is stressed by the supervisors in one country.”

D.4 Key questions to be considered

- Can we give a definition of the meaning of case-by-case, because the Level 1 text leaves this open?
- Under which conditions does “case-by-case” satisfy the general legal framework?
- Is it possible to reduce the subjectivity in the calculation of a case-by-case provision?
- How can inflation and discounting be taken into account?
- How can we calculate the component for IBNR and ULAE in a claim provision if we are using the case-by-case method?
- Would a case-by-case calculation be useful even if the claims provision is calculated by a statistical method?

D.5 Analysis and recommendations

D.5.1 Definition and application spectrum

- D.15 We can define the case-by-case provision as the sum of several individual valuations (one for each claim), that is, the addition of several case estimates.
- D.16 The joint application of Articles 76(2) and 81 requires, among other developments, to clarify the definition of what is considered an '*actuarial method*' and which features identify the presence of a '*case-by-case*' approach. This task has a significant relevance to the extent that a majority of insurers currently assess their technical provisions using miscellaneous procedures, and for the sake of legal certainty an appropriate differentiation is relevant.

Actuarial method

- D.17 Since there is no legal definition of '*actuarial method*' it is necessary to build its identification according to the conceptual framework of Solvency 2 project and the three building blocks stated in Article 76.2. On these bases, it seems possible to ascertain the existence of an actuarial method when the procedures followed by the insurer to assess their outstanding claims provisions present the following features:

1. The procedure applied by the insurer allows the development of a projection of estimated cash-flow stream of payments, including both those payments to settle claims and those expenses necessary to handle the claims. It doesn't matter whether this assessment is based solely on statistical methods or on a successive set of steps that can begin with an individual assessment of each claim, completed at a later stage with an '*appropriate statistical analysis*'.

'An appropriate statistical method' means a set of statistical analysis whose device and outputs are sufficiently reliable for assessment purposes (i.e. it might range from a study of the past accuracy of individual assessments to statistical methods to contrast the results).

Obviously, a supervisory judgement seems appropriate to avoid cherry picking and encourage insurers to imbricate the parts of miscellaneous procedures (individual assessment + appropriate statistical methods) in such a manner both of them interact, improve reciprocally and form part of the real risk management of the insurer.

2. The procedure includes an explicit and separate discount of the cash-flow stream according to the relevant risk free interest rate curve (this issue is out of the scope of this paper).
 3. And finally a risk margin consistent with the provisions in the Level 1 text is added to the actual value of the cash-flow stream abovementioned (this issue is out of the scope of this paper too).
- D.18 The proposed system of identification benefits on the one hand of a strict respect to Level 1 text, and at the same time foster an smooth application of Solvency 2 project to the procedures most of insurers apply currently to assess their outstanding claims provisions. These procedures usually involve a conjunction of individual assessment with appropriate statistical methods, in such a manner that each method controls the other and increase the reliability of the final assessment.
- D.19 Due this reciprocal relationship, its effect on a better reliability of the final assessment and its respect to the three building blocks, these mixed

procedures fully meet the high goals of the conceptual framework of Solvency II, and then deserve to be qualified as '*actuarial method*'.

Case-by-case approach

D.20 On the other hand, the conditions listed in article 81 seem to identify at least one situation to use a '*case-by-case approach*':

- The claims whose assessment is faced, do not allow a reliable portfolio treatment, either due their intrinsic nature or due the non-avoidable constraints of the concrete insurer (i.e. during the very first years of new insurers)
- Therefore, not being possible any type of statistical support or application of a portfolio method, the assessment is based solely and exclusively on a case-by-case expert judgement if such judgement aims at the Best (unbiased) Estimate. This doesn't imply a free degree of subjectivity and a discretionary valuation, to the extent that even in a case-by-case an appropriate internal control requires the existence of sufficiently developed handbook for claim handling and valuation of each case.
- As aforementioned, an actuarial method does not exclude the use of individual assessment, but to consider that a '*case-by-case approach*' is an '*actuarial method*' requires as a necessary condition something more, it is necessary a set of statistical analysis whose device and outputs are sufficiently reliable and unbiased for assessment purposes of the Best Estimate.

D.21 In order to fit into the framework of Solvency II a case-by-case approach has to recognise several aspects:

- Cash-flows should take account of future inflation. This is necessary for every cash-flow with duration higher than a year. The future inflation rates should be suitable for every line of business and every company, and market consistent, that is, consistent with the market forecasts. For instance, if market considers a general inflation rate for the next year of 5% and the company considers only 2%, that company must give a justification for its deviation.
- The individual provision for a single claim should include a forecast of the years of the payments. This information can be used for discounting with a term structure curve and inflation rates.
- The individual provision for a single claim should be a "best guess" upon up-to-date and credible information and realistic assumptions. It is merely that we are watching the claims one by one, using only the proper information for every claim and not in an overall way. Of course, individual valuations should be changed as the information is improved.
- "Case-by-case" satisfies also Article 83 if individual valuations are reviewed periodically. If a bias is identified, an adjustment will be able to be made.

D.22 Although insurance and reinsurance undertakings have adequate processes and procedures to collect data with respect to their claims experience, there are several circumstances where "case-by-case" reserving methods (but not methods for a portfolio of a homogenous group of risks) are applicable as a correct method:

- Small portfolios
- High-severity-low-frequency claims (even in a big portfolio)
- New (re)insurance company or new line of business

- D.23 Therefore case-by-case may be regarded as appropriate method because the number of claims is too small or the claims are not homogeneous to find patterns of regularity. In these three cases there is a justified lack of sufficient data to use a portfolio method. Claims coming from non-proportional cover will be an example for no. 2.
- D.24 A small portfolio doesn't allow to gather enough information to use an actuarial method (the lack of data is justified, it doesn't come from inadequate internal processes for data collection and storage).
- D.25 When we are speaking about high-severity-low-frequency claims, we are dealing with a big portfolio, where we can find regularity patterns to use an actuarial method but a few large claims doesn't follow these patterns because the extraordinary size thereof.
- D.26 In the first 2 circumstances case-by-case may be of permanent use. Case-by-case will be an acceptable method on a temporary basis for *new (re)insurance company or new line of business*. When enough data are collected, then the (re)insurance company may change case-by-case to another more reliable portfolio method. In this case, case-by-case could be considered as a simplification or proxy.
- D.27 For the 3rd case (new (re)insurance company or new line of business), the using of market data could be interesting to control or complete the case-by-case approach.
- D.28 Furthermore these 3, we may view case-by-case as a simplification in the context mentioned in Article 81. As a simplification, case-by-case will play when being possible an actuarial method, a (re)insurance company prefer to apply case-by-case and this is in accord with proportionality principle (case-by-case would be proportionate to the nature, scale and complexity of the risks).
- D.29 If we have a large number of claims, an aggregate estimate (an actuarial method) will usually exhibit performance superior to that case-by-case method. But when the liability is to be estimated in respect to a small number of claims, superior performance will usually be exhibited by case-by-case approach (and better if we can correct it for bias).
- D.30 Although an insurance or reinsurance undertaking is using statistical methods (because it has adequate data) as the best way to calculate the estimation of a claims provision, it would be interesting to oblige that undertaking to carry out an individual assessment of the claims. This is because such assessment is a very important source of information, very useful for supervisor and for the undertaking too. For instance, it can be used by building incurred triangles. It is also important to build a triangle net of reinsurance recoveries. This doesn't mean that case-by-case is obligatory as method to calculate claims provision; this is only intended to mean that the set of individual claim valuations is an important input to be able to control the reserving process: for this reason, it's interesting to have this valuations. That source of information is less necessary in a short tail line of business, and in that case individual assessment could be voluntary for this reason.
- D.31 Case-by-case calculation is useful to calculate the tail in a triangle of payments.
- D.32 If a company is using this approach several years, it will be possible to calculate the bias of the past years provision (viewing the run-off). If the conclusion is that the provision was insufficient, we could improve the approach by making the insurance undertaking correct the current provision for the known bias.

- D.33 Loss payments by an insurer will often be offset by recoveries (from reinsurers, from third parties at fault in the event causing the claim or salvage value). If an insurer can't use statistical methods to calculate claim provision, he/she won't be able to use statistical methods to calculate these recoveries. In such circumstance, a recovery estimation will only be able to be included in the claim provision when it exists a high level of certainty about that recovery. However, if we are using statistical methods to calculate claim provision, we will be able to use statistical methods to calculate a claim provision net of these recoveries.

D.5.2 How Case-by-case could be carried out

- D.34 The following proposal for evaluating Best Estimate reserves for a portfolio on a case-by-case approach takes into account an increase by an IBNR reserve and an adjustment by a sustainable run-off result:

Best estimate loss reserves =
+ sum of individual case reserves of reported claims
+ flat rate reserve for not reported claims (IBNR)
- sustainable run-off result

Explanation:

- (i) With respect to mass lines of business it is possible that individual case reserves for frequently occurring "small" claims can be determined on the basis of a lump sum or by using a standard approach.
- (ii) The **flat rate reserve** for not reported claims may be estimated on the basis of a time series of reported long-tail claims of the last few years, for example:
flat rate reserve = claims average x expected number of claims.
- (iii) An estimate of the **sustainable run-off result** may be determined based on the experience gained with claims settlement in previous years:

+ Incoming reserve for claims of all previous years incl. annuity provisions for annuity obligations arising in the current year
- payments for claims of all previous years in the fiscal year
- reserves for claims of all previous years at the end of the fiscal year

- D.35 In this context, "sustainable" means that it is about a ("conservative") run-off result that has been adjusted by fluctuations of the last few years; for example, this could be estimated by taking the minimum of the settlement in the last 5 years. Significant additional reserving in the past can thus lead to a negative value, i.e. to an increase of the sum of individual case reserves.

Subjectivity

- D.36 The case-by-case method may imply a lot of subjectivity, since the claims are valued by different employees within the company. To reduce that subjectivity, it would be important that every insurance undertaking had a manual with the rules to value claims. This manual should consider:
- Initial valuation of a claim, when hardly nothing is known about its features.
 - The manual must say how to consider inflation, discounting, direct and indirect expenses.
 - The initial valuations will be updated as time goes by and new information comes in.
- D.37 The rules should be adequate to every kind of risk, taking into account the characteristics of insurance policies, underwriting and claim processes. The reserver must consider how changes in both entity specific, legal, social, or economic environmental factors are accounted for.
- D.38 The supervision process should include a review of this manual. The reserver must be able to demonstrate the appropriateness of the level of provision set on a case by case approach by comparing with some other simplified technique (a benchmark, for instance)

IBNR, ULAE, inflation, discounting

- D.39 When we are using the case-by-case approach, we also need to calculate an IBNR provision and a reserve for ULAE. And we also need to take into consideration inflation and discounting.³⁰

Method for U.L.A.E.

- D.40 We can use the two approaches provided by Coordination Group for QIS4: see *Claims-handling cost-reserves proxies*

Inflation and discounting

- D.41 To take into account inflation, we need a forecast of the time frame of future payments. In a case by case method, especially if we are dealing with large claims with a long period until they are completely paid, this forecast should be made by a claim adjuster for each claim (that adjuster will take into account circumstances such as the amount, kind of claim, trials, etc. that vary the duration of a claim, and which should be topic for the claims manual in every company). However, if it is possible to find a general pattern of payments through the time, it will be used to introduce inflation in the valuations.
- D.42 The future inflation rates should be suitable for every line of business and every company, and market consistent.

³⁰ We refer to the annex of this sub-section for a description of a method which calculates a provision for IBNR claims in the context of a case-by-case approach.

First draft recommendations³¹

- D.43 We define a case-by-case approach as a method for claims provisions used where the claims whose assessment is made do not allow a reliable portfolio treatment. This may be due to their intrinsic nature or due to unavoidable undertaking-specific constraints (i.e. during the very first years of new insurers)
- D.44 Therefore, where a statistical method or an application of a portfolio method is not possible, under a case-by-case approach the assessment is based solely and exclusively on a case-by-case expert judgement if such judgement aims at the Best (unbiased) Estimate.
- D.45 A “case by case” could be applicable as an appropriate method in the following circumstances:
1. Small portfolios; or
 2. High-severity-low-frequency claims (even in a big portfolio); or
 3. New (re)insurance company or new line of business.
- D.46 Following a case-by-case approach should not imply a free degree of subjectivity or a discretionary valuation, inasfar as even under a case-by-case approach an appropriate internal control requires the existence of sufficiently developed handbook for claim handling and valuation of each case.
- D.47 A case-by-case approach should lead to a best estimate calculation.
- D.48 This implies that the calculation should consider taking into account:
- IBNR provision
 - Any expected run-off result from the setting of individual case reserves
 - Discounting as well as
 - Other factors such as inflation.
- D.49 A case-by-case assessment is a very important source of information and a necessary input for several actuarial methods. For this reason, it is recommended that undertakings carry out an individual assessment of every claim because case-by-case may be used as a reference benchmark (to compare against other best estimate approaches) and as an input in actuarial methods. The undertaking may be required to produce a case by case approach if this is required by the supervisor.

³¹

The following are first draft recommendations reflecting the current state of discussion in the Coordination Group. The Group intends to develop final recommendations until June 2009.

D.6 Annex – method for IBNR claims reserve

D.50 This method should be seen as indicative method and should only be used in case the undertaking does not have a more appropriate method to calculate the “flat rate reserve”. It should therefore be regarded as an illustration and not as a prescriptive method.

D.51 The method determines the IBNR reserve at year t as follows: ³²

$$IBNR = N_t \cdot C_t$$

where

$$N_t = \frac{N_{t-1}/p_1 + N_{t-1}/p_2 + N_{t-3}}{R_{t-1} + R_{t-2} + R_{t-3}} \cdot R_t$$

and where:

N_{t-i} = number of claims incurred but not reported, at the end of the year $t-i$, for all the accident years

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

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

R_{t-i} = reported in year t (independent of the accident year)

C_t = average cost of IBNR claims, after taking into account inflation and discounting

D.52 We divide N_{t-1} by p_1 , and N_{t-2} by p_2 in case IBNR claims need more than a year to be reported.

D.53 By using a ratio based on 3 years, we are looking for a mean that is in line with the business or group of claims concerned, in a case where there is no clear regularity in patterns of development (it is the reason why a case-by-case method is used). Going up to using 4 or 5 years of experience, we would get a more accurate mean. In that case, the adaptation of the method to use 4 or 5 years will be easy.

D.54 This average cost C_t can be based on the average cost of claims reported in the year t . Since a part of the overall cost of claims reported in the year t was covered by technical provisions, we can apply to this part a correction for bias.

D.55 Below we present a numerical example of an application of this method.

³² Assuming that the calculation is carried out at the end of year t .

IBNR Example

Assume that on 31 December 2008 the following data is known:

$$N_{2007} = 90$$

$$N_{2006} = 100$$

$$N_{2005} = 100 \text{ (85 reported in 2006 and 10 reported in 2007)}$$

$$R_{2008} = 10.500$$

$$R_{2007} = 8.500$$

$$R_{2006} = 8.200$$

$$R_{2005} = 8.700$$

Assume further that the overall cost of claims reported in 2008 is equal to 11.000.000 €, from which 5.500.000 € are case reserves (with a bias of 0,9).

The estimated inflation for 2009, 2010 and 2011 is 5% (every year). The discounting rate is 4% for the same years.

Assume that 50% of the claims reported every year are paid during the year of reporting, 35% the year after, and 15% the third year (this estimation is based on the entity experience or on market experience).

Then the method gives the following results:

Bias correction =	6.111.111		
	11.611.111		
50% =	5.805.556	6.095.833	5.861.378
35% =	4.063.889	4.480.438	4.142.416
15% =	1.741.667	2.016.197	1.792.392
After bias correction and inflation+discounting=			11.796.186
Overall cost of claims reported in 2008 =			11.796.186
		C2008 =	1.123
		p1=	0,85
		p2=	0,95
N2007/p1=	106	N2006/p2=	105
	N2008=		129
IBNR reserve =	144.501,20 €		

If the average cost of IBNR claims is different from the average cost of reported claims, C_t can be adjusted.

This method requires that the undertaking has 4 years of experience. For a new company or a new line of business, another method will be needed. This could be a simple percentage (based on market data) of the provision for claims reported and may differ for each line of business.

General issues concerning non-life best estimate valuations

E Methods for the assessment of appropriateness of the level of the best estimate calculation

E.1 Introduction

- E.1 The Level 1 text requires undertakings to demonstrate that:
- They hold an appropriate level of technical provisions.
 - That the methods used when calculating the best estimate are relevant
 - That the underlying statistical data used is adequate.
- E.2 In this sub-section we provide recommendations on how undertakings can use methods to demonstrate the appropriateness of the level of the best estimate, in particular the adequacy and relevance of the assumptions and methods used in the calculation.
- E.3 The Groupe Consultatif paper "Valuation of Best Estimate under Solvency II for non-life insurance" provided a basis from which we have addressed in further detail the application of methods that will allow undertakings to satisfy the calculation of the best estimate.
- E.4 The scope of this sub-section does not cover the requirement in the Level 1 text to ensure the adequacy of the underlying statistical data nor does it cover the risk margin element of the technical provisions.

E.2 Legal framework

E.2.1 Extracts from Level 1 Text

- E.5 Article 83 "Appropriateness of the level of technical provisions" states that *"upon request from the supervisory authorities, insurance and reinsurance undertakings shall demonstrate the appropriate level of their technical provision, as well as the applicability and relevance of the methods applied, and the adequacy of the underlying statistical data used."*
- E.6 Article 76 (2)*The calculation of the best estimate shall be based upon up to date and credible information and realistic assumptions and be performed using adequate actuarial and statistical methods.*
- E.7 Article 82 "Comparison against experience" states that *"Insurance and reinsurance undertakings shall have processes and procedures in place to ensure that best estimates, and the assumptions underlying the calculation of*

best estimates, are regularly compared against experience. Where the comparison identifies systematic deviation between experience and the best estimate calculations of insurance or reinsurance undertakings, the undertaking concerned shall make appropriate adjustments to the actuarial methods being used or the assumptions being made."

E.2.2 Relevant implementing measures

E.8 The legal basis for implementing measure is Article 85:

(a): "actuarial and statistical methodologies to calculate the best estimate referred to in Article 76 (2)"

(h): "where necessary, simplified methods and techniques to calculate technical provisions, in order to ensure the actuarial methods and statistical techniques referred to in point (a) are proportionate to the nature, scale and complexity of the risks supported by insurance and reinsurance undertakings".

E.3 Background information

E.9 The methods used for the assessment of appropriateness of the level of best estimate can include both numerical and qualitative tests, tools and procedures.

E.10 These methods will allow undertakings to:

- Validate the appropriateness, completeness and accuracy of the assumptions and modelling used in the calculation of the best estimate
- Encourage understanding of how the cash flows may emerge in the future and trace any flaws during the calculation process.
- Justify the applicability and relevance of methods used in the estimation of the level of the best estimate.

E.11 Technical Specifications QIS4: TS.II.A.8 states that *"The calculation of the best estimate shall be based upon current and credible information and realistic assumptions and be performed using adequate actuarial methods and statistical techniques."*

E.12 Technical Specifications QIS4: TS.II.B.2 states that *"The best estimate should be assessed using a method that could be considered reliable and relevant. The most appropriate method is a technique which is part of best practice and which capture the nature of the liability most adequately in a prudent, reliable and objective manner."*

E.13 CEIOPS Annex to the Draft of advice on proportionality: TS.II.A.32 states that *"The Framework Directive Proposal requires insurers to provide an actuarial function to ensure the appropriateness of the methodologies and underlying models used as well as the assumptions made in the calculation of technical provisions.¹ Therefore, proxies based on a lack of actuarial expertise would not be admissible under Solvency II. Nonetheless, they are included in these specifications in order to increase the participation of the insurance industry in this quantitative impact study."*

E.14 CEIOPS Consultation Paper No. 24:43 states that *"The use of proxy methods should also be subject to clear admissibility criteria in order to encourage insurers to use – whenever this is possible – appropriate actuarial methods for the valuation of liabilities as foreseen in the Framework Directive Proposal, including the establishment of internal processes and procedures to ensure the appropriateness, completeness and accuracy of the underlying data. These*

admissibility criteria, guiding the use of proxies, should take into account the special situation for which proxies can be used. Some of them could be provided generally within Solvency II (e.g. because of a new line of business being built up by a company), others could be restricted to a certain period after introduction of Solvency II (e.g. in order to build up a necessary data base for an existing line of business)."

E.4 Key questions to be considered

- How does an assessment of the appropriateness of the level of technical provisions relate to the principle of proportionality?
- How is it related to the availability of data (in terms of both quantity and quality)?
- How can the use of expert judgement be integrated in such an analysis?

E.5 Analysis and recommendations

First draft recommendations³³

- E.15 The Level 1 text requires undertakings to demonstrate that:
- They hold an appropriate level of technical provisions.
 - That the methods used when calculating the best estimate are relevant
- E.16 Undertakings should use methods, in a proportionate manner, to demonstrate the appropriateness of the level of the best estimate; in particular the adequacy and relevance of the assumptions and methods used in the calculation.
- E.17 These methods can include both numerical and qualitative techniques.
- E.18 The methods should be applied by undertakings in order to:
- Validate the appropriateness, completeness and accuracy of the assumptions and modelling used in the calculation of the best estimate
 - Encourage understanding of how the cash flows may emerge in the future and trace any flaws during the calculation process.
 - Justify the applicability and relevance of methods used in the estimation of the level of the best estimate.

³³

The following are first draft recommendations reflecting the current state of discussion in the Coordination Group. The Group intends to develop final recommendations until June 2009.

E.6 Annex – Draft level 3 guidance

Examples of methods used for the assessment of the appropriateness of the level of the best estimate calculation

E.19 **These techniques can help identify emerging features and trends in the historical data.**

- Percentiles and analysis of residuals can be used to detect influential observations, outliers or clustering of claims.
- Ratios can be used to detect what are the drivers or causes for certain patterns. For example we may have noticed an increase in claims. What is driving this, severity or frequency? Ratios such as average claim amounts or number/premium or stripping out inflation, can give an indication of what the main drivers are.
- Separate analysis for settled claims, for reported claims (i.e. Open and settled together) or plotting ratios of paid/incurred over ultimate, can be used to justify decisions.
- Graphs can be used to validate the use of a pattern. Plot the accident year patterns against the final selected patterns, in case there are significant deviations. If there are, it may be necessary to investigate what is driving this deviation and making some manual adjustments.
- Detecting the existence of any biases or other distorting effects within our data which are not representative of future experience. For example a company may have recently merged with another. A specific line of business is now producing 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

E.20 **These techniques can help validate underlying assumptions**

- Scenario testing, sensitivity analysis, as well as back testing techniques
- The use of market or other portfolio's development pattern, when we are not able to estimate our own. We may want to demonstrate the appropriateness of this assumption.
- Investigate the potential change in coverage, higher deductibles, or other external factors that could invalidate the underlying assumption that past development will be repeated in the future.

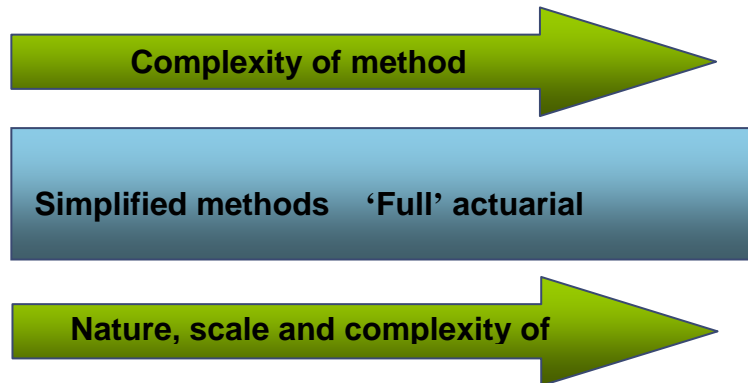
E.21 **These techniques can be used to test the quality of fit and/or appropriateness of the reserving model:**

- Produced several sets of estimators (curves) and assess how well they describe the data. There are several ways they can do this before they calculate reserve estimates. For example, they can plot age to age factors against the estimators. From this they will be able to assess which curve fits best.
- Test different curves and extrapolate a tail factor if necessary.
- Statistical diagnostics techniques such as goodness of fit tests, including analysis of residuals, sum of squares, akaike information criterion and non parametric smoothing, etc...

F Application of Proportionality Principle in the valuation of technical provisions

F.1 Introduction

F.1 Under the principles-based approach followed by the Solvency II framework, it is not envisaged to prescribe specific techniques or rules for the valuation of technical provisions. Rather, it is assumed that in general a continuum of methods would potentially be available, differing in their degree of complexity.



F.2 During the process of determining a valuation of its technical provisions, the insurer 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 obligations.

F.3 As a result of this process, it is the task of the insurer to choose and apply a valuation method which is compatible with

- the overall valuation principles of Solvency II; and
- the principle of proportionality.

F.4 This sub-section considers how the principle of proportionality should be applied in this context, in particular with regard to the use of simplified methods for the valuation of technical provisions.

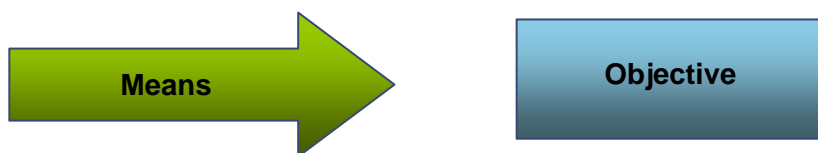
F.5 Applying the proportionality principle to valuation requirements in pillar I is likely to have consequences for other components of the quantitative pillar I framework, and beyond this also for pillar II and pillar III, since the valuation of technical provisions needs to be consistent with the determination of the SCR, the insurer's risk management system and its reporting. For example, the reporting requirements in pillar III should correspond to the segmentation, level of detail and particular specifications of pillar I. Ultimately it needs to be ensured that the proportionality principle is applied in a coherent way across all three pillars, in a solo as well as group context.

F.6 However, these issues are not considered further in this paper which considers proportionality in the context of a valuation of technical provisions and is focused on pillar I aspects.

F.2 Legal framework

F.2.1 Extracts from Level 1 Text

F.7 In its general form, the principle of proportionality deals with the relationship between an objective that is sought to be realised and the means that may be employed to achieve the objective:



F.8 The Principle of Proportionality requires that means

- are suitable to achieve the pursued objective;
- but do not go beyond what is necessary to achieve objectives

F.9 This means that, where there is a choice between several appropriate measures that are similarly effective in reaching the supervisory objectives, the least onerous measure should be applied.

F.10 In this form the Principle of Proportionality is a fundamental concept embedded in the *acquis communautaire*³⁴ and expressed in Article 5(4) of the Treaty on European Union:

“Under the principle of proportionality, the content and form of Union action shall not exceed what is necessary to achieve the objectives of the Treaties.”

F.11 This is reflected in recital 92 of the Level 1 text which states that³⁵:

“In accordance with the principle of proportionality, as set out in that Article, this Directive does not go beyond what is necessary in order to achieve those objectives.”

F.12 Within Solvency II, proportionality is a fundamental principle underlying all requirements of the Level 1 text. Reflecting the risk-oriented approach of the new Solvency regime, the principle of proportionality is generally expressed by stating that the requirements laid down in the Level 1 text should be proportionate to the nature, scale and complexity of the risks to which the insurer is exposed to. Accordingly, Article 28 (3) of the Level 1 text states that:

“Member States shall ensure that the requirements laid down in this Directive are applied in a manner which is proportionate to the nature, complexity and scale of the risks inherent in the business of an insurance or reinsurance undertaking”.

F.13 As is explained in the explanatory memorandum to the Level 1 text, the principle of proportionality is especially important for small and medium-sized

³⁴ The term *acquis communautaire* is used in European Union law to refer to the total body of EU law accumulated thus far.

³⁵ All references to the draft Framework Directive are with respect to the general approach on the Solvency II Directive proposal adopted by the ECOFIN Council on 2 December 2008.

insurers by allowing less sophisticated methods to be applied in cases where the insurer's risk profile is less complex:

"Particular care has been taken to ensure that the new solvency regime is not too burdensome for small and medium-sized (re)insurance undertakings. Importance is therefore attached to the principle of proportionality, which applies to all requirements of this Directive but which is particularly relevant for the application of the quantitative and qualitative requirements of the solvency regime and the rules on supervision. It will be further specified in the implementing measures."

- F.14 It should be stressed that in the legal framework of Solvency II the proportionality principle is being applied regardless of whether the principle of proportionality is explicitly mentioned in a provision or not. Indeed, the mention of the principle of proportionality in certain Articles should not lead to the conclusion *a contrario* that it does not apply or applies less where it is not explicitly mentioned.³⁶
- F.15 We also note that in the regulatory framework of Solvency II, proportionality covers a range of different aspects:
- the design and implementation of regulatory requirements, comprising financial, governance and market conduct issues;
 - the supervisory assessment of the adherence of insurers to regulatory requirements; and
 - the manner in which supervisory powers are exercised.
- F.16 This sub-section focuses on the first of these aspects, i.e. on the recognition of proportionality in the implementation of regulatory requirements for the valuation of technical provisions.

F.2.2 Relevant implementing measures

- F.17 Regarding the implementing measures related to the valuation of technical provisions³⁷, the principle of proportionality becomes relevant where the measure relates to the choice of a means to achieve a particular aim which is part of the valuation process. The design of the implementing measure then has to ensure that the chosen means (e.g. a specific valuation method) is suitable to achieve the pursued objective (e.g. the determination of the best estimate provision), but does not need to go beyond what is necessary to achieve this objective.³⁸ This is generally expressed by requiring that the chosen mean should be proportionate to the nature, scale and complexity of the underlying risks.³⁹
- F.18 Following this consideration, the application of the principle of proportionality would seem relevant for the following list of implementing measures contained in Article 85:

³⁶ Cf. CEIOPS CP 24 (Advice to the European Commission on the Principle of Proportionality in the Solvency II Framework Directive Proposal), para. 12

³⁷ These are summarised in Article 85 of the Framework Directive Proposal

³⁸ Cf. para. F.8

³⁹ Cf. para. F.12

actuarial and statistical methodologies to calculate the best estimate referred to in Article 76(2);

...

(...) the methods to be used in the case where technical provisions are calculated as a whole or as a sum of best estimate and a risk margin;

...

the standards to be met with respect to ensuring the appropriateness, completeness and accuracy of the data used in the calculation of technical provisions, and the specific circumstances in which it would be appropriate to use approximations, including case-by-case approaches, to calculate the best estimate;

the methods to be used when calculating the counterparty default adjustment referred to in Article 80 designed to capture expected losses due to default of the counterparty;

where necessary, simplified methods and techniques to calculate technical provisions, in order to ensure the actuarial methods and statistical techniques referred to in point (a) are proportionate to the nature, scale and complexity of the risks supported by insurance and reinsurance undertakings.

- F.19 It should be noted that there is some overlap in these points, especially between (a), (f) and (h). Overall, we may summarise the following points as being relevant for the application of the principle of proportionality in the context of the valuation of technical provisions:
- The choice of methods and underlying models used in the calculation of technical provisions;
 - The setting of assumptions and parameters when applying these methods;
 - The choice of homogeneous risk groups and lines of business for the segmentation of the insurance portfolio; and
 - The selection and use of data in the valuation process.

F.3 Background information

F.20 In May 2008, CEIOPS published a consultation paper on the principle of proportionality.⁴⁰ In this high level paper CEIOPS expanded on what should be considered in the application of the proportionality principle and gave some first indications as to how proportionality could operate in practice.

F.21 In terms of the interpretation of the three indicators "nature", "scale" and "complexity", CEIOPS' consultation paper states that:

*16. In considering the **nature** of the risks, supervisors will take into account the underlying risk profiles of the classes of business an undertaking is writing, e.g. whether it is long or short-tail business, or whether it is a low frequency and high severity business or consists of high frequency and low severity risks. The specific nature of risks inherent to the reinsurance business and to the captives business should also be taken into account.*

⁴⁰

Cf. CEIOPS-DOC-24/08 (Advice to the European Commission on the Principle of Proportionality in the Solvency II Framework Directive Proposal)

17. **Complexity** is somewhat linked to the nature of the business as certain kinds of business may dictate the use of more demanding methods or an advanced system of governance, in particular a more sophisticated risk management system in order to deal properly with all risks the undertaking faces. However, it may also be introduced via the investment strategy of the undertaking or because the insurer chooses to employ challenging methods or processes in some areas that require a commensurate degree of complexity in other areas of the undertaking. It is also linked to the complexity in the evaluation of the commitments, for example unlimited motor liability, or investment in a complex option, or annuities (as opposed to a lump sum), or non-proportional reinsurance (as opposed to a straightforward direct insurance business).

18. Via **scale** a size criterion is introduced. Relating to the valuation of assets, liabilities or risks, this criterion resembles a materiality requirement and the approach applied should ensure an appropriate relative or absolute approximation of the theoretically correct value. This shall be calculated having regard to the provisions of the Framework Directive Proposal. Relating to Pillar II, cost-benefit analysis can also be seen as a scale issue, applied for example to governance processes.

19. In assessing what is proportionate, the focus must be on the combination of all three criteria to arrive at a solution that is adequate to the risk an undertaking is exposed to. For instance, a business may well 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 should be not allowed to use simplified methods while the possibility may be considered in the second case under very specific circumstances.

35. As one of the conditions for scale which should be set for an allowance of simplified methods, the paper proposed that the approximation error caused by any simplified approach to the valuation of technical provisions should not be expected to be material.

- F.22 This last idea was also taken up in the QIS4 exercise where the technical specifications stated that simplified methods may be applied in the valuation of the insurance liabilities where the result so produced is not material, or not materially different from the result which would result from a more accurate valuation process.⁴¹ Within the QIS4 exercise, some indicative guidance was given concerning materiality, where this was expressed in absolute terms as well as relative to the overall amount of the total best estimate.⁴²
- F.23 A paper of the CEA "Initial thoughts on the use of simplifications" of Dec 22th 2008
- gives further guidance on how to interpret the terms nature and complexity;
 - proposes a 2 step-process to decide when simplifications can be used;
 - advocates for relative scale thresholds to be introduced to interpret and quantify the indicator "scale";

⁴¹ Cf. QIS 4 technical specifications, TS.II.A.35

⁴² Cf. QIS 4 technical specifications, TS.II.A.38

- interprets the term “scale” in the context of model error and uses this interpretation in the second step of its 2-step-process; and
- advocates for a flexible approach when applying the proportionality principle:

“The CEA also believes that proportionality should be applied with flexibility and that the approach outlined should be used by companies and supervisors as a guide as to how to apply proportionality rather than being a hard rule. Some flexibility should be possible depending upon a company’s particular circumstance and risk profile. The simplification approach taken by a company should be the result of discussion between the company and its supervisors. It is essential that supervisors seek and take into account the input of the company on these matters as they best know their business and what is likely to be appropriate.”

F.24 This sub-section takes account of the before mentioned papers and considers in more detail how the principle of proportionality should be applied in the context of a valuation of technical provisions.

F.4 Key questions to be considered

F.25 In the following some key questions concerning the application of the proportionality principle for the valuation of technical provisions are laid out. These questions form the basis for the analysis carried out in sub-section F.5.

F.26 A distinction is made between

- questions addressing the purpose and role of an assessment of proportionality;
- questions related to the way in which an assessment of proportionality should be carried out; and
- questions as to how regulatory requirements could be drafted to ensure that the principle of proportionality is adhered to.

F.4.1 Purpose and role of proportionality assessment

- How can the purpose and role of an assessment of proportionality in the context of a valuation of technical provisions be described?

F.4.2 How proportionality assessments could be carried out

- How should the three indicators “nature”, “scale” and “complexity” be interpreted?
- At which level should the assessment be made? (e.g. per homogeneous risk group, per LOB or per insurer)
- Should scale be measured in relative or absolute terms?
- How could an overall assessment be derived?
- Are there any quantitative figures or ratios available to support this assessment?
- Should a quantitative definition of “small” (in terms of a combined assessment of nature, scale, complexity) be given in the context of risks? Would such a definition apply to a risk, to a portfolio of contracts or to an insurer? What implications would such a definition have?

- How is materiality related to these three indicators?

F.4.3 Regulatory requirements concerning proportionality

- To what extent should the selection of methodologies for the valuation of technical provisions under Solvency II be principle-based? Would it make sense to include a description in formulaic terms of certain specific simplified methods for the valuation of technical provisions in implementing measures?
- What role should simplifications and proxies play in regulatory Level 2 requirements for the valuation of technical provisions?
- Would it be necessary to introduce legal definitions of the terms “simplification” or “proxy” in implementing measures?
- Should materiality thresholds be introduced in Level 2 measures? If yes, how could they be implemented?
- Which regulatory requirements concerning proportionality should be included in level 2 and which steps or details should be left to level 3?

F.5 Analysis and recommendations

F.27 This sub-section analysis the questions set out in sub-section F.4, and sets out the Coordination Group’s recommendations for potential solutions to these questions. It follows the same structure as is used there.

F.5.1 Purpose and role of proportionality assessment

F.28 In this sub-section the overall purpose and role of a proportionality assessment in the valuation of technical provisions is considered further. This analysis has regard to the following:

- the selection of an appropriate valuation methodology, including the setting of parameters and assumptions;
- the role of simplified valuation methods in the valuation process;
- the assessment of the estimation uncertainty inherent in the applied valuation methodology; and
- the selection and the use of data for the valuation.

Selection of valuation methodology

F.29 As was mentioned in the introductory paragraphs, Solvency II envisages a principles-based approach to the valuation of technical provisions. This means that the regulatory requirements relating to the valuation process would generally not pre-scribe any specific approaches to carrying out the valuation. Rather, there will typically be a range of different approaches which are available to the insurer, which then has to choose a valuation method which is appropriate with regard to the valuation principles established in the regime.

F.30 The whole process of finding the appropriate method should be well understood by the undertaking, ultimately resulting in a selected method to derive the valuation estimate. This process and the rationale for selecting a specific method and for the setting of the assumptions and parameters needed for its application should be documented.

- F.31 Within this context, the Principle of Proportionality requires that the insurer should be allowed to choose and apply a valuation method which is
- suitable to achieve the objective of deriving a market-consistent valuation according to the Solvency II principles; but
 - not more sophisticated than is needed in order to reach this objective.⁴³
- F.32 This should enable insurers to minimise resources in form of e.g. actuarial expertise or IT implementation costs, whilst ensuring that the valuation leads to an appropriate economic and risk-oriented assessment as is the objective of the Solvency II framework. This is particularly important to ensure that the solvency regime is not too burdensome for small and medium-sized insurers.
- F.33 Considering the risk-based objectives of Solvency II for a valuation of technical provisions, the overall aim of the Proportionality Principle described in paragraph F.31 can be achieved by allowing insurers to choose valuation methods which are
- Compatible with the Solvency II valuation principles; and
 - Proportionate to the nature, scale and complexity of the risks.⁴⁴
- F.34 We note that, regarding the second condition mentioned in the previous paragraph, “risks” should refer to the risks underlying the insurance obligations which materially affect (directly or indirectly) the amount or timing of cash flows arising from the insurance contracts in the portfolio to be valued. Whereas this will generally include all insured risks, it may also include others such as inflation.
- F.35 Hence where an insurer considers whether a specific valuation method is proportionate, it should only have regard to the risk characteristics of the cash-flows generated by the insurance contracts.
- F.36 Following such an approach will ensure that a decision on the proportionality of a specific valuation method for technical provisions is based on the characteristics of the portfolio insured and its resulting obligations but not on other characteristics of the insurer. This would contribute to ensuring that insurance obligations with similar risk profiles result in similar values for the technical provisions, hence supporting the overall aim of Solvency II to enhance the comparability and consistency of valuations of technical provisions across insurers.⁴⁵

Role of simplified methods

- F.37 Typically, there will be a range of different valuation methods available to the insurer, differing in their degree of complexity and sophistication. Following the proportionality principle as expressed in para. F.33 will enable the insurer to simplify a given valuation method in case where the simplified method is still proportionate to the underlying risks insured. In this way, the proportionality

⁴³ Note this is implied by the general description of the principle of proportionality contained in para. F.8.

⁴⁴ Cf. Best Estimate Paper of Groupe Consultatif, page 14

⁴⁵ Note that this is in line with recital 32 of the Framework Directive proposal which states that the amount of technical provisions should reflect the characteristics of the underlying insurance portfolio. With respect to undertaking-specific information, the recital sets out these should only be used in the calculation of technical provisions “*insofar as that information enables insurance and reinsurance undertakings to better reflect the characteristics of the underlying insurance portfolio, such as information regarding claims management and expenses.*”

principle gives the insurer the opportunity to reduce the complexity of the calculations proportionate to the underlying risk profile of the portfolio.

- F.38 Where the insurer selects a valuation method (whether this is a simplified method or not), it should be consistent with, as part of the valuation process, the requirements laid out in articles 44 (ORSA) and 47 (actuarial function).
- F.39 In line with this, Article 83 of the Level 1 text states that upon request from the supervisory authority the insurer shall be able to demonstrate applicability and relevance of the methods applied and the appropriateness of the level of technical provisions resulting from its use.
- F.40 The possibility to apply simplified methods should not be dependent on the size of an insurance company. Rather, it should depend on the nature, scale and complexity of the risks generated by the underlying portfolio of contracts.
- F.41 Whereas the term “simplified method” would generally refer to a situation where a specific valuation technique has been simplified in line with the proportionality principle, it could be contemplated to define the terms “simplified methods” or “simplifications” in a more broader sense to denote valuation methods which are considered to be less advanced (i.e. more simple to apply) than more complex “commonly used” methods. Such a definition would lead to a classification of the range of available methods into “simplifications” and “common methods”.
- F.42 However, it should be noted that any such definition would necessarily be rather vague and unlikely to lead to a clear classification of methods. This is so because:⁴⁶
- it is not possible to prescribe any method to be either always appropriate or always inappropriate for a particular book of business (e.g. Long-tail, short-tail, line of business, geographical, currency); hence it is not possible to define any “default” methods;
 - within a line of business it is common practice for different reserving methods to be applied, hence there is no single “best practice” method which could be identified; and
 - it will often be very difficult to decide whether a given valuation method is more simple than a benchmark method.
- F.43 We also note that, in practice, there is often insufficient company-specific data of appropriate quality to apply a reliable statistical actuarial method for the determination of technical provisions. It is therefore important to develop valuation techniques which may substitute a lack of company-specific data by e.g. using external market information. Although in the Solvency II debate, the term “proxies” was introduced to denote such techniques there is no need in the following to distinguish between “proxy” and “simplified methods” or “simplifications” because proxies (where admissible under the Solvency II framework) may be seen as a specific kind of simplifications.⁴⁷

Estimation uncertainty and its link to proportionality

- F.44 Due to the uncertainty of future events, any “modelling” of future cash flows will necessarily be imperfect, leading to a certain degree of inaccuracy and

⁴⁶ Cf. Best Estimate Paper by Groupe Consultatif, pp. 23-24

⁴⁷ Cf. The Coordination Group’s Report on Proxies, para. 2.5.

imprecision in the measurement. Sources for this estimation uncertainty or “model error” are for example the possibility that the assumptions and parameters used in the model are incorrect, or that the model itself is deficient.⁴⁸

F.45 Where simplified approaches are used to value technical provisions, this potentially introduces the risk of a significant degree of estimation uncertainty (or model error). This is the case since:

- Often simplified methods are used in situations where there is a lack of insurer-specific claims data, in which case the setting of the parameters and assumptions used in the method will usually require a considerable amount of judgment; and
- due to its simplicity the method may not be able to fully capture the nature, scale and complexity of the risks arising from the contracts.

F.46 The degree of model error in the measurement of technical provisions is closely linked to the reliability and suitability of the valuation. Indeed, the higher the estimation uncertainty, the more difficult it will be for the insurer to rely on the valuation and to verify that it is suitable to achieve the objective of deriving a market-consistent valuation according to the Solvency II principles.

F.47 With regard to the principle of proportionality, these considerations show that the crucial point in applying this principle consists in assessing the model error that results from the use of simplified methods.

F.48 Besides estimating this *model error* it has to be decided how this increased uncertainty can be reflected in the assessment of the overall solvency position of the insurer, in order to ensure that simplified treatments do not lead to a lower standard of policyholder protection.⁴⁹

F.49 In the context of addressing the measurement error incurred by applying simplified valuation techniques, the CEA paper takes the following position:

“For the avoidance of doubt, the CEA is not advocating that companies should quantify the model error inherent in any simplifications they use. Instead the CEA is advocating that the proportionality criteria are used to avoid circumstances where model error might be excessive thereby avoiding the need to quantify it.”

We have the following considerations concerning this opinion:

F.50 Regardless of what methods shall be applied for the valuation of technical provisions it is important that an assessment of their appropriateness should in general include an assessment of the errors implicit to the calculations. How such an assessment of errors could be accomplished in practice is discussed further in sub-section F.5.2, below. In view of the ultimate aim of Solvency II to improve risk assessment and risk management processes across insurers, we believe that such a holistic approach (which integrates an assessment of model error into the valuation process as part of actuarial best practice) would be more suitable than an approach which stresses a need to avoid an assessment and potential quantification of model error.

⁴⁸ In this context, uncertainty does not refer to the randomness of future outcomes (sometimes referred to as *volatility risk* or *process risk*), but to the fact that the nature of this randomness is itself unknown.

⁴⁹ Cf. Sub-Section F.5.2

- F.51 Further we note that the CEA suggests that in order to avoid the need to quantify model errors, specific thresholds for individual simplifications or simplified methods should be defined. As long as these thresholds would not be exceeded, it would not be necessary to calculate model errors. However, it seems doubtful whether such an approach could effectively be implemented in practice:
- it seems likely that the calculation of such artificial thresholds would be much more complicated than the assessment of the model errors implicit to the reserve calculations;
 - it would seem difficult to integrate the calculation of such thresholds into the actuarial reserving process in a reasonable way; and
 - the CEA approach would require a list of simplified calculation methods (together with a list of thresholds individually applying to these methods). Whereas this may be possible for the calculation of the standard formula SCR, it would be far more difficult to establish such a list of methods for the valuation of technical provisions.⁵⁰.
- F.52 Therefore we suggest that in order to apply the proportionality principle and thereby simplified methods one task is to get an idea of the model error. How this can be done is discussed in sub-section F.5.2.

Selection and use of data in the valuation process

- F.53 Proportionality is also relevant with regard to the selection, use and review of data underlying the valuation analysis.
- F.54 When selecting a data base for an application of actuarial or statistical valuation methods, the insurer should determine the nature of the data needed and available, and has to consider whether alternative data sets or data sources should be used.
- F.55 The data should appropriately describe the nature, scale and complexity of the risks arising from the insurance obligations to be valued. In particular, the insurer should have regard to material limitations of the data which may reduce the quality of the valuation measurement, such as questionable data items or inconsistent relationships between different data sets.

Issues for discussion in Coordination Group

Should these considerations regarding the selection and use of data better be integrated into the data quality paper?

F.5.2 How proportionality assessments could be carried out

- F.56 This sub-section analysis how an assessment of proportionality in the context of a valuation of technical provisions could be carried out. Reflecting the questions set out in sub-section F.4.2, it
- considers how the indicators “nature”, “scale” and “complexity” should be interpreted (cf. sub-section F.5.2.1);

⁵⁰ Cf. para. 53, above.

- sets out how an overall assessment of all three criteria could be conducted, taking into account the degree of model error (cf. sub-section F.5.2.2);
- illustrates the main issues concerning proportionality by way of an example (cf. sub-section F.5.2.3);
- considers how quantitative figures or ratios could be used to support an assessment of proportionality (cf. sub-section F.5.2.4); and
- analysis which process could be followed in an insurer to carry out a proportionality assessment, having regard to the various hierarchy levels. (cf. sub-section F.5.2.5).

F.5.2.1 Interpretation of nature, scale and complexity

F.57 As was considered in the previous sub-section F.5.1⁵¹, each of the three criteria mentioned should be analysed with regard to the risks underlying the portfolio of contracts to be valued.

Nature and complexity

F.58 Nature and complexity of risks are closely related, and for the purposes of an assessment of proportionality could best be characterised together. Indeed, complexity could be seen as an integral part of the nature of risks, which is a more broader concept.⁵²

F.59 In mathematical terms, the nature of the risks underlying the insurance contracts could be described by the probability distribution of the future cash flows arising from the contracts. This encompasses the following characteristics:⁵³

- the degree of homogeneity of the risks;
- the variety of different sub-risks or risk components of which the risk is comprised;
- the way in which these sub-risks are interrelated with one another;
- the level of certainty i.e. the extent to which future cash flows can be predicted;⁵⁴
- the nature of the occurrence or crystallisation of the risk in terms of frequency and severity;
- the type of the development of claims payments over time; or
- The extent of potential policyholder loss, especially in the tail of the claims distribution. For example, travel insurance business typically has relatively stable and narrow ranges for expected future claims. In contrast, occasional large (outlier) losses occur in credit insurance business, i.e. it is "fat tailed". Another example is catastrophe (re)insurance covering losses

⁵¹ Cf. Para. F.34

⁵² i.e. whether or not a risk is complex is a property of the risk which is part of its nature.

⁵³ Cf. also CEA working paper on proportionality

⁵⁴ Note that this only refers to the randomness (volatility) of the future cash flows. Uncertainty which is related to the measurement of the risk (model error and parameter error) is not an intrinsic property of the risk, but dependent on the valuation methodology applied.

from hurricanes where there is very considerable uncertainty over expected losses, i.e. how many hurricanes occur, how severe they are and whether they hit heavily insured areas.

- F.60 When assessing the nature and complexity of the insured risks, additional information in relation to the circumstances of the particular portfolio should be taken into account. This could include:
- the type of business from which the risks originate (e.g. direct business or reinsurance business);
 - How highly correlated the risks are with each other, especially tail correlations; and
 - any risk mitigation instruments (such as reinsurance or derivatives) applied, and their impact on the underlying risk profile.
- F.61 The first three bullet points in para. F.59 are in particular related to the complexity of risks generated by the contracts. Such complexity would e.g. depend on:
- the reinsurance structure;
 - the existence of bundling (and unbundling) of covers of different nature; and
 - the structure of the contracts w.r.t to franchises, participations, in- and exclusion criteria of cover.
- F.62 Complexity is associated with the level of calculation sophistication and / or level of expertise needed to predict the best estimate of future cash flows. The more complex the risk, the more difficult it will be to model and predict the best estimate of such an insured portfolio. For example, where losses are the result of interaction of a number of different factors, the degree of complexity of the modelling would be expected to also increase.
- F.63 Therefore, to appropriately analyse and quantify complex risks insured, more sophisticated and elaborated tools will generally be required as well as sufficient actuarial expertise.
- F.64 For a specific cover the complexity of modelling and the nature of risks insured can be inter-related. For example,
- products that are relatively simple with relatively predictable future claims experience such as travel insurance, which is short tailed and typically has relatively small individual losses and hardly any significant outlier large losses;
 - products like motor damage for cars and short term health insurance, are both short tailed products where it is usually relatively simple to estimate best estimate liabilities but may be influenced by mass claims or NatCat risks.

Alternative description of characteristics of nature and complexity

- F.65 Alternative to the above, we may also separately define "nature" and "complexity" as follows:
- F.66 The nature of obligations by the insured risks is described by the (mathematical) distribution function of the pure risk, that is before any adjustments (for example by reinsurance, options etc.) are made.

- F.67 Compared to the nature of risks, the complexity of risks is described by the (mathematical) distribution function of the risk after all adjustments are made. That is, after reinsurance, franchises, options etc.
- F.68 Under this approach, the complexity of the risks arising from the contracts would be characterised by the complexity of the modelling and of predicting the best estimate of future cash flows such as the level of expertise needed to model future cash flows.

Issues for discussion

- Are the description of the characteristics of nature and complexity as given above accurate?
- Is the alternative description of the characteristics of nature and complexity useful?
- Are there further aspects to be considered here?

Scale

- F.69 Assigning a scale introduces a distinction between “small” and “large” risks. Different interpretations of “scale” may be applied when considering risks, depending on the type of assessment to be made.
- F.70 One general option would be to interpret the scale of a risk as the degree to which the insurer is vulnerable to the risk. Following this option, in assessing the scale of a risk one should consider both the likelihood of the risk being realised and the impact of that risk when realised. The scale of the risk would increase as either the likelihood or the (potential) impact of the risk increases.

- **Scale = likelihood x impact?**

- F.71 Such an interpretation of “scale” would seem adequate for the determination of the SCR, which is intended to define the amount of capital resources which the insurer needs to absorb losses. However, it would seem less suitable to be used in the context of a valuation of technical provisions which is in the focus of this paper. Here, a more natural approach would be to measure the scale of the risk in terms of the best estimate of the underlying obligations.

- **Scale = size of best estimate?**

- F.72 It could also be contemplated to define the “scale” of the risks in this context as the degree of model error inherent in the measurement. However, the degree of model error is not an intrinsic property of the risks, but depends on the valuation method to be applied. Also, model error should be regarded as a key overall consideration in an assessment of proportionality⁵⁵, and so it would not be appropriate to consider it only as a sub-consideration of “scale”. Therefore in this sub-section the issue of “model error” is addressed in the context of an overall assessment of proportionality.⁵⁶

⁵⁵ Cf. sub-section F.5.1.

⁵⁶ Cf. sub-section F.5.2.2.

- F.73 Whatever interpretation of “scale” for risks or obligations is followed, it would be desirable if an objective assessment of the scale could be quantified.
- F.74 To decide whether a particular valuation method is proportionate to the scale of the underlying risks, it will usually be necessary to establish a benchmark. Such a benchmark would enable to introduce a relative rather than an absolute assessment (defined, for example, in terms of a volume measure such as premiums or technical provisions that serves as an approximation for the risk exposure).

Scale = likelihood x (relative) impact?
Scale = (relative) size of best estimate?

- F.75 However, the use of simple volume measures to establish materiality thresholds may be problematic since:
- Size in itself may not be an adequate proxy for the risk to which an insurer is exposed. In general, neither the premiums nor the technical provisions can be considered as a sufficient benchmark to specify a threshold below which the insurer would no longer be vulnerable to the risk.
 - Insurers within the scope of the Solvency II Directive should not be classified differently on the basis of size. Indeed, policyholders should not expect a lower degree of protection simply because their cover is provided by a smaller undertaking.
- F.76 An assessment of scale may also be made in terms of the risks relative to an overall volume measure. To illustrate this, suppose that in a LOB a portfolio of contracts is given with overall “smooth” risk characteristics, but with some single mass claims. Then for a valuation method to determine the best estimate for the LOB, it may be proportionate to use a simplified measurement of the additional (more complicated) risk related to the mass claims, in case the risks generated by the mass claims are small with respect to the overall volume measure in the LOB, compare para. F.102.

Scale = SCR / volume measure?

- F.77 The potential use of thresholds (both with regard to scale as well as to the model error as discussed in sub-section F.5.2.2) in the context of Level 2 implementing measures will be further discussed in sub-section F.5.3.

Issues for discussion

- Is the description of the characteristic of scale given above accurate?
- How can scale be characterized in absolute or relative terms?
- Should “scale” always be quantified?

F.5.2.2 Overall assessment and model error

- F.78 It can be concluded from the discussions above that the three indicators - nature, scale and complexity - are strongly interrelated, and in assessing whether a given valuation method is proportionate to the underlying risks the focus should be on the combination of all three factors. This means that for example in the case where the risk is small with respect to scale, but is still of a

complicated and complex nature, a simplified method may not be proportionate to the underlying risks as a whole.

- F.79 This overall assessment of proportionality would ideally be more qualitative than quantitative, and cannot be reduced to a simple formulaic aggregation of isolated assessments of each of the indicators. Ultimately, when a decision needs to be taken whether a certain valuation method or model can be seen as proportionate, the supervisory objective underlying the relevant requirement would need to be considered.⁵⁷ But this can only be done in discussions between insurer and supervisor. For such discussions quantitative ratios to assess proportionality (see below) could play an important role.
- F.80 This implies that, ultimately, a given valuation method for the best estimate could be seen as proportionate if the resulting estimate is not expected to diverge materially from the “true” best estimate which is given by the mean of the underlying risk distribution, i.e. if the model error implied by the measurement is sufficiently small.
- F.81 Therefore, as was highlighted in sub-section F.5.1, an assessment of the model error introduced by the use of simplified methods is of central importance when applying the principle of proportionality.
- F.82 In practice it will not be an easy task to quantify this model error. This is not only a problem for the simplified methods but also for the more sophisticated (maybe more appropriate) methods. Measuring the model error can be done for example by:
- Sensitivity analysis in the framework of the applied model. This means to vary the parameters and/or the data thereby observing the range where a best estimate might be located.
 - Comparison with the results of other methods. This is a possibility for getting a picture of the model error but it doesn't mean that insurers have to perform the “complex” actuarial methods in order to determine “the” model error. After all, it is not clear that more sophisticated methods yield better results. Hence also a sensitivity analysis in the framework of a simplified method may be an adequate tool for estimating the model error.
- F.83 After all, it has to be clear, that a precise determination of the model error will not be possible, neither for simplified methods nor for more complex so called best practice techniques..
- F.84 This means that for an assessment of the uncertainty in the valuation we are not suggesting that insurers should have to perform at least two calculations, one with the “best” method without simplifications and one with the simplified method in order to quantify the model error. Rather, the insurer should seek to get an estimate of the model error implicit to the method applied.

Materiality

- F.85 In an assessment of proportionality, consideration of the materiality of the risk plays an important role. In particular, materiality could be considered with respect to:
- the “scale” of the risk;⁵⁸ or

⁵⁷ Cf. Para. F.8 in sub-section F.2.

⁵⁸ Cf. sub-section F.5.2.1.

- the degree of model error or estimation uncertainty.⁵⁹

F.86 Hence where the scale of the risk is considered immaterial, it is more likely that a simplified method would be proportionate (given it is also commensurate with the nature and complexity of the risk). Likewise, where the model error induced by a simplified method is not material, the method could be regarded as proportionate to the underlying risks.

F.87 For an assessment of materiality, it is important to specify at which level this assessment is carried out: 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, e.g. a certain line of business.

F.88 For the calculation of technical provisions, Article 70 of the Level 1 text stipulates in this regard that the starting point for this valuation is defined by the level of homogeneous risk group (HRG):

“segment their insurance and reinsurance obligations into homogeneous risk groups, and as a minimum by lines of business”

F.89 We note that for non-life insurance, in the technical specification for QIS4 a specification of the lines of businesses (LOBs) was given which was similar to the classification stipulated in Article 63 of the Insurer’s Accounts Directive. A specification of the value of technical provisions per LOB is also necessary for the calculation of the non-life underwriting risk charge in the SCR standard formula.

F.90 Hence for the valuation of technical provisions, three different levels of calculations need to be distinguished:

- the individual homogeneous risk group (HRG);
- the individual line of business (LOB);⁶⁰ and
- the business of the insurer as a whole.

F.91 Where an assessment of proportionality is carried out which involves a consideration of materiality, it is important to specify at which of these three levels the valuation is undertaken.

F.5.2.3 An example illustrating the main issues concerning proportionality

F.92 To illustrate the main issues concerning proportionality further, let us consider an example as follows:

Example

Suppose a test portfolio is given which represents a simple but not fully homogeneous group of risks A. Suppose further that, according to a “simple” valuation technique, risk group A has a Best Estimate of $BE_{\text{simple}}^A = 100$.

Now assume that a board of external, well educated actuaries decided that a more accurate method for this portfolio would be to separate a mass claim from the

⁵⁹ Cf. sub-section 5.2.2.

⁶⁰ Potentially comprising several homogeneous risk groups

observed cash flows: this results in a value for the best estimate as

$$BE^A = BE_{\text{basic}} + BE_{\text{mass}} = 95 + 15 = 110$$

instead of 100 by the more simple method.

Now perform a litmus test with two different samples:

Transfer this test portfolio to a small insurer having only 1 LoB (different from A) with a $BE_{\text{LoB}} = 5$ and also to a big insurer with an overall BE of 100000.

In this setting:

- Would you consider it proportionate for the small insurer to apply the simple valuation technique?
- Would your assessment differ with regard to the big insurer?
- Could the big insurer even skip the effort of calculating the best estimate of A by using a much more simplified approach like “scaling-up-to-completion”?

- F.93 We see that for the small insurer, risk group A accounts for nearly all of its overall portfolio, whereas for the big insurer, the reverse situation holds, i.e. risk group A has only a negligible impact on its overall business.
- F.94 Additionally we can see, as what would be expected in practice, the “simplified” method leads to a higher degree of model error and hence to a higher chance of estimation bias than the more sophisticated technique. Also, overall the small insurer is more influenced by the estimation bias than the big insurer, and would be significantly more affected by losses due to an underestimation of risk group A than the big insurer. Furthermore a small insurer has per se the “disadvantage” that, all other things being equal, the smaller the portfolio the bigger is the coefficient of variation due to lesser diversification.
- F.95 Therefore, at first sight we may come to the conclusion that it would not be appropriate for the small insurer to use the simplified method, since this would bear a higher and more material risk of underestimating its risk position both for risk group A and also for its overall business. In contrast to this, we might consider that for the big insurer an application of the simple method or even a more simplified method would be justified, considering the small impact risk group A has on its overall business.
- F.96 Upon reflection, however, it may be argued that such a conclusion would not be fair towards the small insurer, considering that it would give the big insurer the chance to use the simpler method and hence reduce the costs of the calculation and the data collection relating to risk group A, whereas the small insurer would be forced to apply a more appropriate and complex method, even though the risk characteristics of risk group A would be exactly the same for both the small and the big insurer.
- F.97 These considerations demonstrate that we will need a refined analysis of our example. After all, what has to be assured is the policyholder’s protection. This has to be the same for the small and the big insurer. This would lead us to conclude that
- For the big insurer the small line of business is not material. Using a simplified method would not lead to a lower degree of policyholder’s

protection. Therefore applying the simplified technique for valuing the subset of obligations in risk group A for deriving a best estimate for the overall portfolio seems appropriate.

- If the big insurer has to carry out a separate valuation of the homogeneous risk group A (or the line of business where it belongs to) in isolation, then it would be still need to apply the more complex method, since the model error induced by the simplification is still significant relative to the LOB. However, this might be difficult to ensure if the LOB A in question is not material.
- For the small insurer obviously the model error has much more impact with respect to his overall solvability situation. Therefore it would generally be expected from the small insurer to apply the more sophisticated method.

F.98 But alternatively it could be argued that the small insurer should be able to compensate this higher model error by a higher amount of available own funds. In this way, the same level of policyholder's protection would be guaranteed.⁶¹

F.99 As a summary conclusion taking into account the example above, we suggest that a consideration of proportionality should have regard to:

- The model error introduced by the simplified method at the level of the portfolio being measured; and
- Materiality, especially the size of the portfolio or sub-portfolio to be valued⁶² relative to the level at which the assessment is made.

F.5.2.4 Supporting role of quantitative figures or ratios

F.100 It might be helpful to develop specific key indicators or quantitative figures to support an assessment of proportionality on the level of the insurer as a whole and/or at a homogeneous risk group. Such a quantitative measure may support the decisions made to use simplified methods.

F.101 Typically, such quantitative measures would not be directly applied to a specific valuation method whose proportionality in respect to a given portfolio of risks would need to be assessed. Rather, the quantitative measure would be calculated using risk characteristics of the insurer and/or the homogeneous risk group/LOB in question. This measure could then be used as an indicator for the degree of risk of the insurer and/or the homogeneous risk group/LOB in question.

F.102 A particular example of such a key indicator is given by the "risk ratio". The idea of a "risk ratio" would be to take into account additional information on the overall solvency position of the insurer in order to derive a decision on whether simplified valuation methods could be considered proportionate. The risk ratio may be defined as described below:

Example of key indicator – the risk ratio

To derive a so called "risk ratio" the measures for nature, scale and complexity of a risk are valued relatively to a volume quantity. In order to allow a risk-sensitive

⁶¹ Cf. the example of the „risk ratio“ figure mentioned in the following sub-section.

⁶² Here „size“ could refer to the size of the best estimate (which was suggested to use as a quantification of „scale“ in sub-section 5.2.1).

application of the Proportionality Principle a simple but reliable risk assessment is needed. The SCR (or a simplified version) represents a suitable risk measure as it meets all three conditions mentioned above within the Solvency II context.

As a consequence, all three conditions can be measured simultaneously on a 1-dimensional scale without facing the problem to “aggregate” three conditions to one single decision.

The quantitative measure for the nature, scale and complexity of a risk should be valued relatively to a size/volume quantity. The size/volume could be

- premium income,
- total sum of provisions or net liabilities,
- net balance sheet total (= market value of assets).

The proposed risk ratio is then defined as: **SCR** divided by **Volume measure**.

For the insurer as a whole, a suitable measure of the “size” seems to be the “net balance sheet total” as it is the sum of the market value of the liabilities and the economic capital.

The risk ratio may also be applied to a certain part of a company or a separated risk category only, e.g. to a LoB by dividing the SCR for the LoB by the volume measure of that LoB. By such a restriction it would be possible to concentrate on a part of the total risk profile only, i.e. the nature, scale and complexity of the risks belonging to a special component of the risk profile or part of the portfolio of an insurance company.

F.103 For an insurer with a lower risk ratio the rationale to allow simplifications within the valuation of technical provisions would then be considered higher than for an insurer with a high risk ratio. The risk ratio is further sensitive for the amount of own funds (more own funds results in a lower risk ratio) and the risk profile of the liabilities (lower risk in the SCR results in a lower risk ratio).

F.104 However, the use of a “risk ratio” would raise a number of issues which would need to be resolved:

- It seems doubtful whether the risk ratio as defined above including the level of own funds in the volume measure would be compatible with the overall aim to ensure that the proportionality assessment is reflective of the risks underlying the insurance obligations and should not depend on other risks⁶³. Indeed, an application of such a risk ratio may lead to different assessments for the same portfolio of risks, depending on whether the insurer holding the portfolio would have a small or large excess of available own funds. This may not be compatible with the Level 1 text.

⁶³ Cf. Paras. F.35 and F.36.

- it would not seem adequate to categorise insurers into “low risk” or “high risk” insurers on basis of the risk ratio, and to ensure that such a categorisation is applied consistently across different insurers and markets;
- it would need to be clarified how the SCR and the best estimate required for a calculation of the risk ratio should be determined, considering that normally a decision on the use of a particular valuation methodology would precede the calculation of the best estimate and the SCR;
- The risk ratio may add to procyclicality, as a deterioration of the solvency position of an insurer might trigger the need to apply more robust estimation methods at the same time where the insurer is in a stressed financial position;
- in view of the main objective of supervision to protect policyholders, an acceptance of the use of a simpler valuation method which would lead to potentially higher chance of underestimation of its technical provision may be problematic in countries where option (a) of Article 277(1) of the Level 1 text is chosen⁶⁴; and
- it may be doubtful whether an insurer complies with the provision of the Level 1 text relating to the calculation of the best estimate of the liabilities if the simpler method used would lead to potentially higher chance of underestimation of its technical provisions (and so would lead to a technical provision which can be lower than a best estimate).

F.105 In view of these difficulties, some members of the Coordination Group have concerns with the definition and intended use of a “risk ratio” as described above and take the view that the level of own funds held by the insurer should have no impact on the application of the principle of proportionality in the context of a valuation of technical provisions.⁶⁵ They argue that the ratio could be useful, but only at the level of the portfolio being valued, and to assess the scale of risks criteria for the purpose of using simplifications. In this context, no conclusions should be drawn from an assessment at the level of the insurer and especially the level of own funds would have no impact on the decision to use simplifications or not.

F.106 Concerning these issues we would like to mention that in our view such quantitative figures or ratios should not be used as a rigid threshold for whether the proportionality principle can be applied or not. Nevertheless such figures can and should play an important role in the qualitative discussion between company and supervisor whether simplified method might be applied. In such discussions they may give a more objective view for the treatment of the proportionality principle in question.

F.107 This especially applies to the risk ratio: we would like to stress that the risk ratio should neither be seen as an approach (to proportionality) in its own nor as a kind of a threshold.

F.108 Generally, it should be carefully discussed / assessed whether such a quantitative measure should be included within level 2 or 3 implementing measures.

⁶⁴ This para. Stipulates that *“With respect to assets representing the technical provisions, insurance claims shall take absolute precedence over any other claim on the insurance undertaking”*

⁶⁵ Cf. discussion in previous sub-section

Issues for discussion

- Is the “risk ratio” adequate to address the needs of small insurers?
- Would the risk ratio lead to an equal level of policyholder protection for small and big insurers? Would the “risk ratio” be an appropriate supporting tool?
- Would it be difficult to introduce quantitative ratios in level 2?
- Which quantitative figures or ratios other than the “risk ratio” could be used to assess proportionality?

F.5.2.5 Process of assessment of proportionality for insurer

F.109 For deciding whether the proportionality principle can be applied to a question under consideration the crucial point is the assessment of the model error.

F.110 A useful procedure to assess whether or not a simplification could be considered proportionate to the underlying risks and may hence be used by the undertaking, would be the following:

Step 1: Check of qualitative characteristics

F.111 By evaluating all the three criteria “nature, complexity and scale” in a qualitative manner it should be decided whether the application of the proportionality principle with regard to a simplified method may in principle be possible. For taking this decision, quantitative figures or ratios could play an important role, especially in the qualitative discussion between insurer and supervisor. If applying the proportionality principle seems to be possible, the next step is:

Step 2: Quantitative assessment of the model error

F.112 The model error may be by evaluated by sensitivity analysis, by comparison with other methods, or using other appropriate techniques.⁶⁶

F.113 If the model error seems not to be material, using a simplified method would not lead to a lower degree of policyholder’s protection. Therefore applying the proportionality principle would be appropriate.

F.114 If the model error has much more impact with respect to the overall solvability situation (on the level of lines of business or the business of the insurer as a whole), it may be argued that this may be compensated by a higher amount of own funds.⁶⁷

Step 3: Back testing

F.115 The insurer should monitor the risk profile and reconsider the rationale to apply the simplifications. In case the risk profile change it should be checked whether

⁶⁶ Note however that sensitivity analysis in itself may not be sufficient to detect a deficiency in the model itself.

⁶⁷ Cf. the discussion of the risk ratio approach in the sub-section dealing with materiality.

due to nature, scale and complexity it still will be allowed to use the simplification. If not, the company should switch towards a more advanced (best practice) method

F.116 Some general remarks concerning this process:

- The insurer has to assess the appropriateness of the selected method, including any assumptions or parameters being used and the quality of the underlying data. In case the applied method is a simplified method compared to what could be considered as best practice, the rationale to apply this simplified method should be explained and documented.
- The outlined process should be used by companies and supervisors as a guide as to how to apply proportionality rather than being a hard rule. Some flexibility should be possible depending upon a company's particular circumstance and risk profile. The simplification approach taken by a company should be the result of discussion between the company and its supervisors.
- For the discussion between company and supervisor objective quantitative figures such as the risk ratio might be of great help. It is important that such figures are a natural result of the usual actuarial work. Artificial figures that do not fulfil this requirement should be avoided (as this is the case for the thresholds proposed by the CEA, see below). These figures should not be applied as rigid thresholds but as a basis for discussion.

F.117 We note that the CEA paper proposes a different 2 step process for assessing proportionality as follows:

- **Step 1:** Use a nature and complexity filter as a guide to identify where simplifications are likely to be appropriate
- **Step 2:** Use scale thresholds as a guide as to when to limit the use of certain simplifications where this is needed to mitigate risk from any inaccuracy inherent in the approaches

Issues for discussion

- Would the three step process described above lead to an adequate assessment of proportionality?
- Is that approach preferable to the CEA one?
- How else could a process for assessing proportionality in the context of the valuation of technical provisions be described?

F.5.3 Regulatory requirements concerning proportionality

F.118 It should be included in the implementing measures that the undertaking should determine the Best Estimate technical liabilities by using an appropriate method (selecting from the continuum of methods available) taking into account nature, scale and complexity of the risks.

F.119 The undertaking should explain (for each homogeneous risk group) what method is used and why the specific method is selected. By considering the alternative methods companies should be able to explain/report if they have used simplifications. This can be done by answering questions such as: What is current market practice for this Lob? Do we know of more advanced techniques that could have been applied? Moreover, the management board or

administrative body has to be aware of the methods used and, more precisely, of the hypotheses done (advantages and inconveniences).

- F.120 However, it should be stressed that the principle of proportionality is not intended to undermine the consistent application of the principles-based solvency requirements to all insurers in a jurisdiction. An insurer should provide the means necessary to introduce systems, processes and measures that are proportionate to the risks it is exposed to, and a lack of resources should not be an excuse for not complying with supervisory standards.
- F.121 There should not be an absolute measure or several relative or absolute thresholds to determine the allowance for a simplified approach within implementing measures level 2.

Issues for discussion

- Which further considerations should be included here with regard to regulatory requirements on the valuation of technical provisions?
- Should scale thresholds not be introduced in level 2 or level 3? How could such a conclusion be supported?

G Standards for Data Quality

G.1 Introduction

- G.1 Data used to feed the best estimate calculation can have an essential impact on its outcome. So, it is necessary to assess the quality of these data, for instance by reconciling them with those from the annual accounts or with any other internal statistical database.
- G.2 The Level 1 text states in Article 76 that “The best estimate (of a technical provision) shall be equal to the probability-weighted average of future cash-flows, taking account of the time value of money (expected present value of future cash-flows), using the relevant risk-free interest rate term structure”. It further highlights that “the calculation of the best estimate shall be based upon current and credible information (...) and be performed using adequate actuarial methods and statistical techniques”. Thus, the quality of the database is of crucial importance and it should allow for the application of robust and adequate actuarial methods and statistical techniques. Such methodologies require sufficient data, both from a quantitative and qualitative point of view.
- G.3 Quality of data is crucial in the scope of valuation of technical provisions, mainly, because:
- The more complete and correct is the data, the more consistent and accurate are final estimates;
 - The application of a wider range of methodologies for calculating the best estimate is made possible, improving the chances of application of adequate and robust methods for each case.
 - Validation of methods is more reliable and leads to more credible conclusions, once a reasonable level of quality of data is achieved.
 - Effective comparisons along the time and in relation to market data are possible, which conducts, for instance, to a better knowledge of the businesses in which the undertaking operates and its performance.
- G.4 Considering the call for implementing measure in article 85 (f) related to the standards for data quality, the purpose of this paper is to consider:
- how the main criteria for an assessment of the quality of data – appropriateness, completeness and accuracy⁶⁸ - should be interpreted;
 - which internal processes and procedures would need to be implemented to ensure that the data used in the valuation complies with these quality criteria; and
 - how the quality of data could be reviewed and validated and by whom such review should be carried out.
- G.5 When considering the issues mentioned in the previous paragraph, this paper focuses on requirements relating to the collection, storage and processing of the data by the insurer as a first step in the valuation process.

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In the same subject but in a different context, it should be noted that the same requirements apply when granting authorisation for the use of undertaking specific parameters for SCR purposes (see article 104 (7)). Alignment between concepts should be ensured.

G.6 However, it should be noted that the quality of the data used in the determination of technical provisions is also an essential aspect during the reserving analysis itself, where the insurer has to select and assess the data used in the valuation. Therefore, this paper also discusses the data quality issues in this particular context.

G.2 Legal framework

G.2.1 Extracts from Level 1 Text

G.7 Article 81 states that:

"Data quality and application of approximations, including case-by-case approaches, for technical provisions:

Member States shall ensure that insurance and reinsurance undertakings have internal processes and procedures in place to ensure the appropriateness, completeness and accuracy of the data used in the calculation of their technical provisions.

Where, in specific circumstances, insurance and reinsurance undertakings have insufficient data of appropriate quality to apply reliable actuarial method to a set or subset of their insurance and reinsurance obligations, or amounts recoverable from reinsurance contracts and special purpose vehicles, appropriate approximations, including case-by-case approaches, may be used in the calculation of the best estimate."

G.8 Article 47 lists the responsibilities of the actuarial function, one of which is "to assess the sufficiency and quality of the data used in the calculation of technical provisions".

G.9 In Article 75(3), reference is made to the need to value technical provisions consistent with "information provided by the financial markets and generally available data on insurance and reinsurance technical risks (market consistency)". Similarly, Article 76(2) stipulates that the calculation of the best estimate shall be "based upon up-to-date and credible information (...) and be performed using adequate actuarial and statistical methods".

G.10 Article 83 also refers that, upon request of the supervisory authority, insurers shall to be able to demonstrate "the adequacy of the underlying statistical data used" on the application of the estimation methods for technical provisions.

G.2.2 Relevant implementing measures

G.11 The present paper deals with the call for implementing measure corresponding to the 1st half of article 85(f): "The Commission shall adopt implementing measures laying down the following:

f) the standards to be met with respect to ensuring the appropriateness, completeness and accuracy of the data used in the calculation of technical provisions (...)".

G.3 Background information

G.12 The Groupe Consultatif has developed an interim report about "Valuation of Best Estimate under Solvency II for Non-life Insurance". They describe the four steps in the reserving process; here is the Data step description:

"This step includes the production, collection and processing of the data required to perform reserving analyses. The following should subject to proportionality be in place:

- Ideally a system that maximises the ability to report transparently across departments and subsidiaries;*
- A comprehensive list of the data required by the reserving process should be maintained. This would include specification of segmentation by homogenous risk groups and any additional split of the data required;*
- Data used in the reserving process should be captured automatically and with sufficient granularity to support all methods that might be applied, ideally at transaction level (this could include underlying currency detail);*
- Identified data omissions should be documented;*
- Standard diagnostics (that vary by line of business) would be produced in an automated manner to monitor changes in business mix, eg. lapse rates/renewal rates, exposure by rating factor, geographical location makers, average deductible etc.;*
- Reconciliation of the data to the balance sheet and accounting systems (ideally using the same system); and*
- Where reserving is carried out in advance of an accounting date (e.g. using end of November data for the main analysis feeding the year-end accounts) a defined and documented process should be in place specifying how such data is adjusted to a year-end position."*

G.13 In the Report on proxies edited by CEIOPS in July 2008, we can read that *"within the future Solvency II regime, proxy methods will be needed whenever a lack of sufficiently credible own data cannot be avoided. This is the case, for example,*

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

G.4 Key questions to be considered

G.14 In the following, key questions regarding data quality in the valuation of technical provisions are set out, which will form a basis for the analysis carried out in sub-section G.5. The questions relate to the following broad areas:

- The establishment of criteria to assess the quality of data;
- Requirements and standards relating to the collection, storing and processing of data by the insurer; and
- Issues of data quality in the context of a reserving analysis and review.

Criteria to assess the quality of data

- What is the definition of the appropriateness, completeness and accuracy of the data?
- How should the principle of proportionality apply in an assessment of data quality?

Requirements on the collection, storing and processing of data

- Which internal processes have to be implemented to ensure the quality of data?
- How does the principle of proportionality apply in the quantity and quality of data available and on the underlying systems and processes?
- What is the role of the auditors and the actuarial function in respect to defining the data to be collected and to ensure its quality on an on-going basis?

Issues of data quality in the context of reserving analysis and review

- In what circumstances could the data available lose credibility in the context of reserving analysis and review?
- How do the quality standards apply to external data supplied by others or market data?

G.5 Analysis and recommendations

G.5.1 Criteria to assess the quality of data

- G.15 As implicit in Article 81 of the Level 1 text, the quality of data is assessed by satisfying a set of three criteria: appropriateness, completeness and accuracy. Thus, as a general principle, the valuation of technical provisions should be based on data which is considered complete, accurate and appropriate for that purpose.
- G.16 By data we are referring to all the information which is directly or indirectly needed in order to evaluate the best estimate of liabilities, in particular enabling the use of appropriate actuarial and statistical methodologies, in line with the undertaking's specificities and with the principle of proportionality. In the context of this paper, data comprises numerical, census or classification information but not qualitative information. Assumptions are not data, but data are commonly used in the development of actuarial assumptions.
- G.17 Where the quality of data is insufficient to apply reliable actuarial methods, insurers would have to use "appropriate approximations, including case-by-case approaches" (article 81). Those data limitations should be appropriately documented, including a description of how such situations can be remedied.
- G.18 However, in no case should the use of simplifications and proxies be seen as an alternative to implementing appropriate systems and processes for collecting relevant information and building historical databases.
- G.19 There are two broad reasons why enough data of good quality may not be found to feed the best estimate calculation:
- Unavoidable reasons related to the nature or size of the portfolio. For instance, the frequency of claims may be low, leading to a slow building process of the database; or the quantity of data may be limited because the volume of business is small; or legislative or other fundamental

external changes in the operating environment may reduce the adequacy of the historical data to predict future behaviour;

- Reasons related to deficiencies in the internal processes of collecting, storing or validating data quality. For instance, IT mistakes, high cost of collecting or maintaining existent data, misinterpretation of what is necessary, etc. Where problems of this nature exist, immediate measures should be taken to solve them.

G.20 The following paragraphs discuss a possible definition for each of the three criteria that should be used to assess the quality of data:

Appropriateness

G.21 Data is considered appropriate if it is suitable for the intended purpose (i.e. the valuation of technical provisions) and relevant to the portfolio of risks being analysed (i.e. directly relates to the underlying risk drivers).

G.22 Moreover, data is considered appropriate for reserving purposes if it is deemed representative of the portfolio of liabilities being valued and if it can be used to predict the future behaviour.

G.23 In certain cases, changes in the operating environment (e.g. changes in legislation) may reduce the appropriateness of the historical data, because it becomes less credible for prediction exercises. However, in these cases data may still be considered appropriate if it is possible to reasonably adapt the historical data to the new reality, for instance by means of adjustments to the quantitative data and/or by complementing it with expert opinion. In any case, these adjustment exercises need to be carefully justified and documented, and should not be done on the raw data.

Completeness

G.24 Data is considered to be complete if it allows for the recognition of all the main homogeneous risk groups within the liability portfolio. It should be noted that article 79 implicitly implies that the calculation of technical provisions shall be done at the level of homogeneous risk groups.

G.25 Thus, data is considered complete if it has sufficient granularity to allow for the identification of trends and to the full understanding of the behaviour of the underlying risks.⁶⁹ The detail of information collected should be such that allows for the application of adequate reserving methodologies.⁷⁰

G.26 In principle, the more heterogeneous is the portfolio, the more detailed the data should be. Where data is complete, it would generally allow for the application of reliable actuarial method for the valuation of technical provisions.

Accuracy:

G.27 Data is considered accurate if it is free from material mistakes, errors and omissions. Most of these will be the cause of human error or IT failures, thus a particular link exists with operational risk and to the systems and processes

⁶⁹ For instance, when collecting information on the amount of Motor claims paid, it seems necessary to register separately the amounts relating to damage to property and to personal injury, because the underlying trends are different.

⁷⁰ For instance, if run-off triangles are used to calculate the best estimate, it is necessary to record separately all payments and the date at which the payment was made, instead of just the total amount paid.

employed by the company. Arguably, higher exposure to errors may exist when: several different data systems are used, the interface between such systems is not fully automated, the data systems are old and/or there is not a general policy to link the design of data systems with the technical areas of the company.⁷¹ Furthermore, the sales channel and the outsourcing of services is also important, as the company may lose some level of control over the data collection process if the products are sold or managed via intermediaries.

- G.28 Moreover, data is considered accurate if the procedures to record information are adequate and are kept consistent across time. This is particularly applicable for certain information which may be obvious – for instance, recording information on the claims date for latent claims may be particularly challenging, but what would be of particular importance is to define and document an adequate policy to deal with such situations in a consistent manner.⁷²

G.5.2 Application of the principle of proportionality

- G.29 The degree of appropriateness, completeness and accuracy of data expected from the insurer should be consistent with the principle of proportionality.
- G.30 In practice, as the requirements should be seen in relation to the intended purpose of the analysis/valuation, for portfolios whose underlying risks are considered simple in terms of nature, scale and complexity, automatically “appropriate” would be interpreted differently than in a situation where there are complex risks (since less data is needed to evaluate simple risks).
- G.31 However, this should not work as a justification to lower the general standards for the collection of data procedures and on the efforts to ensure its appropriateness, completeness and, especially, accuracy. It should be noted that past data may become relevant in the future if the principle of proportionality ceases to apply for that line of business (for instance, due to an increase on the size of portfolio or of the perils covered).
- G.32 On the other hand, proportionality should apply symmetrically, i.e. where the nature, scale and complexity of risks is high, companies should pay increased attention to their data collection and validation processes.
- G.33 However, in certain circumstances there may be a clash between the amount of information available in practice and proportionality. For instance, complex risks may have a relatively low frequency (e.g. aviation, catastrophes, etc.), thus leading to a very slow process of collecting claims information. The relative amount of claims information seems to be at odds with the proportionality principle. In such cases, the process of collecting, storing and validating information should still be robust, but the company would be required to complement it by making extra efforts to look for relevant external information to allow the understanding of the underlying risks and to use extensively adequate expert opinion and judgements. Documentation is also a key aspect in this subject.

⁷¹ For instance, if the actuarial function, who is responsible for the reserving process has no say on the identification of the data that needs to be collected and stored.

⁷² Other examples include the treatment of nil claims, how to record an event leading to several claims – one claim or multiple claims? – etc.

G.5.3 Requirements on the collection, storing and processing of data

G.5.3.1 Data quality management- Internal processes

G.34 Data quality management could comprise the following phases:

- a) *Definition of the data;*
- b) *Assessment of the quality of data;*
- c) *Resolution of the problems identified;*
- d) *Monitoring data quality.*

G.35 Definition of the data comprises the identification of the needs in terms of data, a detailed description of the items that should be collected and the eventual relations between the different items. When performing reserving analysis, this step represents the starting point for the IT extractions, and the eventual calculations. In case of an inaccurate data description, the interpretation of the requirement could be too wide and then would imply errors. A comprehensive list of the data required by the reserving process should be maintained. This would include specification of segmentation by homogenous risk groups and any additional split of the data required.

G.36 The assessment of the quality of data implies an objective definition of the features that data must verify in order to be able to produce credible estimates of technical provisions, i.e. the verification of the criteria of appropriateness, completeness and accuracy for the purpose of the analysis. From this assessment it is possible to define the priority objectives to reach data quality requirements. These objectives should be concerned by all the entity's departments directly or indirectly involved in this issue.

G.37 If problems with the validation of the data quality criteria have been identified, the insurer should try to solve them (to the extent possible, but while keeping track of the raw data) and should work towards the improvement of the data collection, storage or other relevant internal processes, so as to ensure the quality of the future data. Where appropriate, the insurer should develop and document data analysis techniques designed to assess the quality of the existing data and to identify potential problems.

G.38 Finally, data quality should be monitored periodically. This process could be based, namely, on data quality performance indicators.

G.5.3.2 Identification, collection and processing of the data

G.39 Identification, collection and processing of the data are steps required to perform the calculation of technical provisions. Next, is set a list of the main principles that should be followed in these processes.

- Data should be registered and maintained on a comprehensive and transparent basis;
- Data collected should be sufficiently granular in order to apply adequate reserving methodologies and generate results with a sufficient level of detail and robustness;

- Any adjustments to the original data must be documented as well as its reasons, in particular the correction of any data errors and omissions, and the original database should generally be maintained;
- Data quality assessments should be made periodically and, once obtained the results, adjustments and corrections may take place in the form of suitable quantitative or qualitative changes.

G.5.3.3 Role of internal auditor, external auditor, actuarial function

- G.40 Generally speaking, the role of both the auditors and the actuarial function requires that some degree of analysis is performed to the quality of the data, although the focus, the objectives and the techniques employed for such an assessment will be different.
- G.41 Auditors will be required to audit specific sets of data, i.e. to conduct a formal and systematic examination for the purpose of testing its accuracy, using techniques commonly employed by audit professionals.
- G.42 On the other hand, the actuarial function will be required to 'review' the quality of data, more specifically, to perform informally examinations of the characteristics of the selected data to determine if such data appear reasonable and consistent for the purposes of the analysis (note that review is not an audit of data).
- G.43 In calculation of technical provisions, actuary expertise presents an important role in selection of data to be included. A more detailed description of the role and scope of analysis of the internal auditor, external auditor and actuarial function is out of the scope of this paper. Interested parties should refer to CEIOPS Issues Paper on Implementing Measures on System of Governance.⁷³

G.5.4 Issues of data quality in the context of a reserving analysis and review

- G.44 In the present sub-section, a wider context of data quality is discussed, namely the adjustments that the actuaries may need to perform to the 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 reserving methodologies.
- G.45 In such a specific context, the assessment of data quality for the purpose of the analysis would necessarily be more granular, as it would be made with a view to fit a specific methodology or to review the appropriateness of specific assumptions and parameters.
- G.46 The assessment of the set of three criteria – appropriateness, completeness and accuracy – and the requirements to set up adequate internal processes and procedures, in the context of article 81, should not relate to such a granular level, but it should consider data quality from an overall perspective for the purposes of calculation of technical provisions, without necessarily relating it to the application of particular methodologies.

⁷³ Available at http://www.ceiops.eu/media/docman/public_files/consultations/IssuesPaper-on-Governance.pdf

- G.47 Nevertheless, the adjustments made by the actuary as part of the reserving process, are a key aspect of the reserving analysis. It can be argued that, although it relates to the quality of data vis-à-vis particular methodologies, it falls under the scope of the call for implementing measure in article 85(a) – “actuarial and statistical methodologies to calculate the best estimate”. Moreover, it seems to sit in between two of the responsibilities of the actuarial function: “to ensure the appropriateness of the methodologies and underlying models used as well as the assumptions made in the calculation of technical provisions” (article 47(b)) and “to assess the sufficiency and quality of the data used in the calculation of technical provisions” (article 47(c)).
- G.48 Due to its importance in the reserving process and to the very close link with the general standards for data quality, this issue is further elaborated in this paper. Furthermore, it is not always clear-cut to split the general conclusions on data quality from the situations where adjustments in the context of reserving analysis will be needed.
- G.49 As a general principle, the actuarial function should produce judgment in how much credibility should be assigned to historical data and to prospective assumptions. This judgement has to be based, namely, on a careful analysis of the underlying liabilities, the company and portfolio’s experience and relevant qualitative information.

G.5.4.1 Circumstances where adjustments to historical data may be needed in the context of reserving analysis

- G.50 When applying reserving methodologies, the actuarial function may need to introduce adjustments to the historical data, not because the data is considered inaccurate, but because it is necessary to increase its credibility and to better align it with the characteristics of the (sub-)portfolio being valued and with the future expected behaviour of risks. The following is a non-exhaustive list of situations that are likely to require adjustments to the historical data, specifically when the best estimate is calculated from the projection of run-off triangles:
- unusually heavy or light experience in a given period;
 - reflection of claims cycles;
 - reflection of future expected trends;
 - reflection of changes in risk, for instance due to a one-off change in the operating environment (e.g. court award increasing the costs of a particular type of claims);
 - reflection of changes in cover (e.g. company may decide to introduce/change/remove an excess in its policies, and the past claims data reflects a different reality in policy covers);
 - reflection of changes in the reinsurance policies;
 - occurrence of large or exceptional claims;
 - lower the credibility of older data, because the further back we go, the less relevant and appropriate the data may be;

create statistical mass sufficient to extract statistically credible conclusions by pooling more than one homogeneous risk group.

G.5.4.2 Issues related with external data or market benchmarks

- G.51 In the context of reserving analysis, it will be necessary to complement the internal data available with external data supplied by third parties or market data. This will be the case, for instance, for the risk-free interest rate term structure, 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.
- G.52 The general requirements on data quality – appropriateness, completeness and accuracy – should also apply to this external and market information.
- G.53 Moreover, whenever adequate, measurement of the quality and credibility of the available data in the context of reserving analysis should have regard to available industry or market data which is deemed comparable, having regard, in particular, to the requirements set in article 75(3). Any material deviations should be identified and interpreted, for instance by referring to the specificities of the own portfolio being valued.

Issue for discussion

In some cases, the contents of sub-section G.5.4 address the broader topic of data adjustments (e.g. in para. G.47 and in sub-section G.5.4.1).

- Should this topic be excluded from the analysis in sub-section G since it may be argued that data adjustments are part of the valuation process but not a characteristic of data quality?
- If yes, are there other sub-sections of this paper where this topic could be integrated?

First draft recommendations⁷⁴

Criteria to assess the quality of data

- G.54 The quality of data is assessed by satisfying a set of three criteria: appropriateness, completeness and accuracy. Thus, as a general principle, the valuation of technical provisions should be based on data which is considered complete, accurate and appropriate for that purpose.
- G.55 Data is considered appropriate if
- it is suitable for the intended purpose (i.e. the valuation of technical provisions); and
 - relevant to the portfolio of risks being analysed (i.e. directly relates to the underlying risk drivers).
- G.56 Moreover, data is considered appropriate for reserving purposes if it is deemed representative of the portfolio of liabilities being

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The following are first draft recommendations reflecting the current state of discussion in the Coordination Group. The Group intends to develop final recommendations until June 2009.

valued and if it can be used to predict the future behaviour.

- G.57 The undertaking may adapt the historical data for instance by means of adjustments to the quantitative data and/or by complementing it with expert opinion for example in cases of changes in the operating environment or changes in legislation. In any case, these adjustment exercises need to be carefully justified and documented, and should not be done on the raw data.
- G.58 Data is considered to be complete if:
- it allows for the recognition of all the main homogeneous risk groups within the liability portfolio; and
 - it has sufficient granularity to allow for the identification of trends and to the full understanding of the behaviour of the underlying risks.
- G.59 Data is considered accurate if
- it is free from material mistakes, errors and omissions; and
 - the procedures to record information are adequate and are kept consistent across time.
- G.60 The degree of appropriateness, completeness and accuracy of data expected from the insurer should be consistent with the principle of proportionality. However, the application of such principle should not lead to a lowering of the the general standards for the collection of data procedures and on the efforts to ensure its appropriateness, completeness and, especially, accuracy.
- G.61 The combination of accuracy, completeness and appropriateness of information collected should be such that it allows for the application of adequate reserving methodologies.

Requirements on the collection, storing and processing of data

- G.62 Data quality management could comprise the following phases:
- Definition of the data;
 - Assessment of the quality of data;
 - Resolution of the problems identified;
 - Monitoring data quality.
- G.63 Definition of the data comprises the identification of the needs in terms of data, a detailed description of the items that should be collected and the eventual relations between the different items.
- G.64 The assessment of the quality of data implies an objective definition of the features that data must verify in order to be able to produce credible estimates of technical provisions, i.e. the verification of the criteria of appropriateness, completeness and accuracy for the purpose of the analysis.
- G.65 If problems with the validation of the data quality criteria have been identified, the insurer should try to solve them (to the extent possible, but while keeping track of the raw data) and should work towards the improvement of the data collection,

storage or other relevant internal processes, so as to ensure the quality of the future data. Where appropriate, the insurer should develop and document data analysis techniques designed to assess the quality of the existing data and to identify potential problems.

- G.66 Data quality should be monitored periodically.
- G.67 Data should be registered and maintained on a comprehensive and transparent basis.
- G.68 Any adjustments to the original data must be documented as well as its reasons, in particular the correction of any data errors and omissions, and the original database should generally be maintained.
- G.69 Data quality assessments should be made periodically and, once obtained the results, adjustments and corrections may take place in the form of suitable quantitative or qualitative changes.

Issues of data quality in the context of a reserving analysis and review

- G.70 Adjustments to the available data may be necessary in order to improve the reliability of the estimates derived from actuarial and statistical reserving methodologies. In such a specific context, the assessment of data quality for the purpose of the analysis would necessarily be more granular, as it would be made with a view to fit a specific methodology or to review the appropriateness of specific assumptions and parameters.
- G.71 The assessment of the set of three criteria – appropriateness, completeness and accuracy – and the requirements to set up adequate internal processes and procedures, in the context of article 81, should not relate to such a granular level, but it should consider data quality from an overall perspective for the purposes of calculation of technical provisions, without necessarily relating it to the application of particular methodologies.
- G.72 As a general principle, the actuarial function should produce judgment in how much credibility should be assigned to historical data and to prospective assumptions. This judgement has to be based, namely, on a careful analysis of the underlying liabilities, the company and portfolio's experience and relevant qualitative information.
- G.73 In the context of reserving analysis, it will be necessary to complement the internal data available with external data supplied by third parties or market data. The general requirements on data quality – appropriateness, completeness and accuracy – should also apply to this external and market information.