Report on Proxies

CEIOPS – Groupe Consultatif
Coordination Group

July 2008
Contents

Executive summary ........................................................................................................... 4

Introduction ......................................................................................................................... 6
   Purpose of this report ......................................................................................................... 6
   Coordination Group on Proxies....................................................................................... 8
   Other initiatives ............................................................................................................... 9
   Style convention .......................................................................................................... 10

The use of proxies under Solvency II ............................................................................. 11
   Definition of proxies and their characteristics............................................................... 11
   Building blocks of the solvency valuation of technical provisions ............................... 14
   Where proxies will be needed – and where they may be useful .................................... 17
   When will proxies be admissible under Solvency II? ...................................................... 18
   Relationship between proxies, simplifications and sound actuarial techniques ............ 22
   Role of proxies in Pillar II and Pillar III ........................................................................ 25
   The dangers in using proxies ....................................................................................... 25
   Summary of main points ............................................................................................... 27

Data availability in different markets .............................................................................. 30
   Purpose of this section .................................................................................................... 30
   Quantitative data provided for reporting purposes ....................................................... 30
   Usage of actuarial expertise in current valuation processes ........................................... 32
   Availability of market benchmark data ....................................................................... 33
   Summary of main points ............................................................................................... 34

Description of proxies and proposals for QIS4 ............................................................. 35
   Classification ................................................................................................................... 35
   Overview of proxy proposals for QIS 4 ......................................................................... 39
   Information on use of proxies requested under QIS4 ...................................................... 40
   Proxies for the best estimate ....................................................................................... 41
   Proxies for the risk margin ............................................................................................ 82
   Proxies for the treatment of annuities ......................................................................... 83
   Proxies for claims handling costs provisions ................................................................ 87

Annex ............................................................................................................................... 91
   Availability of market data in Member States ............................................................... 92
   List of members of the Coordination Group ................................................................. 99
Executive summary

Definition of Proxies

The Solvency II Framework puts forward the protection of policyholders and the harmonisation of quantitative and qualitative solvency requirements within Europe as two of its main objectives. Increased harmonisation of technical provisions is central to this aim.

The economic valuation approach envisaged under Solvency II requires (especially for so called long tail business in non-life insurance) sufficient statistical data and actuarial knowledge in order to apply appropriate actuarial methods. This report is concerned with those cases where one or both of these conditions are not met. In general this is due to one or several of the following reasons:

a) The insurer has not been able to build up sufficient actuarial expertise (either internally or by external know-how). This is especially important for the ongoing QIS exercises but should not be a problem under the new Solvency II regime due to the introduction of an actuarial function (Article 47).

b) Sufficient statistical data are not available for the next few years because the necessary data base of own claims data will in some cases only be built up from now on. It may take several years before these data are sufficiently reliable and extensive enough to be used for a full actuarial approach.

c) Under the Solvency II Framework, insurers will be required to 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. However, even after the introduction of the Solvency II regime, sufficient statistical data will not always be available, e.g. in the case where an insurer sells products within a new line of business, or where the portfolio is too small to allow the build-up of credible historic claims data.

This report explores pragmatic solutions in order to overcome these practical difficulties, and sets out a number of harmonised valuation techniques for the calculation of technical provisions. These techniques are called “proxies” since they are intended to substitute a lack of data or actuarial expertise in the valuation process. The proposals focus on the valuation of the best estimate as the main building block within technical provisions. They were derived on basis of the work of national “proxy” working groups, which at the time this report was written have been established in 12 different Member States.

Proxies in QIS4

The report recommends testing the described proxies under the next Quantitative Impact study (QIS 4) in the case that a proper actuarial approach is not possible. Including proxies into the QIS4 exercise will lead to a better assessment of the suitability and reliability of various proxy techniques, as well as their interplay with more advanced
measurement methods. The comparability of the data could be enhanced and the overall quality of data would increase. Facilitating the valuation of technical provisions will also help to increase the participation of the insurance industry in the QIS.

**Proxies in Solvency II**

The proposed proxy methods are expected to be generally compatible with the principles for the solvency valuation of technical provisions as set out in the draft Framework Directive.

However, the use of the proposed proxy methods should be subject to clear admissibility criteria in order to encourage the (re)insurance undertakings to use – whenever this is possible - appropriate actuarial methods for the valuation of liabilities as foreseen in the draft Framework Directive, including the establishment of internal processes and procedures to ensure the appropriateness, completeness and accuracy of the underlying data. These admissibility criteria 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). The details hereof should be part of level 2 or level 3 measures of the Lamfalussy process.
Section 1

Introduction

Purpose of this report

1.1 The market-consistent approach envisaged under Solvency II for the valuation of technical provisions will require insurers to consider the full range of possible outcomes of future cash flows arising from their insurance obligations in order to determine their expected present value (the ‘best estimate’) as well as the corresponding risk margin.

1.2 In non-life insurance, the actuarial methods used to determine best estimates and risk margins can be expected to range in complexity but will usually require granular company-specific internal data, particularly for lines of business with payout periods of several years (so-called "long-tailed" lines of business). In life insurance, the consideration of the time value of embedded options and guarantees may often require the use of more sophisticated stochastic modelling techniques.

1.3 In this context, proxies (i.e., practical simplified solutions) for the valuation of technical provisions come into play where, for the subset of insurance obligations to be valued in question, either one of the following conditions is fulfilled:

- ‘Data condition’: there is only insufficient company-specific data of appropriate quality to apply a reliable statistical actuarial method for the determination of the ‘best estimate’; or
- ‘Actuarial expertise condition’: there is only insufficient actuarial expertise available to the insurer to carry out a best practice actuarial valuation.

1.4 At current, these conditions apply for a significant number of insurers, especially in non-life insurance where in some markets the use of actuarial techniques has traditionally been less widespread than in life insurance.

1.5 To prepare for the move towards an economic, market-consistent valuation under the future Solvency II regime, insurers will need to build up their statistical databases and actuarial expertise, so that overall the relevance of these conditions will diminish in the forthcoming years. In particular, this is the case for the availability of actuarial expertise, given the Solvency II requirement to provide an actuarial function to ensure the appropriateness of the methodologies used and assumptions made in the calculation of technical provisions.\(^{1}\) Therefore, the lack of actuarial expertise currently observed will only be a temporary phenomenon and should not constitute a problem after the introduction of the new Solvency II regime. In contrast to

\(^{1}\) Cf. paras. 2.52 to 2.58, below.
This, a lack of data will continue to occur in certain situations, for example when an insurer writes a new line of business.

1.6 This report explores the role of proxies in the valuation of technical provisions, and discusses the extent to which these conditions can be appropriately aligned with the actuarial function Article and the proportionality principle in the Solvency II draft Framework Directive (hereafter draft Framework Directive).\(^2\)

1.7 More importantly, it gives a comparative description of proxy methods developed by national proxy expert groups. On basis of these national proxy suggestions, it proposes ‘harmonised’ proxies that could be tested under the forthcoming quantitative impact study QIS4. Including proxies into the QIS4 exercise is expected to lead to a better assessment of the suitability and reliability of various proxy techniques, as well as their interplay with more advanced measurements methods.

1.8 The report is divided into four sections:

- **Section 1** introduces into the subject of this report, and sets out the aims of the Coordination Group’s work;
- **Section 2** describes the characteristics of proxies, and explores their role under the Solvency II framework;
- **Section 3** briefly considers the availability of data in the various member states;
- **Section 4** suggests a classification for proxies, and gives an overview of the proxy techniques which so far have been developed by the national expert groups. On the basis of a comparative analysis of these proxies, it derives testing proposals for proxies under QIS 4.

1.9 This is an interim report, and, as such, does not seek to give a comprehensive view on possible proxy solutions under Solvency II. Rather, it is intended to set out first general considerations on the role of proxies, and to provide a number of testing proposals for proxies under QIS 4. The Coordination Group plans to update its report in the light of the QIS 4 results, and when the national proxy expert groups have progressed further in their work.

1.10 Whereas the general considerations on the use of proxies under Solvency II are applicable to both life and non-life insurance business, the discussion of specific proxy techniques contained in section 4 of this report is restricted to the field of non-life insurance.\(^3\) This reflects the fact that most of the national expert groups have so far only considered non-life insurance issues.

---


\(^3\) Whilst also considering the treatment of annuities arising from non-life insurance contracts, cf. section 4.
Coordination Group on Proxies

1.11 A working group – the Coordination Group on Proxies – established jointly by the Committee of European Insurance and Occupational Pensions Supervisors (CEIOPS) and the Groupe Consultatif Actuariel Européen (GC) has drafted this report. The Coordination Group meets under the chairmanship of Rolf Stölting (Munich Re) and Olaf Ermert (BaFin - German Federal Financial Supervisory Authority). It acts as an umbrella group for national working groups on proxies, which at the time this report was written have been established in 12 different Member States. The task of the Coordination Group is to steer and coordinate the work of the national proxy groups, and to act as a point of contact for CEIOPS and the Groupe Consultatif.

Goals of the Coordination Group

1.12 The overall aim of the Coordination Group is to further the development of an actuarial “Best Practice” for the application of proxy solutions in the context of a valuation of technical provisions according to the Solvency II principles. Such work is expected to improve the consistency and comparability of application of Solvency II valuation principles for technical provisions across different member states, in order to ensure a level playing field.

1.13 The work of the Coordination Group complements the cooperation between CEIOPS and the Groupe Consultatif towards defining harmonized criteria for the calculation of the best estimate of technical liabilities, and guidance on other methodological questions concerning its calculation.

1.14 The Coordination Group has aimed to support the Solvency II QIS 4 exercise, which started in April 2008, by providing testing proposals for specific proxy techniques. A description of these testing proposals, which have been derived on the basis of a comparative analysis of the proxies provided by the national expert groups, is set out in this report. The proposals consist of a specification of the formula underlying the proxy technique, as well as a description of the criteria under which the proxies are intended to be applied. To provide a better picture of the interplay of the various proxy techniques (also with more advanced valuation

---

4 Belgium, Italy, Norway, Ireland, Bulgaria, Portugal, Germany, Slovenia, the Netherlands, the UK, France and Sweden.
techniques), decision trees for the valuation processes for technical provisions have been developed as further guidance for QIS 4 participants.\(^5\)

1.15 The proxy testing proposals of the Coordination Group were included into the draft technical specifications for QIS4, which CEIOPS delivered to the European Commission by 20 December 2007. During the consultation period on the QIS4 technical specifications, which lasted until 15 February 2008, in cooperation with the Coordination Group some further refinements and amendments to the original proposals were carried out. We therefore refer the reader to the QIS4 technical specifications\(^6\) for the final version of the individual testing proposals for proxies which were included in QIS4.

1.16 In the medium term, the Coordination Group intends to support CEIOPS’ work on providing advice to the European Commission on the drafting of implementing measures for the draft Framework Directive on the valuation of technical provisions (“Level 2 activities”). This relates in particular to the implementing measures for Article 81 (data quality and the application of a case-by-case approach for technical provisions) and for the application of the proportionality principle when valuing technical provisions.\(^7\)

1.17 Finally, an important long term aim of the Coordination Group is to contribute to CEIOPS work on establishing supervisory standards, recommendations and guidelines to enhance convergent and effective application of the regulations and to facilitate cooperation between national supervisors (“Level 3 activities”) in the context of the valuation of technical provisions.

**Other initiatives**

1.18 In September 2007, CEA\(^8\) has created a number of working groups with the aim to assist CEIOPS and the European Commission in developing adequate and appropriate implementing measures under the draft Framework Directive. One of these working groups is the “Working group on Proportionality”. The aim of this working group is to propose simplifications which could be used under the principle of proportionality and to propose alternatives for some of the formulas and scenarios used in the calculations of the best estimate, risk margin, and Solvency Capital Requirement (SCR).

1.19 The Coordination Group believes that it is important that in dealing with the issues of proxies the views of all stakeholders involved in the Solvency II process are taken into account. Therefore, the national proxy groups were set up as joint working groups, consisting of representatives from the supervisory authorities, actuarial organisations and the insurance industry.

---

\(^5\) Cf. section 4 of this report.

\(^6\) Available on the EU Commission’s website under [ec.europa.eu/internal_market/insurance/solvency/index_en.htm](ec.europa.eu/internal_market/insurance/solvency/index_en.htm).

\(^7\) The role of proxies under the Solvency II framework is further explored in section 2 of this report.

\(^8\) The European Insurance and Reinsurance Federation (Comité Européen des Assurances).
**Style convention**

1.20 The following has been adopted for this document:

<table>
<thead>
<tr>
<th>Recommendations for QIS 4 related to testing proposals for proxies appear in shaded (blue) boxes, headed <strong>Recommendations for QIS 4.</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Summaries of main findings are also boxed, shaded in green.</td>
</tr>
</tbody>
</table>
Section 2

The use of proxies under Solvency II

2.1 This section describes the characteristics of proxies, and explores their role under the Solvency II framework.

Definition of proxies and their characteristics

Definition of proxies

2.2 As briefly discussed in the introduction, we use the term “proxy” to refer to a method for the solvency valuation of technical provisions which is used in a situation where either one of the following two conditions is fulfilled:

- ‘Data condition’: there is only insufficient company-specific data of appropriate quality to apply a reliable statistical actuarial method for the determination of technical provisions; or
- ‘Actuarial expertise condition’: there is only insufficient actuarial expertise available to the insurer to carry out a best practice actuarial valuation.

Therefore, a “proxy” is a valuation methodology which is used to overcome the problem of a lack of data, or of a lack of actuarial expertise.

2.3 Given the importance of the evaluation of risk within Solvency II, the requirement to provide an actuarial function\(^9\) will have the effect that a lack of actuarial expertise within non-life insurance companies is only a temporary phenomenon. Both effects (lack of data or actuarial expertise) may still occur during some transitional period before or at the beginning of the introduction of Solvency II, but should end at a certain point in time. Only a lack of data can also occur on a regular basis under the Solvency II regime, for example when a company builds up a new line of business.

2.4 We have defined a proxy to be a valuation method that is applied when the ‘data condition’ or the ‘actuarial expertise condition’ (or both) are fulfilled. This means that we do not presume that proxy methods need necessarily be applied by non-actuaries. It also means that we use the term ‘proxy’ also in situations where reliable data is available, but where the insurer has only insufficient actuarial expertise to carry out a ‘state-of-the-art’ statistical analysis.\(^10\)

---

\(^9\) Cf. Article 47 of the draft Framework Directive and the discussion in paras. 2.52 to 2.58, below.

\(^10\) The extent to which such ‘non-actuarial’ usage of proxies is compatible with the Solvency II framework is a different matter, which is discussed further below.
Proxies vs. simplifications

2.5 Under the principle of proportionality contained in the Solvency II framework, simplified methods (‘simplifications’) for the calculations of technical provisions may be used, where these methods are compatible with the overall solvency II valuation principles and proportionate to the nature, scale and complexity of the underlying risks. This report considers proxy techniques in the calculation of technical provisions – where they are admissible under the Solvency II framework - as a specific kind of simplifications, without however comprising all possible simplifications.

2.6 Among the valuation techniques used under Solvency II, we may therefore distinguish between:

- ‘Full’ actuarial techniques on the basis of credible own data; and
- Simplifications, subdivided into:
  - simplifications due to a lack of data (i.e., admissible proxy valuations)
  - other simplifications (e.g. due to “small” underlying risks).

2.7 Further analysis will be carried out by CEIOPS for determining appropriate criteria for the admissibility of the use of simplified methods for the calculation of technical provisions under Solvency II. The results of this analysis should be reflected in the drafting of implementing measures on the valuation of technical provisions (i.e., on level 2), and also in establishing supervisory recommendations and guidelines (i.e., on level 3).

2.8 The Coordination Group has focused its work on proxy techniques, which are characterised by the two conditions mentioned above in para. 2.2 (i.e., lack of data or lack of actuarial expertise). In its analysis of specific proxy techniques (see section 4 of this report), the Coordination Group has set out, for each of the proxies considered, a number of application criteria. Some of these application criteria could be seen as indicative admissibility criteria for proxy techniques under the future Solvency II regime, whereas others will be limited to the use in preliminary QIS studies.

2.9 Generally, it should be stressed that the admissibility of any given valuation technique will depend on the individual risk situation of the insurer. Therefore, the criteria laid out in section 4 are intended to give guidance to an insurer in its assessment of the appropriateness of a given proxy technique, rather than to provide a definite decision whether the technique is admissible or not.

Characteristics of proxies

2.10 Typical characteristics of proxies could be summarised as follows:

- **Substitute for lack of data**: A lack of data is one of the defining properties for the use of proxies; a proxy calculation attempts to substitute the missing company-specific data by other means, e.g. by the use of market data or by substituting statistical estimates by a-priori assumptions.
• **Substitute for lack of actuarial expertise**: A lack of actuarial expertise can be an issue in non-life insurance, where for some markets the usage of statistical techniques for the setting of technical provisions is less common than in life insurance.

• **Measurement uncertainty**: Due to their simplicity and the lack of credible, insurer-specific data, proxy approaches will usually lead to a higher degree of measurement uncertainty than proper actuarial methods.

• **Simplicity**: In the absence of company-specific data, proxies need to rely on simplifying, average assumptions on expected cash flows (e.g. based on market data). Therefore, proxies typically require less complex calculations than proper actuarial techniques.

• **Temporariness**: Normally, the lack of data which leads to using a proxy is of a temporary nature (e.g. when the insurer writes a new line of business). As time progresses, more company-specific data becomes available. At some point in time, the proxy needs no longer be used due to the availability of data.

In the following paragraphs, some aspects of these characteristics are discussed in more detail.

• **Measurement uncertainty**

2.11 The following factors are likely to impair the statistical quality of proxy methods:

• Increased **model error**: Due to its simplicity, and due to the lack of company-specific data, the model underlying the proxy valuation will be less apt to describe the future cash flows arising from the insurer's obligations than a proper actuarial technique; and

• Increased **parameter error**: In the absence of sufficient observable data, the parameters and assumptions used in the proxy calculations will usually require a considerable amount of judgment.

2.12 These factors will lead to an increased overall estimation error, and hence to an increased measurement uncertainty, for proxy calculations. This increased measurement uncertainty will have to be reflected in the assessment of the overall solvency position of the insurer. Principally, this could be achieved with regards to one or several of the following aspects of the quantitative solvency assessment:

• the setting of the parameters and assumptions used in the proxy; or

• the calculation of the risk margin; or

• the determination of the solvency capital requirement.

Further analysis is required to determine which (or which combination) of these potential adjustments could appropriately be made when proxy valuations are applied.

2.13 For the Solvency II regime, the increased uncertainty of proxy valuations also entails the risk that a diverse range of different proxy methods may
produce outcomes that are inconsistent as between different insurers using them, contradicting the overall Solvency II aim to enhance harmonisation in the valuation of technical provisions. To mitigate this risk, the Coordination Group supports the development of an actuarial best practice for proxy calculations. Such “best practice” is intended to define, limit and describe appropriate proxy approaches, setting out how they should be calibrated and how and when they should be used.

- **Temporariness of proxy calculations**

2.14 As noted in para. 2.10, an insurer will typically build up credible own claims experience as time progresses, and therefore a lack of data will usually occur only temporarily. However, in some situations a lack of data may also have permanent character, for example in classes of business which generally have little material, or credible, claims experience to act as a base (for example cyber risks or political risks). In such cases, a proxy valuation will need to be used for a longer period of time.

2.15 With regard to a lack of actuarial expertise within non-life insurance companies, it was already highlighted in para. 2.3 that this is expected to be only a temporary phenomenon.

**Building blocks of the solvency valuation of technical provisions**

2.16 This subsection briefly recalls the main ‘building blocks’ of a solvency valuation of technical provisions. It then discusses to which of these building blocks proxy methodologies could be applied, and gives an overview of the scope of the comparative analysis of proxies contained in section 4.

**Best estimate and risk margin as major building blocks**

2.17 The solvency valuation of technical provisions is based on their current exit value. The current exit value reflects the amount an insurer would expect to have to pay today if it transferred its contractual rights and obligations immediately to another undertaking.\(^{11}\)

2.18 Where the future cash flows associated with insurance obligations can be replicated using financial instruments for which a market value is directly observable (i.e., where those cash flows are hedgeable), the value of technical provisions is determined on the market value of those financial instruments. In such a situation, proxy calculations don’t apply.\(^{12}\)

2.19 Otherwise, the technical provisions are split into two building blocks:

- The **best estimate**, defined as the expected present value of future cash flows, and;

---

\(^{11}\) For the following, cf. the explanatory memorandum and section 2 in chapter VI of the Directive proposal.

\(^{12}\) Note that this situation is characterised by the fact that the required data (the market value of replicating financial instruments) does exist.
• a risk margin, determined by the Cost-of-Capital (CoC) approach and on basis of the calculation of the Solvency Capital Requirement (SCR).

2.20 The best estimate constitutes by far the largest “building block” on the liability side of the solvency balance sheet. Therefore, the work on proxy methods is mainly focussed on the best estimate, and most of the techniques discussed in this report relate to the valuation of the best estimate.

2.21 It should be noted, however, that the use of a proxy method for the best estimate has implications on two other important building blocks of the quantitative solvency system:

• The calculation of the SCR, which requires the best estimate valuation as an input; and

• The calculation of the CoC risk margin, which in turn depends on the SCR.

2.22 To illustrate this, suppose a very simple proxy is used for the determination of the best estimate. Then it may be difficult to assess the impact of a given interest rate shock to the value of the provision, thus requiring a “proxy” calculation for the interest rate risk module in the standard formula.

2.23 Therefore, further analysis is required to ensure that the use of proxies for the best estimates fits together with the calculation of the SCR, and the determination of the risk margin. Ideally, a proxy calculation for the best estimate should go hand in hand with an appropriate (simplified) calculation of the SCR, and a corresponding (proxy) calculation of the risk margin.

2.24 In this report, first ideas on proxy calculations for risk margins are set out, although the focus is clearly put on proxies for the determination of the best estimate.

2.25 In addition to the split between the best estimate and the risk margin, it is necessary to split the valuation of technical provisions with respect to a number of further dimensions, namely:

• The split between life and non-life technical provisions;

• the split between gross provisions and recoverables from reinsurance contracts;

• the split into homogeneous risk groups (HRG’s)\textsuperscript{13}; and

• in non-life insurance, the split between claims provisions and premium provisions.\textsuperscript{14}

\textsuperscript{13} Note that, according to Article 78 of the draft Framework Directive, the segmentation into HRG’s needs to be a refinement of the segmentation into lines of business (LOB’s); as set out in Article 84(e), these LOB’s shall be defined in implementing measures to the Directive.

\textsuperscript{14} Note that this split is not explicitly required by the Framework Directive, but corresponds to the split between “pre-claim” and “post-claim” liabilities in the IASB discussion paper. It has also been introduced in CEIOPS technical solvency advice and into the technical specifications for QIS2 and QIS3 (note also that this split is necessary in order to calculate the premium and reserve risk charge in the current SCR standard formula).
**Overall valuation process**

2.26 The following diagram illustrates how the various building blocks for the valuation of technical provisions are typically derived:

![Diagram of overall valuation process](image)

2.27 We note that a proxy method could also apply to the process of splitting up the book of business into HRG’s or LOB’s, or to the process of allocating obligations between life and non-life insurance.

2.28 As already mentioned, the discussion of the proxy methods in section 4 of this report will be restricted to non-life insurance\(^{15}\) (together with the issue of annuities arising from non-life insurance contracts). The following table summarises which of the building blocks described above are covered by this analysis:

\(^{15}\) For life insurance the need for proxies may also exits, the current report focuses on non-life business.
<table>
<thead>
<tr>
<th>Building block</th>
<th>To which extent discussed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Split between life and non-life obligations</td>
<td>• only with respect to treatment of annuities arising from non-life contracts</td>
</tr>
<tr>
<td>Best estimate</td>
<td>• premium provisions and claims provisions in non-life; further split between gross and net</td>
</tr>
<tr>
<td></td>
<td>• annuities</td>
</tr>
<tr>
<td></td>
<td>• no other life technical provisions covered</td>
</tr>
<tr>
<td>Risk margin</td>
<td>• only non-life premium and claims provisions</td>
</tr>
<tr>
<td></td>
<td>• only first considerations</td>
</tr>
</tbody>
</table>

**Where proxies will be needed – and where they may be useful**

2.29 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;
- where 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.

2.30 The development of proxy methods may also be helpful to ease the transition to the new solvency regime. In this respect, it is useful to distinguish between

- the time period until the Solvency regime becomes effective; and
- the first years of the Solvency II regime.

**Ease of transition during run-up to Solvency II**

2.31 During the running up to Solvency II, the discussion of proxy techniques could help to raise the awareness of insurance industry and supervisors about the suitability and practicality of valuation techniques, thus supporting the development of such techniques in the market. By facilitating the valuation of technical provisions, it could help increasing the participation of the insurance industry in future CEIOPS quantitative impact studies.
Ease of transition during first years of Solvency II

2.32 It might also be useful to allow the use of proxies (limited to clearly defined exceptions) during a defined transition period beginning at the start of the Solvency II regime. During this transition period, the insurers would still have some time to set up a reliable data basis and build up sufficient actuarial expertise, before the ‘full’ requirements of the regime would become effective at the end of the transition period.

2.33 However, the draft Framework Directive does not reflect this idea. Therefore, the introduction of such a transitional period (with some allowance for proxy methods for the valuation of technical provisions during this period) would require further debate.

When will proxies be admissible under Solvency II?

2.34 The preceding subsections are written from the perspective that there is a practical need for proxy methods, especially for small and medium sized insurers which have limited resources on data and actuarial expertise. However, the Coordination Group recognises that there is a certain contradiction between this practical need for proxy methods and the risk-based approach under Solvency II which aims to capture the true risk profile of insurers.

2.35 Therefore, this subsection discusses the requirements on a solvency valuation of technical provisions under the Solvency II framework. It then analyses the conditions which proxy methods will have to meet in order to be compatible with Solvency II.

Requirements on valuation methodology for best estimate

2.36 The draft Framework Directive has chosen a ‘full’ economic approach for the definition of the best estimate, by requiring it to take into account all cash in- and out-flows required to settle the insurance obligations, including the value of financial guarantees and contractual options. The calculation of the best estimate shall be also based upon ‘current and credible information’ and ‘realistic assumptions’ and be performed using ‘adequate actuarial methods and statistical techniques’.

2.37 This far-reaching definition of the best estimate will usually require explicit projections of future cash flows on the basis of granular company specific data. However, the draft Framework Directive attaches particular importance to the principle of proportionality, which applies to all requirements of the Directive and which shall ensure that the new solvency regime is not too burdensome for insurers with “small” risk profiles.

2.38 With regard to the calculation of technical provisions, the principle of proportionality allows for the use of “simplified methods and techniques to calculate technical provisions, in order to ensure the actuarial methods and statistical techniques [...] are proportionate to the nature, scale and
Hence, the draft Framework Directive principally allows for a continuum of methods that could be applied, differing in their degree of complexity. It is only required that the method that is actually chosen to determine the technical provision is proportionate to the underlying risks. Under this perspective, proxies (where they are admissible under the Solvency II framework) can be regarded as special types of simplifications:

However, it is clear that any method which is applied to determine technical provisions still needs to be compatible with the principles and general requirements on the valuation of technical provisions set out in the draft Framework Directive.

With regards to proxies for the best estimate, this means that a proxy, in order to be compatible with the draft Framework Directive, would need to be an estimate of the expected present value of future cash flows (i.e. an ‘estimate of the best estimate’). It would also need to reflect the following key factors mentioned in the draft Framework Directive:

- the time value of money;
- any expenses incurred in servicing the obligations;
- inflation (including expenses and claims inflation);
- any expected future bonus payouts; and
- any financial guarantees and contractual options embedded in the contracts.

To illustrate this by way of an example, suppose that within some markets statutory claims provisions would typically be set in a very conservative manner, and would not be discounted. In such a situation, it could be argued that the statutory value of claims provisions could be chosen as a very simple ‘best estimate’ proxy. However, such a proxy would in general not be compatible with the draft Framework Directive: firstly, it would disregard the time value of money; and secondly, the statutory balance sheet value could not be regarded as an approximation of the statistical best estimate of future cash flows.

---

16 Cf. Article 85(h) of the Directive proposal. In the following, we use the term "simplifications" to denote such methods.
2.43 We can conclude from this that under the Solvency II framework it is admissible to use a proxy to determine technical provisions if

- the proxy is compatible with the general framework principles underlying the valuation; and
- the use of the proxy is proportionate to the underlying risks.

2.44 In some situations, a lack of data could be seen as a characteristic of the underlying risk. This could be the case, for example, for risks for which the claims experience would generally be very sparse. In these cases, the use of a proxy method could be seen as proportionate to the nature of the underlying risk.

2.45 Under most circumstances, however, the extent to which historic claims data is available would not be immediately related to the scale or complexity of the underlying risks. In this case, a lack of data in itself will usually not be sufficient to ensure that the use of the proxy is proportionate to the risks. For this to hold, additional conditions would have to be met, e.g. regarding the scale of the exposure.

2.46 For the use of proxies, this implies that:

- typically the proxy could only be applied temporarily, e.g. when the insurer expands into a new line of business and until the volume of this new business has reached a point where own data can reliably be used; and
- where data can principally be derived, insurers need to gather this data to sophisticate their valuation methods.

2.47 Within the draft Framework Directive, this view is reinforced in Article 81, which states that 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.”

2.48 The Coordination Group fully supports this view, and regards the build-up of credible own data as fundamental to the quality of the valuation process. As previously noted, however, in some situations a lack of credible own data (and therefore a use of proxy methods) cannot be avoided. Article 81 in the draft Framework Directive recognises this issue, and states that in such cases “case-by-case approaches may be taken with respect to the calculation of the best estimate.”

2.49 The Coordination Group believes that this statement is not intended to create a loophole for valuation methods that would otherwise not be acceptable; rather, the statement should be read as an explicit recognition that case-by-case approaches – in case there is only insufficient data of appropriate quality to apply a reliable actuarial method – represent a

---

17 Cf. para. 2.29.

18 Under the current political debate, it seems likely that this wording is opened up to include other proxy valuation methods beside case-by-case.
valuation method that is compatible with the principles of the draft Framework Directive, and proportionate to the underlying risks.

2.50 The Coordination Group agrees with this view. However, it notes that an application of a case-by-case approach

- is an issue in non-life rather than life insurance; and
- requires further considerations (with regards to e.g. IBNR claims).

This will be addressed in more detail in section 4 of this report, which includes a discussion of proxy methods based on a case-by-case approach.

2.51 It should also be noted that, in the absence of sufficient own data, the second sentence of Article 81 of the draft Framework Directive should not lead to a restriction of allowable proxy methods to the case-by-case approach. Indeed, any (proxy) approach which is compatible with the general valuation principles, and proportionate to the underlying risks, would represent an acceptable valuation method.\(^19\)

**Requirements on actuarial expertise**

2.52 There is a clear steer from the development of Solvency II that an actuarial best estimate should be at the heart of Pillar I. The draft Framework Directive states (in Article 47) that:

> "Insurance and reinsurance undertakings shall provide for an effective actuarial function to undertake the following:

(a) to coordinate the calculation of technical provisions;

(b) to ensure the appropriateness of the methodologies and underlying models used as well as the assumptions made in the calculation of technical provisions;

(c) to assess the sufficiency and quality of the data used in the calculation of technical provisions;

(d) to compare best estimates against experience;

(e) to inform the administrative or management body of the reliability and adequacy of the calculation of technical provisions;

(f) to oversee the calculation of technical provisions in the cases set out in Article 81;

(g) [....]"

These requirements illustrate that it is expected that persons having actuarial knowledge should be heavily involved in the calculation and oversight of technical provisions.

\(^19\) For an analysis of other proxy methods besides a case-by-case approach, we refer to section 4.
2.53 As set out in the explanatory memorandum to the draft Framework Directive, however, the identification of an (actuarial) function does not prevent the insurer from freely deciding how to organise this function in practice, and account should be taken of the nature, scale and complexity of the operations of the insurer when implementing the governance system (and in particular the actuarial function). The actuarial function could be staffed by own staff or can rely on advice from outside experts or can be outsourced to experts within the limits set by the Directive.

2.54 For small insurers, or those writing niche products, where the cost of significant actuarial involvement may be disproportionate, this means that it would be up to the management of the insurer, and the regulator, to form a view as to the capability of those involved in setting the provisions.

2.55 Quoting from Article 47 again, in section 2 this describes the capabilities of those performing the actuarial role which include:

"... sufficient knowledge of actuarial and financial mathematics and able where appropriate to demonstrate their relevant experience and expertise with applicable professional and other standards”.

2.56 This doesn't preclude non-actuaries being involved but notes the experience/expertise required and the need to have some sort of standards.

2.57 With regards to proxy calculations, this sets clear limits on the use of proxies by persons not having actuarial knowledge under the Solvency II framework. For example, it seems doubtful whether a ‘mechanical’ application of statistical reserve algorithms in non-life insurance (in cases where there is sufficient own data available) could be seen as compatible with the aims of the actuarial function as stated in Article 47.

2.58 On the other hand, using the judgement of non-actuaries (typically underwriting / claims staff) to set provisions may in certain situations be entirely appropriate, subject to the requirements for experience / expertise and standards noted above.

**Relationship between proxies, simplifications and sound actuarial techniques**

2.59 This subsection considers further the relationship between proxies, simplifications and sound actuarial techniques in the valuation of technical provisions. It first discusses this relationship in terms of the quantity and quality of the data involved. Then, it describes a ‘high level decision tree’ which visualises the interplay between these types of methods in the valuation of the best estimate.

**Relationship in terms of quantity and quality of data**

2.60 In describing the relationship between proxies, simplifications and sound actuarial techniques, it is useful to make a distinction between the *insurance risk process* and its empirical counterpart, the *observed risk process*.

2.61 If both are close to each other this means that the quality of the undertaking’s data is good. As a result the appropriate statistical procedures
may be simple. If on the other hand the observed risk process is exposed to ambiguities and complexities, the quality will be poor and sophisticated statistical analysis will be needed to account for these. As regards the quantity of these data, this is driven by the size of the insurance portfolio as well as the number of years that this process can be observed. A long historical record may undo the effects of a small portfolio, but not completely. Also, if the quality of the data is good, but the quantity is poor, efficient statistical procedures are called for to avoid loss of information. In case of large data sets of good quality statistical procedures may become simpler as the precision of results will be more than sufficient.

2.62 From statistical sampling theory it is known that sampling is costly and that there is a trade-off between statistical precision and cost. The same applies to the present discussion. Investments in the design of the observational process as well as development of the appropriate statistical procedures will involve costs and these costs should stand in a balanced relation with the insurance portfolio.

2.63 In case of large portfolios, a lack of actuarial knowledge should not form a reason not to use state of the art actuarial methods. On the other hand, for ‘small risk’ portfolios the use of proxies may get a permanent character.

Relationship within best estimate valuation process

2.64 As described above, a proxy is to be used in certain instances, a proxy could also be a simplification and . In some cases, proxy techniques can also be part of sound actuarial techniques. The following describes the relationship between these three – with regards to the best estimate valuation - in more detail.

2.65 A high level ”best estimate decision tree” can be graphically presented as shown below. Note that this decision tree is a sub-tree within the overall decision tree describing the valuation process for technical provisions. It will therefore be applied on basis of a segmentation of the book of business into homogeneous risk groups.20

20 Cf. para. 2.26.
2.66 The first step in the decision tree is to assess whether the proxy conditions apply, i.e. whether the best estimate can be determined on the basis of sufficient data and actuarial expertise. If this is the case, the insurer should assess whether the principle of proportionality allows the use of simplified calculation techniques. This principle can be used when the risk profile is low and complex / onerous calculations can be avoided. Naturally the simplifications should be available and should be measured in a reliable manner.

2.67 If the best estimate cannot be determined on the basis of sufficient own data and actuarial expertise, proxy methods for the calculation of the best estimate need to be used.

2.68 The insurer should then analyse the available proxy methods, taking into account his specific risk profile, and the criteria underlying the application of the proxy method. Under the Solvency II regime, it would then need to choose a proxy method which is compatible with the Solvency II requirements (i.e., an admissible proxy).
2.69 The insurer should then assess whether it is still able to calculate a significant part of the best estimate of an insurance liability on basis of sufficient data. If this is the case, the insurer is able to supplement the actuarial techniques with the proxy methodology. Otherwise, the best estimate of the whole insurance liability in question needs to be determined using proxy methods.

**Role of proxies in Pillar II and Pillar III**

2.70 As the use of proxies represents a deviation from the application of sound actuarial techniques when calculating technical provisions, it is necessary that the insurers assesses the appropriateness of the use of proxy techniques, and that it communicates their use both internally and also externally in an adequate way.

2.71 A use of proxies will hence not only affect the quantitative Pillar I requirements, but will also have implications on the supervisory review process, the ORSA and on disclosure requirements under Pillar III. By means of integrating the use of proxies in all three Solvency Pillars, it is expected that the undertaking will face sufficient scrutiny from the various stakeholders to ensure that the use of the proxy techniques is compatible with the Solvency II valuation principles.

2.72 In the future, the Coordination Group will further analyse the relation between the use of proxies, the actuarial function, the insurer’s risk management systems, the insurer’s own risk and solvency assessment (ORSA) and the disclosure requirements under Pillar III. This analysis will be carried out in close cooperation with the relevant CEIOPS Expert Groups.

**The dangers in using proxies**

2.73 Notwithstanding the practical need for proxies, and their potential advantages in smoothing the transition to Solvency II, the Coordination Group recognises that there are also potential dangers in the use of simplified, more assumption-driven methods to determine technical provisions. Indeed, the reason why the draft Framework Directive places such responsibility on the actuarial function is that mechanical or simplistic methods of setting provisions, applied without the necessary experience or understanding of the nature of the business, can produce unreliable results.

2.74 The starting premise of any form of projection is that the past is, in some sense, a guide to the future. Actuaries then use their judgement and expertise to adjust for the various reasons why this is not always the case. In the absence of the application of this judgement and experience, proxy methods can be materially inaccurate. That is not to say that any one proxy method is inherently “wrong” or unsuitable; but proxy methods cannot be relied upon to provide a meaningful estimate of future claims costs without appropriate judgement and understanding.

2.75 Some of the reasons why the assumptions underlying proxy methods may be less reliable are listed below:

- Expected or “Plan” loss-ratios may be based on flawed assumptions. Few people set out and plan to write unprofitable business, but many
of them in reality do so. Plans are generally more likely to be optimistic than pessimistic.

- Individual company experience, of both profitability and claims developments, may be markedly different from the market as a whole. Market benchmarks for loss-ratios or claims development factors may lead to provisions being significantly under- or over-stated.\(^{21}\)

- External legal, or claims environment factors (such as inflation, unemployment, market competitiveness) can change rapidly. For example legal decisions may increase or decrease typical amounts of injury claims, or worsening unemployment may considerably increase theft frequencies. New types of claim may also emerge. Past assumptions about claims development can become inappropriate in a short amount of time. Benchmark data would not reflect recent experience quickly enough.

- Claims development patterns may be significantly changed by internal factors such as new claims handling guidelines, new approaches to setting case estimates, the speed of paying claims or work state issues in the claims team. Internally (or externally) derived claims development patterns may need adjustment to reflect changes in claims handling processes.

- Internal product features may have changed which need to be reflected in any reserving exercise. For example higher or lower excesses or deductibles may dramatically change average costs or the number and speed of reporting of claims.

- Underwriters may have changed and the types of business being written may have changed. These changes could invalidate any assumptions about past claims or profitability experience.

- There may have been changes to a company’s IT systems that mean that claims data is distorted, or changed, and past trends in claims data are no longer appropriate.

2.76 As a general observation, over-reliance on any specific proxy method is inappropriate. Each proxy may, at a point in time, produce sensible estimates. However changing circumstances may render its accuracy and validity of limited use. For this reason no one proxy method should be thought of as appropriate, rather a range of approaches should be used.

2.77 On the other hand, the described dangers in using proxies should be mitigated by including the use of proxies into the supervisory review process, and by requiring an adequate disclosure of proxy valuations.\(^{22}\) By integrating the use of proxies in all three pillars, the undertaking will face sufficient scrutiny from the various stakeholders to ensure that the use of the proxy techniques is compatible with the Solvency II valuation principles.

---

\(^{21}\) In general, the terms “provisions” and “provisioning” are being used throughout the document rather than “reserves” and “reserving”. However, in some specific context the term “reserve” is being used, eg. “case reserves” or “reserving techniques”.

\(^{22}\) See paras. 2.70 to 2.72, above.
Summary of main points

Definition of proxies and their characteristics

2.78 The term “proxy” is used to denote simplified methods for the valuation of technical provisions that are applied when there is only insufficient company-specific data to apply a reliable statistical actuarial method, or when only insufficient actuarial expertise is available to the insurer.

2.79 Typically, proxies will be applied only temporarily, until sufficient data/actuarial expertise has been built up to allow more sophisticated methods. However, proxies may also be applied for longer time periods, e.g. in classes of business where claims experience would generally be very sparse, or when it would be disproportionate to use a ‘full’ actuarial technique.

2.80 At current, in some markets a lack of actuarial expertise in non-life insurance can be observed. However, in view of the requirement on insurers to provide an actuarial function under Solvency II, this is expected to only be a temporary phenomenon.

2.81 The Solvency II framework allows the use of simplified methods (‘simplifications’) for the calculations of technical provisions, where these methods are proportionate to the underlying risks. This report considers proxy valuations – where they are admissible under the Solvency II framework - as a specific kind of simplifications, without however comprising all possible simplifications.

2.82 In most cases, proxy techniques will lead to a higher degree of measurement uncertainty than proper actuarial techniques. This increased measurement uncertainty will need to be taken into account in the assessment of the overall solvency position of the insurer. Further analysis is required to decide in which of the three main building blocks of quantitative solvency requirements (best estimate, risk margin or SCR) this should be addressed.

Building blocks of the solvency valuation of technical provisions

2.83 The work on proxy methods is mainly focussed on the best estimate, which constitutes the largest “building block” on the liability side of the solvency balance sheet.

2.84 However, it is recognised that the use of a proxy method for the best estimate has implications on the calculation of the Solvency Capital Requirement (SCR) and on the determination of the risk margin following a Cost-of-Capital approach. The use of proxies for the best estimate should be consistent with these other ‘building blocks’ of the quantitative Solvency requirements.

2.85 The scope of this interim report is restricted to non-life insurance, setting out proxy techniques for claims provisions, premium provisions and the treatment of annuities arising from non-life insurance contracts.
Where proxies will be needed – and where they may be useful

2.86 Within the future Solvency II regime, typical situations where proxy methods will be needed are as follows:

• for entirely new types of insurance in the market that won’t have any historic data to act as a guide; or

• for classes of business that are being written for the first time by an insurer; or

• in cases where the insurer (or the class of business in question) is too small to allow the build-up of credible historic claims data.

2.87 The introduction of a defined transition period beginning at the start of the Solvency II regime for allowing the use of proxies (limited to clearly defined exceptions) might be helpful to ease the transition to Solvency II. During the transition period, insurers would still have some time to set up a reliable data basis and build up sufficient actuarial expertise, before the ‘full’ requirements of the regime would become effective at the end of the transition period. After this transition phase, proxies would only be needed in situations where a company had no possibility to build up reliable statistical data in order to apply actuarial methods. The Coordination Group notes that such a transition phase is not currently reflected in the draft Framework Directive.

When will proxies be admissible under Solvency II?

2.88 Within the Solvency II regime, any method which is applied to determine technical provisions needs to be compatible with the principles and general requirements set out in the draft Framework Directive. With regards to the best estimate, this includes a recognition of:

• the time value of money;

• expenses incurred in servicing the obligations;

• inflation (including expenses and claims inflation);

• expected future bonus payouts; and

• the value financial guarantees and contractual options embedded in the contracts.

2.89 The principle-based valuation requirements under the draft Framework Directive generally allow for a continuum of methods, differing in their degree of complexity. According to the principle of proportionality, however, the chosen valuation method needs to be proportionate to the nature, scale and complexity of the underlying risks. In this context, proxies (where they are admissible under the Solvency II framework) can be regarded as special types of simplifications.

2.90 A lack of credible own data will usually not be sufficient to ensure that the use of the proxy is proportionate to the risks. For this to hold, additional conditions would have to be met, e.g. regarding the scale of the exposure.

2.91 The Coordination Group regards the build-up of credible own data as
fundamental to the quality of the valuation process, and fully supports the view taken in Article 81 of the draft Framework Directive that insurers should 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.

2.92 The Coordination Group also agrees that, in the absence of sufficient own data, a case-by-case approach for the valuation of technical provisions can be regarded as a valuation method that is compatible with the principles of the draft Framework Directive, and proportionate to the underlying risks. However, it notes that:

- the application of a case-by-case approach is an issue in non-life rather than life insurance, and requires further considerations (with regards to e.g. IBNR claims); and
- depending on the circumstances, other proxy methods may also be acceptable under the Solvency II regime.

Relationship between proxies, simplifications and sound actuarial techniques

2.93 Proxies are in essence methods which can be used by an insurance undertaking in various situations. In cases where this is proportionate to the underlying risks, proxies could serve as "simplifications". Proxies can also supplement the application of sound actuarial techniques for those parts of an insurance portfolio for which a full application of actuarial techniques would be disproportionate. In all other instances, proxies are used to accommodate either the lack of credible own claims data or the availability of actuarial knowledge.

2.94 The choice of an appropriate valuation method should have due regard to both the quantity and the quality of the underlying data. The quality of data is reflected in the extent to which the insurance risk process is described by its empirical counterpart, the observed risk process.

Role of proxies in Pillar II and Pillar III

2.95 The Coordination Group expects that a use of proxies will not only affect the quantitative Pillar I requirements, but will also have implications on the supervisory review process, the ORSA and on disclosure requirements under Pillar III. By integrating the use of proxies in all three Solvency Pillars, it is expected that the undertaking will face sufficient scrutiny from the various stakeholders to ensure that the use of the proxy techniques is compatible with the Solvency II valuation principles.

Data availability in different markets

Purpose of this section

3.1 Proxies for the best estimate valuation of technical provisions come into play where there is only insufficient company-specific data of appropriate quality to apply a reliable statistical actuarial method, or where there is a lack of actuarial expertise. To compensate for the absence of insurer-individual data, a number of proxies developed by the national groups rely on market data, such as market development patterns or estimates of market-average ultimate loss ratios.

3.2 In the light of this, it would be useful to examine the availability of data on non-life insurance technical risks in the individual markets, to give an indication of the extent to which the use of proxies can be expected to become relevant. Specifically, the following questions could be asked:

- To what extent have insurance undertakings already built up statistical data history that could be used as a basis for the application of statistical actuarial valuation techniques?
- To what extent are insurance undertakings already using actuarial expertise within the valuation process?
- To what extent is market information on non-life insurance technical risks relevant for the ‘best estimate’ valuation (such as benchmark development patterns) available in the individual markets?

3.3 Information concerning these questions can usefully complement the description of individual proxies.

3.4 To address these questions, in the following the results of a questionnaire on the supervisory reporting on non-life underwriting claims provisions issued by the CEIOPS Pillar I Non-Life WG in May 2005 have been used. This questionnaire aimed at providing an overview of the (then) current supervisory reporting on provisions for claims throughout the European market. It covered quantitative aspects (such as the ‘granularity’ of the reporting on claims provisions or claims payments) as well as qualitative aspects (such as for example the need to provide a valuation report).

Quantitative data provided for reporting purposes

Supervisory reporting

3.5 Generally, the answers drawn from the questionnaire showed that the degree of detail of supervisory reporting on non-life insurance claims provisioning varies a lot from jurisdiction to jurisdiction. This concerns both the granularity of the segmentation into distinct classes or lines of business, and also the extent to which individual occurrence-year data is available within a given segmentation class.
3.6 As regards segmentation, the number of different segmentation classes varies widely (from 5 to 107 categories), although in most cases these are compatible with the lines of business as defined in the insurance accounts directive.\(^{24}\)

3.7 For an application of statistical actuarial claims reserving methods, the availability of ‘triangular data’, i.e. data per individual occurrence years, is important. This concerns

- the type of data that is available in ‘data triangles’ (e.g. paid claims or number of claims); and
- the ‘length’ of these ‘data triangles’ (i.e. the number of years of available data per occurrence year).

3.8 As to the ‘length’ of the data triangles, the number of years varies considerably between jurisdictions, ranging from 3 to 20 years (10 years being the most common), depending on the segmentation class and the jurisdiction.

3.9 In regards the type of data that is collected per occurrence year, it could be concluded that:

- Nearly all jurisdictions collect data per occurrence year for provisions and paid claims;
- In all jurisdictions, premiums are reported with the same break-down than claims provisions and claims paid;
- Most Member States collect data regarding the number of claims; most are split per occurrence year;
- Most of the data are gross of reinsurance - only a few jurisdictions collect data net of reinsurance or data related to the reinsurers’ share.

3.10 In most jurisdictions, claims provisions per occurrence year are available as ‘full’ provisions, i.e. including IBNR, annuities, claims management costs and with deduction of technical charges to be recovered.

3.11 As to the granularity of the collection of data concerning these components of the overall provisions, the answers showed that:

- In most jurisdictions, provisions for IBNR are reported separately per each segment;
- Also, claims management costs and the provision for these costs are reported separately in most jurisdictions;
- However, only a minority of jurisdictions collect IBNR data with their spreading over occurrence years (e.g. Belgium, Portugal and UK), and still fewer jurisdictions require reporting of claims management costs per occurrence year (e.g. France and Iceland);

• About half of jurisdictions collect data concerning the technical charges to be recovered separately per segment; and only very few also collect their spreading over occurrence years.

3.12 Overall, this indicates that in most jurisdictions insurers should at least have available a ‘rudimentary’ collection of triangular gross claims data concerning paid claims and number of claims, and also ‘full’ claim provisions. However, the ‘length’ of such triangular data, as well as their level of granularity (concerning segmentation and a finer split into sub-components of the overall provisions) can be expected to vary widely both within and across jurisdictions.

**Financial reporting and public disclosure**

3.13 As of the 1\textsuperscript{st} January 2005, all insurers with listed security or debt instruments are required to present their Financial Statements in accordance with IFRS as adopted by the European Commission. Within this IFRS framework an insurer is required to disclose claims development data. This data is usually aggregated. However an insurer should have the data available at a lower level in order to be able to aggregate. This does not necessarily imply that a similar homogeneous risk group is used as presented in the draft Framework Directive. By reallocation the required homogeneous risk groups may be derived.

**Usage of actuarial expertise in current valuation processes**

3.14 In almost all Member States, the undertakings must communicate the methods used for estimating the provisions for claims. A majority of jurisdictions also require the communication of the method used for calculating the provision for IBNR.

3.15 About half of the supervisory authorities require the undertaking to prepare an actuarial report on the level of provisions for claims. Depending on the jurisdictions, this report is prepared either by the auditor or by an actuary (external or internal). In about half of the Member States, this report must be addressed to the supervisory authority. If not, it may be requested from the company if needed.

3.16 The actuarial report provides the authority with comments on the sufficiency of provisions and with other elements related to technical provisions. This will typically include:

• a description of the actuarial methodologies applied;

• a justification of the assumptions used in the application of the actuarial methodologies;

• a demonstration of the adherence of those assumptions to ongoing business (reality check);

• a verification of the adequateness of the underlying data base;

• sensitivity analysis.
In some jurisdictions (e.g. Portugal), the actuarial report is expected to cover a more comprehensive risk and solvency analysis, including wider judgements on e.g. the policy for risk underwriting, the claims management procedures and the investment policy.

In some jurisdiction, the insurer also relies on an Auditor Actuary. The Auditor Actuary would e.g. certify the adequateness of technical provisions of the insurance undertaking as a whole (i.e. all lines of business), as shown in public financial statements. The Auditor Actuary would typically illustrate the result of his work in a report that is submitted to the auditor and to the supervisory authority. The certification on the adequateness would then be made public as an annex to financial statements.

In jurisdictions that require a reserve report, insurers can be expected to already use at least a certain level of actuarial expertise when setting their reserves. In other jurisdictions, the use of actuarial and statistical methods to determine claims provisions is less widespread.

**Availability of market benchmark data**

The annex contains a description of the availability of market data in non-life insurance for a number of jurisdictions (Belgium, Italy, Germany, the Netherlands, Sweden, Portugal, Norway and UK). In all of these jurisdictions, market data on the development of claims is principally available, and is provided either by the supervisory authority, by insurance associations (or affiliated organisations) or by consultant firms.

For the purpose of deriving market benchmark development patterns, market “triangular” data are of particular interest. The degree of detail of available market data varies a lot between different jurisdictions. In some jurisdictions, aggregated (or even insurer-specific) claims triangles are available for all lines of business; whereas in others availability is restricted to certain lines (e.g. to long-tailed business). Mostly, the triangular data is with regard to paid claims (gross of reinsurance).

Further analysis is required to assess the usefulness of this data to derive market development patterns. A number of jurisdictions (Belgium, Italy, Portugal, Sweden, Slovenia, Norway and Germany) plan to derive such market patterns for QIS 4, as a proxy valuation for insurers that have only insufficient data to determine development patterns that are specific for their business.

---

25 See the description of 'development patterns proxies' in section 4.
Summary of main points

Quantitative data provided for supervisory reporting

3.23 The degree of detail of supervisory reporting on non-life insurance claims provisioning varies a lot from jurisdiction to jurisdiction. This concerns both the granularity of the segmentation into distinct classes or lines of business, and also the extent to which individual occurrence-year data is available within a given segmentation class.

3.24 In most jurisdictions, however, insurers need to report triangular gross claims data concerning paid claims and number of claims, and also ‘full’ claim provisions. The ‘length’ of such triangular data, as well as their level of granularity (concerning segmentation and a finer split into sub-components of the overall provisions) varies widely both within and across jurisdictions.

Availability of market benchmark data

3.25 In a number of jurisdictions, market triangular data on claims provisioning (mostly with regard to paid claims gross of reinsurance) is publicly available. The usefulness of this data to derive market development patterns requires further analysis. For QIS 4, six jurisdictions plan to derive such patterns for selected lines of business.
Section 4

Description of proxies and proposals for QIS4

4.1 In this section, we give a description of the proxy methods which – up to the point this interim report was written – had been developed by the national expert groups. Based on a comparative analysis of these proxies, we then describe proxy testing proposals for QIS4.

4.2 To improve the transparency of this description, we first introduce a classification scheme for proxies.

Classification

4.3 As previously noted, the scope of this report is restricted to non-life insurance, including the treatment of annuities arising from non-life insurance contracts. Therefore, proxy methods are analysed for the following ‘building blocks’ of a valuation:

- proxies for the best estimate of claims or premium provisions;
- proxies for the risk margin of claims or premium provisions;
- proxies for the treatment of annuities arising from non-life contracts, including:
  - the allocation of such annuities between life and non-life;
  - the valuation of such annuities (if allocated to non-life).
- proxies for the best estimate of claims handling costs reserves.

4.4 With regards to the split between claims provisions and premium provisions, we assume that this is defined as in IASB’s discussion paper on the valuation of insurance contracts\(^{26}\), i.e.

- **Claims provisions**: amount set aside on the balance sheet to meet valid claims for insured events that have already occurred, including claims incurred but not reported (IBNR).
- **Premium provision**: amount set aside on the balance sheet to meet the insurer’s stand-ready obligation to pay valid claims for future

---

\(^{26}\) Cf. para. 21 of part 1 of the IASB DP.
insured events arising under existing contracts — the obligation relating to the unexpired portion of risk coverage.  

4.5 With regards to proxies for the best estimate of claims or premium provisions, the suggestions by the national groups can usefully be classified into:

- **Development patterns proxies**: Benchmark proxies using information of market or other reference portfolios representing characteristics similar to the own portfolio of the company in order to approximate the development of own claims over the development years.

- **Frequency-severity proxies**: Benchmark proxies using information of market or other appropriate portfolios by separate approximations of the development of the severity of claims and of the frequency of claims.

- **Other benchmark proxies**: These proxies use some information from benchmark portfolios, other own (similar) portfolios or market-representative portfolios. They are normally used within actuarial methods in order to complete these approaches.

- **Case-by-Case proxies**: these are proxies based on case estimate information, in some cases adjusted for further effects, e.g. discounting or IBNR claims.

- **Expected Loss proxies**: these use expected ultimate loss ratios to set provisions, e.g. based on initial pricing or business plan assumptions about likely level of claims experience.

- **Scaling-to-completion proxies**: these proxies attempt to estimate the best estimate of the whole portfolio by ‘scaling to completion’ the estimate for the modelled part.

- **Simplified application of standard statistical techniques**: this refers to an application of statistical reserving methods (e.g. chain ladder) without carrying out full actuarial ‘checks and balances’ analysis.

- **Accounting based proxies**: proxies based on local accounting figures, e.g. unearned premium provisions.

4.6 These proxies are often combined with either:

- **Discounting proxies**: These transform an estimate of the undiscounted expected value of future cash flows into a discounted estimate; or

- **Gross-to-Net Proxies**: These transform a gross of reinsurance estimate into a net estimate.  

---

27 Cf. the QIS 4 specifications for further considerations regarding the extent to which future premiums need to be taken into account for the valuation of premium provisions.
4.7 The following proxy decision tree illustrates how these different classes of proxies would typically relate to another within a best estimate valuation of gross (non-life) technical provisions. It is to be used when the insurer needs to carry out a proxy valuation, i.e. when the insurer has only insufficient credible historical data and / or relevant actuarial knowledge. Note that this decision tree is a sub-tree of the best estimate decision tree presented in para. 2.65:

4.8 The first question in the proxy decision tree is to assess whether sufficient own historical data is available. If an insurer has sufficient historical data, and this data is sufficiently ‘smooth’ to allow a straightforward statistical technique being used, then the insurer is able to use proxies based on a simplified application of standard statistical techniques in order to calculate the best estimate of the insurance liabilities.

---

28 Note that most of the proxies mentioned in para. 4.5 deliver best estimates gross of reinsurance.
If no credible own data is available, the next assessment is whether the insurer is able to use benchmark data to calculate the best estimate. This could be a proxy in any one of the first three categories mentioned in para. 4.5, for example a proxy based on market run-off triangles or mirror portfolios. If benchmark data is available, the insurer can use these proxies until sufficient own data is available.

If no benchmark data is available, and the best estimate of a claims provision needs to be determined, the insurer has to assess whether a credible case-by-case estimate of the insurance liability is available. If this is the case, the insurer can use this category of proxy. However a suitable adjustment may be necessary to calculate IBNR claims.

If an insurer is not able to calculate a credible case-by-case estimate, the insurer should use a proxy in one of the remaining proxy classes: reference to accounting figures, scaling or by reference to expected losses. Sufficient attention should be given towards the extent of uncertainty.

The last proxy which could be used by insurers is when the insurer is not able to discount the gross best estimate by means of the use of the full yield curve. In this case a discounting proxy should be used.

### Overall recommendations for QIS 4

#### Proxy decision tree

<table>
<thead>
<tr>
<th>Para</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.13</td>
<td>The Coordination Group recommends including the proxy decision tree (as shown in para. 4.7) into the specifications for QIS 4. This is expected to provide useful additional guidance to QIS 4 participants by illustrating where in the valuation process the individual proxy classes come into play.</td>
</tr>
<tr>
<td>4.14</td>
<td>The proxy decision tree may usefully be supplemented by the two decision trees included in section 2 of this report: the decision tree on the overall valuation process (as shown in para. 2.26) and the best estimate decision tree (as shown in para. 2.65).</td>
</tr>
<tr>
<td>4.15</td>
<td>The specifications should clarify that the proxy decision tree may be used as guidance when one of the proxy conditions mentioned in para. 0 applies, i.e. when there is a lack of sufficient own, credible data or when there is only insufficient actuarial expertise available.</td>
</tr>
</tbody>
</table>

#### Use of proxies

<table>
<thead>
<tr>
<th>Para</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.16</td>
<td>It would be useful to point out in the QIS 4 specifications that over-reliance on any one proxy method would seem inappropriate, considering that each may, at a point in time, produce sensible estimates, but changing circumstances may render its accuracy and validity of limited use. Therefore, to the extent this is practicable, participants should not rely on a single proxy method, be thought of as appropriate, but rather consider a range of approaches before making a final decision on which</td>
</tr>
</tbody>
</table>
4.17 The specifications should also point out that it seems likely that some of the proxy techniques discussed below (particularly those induced by a lack of actuarial expertise) will not be fully compatible with the Solvency II framework (see discussion in section 2, and additional remarks to individual proxy techniques, below).

**Overview of proxy proposals for QIS 4**

4.18 The following table gives an overview of the proxies derived for the best estimate (a more detailed description is given below):

<table>
<thead>
<tr>
<th>Proxy</th>
<th>Applied to Claims provision</th>
<th>Premium provision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market development patterns</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Average severity/frequency</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Bornhuetter-Ferguson</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Case by case</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Expected loss</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Mechanical application of statistical techniques</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Accounting based</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Claims handling costs</td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>

4.19 As described above, the solvency valuation of claims and premium provisions requires discounted best estimates both gross and net of reinsurance. To derive these estimates, in some cases additional proxies are needed which convert undiscounted into discounted estimates (discounting proxies) and estimates gross of reinsurance into estimates net of reinsurance (gross-to-net proxies). The following table describes where this is the case for the proxies listed in the previous paragraph:

<table>
<thead>
<tr>
<th>Proxy</th>
<th>Additional proxy needed</th>
<th>Discounting</th>
<th>Gross to net</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market development patterns</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Average severity/frequency</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Bornhuetter-Ferguson</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Case by case</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Expected loss</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Mechanical application of statistical techniques</td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Accounting based</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Claims handling costs</td>
<td>✓</td>
<td></td>
<td>✓</td>
</tr>
</tbody>
</table>
4.20 This report sets out two testing proposals for discounting proxies, as well as two testing proposals for gross-to-net proxies. These may be combined with the proxies mentioned in para. 4.18, where this is applicable according to the table given in para. 4.19. For example, a discounted best estimate for claims provisions may be derived by combining the case-by-case proxy with one of the discounting proxies:

![Diagram showing the process of combining case-by-case proxy, undiscounted gross best estimates, discounting proxy, and output: discounted gross best estimates.]

4.21 In addition to the proxies for the best estimate of claims and premium provisions, in the following also a simple proxy for the determination of the risk margin of non-life technical provisions is suggested. Moreover, a QIS 4 proposal for a proxy valuation of the best estimate of annuities arising from non-life obligations is made.

### Information on use of proxies requested under QIS 4

4.22 In order to derive useful input on the application of proxy valuations, it is suggested to ask the QIS 4 participants to supply additional qualitative information on the use of proxies in calculating technical provisions.

4.23 The amount and type of additional information requested should be chosen such that the information can be assessed and summarised in an appropriate way. A suggestion based on this consideration is described below.

### Recommendations for QIS 4

#### Requested qualitative information on the use of proxies

4.24 Per LOB and for the determination of the best estimate, the participant should answer the following questions:

<table>
<thead>
<tr>
<th>Question</th>
<th>Possible answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proxies (for whole or partial portfolio) used in valuation of the best estimate?</td>
<td>yes/no</td>
</tr>
<tr>
<td>If yes – was one of the proxies supplied by CEIOPS used?</td>
<td>yes/no</td>
</tr>
<tr>
<td>If yes – please tick which proxy(ies) was/were chosen</td>
<td>tick in list of CEIOPS proxies</td>
</tr>
<tr>
<td>If no – please give description of</td>
<td>description</td>
</tr>
</tbody>
</table>
4.25 In an analogous way, information on the use of proxies for the determination of risk margins should be derived.

4.26 With regards to the treatment of annuities arising from non-life insurance contracts, the following questions could usefully be put:

<table>
<thead>
<tr>
<th>Question</th>
<th>Possible answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does LOB contain annuities?</td>
<td>yes/no</td>
</tr>
<tr>
<td>If yes - were obligations arising from such annuities valued separated from other non-life obligations?</td>
<td>yes/no</td>
</tr>
<tr>
<td>If yes – have they been valued using proxy techniques?</td>
<td>yes/no</td>
</tr>
<tr>
<td>If yes – please give description of proxy</td>
<td>description</td>
</tr>
<tr>
<td>If no – please give description of valuation</td>
<td>description</td>
</tr>
<tr>
<td>If no – please describe how they have been valued</td>
<td>description</td>
</tr>
</tbody>
</table>

**Proxies for the best estimate**

**Development patterns proxies**

4.27 Development patterns proxies use benchmark information from market or other reference portfolios representing characteristics similar to the own portfolio of the company in order to approximate the development pattern of own claims. This information is then used as an input to a statistical claims reserving method, such as for example the chain ladder technique, to derive the best estimate of claims provisions.

4.28 Development pattern proxies have been suggested by almost all of the national expert groups. The following table gives an overview of these suggestions, focusing on points where there are variations between the different groups (e.g. with respect to the application criteria).

<table>
<thead>
<tr>
<th>Suggested by</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Use of market claims development patterns.</td>
</tr>
<tr>
<td></td>
<td>Use of market claims development patterns, plus an additional adjustment for discounting.</td>
</tr>
</tbody>
</table>
Market development patterns.

Market benchmark patterns are used to explain the evolution of paid claims over the development years of the run-off triangle.

Used for: Claims provisions

Output: Undiscounted gross best estimate

Discounting: Proxy formula makes possible the use of discount factors

Criteria of application:

- A projection methodology of the “link ratio” family is generally adequate for the run-off claims paid triangles for that LoB, i.e. triangles are usually fairly stable, and it is reasonable to expect some proportionally between columns
- The LoB has not a very significant long-tailed component
- The claims portfolio of the company is considered to be comparable to the average “market” portfolio, i.e. the company is not a “niche” player in that LoB
- The claims management processes of the company are not expected to lead to significantly different development patterns and/or amounts of claims than other ‘average’ market participants

Open issues:

- Degree of prudence (if any) embedded in proxy?
- Calibration based on small company data only? (in our case, we considered, for Motor, data from companies with premiums less than 100M€ only)
- Development factor estimates should be based on weighted averages or simple averages? (we considered simple averages)
- We used claims paid triangles for direct business only, after recoveries and including amounts of direct claims management costs (note: this is the information we have available)

Chain-Ladder algorithm with market benchmark patterns.

Used for: Claims provisions

Delivers: undiscounted gross best estimate

An insurer can use a market benchmark development pattern for a particular LoB under the following conditions:

- the insurer is new or has just started a new LoB,
- no credible own data available
- credible own data available but too short; in this case use
<table>
<thead>
<tr>
<th><strong>Market Pattern Only</strong></th>
<th>To complete cash flows for not observed parts.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>For Claims Provisions:</strong></td>
<td>Use market development patterns.</td>
</tr>
<tr>
<td><strong>Use of Run-off Experience:</strong></td>
<td>From other portfolio or use of market information.</td>
</tr>
<tr>
<td>Market development patterns were identified for a number of lines of business, by applying a classic technique chain-ladder developed along 8/12 years in order to determine the market link ratios. The application of those patterns leads to best estimate gross of reinsurance undiscounted and discounted. In addition to patterns mentioned above, insurance undertakings should also take into account a case by case approach for older claims (older than 8/12 years mentioned above, according to different LOBs).</td>
<td></td>
</tr>
<tr>
<td><strong>Use of Market Claims Development Patterns:</strong></td>
<td>• Only based on cumulative payments for outstanding claims liabilities</td>
</tr>
<tr>
<td><strong>Use Run-off Experience from Other Portfolio:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Use Run-off Experience from Other Portfolio or Use Market Information:</strong></td>
<td>In some instances an insurance portfolio can experience the lack of credible own data due to the newness of the insurance products or by changes in the characteristics of the insurance product. However a best estimate is to be calculated. In these instances the insurer could use a benchmark portfolio and their run off triangles. The run off experience could come from other sources, internal or external. Each will have its own entry criteria: <strong>Internal</strong> • The portfolio which will act as a benchmark must have sufficient and credible own claims data; this portfolio should only be calculated by means of sound actuarial techniques; • The insurance products must be in the same Line of Business and/or the same product category. The product must have similar characteristics e.g. one should for example not have profit sharing features and the other none. Expected surrender patterns should be roughly similar. Substance should be over form.</td>
</tr>
</tbody>
</table>
Credible market benchmark data should be available from an independent source;

The market data should be the aggregation of insurance portfolios within similar Lines of business and/or products;

The benchmark market data should cover at least a significant portion of the premium volume in that specific Line of Business. The portion should be dependent on the characteristics of the specific Line of Business.

The run off patterns of the benchmark portfolio will be used as off the balance sheet data to estimate the future cash flows. The balance sheet data amount is calculated as the amount estimated for claims incurred but not yet paid and the incurred but not yet reported. The run off patterns are subsequently applied.

If this proxy is used, no other limitations will arise in the calculation of the Solvency Capital Requirement by means of the Standard formula.

The Slovenian Insurance Supervision Agency has prepared proxies for the determination of the best estimate of claims provisions for compulsory motor third party liability insurance.

The chain ladder technique was used for calculating the development ratios for each insurance company by using their undiscounted cumulative claim payments. For smoothing and extrapolating/interpolating average development factors, the Weibull function was used.

An insurer can use a market benchmark development pattern for compulsory motor third party liability insurance under the following conditions:

- the insurer is new or has just started to offer motor third party liability insurance;
- no credible own data available;
- credible own data available but too short; in this case use market;
- pattern only to complete cash flows for not observed paths.

Comparing the suggestions from the national groups, the Coordination Group has found that there is a high degree of convergence with respect to the overall description of development patterns proxies. Therefore, the Group suggests testing a generic type of this kind of proxy in QIS 4.
4.30 However, differences between the national proxy suggestions emerged with regards to the choice of application criteria, as well as the approach to derive and calibrate the market reference development patterns that are needed as in input for these proxies.

4.31 At the time this interim report was written, six members of the Coordination Group (Belgium, Italy, Portugal, Sweden, Slovenia and Germany) were planning to derive market development patterns for selected lines of business for QIS4.

4.32 We also note that the Swiss Federal Office of Private Insurance (FOPI) publishes market development patterns for a number of non-life insurance LOB’s on their website.\(^{29}\)

4.33 For illustrational purposes, the following diagram shows market development patterns for 3rd party motor liability insurance. The development factors (shown here for development years 0 to 8) reflect the “average” evolution of accumulated paid claims between consecutive development years.\(^ {30}\)

4.34 We stress that the factors for the Portuguese and Slovenian market shown in this diagram are provisional and are provided only as an example. The factors for the Swiss market are taken from the FOPI excel template for the 2007 Swiss Solvency Test.

![Market development pattern](image)

4.35 With regards to the calibration of a market development pattern, the Coordination Group notes that the task to derive a “typical average” of development patterns for the respective LOBs and markets presents a

\(^{29}\) As part of the excel template that FOPI provides for conducting the Swiss Solvency Test (see [http://www.bpv.admin.ch/themen/00506/01203/index.html?lang=en]).

\(^{30}\) Cf. the notation introduced in para. 4.38.
significant challenge. In this regard, the following questions would need to be addressed:

- Should the gross development factor \( f_j \) be derived from an aggregated triangle or weighted/unweighted mean from several individual triangles?
- How could the variation of the market development factors be calculated?
- To what extent should this variation of market development factors (and the expected deviation from the insurer’s “true” development factors) be reflected in their calibration?

Based on this analysis, it is proposed to test the following proxy under QIS4:

**Recommendations for QIS 4**

**Market-development-pattern Proxy**

**Description**

4.37 This proxy uses a market benchmark development pattern to estimate the evolution of paid claims over the development years of the run-off triangle per LOB.

4.38 Let variables \( A_{i,j} \) and \( f_j \) be defined as follows:

\[
A_{i,j} \quad \text{Gross cumulative amount of claims paid for the accident year } i, \ 0 \leq i \leq n-1, \text{ and development year } j, \ 0 \leq j \leq n-1; \ n \text{ denotes the last development year, when full run-off is achieved. The last year } m \text{ of observed development is usually smaller than } n.
\]

\[
f_j \quad \text{Gross development factor that reflects the “average” evolution of the } A_{i,j} \text{ between development years } j \text{ and } j+1 \text{ (for } 0 \leq j \leq n-1).\n\]

4.39 In this setting, the proxy consists of identifying the “market” parameters \( f_j \) for each development year \( j \). The proxy will enable the insurer to estimate the total claims amount per accident year \( A_{i,n} \) by projecting the observed amount of claims paid in the development year zero\(^{31} \) \( A_{i,0} \), known at the valuation date. More generally the projection may start from latest development year \( n-i \) with \( A_{i,n-i} \). The proxy also allows the decomposition of the total claims cost into the claims costs per each of the future development years, which makes it possible to also measure the discount effect.

4.40 Usually, the available information only allows reliable estimates

---

\(^{31}\) Or more generally from the projection of the observed amount of claims paid (cumulative) for development years between zero and \( n \), using, in this particular case, the relevant development factors reflecting the evolution from that development year to the full run-off situation \( n \).
of development factors until a particular development year m, with m<n. In this case, the factors

\[ f_m, f_{m+2}, \ldots, f_{n-1} \]

represent tail factors that are intended to explain the evolution of claims paid between years m and n (full run-off). Particularly for long-tailed LOB’s, non-consideration of tail factors can lead to significant underestimation of the provision.

4.41 To estimate the “market” tail factors, statistical projection techniques may be used which extrapolate the curve from m to n: e.g. exponential decay, inverse power, logarithmic curve and other techniques.

4.42 However, it should be noted that this is a pragmatic approach that may or may not be suitable, depending on the LOB. One should note that late claims are usually more complex and have different characteristics from the most “common” claims, so by extrapolating the development pattern to later development years, the occurrence of late (and potentially large) claims may be underestimated. Therefore, the use of expert opinion is very important for estimating the tail factors.

4.43 Where a curve fitting approach has been used to derive a “full” market development pattern (including tail factors), an insurer applying this proxy should check the results of this approach with own benchmarks, for example the amount of outstanding case reserves for “old” accident years. Alternatively, it would be possible to restrict the application of this proxy to the observable part of the market development years, and to leave the determination of appropriate tail factors to the insurer.

*Input*

4.44 The proxy requires the following input information:

- Market benchmark development factors for a given LOB and per member state;
- Market tail factors (where the consideration of tail factors is necessary to avoid an underestimation of the provision); and
- accumulated gross paid claims \( A_{i,j} \) for individual accident years \( i \) and development years \( j \).

4.45 For QIS 4, it is expected that Belgium, Italy, Germany, Sweden and Portugal will provide such market benchmark patterns for their markets and selected LOB’s.

4.46 In markets where development patterns have not been provided, the supervisor may decide whether participants would be allowed to use benchmark development patterns from other markets. Further analysis is required to decide whether for certain LOBs the development patterns per member state are similar enough to “aggregate” them across Member States to
one single pattern for each LOB.

Output

4.47 The proxy delivers the following output information:

- Expected future cash flows by maturity date; and
- Gross discounted best estimate of claims provisions.

Calculation

4.48 The total undiscounted ultimate cost for each accident year is given by the formula:

\[ A_{i,n} = A_{i,n-1} \prod_{k=0}^{i} f_{n-k, i-k} \quad i = 0, ..., n-1 \]

Here, \( A_{i,n} \) denotes the last observed cumulative paid loss of accident year \( i \) at the valuation date.

4.49 The total undiscounted best estimate of technical provisions is obtained as:

\[ BE_{\text{und}} = \sum_{i=0}^{n-1} \left( A_{i,n} - A_{i,n-1} \right) \]

4.50 The total liabilities expected to be paid at the maturity \( j \) can be obtained as:

\[ Y_j = \sum_{i=j-1}^{n-1} \left( A_{i,n-1+j-i} - A_{i,n-2+j-i} \right) \quad j = 1, 2, ..., n \]

4.51 Applying the risk-free interest curve applicable in QIS 4, the total discounted best estimate of technical provision is given by the formula:

\[ BE = \sum_{j=1}^{n} Y_j \left( 1 + r_j \right)^{-j} \]

Here, \( r_j \) denotes the risk-free interest rate applicable to the maturity \( j \).

Criteria for application:

4.52 An insurer may apply this proxy for a particular LOB under the following conditions

- the insurer has no credible own data available; or
- credible own data per year of occurrence is available, but too short; in this case the market pattern should only be used to complete cash flows for not observed parts;
and also

- the claims portfolio of the company is considered to be comparable to the reference portfolio, i.e. the company is not a “niche” player in the given LOB;

- a projection methodology of the “link ratio” family is generally adequate for the run-off claims paid triangles for that LoB, i.e. triangles are usually fairly stable, and it is reasonable to expect some proportionally between columns;

- claim settlement practises must not vary too much over time.

**Other remarks:**

4.53 The discounting formula in para. 4.51 is based on the assumption that the cash flows $Y_i$ are paid at year-end. However, it could easily be modified to reflect other assumptions on the timing of these cash flows (e.g. that claims are paid on average in the middle of the year).

4.54 This proxies might be especially relevant for the following classes of non-life insurance:

- Accident - Health
- Land vehicles - Ships
- Goods in transit - Fire and natural forces
- Other damage to property - Motor vehicle liability
- General liability

However, further analysis is required to assess in which markets and LOB market development patterns could reliably be derived.

**Proxies based on frequency-severity methods**

4.55 The idea of frequency-severity methods is to separately estimate

- the expected number of claims for each accident year (expressed as a percentage of some exposure measure, this would represent the frequency of claims); and

- the expected average cost (severity) of claims for the applicable accident year.

An estimate of the ultimate claim amount is then given by the product of these two variables.

4.56 For use as a benchmark data proxy technique, frequency-severity methods could either:
- estimate the expected frequency of claims on basis of market data (i.e. estimate a market claims frequency); or

- estimate the expected average cost of claims on basis of market data (i.e. estimate a market average cost of claims).

4.57 A number of national proxy groups have developed benchmark proxies based on this idea:

<table>
<thead>
<tr>
<th>Suggested by</th>
<th>Description</th>
</tr>
</thead>
</table>
| 🇫🇷 | Use of frequency-severity proxies for claims provisions.  
Two options:  
- use market average costs (ultimate number * average costs)  
- use market frequency |

**Description:**
This proxy is based on the product of 2 parameters: one representing the frequency of claims (number of outstanding claims) and other representing the severity of claims (average cost per claim).

The ‘market’ statistics given are: the average % of late claims arising at each development year and the average cost per claim. For the former, we could have a sort of development pattern describing the evolution of the number of claims.

**Calculation formula:**

\[
\text{Expected number of outstanding claims at valuation date} \times \text{Average cost per claim}
\]

**Tail factor:**
For LoB’s where claims can be reported to company very late (after the development years commonly captured by a typical run-off triangle), tails factor might be needed.

If that is the case, the considerations made for the previous proxy apply.

**Criteria:**
- A projection methodology of the “link ratio” family is generally adequate for the run-off number of claims triangles for that LoB, i.e. triangles are usually fairly stable, and it is reasonable to expect some proportionally between columns
- The LoB has not a very significant long-tailed component in terms of number of reported claims
- The claims portfolio of the company is considered to be comparable to the average “market” portfolio, i.e. the company is not a “niche” player in that LoB
- The claims management processes of the company are not expected to lead to significantly different development patterns and/or amounts of claims than other ‘average’ market participants
- The overall severity of claims can be reasonably approximated by an ‘average’ cost per claim

Other comments:
- Target Building blocks: This proxy intends to estimate the ‘best estimate’ of claims provision
- Gross or Net: Gross of reinsurance
- Discount: Proxy formula makes possible the use of discount factors

Open issues:
- (same as for the previous proxy, for now…)

Based on this analysis, it is proposed to test a generic form of a frequency-severity proxy under QIS 4. This should be designed such that the default approach is to use a market estimate of the average severity of claims, and a company-specific estimate of the number of claims. However, the proxy should be flexible enough to allow for other variants, depending on the extent to which market and company specific information would be available.

**Recommendations for QIS 4**

**Frequency-severity proxy**

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.59</td>
</tr>
<tr>
<td>4.60</td>
</tr>
</tbody>
</table>

**Input**

| 4.61 | The proxy requires the following input information for each accident year (in the given individual LOB): |
|      | • the accumulated claims payments; |
|      | • the expected (ultimate) number of claims (company-specific) |
specific);

- the expected average cost (severity) of claims (based on market data).

4.62 In QIS 4, the expected severity of claims would need to be supplied by the supervisor (as an absolute quantity per LOB).

4.63 If a reliable development pattern for the number of reported claims can be calibrated from market data, a variant of this proxy could be implemented as follows:

- The market development pattern for the number of reported claims would be included in the QIS4 specifications;

- The insurer could determine its (ultimate) number of claims by combining the percentage of claims not yet reported (inferred from the market development pattern) with the number of claims reported up to date;

- For the determination of the average severity of claims, the insurer could also use a company-specific estimate, in case this would be more reliable than the market estimate of average claims costs. The supervisor may also decide to omit an estimation of market average costs altogether, in case such estimation would not seem feasible or appropriate.

**Output**

4.64 Undiscounted gross best estimate of claims provision.

**Calculation**

4.65 Under this proxy, an estimate of the ultimate claims amount is derived as

\[ U_i = N_i \cdot S_i \]

where

- \( U_i \) = ultimate claims amount in accident year \( i \)
- \( N_i \) = expected (ultimate) number of claims in accident year \( i \)
- \( S_i \) = expected average cost (severity) of claims for the applicable accident year

4.66 The best estimate for accident year \( i \) is then determined as

\[ BE_i = U_i - AC_i \]

where
\[ BE_i = \text{undiscounted best estimate for accident year } i \text{ (gross of reinsurance)} \]

\[ AC_i = \text{accumulated claims payments in accident year } i \]

**Criteria for application:**

4.67 To apply this proxy, the following conditions should be met:

- the overall severity of claims for the LOB can be reasonably approximated by an ‘average cost’, i.e. the amount of claims is, in average, relatively stable;
- the development of claim counts in the given LOB is stable.

**Other remarks:**

4.68 Using average claims amounts involves a counting of the number of claims. However there are some potential pitfalls in this counting:

- Is the number of claims defined to include nil-claims?
- Does one use the number of claims reported during a year (as an approximation of the number of incurred claims) or the (estimated) ultimate number of incurred claims?
- Do all companies count the numbers in the same way? - one claim in one company may correspond to two or more claims in another company. Some examples: a fire which causes business interruption in Commercial; building and content may be affected by the same claim (fire, water damage, theft) in Private Property / Homeowner's and Householder's Comprehensive; a claim in Motor Third Party with property damage and two injured persons may be counted as 1, 2 or 3 claims.

4.69 Therefore, clear guidelines for the counting of claims are necessary to get a consistent reporting and useful averages.

**Other benchmark proxies**

4.70 The national proxy groups have also developed a number of other proxies that are based on market benchmark data:

<table>
<thead>
<tr>
<th>Suggested by</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Use of market ULR’s to determine premium provisions or claims provisions.</td>
</tr>
<tr>
<td></td>
<td>For claims provisions: use exposure based methods (Bornhuetter Ferguson).</td>
</tr>
</tbody>
</table>
Benchmark survival ratios.

The provisions for claims outstanding are calculated by a Bornhuetter-Ferguson-based method, using as input a specified Market Ultimate Loss Ratio (MULR) and a Market Payment Pattern (MPP).

4.71 Based on this analysis, it is proposed to test the following Bornhuetter-Ferguson-based proxy under QIS4:

**Recommendations for QIS 4**

**Bornhuetter-Ferguson-based proxy**

**Description**

4.72 The Bornhuetter Ferguson loss reserving method consists of selecting a development pattern and, for each accident year, an initial ultimate loss ratio. From these, the provision estimate is derived.

4.73 It proves to be an interesting option to model most recent exercises insufficiently developed.

4.74 This method is less sensitive to the first years’ claims payments than the chain-ladder method. As the undertaking’s experience develops, the initial expected loss ratio weights less and the experience weights more in the reserve estimate.

4.75 The proxy considered in this subsection applies market data to the Bornhuetter-Ferguson method when the insurer has only insufficient credible own data to derive initial ultimate loss ratios and development patterns specific for its own portfolio.

**Input**

4.76 The following input information is required for each accident year:

- an initial market-based ultimate loss ratio + effectively paid claims
- A development pattern (entity specific if available, marked based otherwise)

**Output**

4.77 Estimated ultimate loss

**Calculation**

4.78 An estimate $L$ of the ultimate claim amount is given by:
\[ L = D \cdot \frac{1}{CDF} + A \left( 1 - \frac{1}{CDF} \right) \]

Where:

- \( D \) = loss development estimate
- \( A \) = initial expected loss estimate (along initial ultimate loss ratio)
- \( CDF \) = Cumulative loss development factor (ratio of ultimate loss estimate on basis of development pattern relative to current loss)

4.79 The best estimate is then determined as:

\[ BE = L - AC \]

Where:

- \( BE \) = best estimate of claims provision
- \( AC \) = Accumulated paid claims

**Criteria for application:**

4.80 Claim settlement practices must not vary too much over time.

**Other remarks**

4.81 Generally, the development pattern used for this approach could be based on either paid or incurred claims. In case it is based on incurred claims (i.e. cumulated paid claims plus case reserves), we have that

\[ D \cdot \frac{1}{CDF} = AC + R^{case} \]

where \( R^{case} \) denotes the sum of case reserves. In this case, an estimate of the IBNR claims is given by:

\[ A \left( 1 - \frac{1}{CDF} \right) \]

and the best estimate derived above is given by:

\[ BE = A \left( 1 - \frac{1}{CDF} \right) + R^{case} \]

4.82 In case the development pattern is based on paid claims, it follows that:

\[ D \cdot \frac{1}{CDF} = AC \]

so that for the best estimate we have:

\[ BE = A \left( 1 - \frac{1}{CDF} \right) \]
Bornhuetter-Ferguson proxy based on paid development patterns

Description
4.83 This proxy is a special variant of the general Bornhuetter-Ferguson-based proxy described above using claims development patterns based on paid claims.

Input
4.84 The following information is required for each line of business:

- an average ultimate loss ratio for the accident years not finally settled,
- an adjustment factor for each accident year not finally settled, and
- a market payment pattern.

4.85 It is assumed that these parameters have been estimated on a market-wide basis by using risk statistics where the relevant amounts are adjusted for inflation.

Output
4.86 The following output is calculated for each line of business:

- expected future cash-flows by accident year (not finally settled) and maturity date;
- a discounted best estimate for gross provisions for claims outstanding per accident year (not finally settled).

Calculation
4.87 For a given line of business, the various steps in the calculation of the undiscounted best estimate for the provisions for claims outstanding on a gross basis can be summarised as follows:

1. An inflation-adjusted earned premium (EPIAi) is stipulated for each accident year i by applying a given inflation adjustment factor (IAi) – normally based on the consumer price index – to the earned gross premium in nominal terms (EPi), that is:
   \[ EPI_A_i = EP_i \cdot IA_i \]

2. For each accident year i, the effective loss ratio or market ultimate loss ratio (MULRi) is in practice given, since both the average ultimate loss ratio (LR) and the accident year adjustment factor (AYAi) are given as input to the undertaking (applying this proxy), that is
   \[ MULR_i = LR \cdot AYA_i \]

3. As also the market payment pattern (MPPd where d represents the development years) is given to the undertaking, proxies for the provisions for claims outstanding related to the individual accident years
(PCO$_{\text{Gross},i}$) are calculated as follows:

$$PCO_{\text{Gross},i} = EPIA_i \cdot MULR_i \cdot OP_i$$

where:

$$OP_i = \sum_{d > I-i} MPP_{d}$$

is the expected outstanding part of the ultimate (inflation adjusted) claims costs and I is the current accounting year.

(4) Finally, the undiscounted (but inflation-adjusted) best estimate for the overall provisions for claims outstanding on a gross basis (PCO$_{\text{Gross}}$) is calculated in the following manner:

$$PCO_{\text{Gross}} = \sum_{i \leq I} PCO_{\text{Gross},i}$$

4.88 It should be noted that – due to the adjustment for inflation – all amounts referred to in (1)–(4) above are evaluated according to the price level at the balance sheet day. This aspect must be taken into account when stipulating the discounted best estimate for the provisions for claims outstanding.

4.89 The part of the (inflation-adjusted) provisions for claims outstanding that is expected to be paid at a future maturity date $j$ ($j>I$) is given by:

$$Y_j = \sum_{i \leq j} PCO_{\text{Gross},i} \cdot MPP_{j-i} \text{ for } j = I+1, ..., I+D$$

where $D$ is the maximum number of development years.

4.90 By applying the available risk-free interest curve, the discounted best estimate of the overall provisions for claims outstanding on a gross basis is given as:

$$PCO_{\text{Gross}}^{\text{disc}} = \sum_{j=I} Y_j \cdot \left(\frac{(1 + r_j)}{(1 + p)}\right)^{-j}$$

where $r_j$ denotes the risk-free interest rate corresponding to maturity $j$ while $p$ denotes the expected future rate of inflation (assumed to be constant for the sake of simplicity).

Other remarks

4.91 It should be noticed that the set-up sketched by (1)–(4) above also applies – with only minor adjustments – in cases where the estimation of the necessary input parameters (LR, AYA$_i$ and MPP$_d$) are not based on figures (e.g. premiums and paid claims) adjusted for inflation. In such cases the future inflation is implicitly predicted as an average of the recent historic inflation and this fact will be reflected also in the estimated values of the input parameters. Moreover, in this case the earned premiums should not be adjusted for inflation, cf. (1) above, and the discounting should be carried out by using the nominal risk-free interest rate curve (i.e. with $p = 0$ in the expression for (PCO$_{\text{Gross}}$)*).

Case-by-Case proxies
Case-by-case proxies use the information contained in case-by-case estimates to derive best estimates of claims provisions. Most national groups have considered variants of this kind of proxy. The following table gives some of the details of these considerations:

<table>
<thead>
<tr>
<th>Suggested by</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Use “pure” case-by-case.</td>
</tr>
<tr>
<td></td>
<td>Use case-by-case + factor adjustment for IBNR, e.g. case-by-case + %*premiums or %*case reserves.</td>
</tr>
<tr>
<td></td>
<td>Case-by-case + adjustment to achieve a best estimate. <strong>Formula:</strong> „best estimate“ of claims provisions = + sum of case-by-case provisions for known claims + provisions for annuities valued according to principles life-insurance liabilities + lump-sum provisions for IBNR claims (estimated frequency x claims average) incl. IBNR for annuities – sustainable estimate of run off gains/losses from last three accounting years on the basis of case-by-case provisions.</td>
</tr>
<tr>
<td></td>
<td>Application criteria: • no or no reliable data is available • reliable data available but not applicable for statistical portfolio methods • small portfolio (proportionality principle)</td>
</tr>
<tr>
<td></td>
<td>Use case-by-case basis as a proxy for lines of business, due to their high degree of specialisation (niche undertakings) or due to the specificity of risks.</td>
</tr>
</tbody>
</table>

Based on this analysis, it is proposed to test the following case-by-case proxy under QIS4:

**Recommendations for QIS 4**

**Case-by-case based Proxy for claims provisions**

**Description**

This proxy uses cases-by-case estimates to derive a best estimate of claims provisions. Future inflation has to be taken into account.
It includes an adjustment to take into account claims that have occurred, but have not (yet) been reported (IBNR claims).

Usually case-by-case provisions are resulting from claims settlement staff and therefore it is à priori not transparent if those provisions are under- or over-estimated. Therefore, the proxy includes a further adjustment to take into account expected run-off results from the setting of case-by-case reserves.

This method based only on individual data of a company and is therefore a rather subjective valuation method. A more objective harmonisation across different company or member states may be difficult to achieve.

**Input**

The following input data is required:

- case-by-case provisions for known claims (at end of current year);
- expected frequency and claims average for IBNR claims;
- for each of the last 3 to 5 business years, historic run-off gain/loss on the basis of case-by-case provisions.

**Output**

Best estimate of claims provisions (undiscounted and gross of reinsurance).

**Calculation**

The best estimate of the claims provision (across all occurrence years) is from the following three components:

\[ \text{sum of case-by-case provisions for known claims} + \text{lump-sum provisions for IBNR incl. IBNR for annuities} - \text{sustainable and reliable estimate of run off gains/losses from last three to five accounting years on the basis of case-by-case provisions} \]

The lump-sum provisions (contingency reserves) for IBNR claims may be estimated by a product like expected frequency x claims average. Both statistics are usually estimated from a time series of claims reported later in following business years. Those statistics should be back-tested.

From the experience of past accounting years an estimation of a sustainable value of settlement results for the set of claims with case-by-case-provisions could be derived as follows (where the calculation should be carried out for each of the last 3 to 5 business years):

\[ \text{sum of case-by-case provisions for all claims outstanding at the beginning of the given business year} \]
- payments for such claims of all occurrence years within given business year
- sum of case-by-case provisions for such claims at the end of the business year

4.103 To derive a sustainable and conservative estimate, the minimum of the yearly run-off-results from the last 3 to 5 years should be used. This might result in positive as well as in negative values.

Criteria for application:
4.104 For an application of this proxy, the following 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.

Other remarks:
4.105 This proxy does not include a valuation of annuities arising from non-life insurance obligations (in e.g. worker's compensation business, motor third party liability, liability and accident insurance). This issue is addressed separately, below (cf. para. 4.192).

Expected Loss proxies

4.106 Expected loss based reserving methods rely on projected ultimate loss ratios for the calculation of technical provisions.

4.107 Such methods may be used in connection with company's pricing information and can be used when the historical data has limited credibility. However, the weakness of this method is that it is slow to react to the emerging loss experience for a particular accident year. For claims provisions, it should therefore only be used as a proxy 'of last resort'.\(^{32}\) For premium provisions, however, expected loss based methods (and therefore proxies derived on basis of such methods) play a more important role.

\(^{32}\) However, note that the quality of this method can be improved by mixing the a priori estimate of the ultimate loss ratio with the application of a development pattern. This leads to Bornhuetter-Ferguson methods, a variant of which (using market loss ratios) is proposed in this report for inclusion in QIS 4.
The following describe expected-loss based proxies considered by the national expert groups:

<table>
<thead>
<tr>
<th>Suggested by</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Use of ultimate loss ratios (ULR) for premium provisions.</td>
</tr>
<tr>
<td></td>
<td>Use of ultimate loss ratios (ULR) for claims provisions.</td>
</tr>
<tr>
<td></td>
<td>Proxy for premium provision:</td>
</tr>
<tr>
<td></td>
<td>( UPR = \text{written premiums} \times \text{term of contracts after the end of the year} \times (\text{loss ratio} + \text{administrative costs ratio}) ).</td>
</tr>
<tr>
<td></td>
<td>Proxy for premium provision:</td>
</tr>
<tr>
<td></td>
<td>( UPR = (\text{written premium} - \text{acquisition cost}) \times \text{term of contracts after the end of the year} \times (1 + \text{ratio of premium deficit}) ).</td>
</tr>
<tr>
<td></td>
<td>Proxy for premium provision:</td>
</tr>
<tr>
<td></td>
<td>( UPR = \text{sum of UPR for every type of risk} = \text{number of insured objects} \times \text{frequency of claims} \times \text{severity of claims} \times \text{term of contracts after the end of the year} + \text{administrative costs} ).</td>
</tr>
<tr>
<td></td>
<td>Proxy for premium provision:</td>
</tr>
<tr>
<td></td>
<td>( UPR = \text{sum of UPR for every type of risk} = \text{sum insured} \times (\text{claims} / \text{sum insured}) \times \text{term of contracts after the end of the year} + \text{administrative costs} ).</td>
</tr>
<tr>
<td></td>
<td>Proxy for premium provisions:</td>
</tr>
<tr>
<td></td>
<td>Formula: ( TP = (CR - 1) \times (\text{sum of future premiums}) + CR \times \text{pro rata temporis of the paid premium for the unexpired risk period} ).</td>
</tr>
<tr>
<td></td>
<td>“Bottom up approach”: uses original pricing information.</td>
</tr>
</tbody>
</table>

In those cases no credible own data is available and no benchmark data can be obtained, the insurer could refer back to its original pricing assumptions. In the business case for a new product, the insurer normally estimates the expected claims ratio’s and run off cycle.

The insurer can use this information to estimate the best estimate of the insurance product. In this calculation the insurer should not allow for any profit (e.g. the profit margin is set at

---

33 Unearned premium provision.
zero) unless the insurer is able to evidence any profit.

The insurer is to confront any experience with the expected information within the pricing considerations. For example if the product is expected to have no seasonal pattern, the insurer is able to use the data from the first six – nine months to calibrate the best estimate and to adjust where necessary the pricing information.

Use loss ratios/combined loss ratios on historic years.

Addition discussions lead the expert group to eliminate this specific proxy and to comply with the other proxies as suggested by other expert groups.

Premium Provision: Expected loss ratio combined with market development pattern proxy.

Description:

The first step to apply this proxy is to estimate the amount of claims that will be paid during the next year only, relating to future accidents covered by the policies in force at the valuation date \( A_{i,0} \).

For this an expected loss ratio (for development year 0), derived from “market” data (eventually, a credibility mix between the market and the entity-specific ratios could be used), should be multiplied to the amount of unearned premiums at the valuation date. This latter amount is in the books of the company.

This loss ratio estimate can be given by a market average calibrated from historical data (if the historical ratios are relatively stable) or by modelling the underwriting cycle.

The second step is to project the estimate of \( A_{i,0} \) using the ‘market’ development pattern proxy (see 1st proxy above).

The final step is to add an estimate of future expenses (e.g. administration of policies) and deduct the future premium cash flows, if any (based on the timing of receival, not on pro-rata basis). We do not propose specific proxies for these two items. Companies should be able to derive proper estimates for these amounts.

Calculation formula:

The result of the first step is given by:

\[ A_{n+1,0} = P_{n+1} \cdot LR_{n+1,0} \]

(note: indices relate to accident year \( n+1 \) and development year 0. \( P_{n+1} \) is the amount of unearned premiums)

The second step is given by the application of the proxy market development pattern (see above), using \( A_{n+1,0} \) as input information.

To obtain the best estimate of the premium provision, the final step is given by:
\[ BE_i = PV(A_{i,\infty}) + PV(\text{Expenses}_i) - PV(\text{Premiums}_i) \]
(note: the present values are to be calculated using the risk-free yield curve)

An alternative way to write the whole formula is:

*Premium Provision* = *Unearned Premiums* \( \times \) *Final Combined Ratio* (accident year) \( \times \) *Cycle Adjustment factor* \( \times \) (1+*Discount proxy*) [- PV *Future premium cash flows*]

(for discount proxy, see below)

**Parameters:**

(Not yet available. Studies are currently being carried out for Motor LoB).

**Criteria:**

- The loss ratio for the LoB is fairly stable across stable or it follows a cycle which can be reasonably picked up by an adequate calibration model;
- As for the second step, the criteria for the market development pattern proxy is applicable.

**Other comments:**

- *Target Building blocks*: This proxy intends to estimate the ‘best estimate’ of premium provision;
- *Gross or Net*: Gross of reinsurance;
- *Discount*: Proxy formula makes possible the use of discount factors.

\[ CR = \text{Loss ratio} + \text{Expense ratio} \]

\[ BE = (CR - 1) \times (\text{sum of future premiums}) + \]

\[ CR \times \text{Pro rata temporis} \text{ of the paid premium for the unexpired risk period} \]

**Usage of expected loss ratio for claims provisions.**

**Use loss ratio / combined loss ratio on historic years for premium liabilities.**

4.109 The Coordination Group proposes to test the following proxy under QIS 4:

**Recommendations for QIS 4**

**Expected Loss Based Proxy**

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.110 This proxy derives a best estimate for the premium provisions,</td>
</tr>
</tbody>
</table>
based on an estimate of the combined ratio in the LOB in question.

**Input**

4.111 The following input information is required:

- estimate of the combined ratio (CR) for the LOB during the run-off period of the premium provision;
- present value of future premiums for the underlying obligations\(^{34}\);
- unearned premium reserve for the underlying obligation.\(^{35}\)

4.112 The combined ratio should be defined as the ratio for year \(y\) of expenses and incurred claims in a given LOB over earned premiums, determined at the end of year \(y\). The earned premiums should exclude prior year adjustments, the expenses should be those attributable to the premiums earned other than claims expenses, and incurred claims should exclude the run-off result, that is they should be the total for losses occurring in year \(y\) of the claims paid (including claims expenses) during the year and the provisions established at the end of the year.

4.113 Alternatively, if it is more practicable, the combined ratio may be considered to be the sum of the expense ratio and the claims ratio, where the expense ratio is the ratio of expenses (other than claims expenses) to written premiums and the expenses are those attributable to the written premiums.

**Output**

4.114 Best estimate of the premium provision (gross of reinsurance).

**Calculation**

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

\[
BE = CR \times UPR + (CR - 1) \times PVFP,
\]

where

- \(BE\) = best estimate of premium provision
- \(CR\) = estimate of combined ratio for LOB
- \(UPR\) = unearned premium provision
- \(PVFP\) = Present value of future premiums (discounted using CEIOPS term structure of risk-free interest rates)

\(^{34}\) The QIS 4 technical specifications should clarify the extent to which future premiums need to be taken into account in the valuation of premium provisions. These overall specifications should then also apply to the proxy calculation set out above.

\(^{35}\) intended to denote the paid premium for the unexpired risk period determined on a pro rata temporis basis
Where a market development pattern proxy is available for the LOB being measured, a further alternative is to combine such pattern with the expected loss based proxy. This is based on a 3 step approach:

- Estimate the (undiscounted) total claims cost for the next future accident year by multiplying the ultimate claims ratio (based on undiscounted figures) by the (undiscounted) estimate of premiums that will be earned during next year\(^{36}\);

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

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

**Criteria for application:**

The following conditions should be met for an application of this proxy:

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

- a reliable estimate of the combined ratio can be made

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

**Other remarks:**

It should be pointed out that, in cases where the combined ratio is estimated to be lower than 100%, this proxy would lead to introducing future profits in the calculation of the TP. However, the Coordination Group considers this to be conceptually consistent with the valuation principles underlying the Draft Framework Directive.

In some markets, the unearned premium provisions are calculated net of commissions. In such cases, the unearned premium provisions shall be adjusted in order to ensure that the use of the combined ratio does not lead to a methodological error. Such an adjustment could be achieved by dividing the unearned premium provisions by \((1 - \text{commission rate})\).

---

\(^{36}\) For multi-year contracts the approach should be extended to cover all the relevant accident years.
Scaling-to-completion proxies

4.120 Scaling-to-completion proxies come into play where almost all of the insurance obligations in question have been valued, but where it is more difficult to determine the value of technical provisions for the remaining part of the obligation due to e.g. a lack of data.

4.121 In such a situation, ‘scaling-to-completion’ methods may be used to derive the best estimate of the whole portfolio on basis of the valuation of the modelled part of the obligations. The national proxy groups have described the following ‘scaling-to-completion’ techniques:

<table>
<thead>
<tr>
<th>Suggested by</th>
<th>Description</th>
</tr>
</thead>
</table>
|              | In some cases, it is difficult to determine the best estimate of the whole portfolio of insurance products. In these instances, the insurer is able to scale the best estimate towards 100%. The scaling could be based on various volume measures, such as Premiums, Number Reported claims, etc. When the scaling is based on for example premiums, the best estimate of the part of the portfolio which is determined by means of sound actuarial techniques, will serve as a benchmark. Thus:

\[
BEL = BEL_{act\text{,technique}} \times \left( \frac{\text{Premium}_{total}}{\text{Premium}_{scaled}} \right)
\]

The scaling factor is used in all other parts of the calculations of the Solvency Capital Requirements. Therefore no other simplifications are deemed to be necessary. |
|              | Oldest accident year & Old accident years not included in data triangulation: different options |
|              | 1) Use claims manager’s opinion |
|              | 2) Best Estimate = case reserve |
|              | 3) Assume same surplus as found for the analysed accident years and apply ratio between e.g. case reserves vs best estimate of an analysed part of the portfolio to a part that is not modelled (if the analysed part is representative of the rest) |
|              | For the present value, apply an extrapolated payment pattern (e.g. Adjusted Log linear or linear decreasing function) |
|              | Aggregate portfolio to create mass. Combination of portfolios with different risks. Separate long tail and short tail. |

4.122 For the purposes of QIS 4, the Coordination Group has decided not to suggest specific testing proposals for scaling-to-completion proxies, since
there a wide range of different techniques for such proxies is observable, and an appropriate choice depends to a large extent on the specific risk situation of the insurer. Moreover, a number of ‘scaling-to-completion’ techniques are already subsumed under the other proxy classes.

4.123 However, the ‘scaling-to-completion’ proxy class should be taken into account in the context of the additional qualitative information that participants of QIS 4 should be asked to provide on the use of proxy techniques.

*Simplified application of standard statistical techniques*

4.124 In case there is sufficient historical claims data available, a number of statistical actuarial techniques (e.g. chain ladder) could be used for setting best estimate provisions. However, by the nature of general insurance business, with volatility of claims experience over time and a wide range of internal and external factors influencing ultimate claims costs\(^\text{37}\), a reliable assessment of provisions cannot be achieved by a mechanical or simplistic application of statistical reserving techniques. Rather, such an assessment will usually require considerable amount of actuarial judgment, and supplementary “checks and balances” analysis.

4.125 Recognising this, the Coordination Group would consider it helpful to get more insurers acquainted with a statistical best estimate valuation of technical provisions. To achieve this in the context of QIS 4 (especially with a view towards insurers that, as yet, have only limited experience with a statistical or actuarial setting of non-life provisions), the group has discussed the following type of “proxy”, which consists of a simplified application of a standard statistical technique (e.g. chain ladder), to be applied in cases where there is sufficient historical data and stable claims experience:

\(^{37}\) E.g. the mix or type of business being written, the external legal environment or claims handling processes.
Use ‘mechanical’ chain ladder in case there is sufficient data.

The ‘mechanical’ use of a software for the Chain-Ladder-algorithm is acceptable under some “smooth” conditions mentioned below.

A company has made big progress in data availability if a “mechanical” chain ladder application is already possible.

A “mechanical” use of a software for the chain ladder algorithm should also comprise a calculation of a tail reserve if the latest Chain-Ladder-factor – or a mean value of the latest 3 years – is not smaller than, say, 1.001.

The ECXEL-sheets of QIS4 may have a simple “helper”-table similar to those already integrated in QIS3 for the chain-ladder calculations including the variance due to T.Mack and discounting.

On basis of these considerations, the Coordination Group proposes to test the following ‘simple-chain-ladder-proxy’ under QIS4:

**Recommendations for QIS 4**

**Simple-Chain-Ladder-Proxy**

**Description**

4.127 This proxy consists of a simple application of the chain-ladder algorithm for determining the best estimate of the claims provision in cases where sufficient historical data is available and the claims.

4.128 For QIS 4, such a proxy could be made available to participants in form of an Excel macro (or other software support) that allows the calculation of the chain ladder technique using a flexible triangle (insurer would chooses the number of accident and development years).

4.129 For reasons of practicability, and in order to allow insurers to participate in QIS 4 on a “best efforts” basis, it would not be expected that each insurer would supplement the application of this proxy with the full range of actuarial “checks and balances” analysis. However, it should be stressed that, in the future Solvency II regime, any mechanic or “automatic” application of statistical claims reserving technique could probably not be regarded as an appropriate valuation method.

**Input**

4.130 Cash flow triangle of gross cumulative amount of claims paid for claims outstanding for a single LOB.
Output
4.131 The proxy delivers:

- company specific gross development factors $f_j$ that reflect the evolution of the gross cumulative amount of claims paid between development years $j$ and $j+1$, and
- best estimate of the claims provision.

Calculation
4.132 The development factors $f_j$ are derived by a standard application of the ‘pure’ chain-ladder algorithm.

4.133 Given the development factors, the same calculations as with the market development patterns mentioned above can be applied to derive the best estimate.

Criteria for application:
4.134 The following conditions should be met:

- Company specific gross cash flows of a single LoB are available in the structure of a triangle (occurrence times development years);
- No experience of extreme/Cat losses in the triangle.
- Values on main diagonal are not significantly low or high („sensitivity” of the diagonal);
- Similar observed development factors across incurred years;
- Number of observed development years is so large that latest chain-ladder factor – or a mean value of the latest 3 years – is smaller than a given threshold (for example, 1.01);
- No change in development structure due to e.g.:
  - mergers and acquisitions;
  - changed or new products;
  - changes in claims settlement;
  - changes in jurisdiction.

Other remarks
4.135 Together with a “mechanical” application of some software for the calculation of development patterns, a calculation of a tail reserve should be provided. As a rule of thumb will serve: if the latest Chain-Ladder-factor – or a mean value of the latest 3 years – is not smaller than a certain threshold (for example, 1.001) then a tail should be estimated. A „mechanical’ log-linear
extrapolation of the tail could be carried out using company specific and/or market benchmark development patterns.

4.136 It would also be helpful to integrate a measurement of the estimation error (e.g. on basis of generalised linear model techniques, or the Mack formulas). This would provide the insurer with useful information on the appropriateness and reliability of the applied provisioning method.

**Accounting based proxies**

4.137 Accounting-based proxies use items from statutory balance sheets (e.g. the unearned premium provision) to derive a best estimate valuation of claims or premium provisions.

4.138 The Coordination Group recognises that, under the future Solvency II regime, the admissibility of such accounting-based valuation techniques will be limited. However, it is believed that for QIS 4 purposes, it will be helpful to include simple proxy proposals using also items taken from existing statutory balance sheets in order to get more insurers involved in testing the Solvency II principles and instruments.

4.139 The following table gives an overview over accounting-based proxies developed by the national expert groups:

<table>
<thead>
<tr>
<th>Suggested by</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>🇸🇪</td>
<td>Premium provision proxy (unearned premium provision + premium deficiency provision) ( \times v^{0.5} ).</td>
</tr>
<tr>
<td>🇳🇱</td>
<td>For Premium provision: unearned premium provision. Normally this provision is to be amortised to zero at the end of the insurance cover. At this moment all the premiums written are deemed to be earned. Whenever at the balance sheet date the insurance cover is still in force, the level of this provision is to be estimated. Based on the total written premiums and the passing of the time within the insurance portfolio the remaining provision is determined (pro rate temporis). Thus, with ( n ) policies in force at balance sheet date, we have the following:</td>
</tr>
<tr>
<td></td>
<td>( \text{Premium}<em>\text{provision} = \sum</em>{i=1}^{n} \left( \text{Written}<em>\text{premium}<em>i \times \frac{\text{Remaining}</em>\text{cover}</em>\text{duration}<em>i}{\text{Total}</em>\text{cover}_\text{duration}_i} \right) )</td>
</tr>
<tr>
<td></td>
<td>If appropriate the insurer should accommodate in the formula above for any seasonal patterns. Naturally the insurer should verify whether a premium deficiency provision is not required. Any deficiencies should be accounted for.</td>
</tr>
</tbody>
</table>
For claims provision: set underwriting risk (technical result + financial result) equal to 0.

For claims provision: Take the original premium formula without risk margin (frequency and severity) less historical payments.

For claims provision: Current year / prior years result.
Calculate, on at least 3 years, ratio as prior years result / provisions settled during accounting year (rather than 1/1 provisions)
Only if the results are representative for the future (not in case of changed provisioning policy!)
Undiscounted BE = (1 – ratios average) x case & IBNR provisions.

4.140 Based on this analysis, it is proposed to test the following proxy under QIS4:

### Recommendations for QIS 4

#### Accounting-based Proxy

**Description**

4.141 This proxy is intended to derive a best estimate for premium provisions, based on the unearned premium provision and the provision for unexpired risks shown in statutory balance sheets.

**Input**

4.142 The following input information is required for the LOB in question:

- Provision for unearned premiums;
- Provision for unexpired risks (if applicable).

**Output**

4.143 Best Estimate for the Premium provision.

**Calculation**

4.144 The best estimate for the premium provision is derived as follows:

\[
BE = \frac{(\text{Provision for unearned premiums} + \text{Provision for unexpired risks})}{1+i/3}
\]

where \( i \) (100 \( i \) %) is the risk-free interest rate (for a 1-year maturity) used for the discounting.

**Criteria for application:**
4.145 The premium provision is supposed to decrease at an even rate during the forthcoming 12 months.

Other remarks:

4.146 As mentioned above, the Coordination Group recognises that such a proxy may not be compatible with the Solvency II framework.

Discounting proxies

4.147 Discounting proxies are used to convert undiscounted best estimates of claims provisions into discounted estimates, in cases where there is not enough data to apply the full term structure of risk-free interest rate. For the proxies discussed above, this is the case for the case-by-case proxy as well as the frequency-severity proxy. 38

4.148 The following discounting proxies have been considered by the national groups:

<table>
<thead>
<tr>
<th>Suggested by</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>🇫🇷</td>
<td>Use loss development patterns.</td>
</tr>
<tr>
<td>🇧🇪</td>
<td>Use duration fixed at market level.</td>
</tr>
<tr>
<td>🇩🇪</td>
<td>Use factor per LOB fixed at market level.</td>
</tr>
</tbody>
</table>

Criteria for application: This approach should be used only in case of case-by-case approaches.

Formula: A separate value per LoB can be given which represents a factor for discounting:

<table>
<thead>
<tr>
<th>LoB</th>
<th>discounting factor</th>
<th>... based on</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mod. duration</td>
<td>mean interest rate</td>
</tr>
<tr>
<td>....</td>
<td>3%</td>
<td>2.8</td>
</tr>
</tbody>
</table>

The calibration of the factors are based on representative samples of cash flow triangles from participations of the Quantitative Impact Studies.

38 Cf. para. 4.19.
Discount proxy based on concepts of duration and convexity.

**Description:**
The duration and convexity for a given LoB can be computed using the proxy market development pattern.

Then, a simple formula based on these 2 market parameters is the use to discount the undiscounted estimate of the total claims costs (which can be derived from other proxy).

**Calculation formula:**
Given the duration (D), the convexity (C) and the yield-to-maturity (YTM), the discount proxy is given by:

\[
\text{Discount adjustment factor} = D \times \text{YTM} + \frac{1}{2} \times C \times \text{YTM}^2
\]

(the YTM is calculated as the single rate that leads to the same discounted value that would be obtained by using the full term structure)

**Criteria:**
- Highly dependent on the proxy market development pattern, so the criteria made for that proxy applies
- Needs to be (very) frequently updated, namely when there are changes in the term structure of risk-free interest rates

**Other comments:**
- **Target Building blocks:** This proxy intends to estimate a factor that allows the quick an easy passage from an undiscounted amount to a discounted one
- **Gross or Net:** Not applicable
- **Discount:** The purpose of the proxy is to allow discounting
Based on this analysis, it is proposed to test the following discounting proxy under QIS4:

### Recommendations for QIS 4

**Discounting Proxy**

<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.150</td>
<td>This proxy is intended to convert an undiscounted best estimate of claims provisions into a discounted estimate. It may be combined with either the case-by-case or the frequency-severity proxy described above.</td>
</tr>
<tr>
<td>4.151</td>
<td>Where estimates for cash flows for individual development year ( j ) have been derived, this proxy is not needed, since discounting is a simple division of the cash flow in development year ( j ) by the given interest rate of CEIOPS’s term structure curve.</td>
</tr>
<tr>
<td>4.152</td>
<td>The proxy uses a single percentage value per LOB, which represents the factor for discounting. Further analysis should be undertaken to evaluate the differences in setting these factors among member states and to decide whether for each LOB one single market factor may be used.</td>
</tr>
</tbody>
</table>

**Input**

4.153 | The following input information is required for the given LOB:

- undiscounted best estimate of claims provision (for whole or part of LOB);
- market-wide discounting factor \( f \) for LOB. |

**Output**

4.154 | The discounted best estimate of the claims provision (for whole or part of LOB). |

**Calculation**

4.155 | The discounted best estimate is derived by applying the market-wide discounting factor \( f \) to the undiscounted best estimate:

\[
BE = (1 - f) \cdot BE^{\text{undiscounted}}
\]

4.156 | The calibration of the factor \( f \) should be based on representative samples of cash flow triangles from participations of the Quantitative Impact Studies. |

4.157 | To derive this factor, the underlying average duration of insurance contracts in the given LOB should be determined. Given this underlying duration, the factor \( f \) can determined as follows:

\[
1 - f = (1 + i)^{-d},
\]
where

\[ i = \text{risk-free interest rate corresponding to duration } d \]

(taken from risk-free interest rate curve provided by CEIOPS)

\[ d = \text{average duration of insurance contracts in given LOB} \]

**Criteria for application:**

4.158 The following conditions should be met:

- separate estimates for cash flows in the individual development years are not available;
- the best estimate cannot be calculated from a run-off cash flow triangle by using company specific development pattern or market development patterns.

**Other remarks:**

4.159 The most common situation of the application of this proxy will be in connection with case-by-case provisioning.

4.160 With regards to a duration approach to discount provisions, we note that a duration can only be calculated if cash flows are available for each development year. But in this situation a direct calculation of discounted cash flows is possible. Therefore, such an approach has not been additionally described.

4.161 For QIS 4, the market-wide discounting factors for the individual LOB’s would need to be calibrated by the supervisors in the individual markets. This calibration should also make transparent the assumption on the underlying average modified duration (and the corresponding risk-free interest rate). To illustrate this, the following table shows the factors that were applied for the German market in the QIS 3 exercise:

<table>
<thead>
<tr>
<th>LOB</th>
<th>discounting factor</th>
<th>... based on Dur$_{mod}$</th>
<th>mean interest rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accident and health</td>
<td>3%</td>
<td>1,8</td>
<td></td>
</tr>
<tr>
<td>Motor, third-party liability</td>
<td>10%</td>
<td>5,8</td>
<td></td>
</tr>
<tr>
<td>Motor, other classes</td>
<td>1,5%</td>
<td>0,8</td>
<td></td>
</tr>
<tr>
<td>Fire / other classes</td>
<td>2%</td>
<td>1,1</td>
<td></td>
</tr>
<tr>
<td>Third-party liability (private)</td>
<td>4,5%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Third-party liability (other)</td>
<td>9,5%</td>
<td>5,0</td>
<td></td>
</tr>
<tr>
<td>Marine, aviation and transport</td>
<td>2,5%</td>
<td>1,5</td>
<td></td>
</tr>
<tr>
<td>Credit and suretyship</td>
<td>2,5%</td>
<td>2,0</td>
<td></td>
</tr>
<tr>
<td>Legal expenses</td>
<td>4%</td>
<td>2,5</td>
<td></td>
</tr>
<tr>
<td>Assistance</td>
<td>1,5%</td>
<td>0,7</td>
<td></td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>2%</td>
<td>1,7</td>
<td></td>
</tr>
<tr>
<td>non-proportional reinsurance</td>
<td>0%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Gross-to-Net Proxies**

4.162 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. For the proxies discussed above, gross-to-net proxies may be applicable for 5 out of seven proposed proxies for the best estimate.\(^{39}\)

4.163 The following gross-to-net proxies have been considered by the national groups:

<table>
<thead>
<tr>
<th>Suggested by</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Use ratio gross to net from accounting.</td>
</tr>
<tr>
<td></td>
<td>Apply ratio of gross over net case reserves.</td>
</tr>
<tr>
<td></td>
<td>The application of this proxy should confine itself to quota-share reinsurance. Other reinsurance cover may function as well but should have an appropriate assessment due to the additional risks.</td>
</tr>
<tr>
<td></td>
<td>The ratio is Net / gross, derived from another portfolio, is used as benchmark for other insurance portfolio with similar reinsurance cover.</td>
</tr>
<tr>
<td></td>
<td>Set net IBNR to zero.</td>
</tr>
<tr>
<td></td>
<td>Use historical accounting figures.</td>
</tr>
<tr>
<td></td>
<td>Based on historical accounting data, the historic trend is extrapolated towards the future. An important requirement is that the reinsurance treaties applicable are not changed in substance.</td>
</tr>
<tr>
<td></td>
<td>Use ratio of cumulated gross cash flow over cumulated net cash flow, per occurrence year.</td>
</tr>
<tr>
<td></td>
<td><strong>Conditions:</strong></td>
</tr>
<tr>
<td></td>
<td>• gross as well as net cash flows per year of occurrence are available</td>
</tr>
<tr>
<td></td>
<td>• a gross best estimate (R_i) of claims provisions per occurrence year is available</td>
</tr>
<tr>
<td></td>
<td><strong>Formula:</strong> Starting with the simplest case – proportional</td>
</tr>
</tbody>
</table>

\(^{39}\) Cf. para. 4.19.
reinsurance – of a quota \( q_i \), of occurrence year \( i \), the undiscounted best estimate of claims provisions is

\[
N = \sum_i q_i R_i
\]

This formula is also valid for the present value (discounted best estimate).

Proportional and non-proportional reinsurance: for past business years reinsurance structure is known and will not change retroactively any more. A comparison of net over gross cumulated cash flows in the past differentiated by year of occurrence then gives a rate \( 1 - \bar{q}_i \) for recoverables from proportional and non-proportional reinsurance.

For newer years and especially the last business year \( (i = n) \) this quota \( 1 - \bar{q}_i \) might be a little bit too low because \( \bar{q}_i \) will be a bit too high due to IBNRs. Therefore, the proxy does not lead to an underestimation of the net provision in these cases. For the running business year an expected quota \( 1 - \hat{q} \) can be estimated as the share of proportional reinsurance. Because non-proportional reinsurance for the running business year is not taken into account in this case it is a conservative approach for the first insurer.

Additionally these ideas are applicable to **Coinsurance**.

---

**Use case reserves only.**

Calculate difference between gross and net provisions only based on case reserves (overestimation of the ceded provision in case of indexation clause and/or interest share clause)

Assume zero of the gross IBN(E)R is ceded (assuming that the ceded “pure” IBNR are compensated by the overestimation of the ceded case reserves for the reasons mentioned here above)

**Pro-rata estimation to determine net IBN(E)R.**

Estimate gross ultimate provisions defined as case by case reserve + IBN(E)R (ex: 90+10)

Use ratio between gross ultimate loss and gross case provisions (ex: 100/90) to estimate net IBN(E)R using net case provisions

ex: if net case reserve = 80, ultimate net provisions = 100/90 x 80, net IBN(E)R = ((100/90)-1) x 80

**Bottom-up modelling.**

Use original premium model based on e.g. separate frequency and severity

Analysis to derive portion reinsured: less precise than ceded
Average method based on historical accounting figures.

Use historical accounting figures on reinsured portion of book to determine reinsured liabilities: probably very volatile and therefore only useful for most very recent accident year if no ceded case reserves identified, yet.

A market-based Gross-to-Net proxy may be stipulated as the ratio of the expected value of a single claim amount net of reinsurance to the expected value of a single claim amount gross of reinsurance. For a given accident/occurrence year $i$, this leads to the following expression:

$$GN_i = \frac{E(Z(c_i))}{E(Z)},$$

where $Z$ denotes a random single claim amount (gross of reinsurance) and $c_i$ denotes the parameters characterising the reinsurance program for accident/occurrence year $i$ (for the insurance undertaking in question).

This proxy may be applied in cases where the reinsurance program consists mainly of (relatively) simple excess-of-loss treaties or combinations of quota share treaties and simple excess-of-loss treaties. (It may be noticed that the later latter case also include combinations of surplus treaties and excess-of-loss treaties, where the surplus treaties are approximated by quota-share treaties.)

If the probability distribution of the single claim amounts is available (either as an estimated parametric distribution or simply as the available empirical distribution), Gross-to-Net proxies could be tabulated for the case where the reinsurance program consists of a simple excess-of-loss treaty. E.g. for a set of excess points $\{m_k, k = 0,\ldots,K\}$, the proxy is given by

$$GN(m_k) = \frac{E(Z(m_k))}{E(Z)},$$

where

$$E(Z(m_k)) = E(\min(Z,m_k)).$$

If the actual excess point lies between $m_k$ and $m_{k+1}$ (say), the tabulated values of $GN(m_k)$ may be used as a starting point for interpolations.

It may also be noted that in cases where the reinsurance program consists of a combination of a quota share treaty with retention $q$ and a simple excess-of-loss treaty with excess point $m$, the Gross-to-Net proxy may be stipulated as

$$GN(q,m) = q \times GN(m/q).$$

Accordingly, it is sufficient to tabulate this proxy for cases of excess-of-loss treaties only.
The Norwegian FSA intends to make such proxies available for QIS4.

If no other proxy is available, one of the following approaches could be applied:

(i) For each accident/occurrence year use the ratio of cumulated paid claims on a net basis to the cumulated paid claims on a gross basis.

(ii) The same as (i) but replace the cumulated payments with the sum of cumulated payments and the provisions for reported claims (RBNS claims).

From the above proposals, the Coordination Group decided to test two different designs: one based on the first proposal developed by the Dutch group (gross-to-net proxy based on case reserves), which is similar to the first Belgian proposal, and one based on the German proposal (gross-to-net proxy based on cumulated cash flows). A detailed description of these suggestions is provided below.

### Recommendations for QIS 4

**Gross-to-net proxy based on case reserves**

#### Description

4.165 This proxy uses a ratio of net over gross of an available portfolio A to estimate the net provision of another portfolio B based on the observable gross provision of portfolio B.

#### Input

4.166 The following input is required:

- Data set of gross case provisions portfolio A and B;
- Data set net case provisions portfolio A.

#### Output

4.167 Ratio net over gross, which can be applied to other portfolio’s.

#### Calculation

4.168 Net provision = ratio x observable gross provision.

4.169 This proxy uses a ratio of net over gross of another portfolio to estimate the provision of another portfolio based on its observable gross provision.
4.170 The following criteria should be met:

• The benchmark portfolio should be similar to the portfolio for which the proxy is used (substance over form);

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

Other remarks:
4.171 It is noted that 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 flows

Description
4.172 This proxy derives an estimate of net claims provisions on bases of gross claims provisions and an estimate of the recovery rates from reinsurance in individual occurrence years.

4.173 For past business years, the reinsurance structure for individual occurrence years is known and will not change retroactively any more. A comparison of net over gross cumulated cash flows per LOB in the past differentiated by year of occurrence may therefore be used to derive an estimate of the recovery rate for proportional and non-proportional reinsurance in the given occurrence year.

Input
4.174 The following input data are required:

• $A_{i,n-i}^{\text{gross}}$ and $A_{i,n-i}^{\text{net}}$: the gross resp. net cumulative amount of claims paid (per LOB) for the accident year $i$ and development year $n-i$: these are the latest observed values on the diagonal of the net and the gross cash flow triangle

• $R_{i}^{\text{gross}}$: Gross best estimates for individual occurrence years $i$

Output
4.175 The proxy derives

• quotas $r_i$ (per LOB) for the recovery rates from reinsurance for each year of occurrence $i$ for the undiscounted best estimate of claims provisions. These shares are also valid
for discounted best estimate;

- the undiscounted best estimate of claims provisions;
- a net best estimate for premium provisions: see “other remarks” below.

**Calculation**

4.176 For each occurrence year $i$, the recovery rate $r_i$ (i.e., the average rate of recovery from proportional and non-proportional reinsurance) can be estimated as follows:

$$r_i = 1 - \frac{A_{i,n-i}^{\text{net}}}{A_{i,n-i}^{\text{gross}}}$$

where

- $A_{i,n-i}^{\text{net}}$ = cumulated net cash flow until given business year for occurrence year $i$
- $A_{i,n-i}^{\text{gross}}$ = cumulated gross cash flow until given business year for occurrence year $i$

4.177 The net best estimate for the claims provisions in occurrence year $i$ may then be derived as follows:

$$R_i^{\text{net}} = (1 - r_i) \cdot R_i^{\text{gross}}$$

4.178 The overall net best estimate of the claims provision is given by:

$$R^{\text{net}} = \sum R_i^{\text{net}}$$

**Criteria for application:**

4.179 To apply this proxy, gross as well as net cash flows per year of occurrence need to be available per LOB.

**Other remarks:**

4.180 For newer years and especially the last business year ($i = n$) the estimated recovery rates $r_i$ might be a little bit too small because $1-r_i$ will be a bit too high due to IBNRs. Therefore, the proxy does not lead to an underestimation of the net provision in these cases.

4.181 The above mentions ratios $r_i$ are for claims provisions. For premium provisions, i.e. for the current business year, an expected recovery rate can be estimated by $1-q$, where $q$ is the share of the proportional part of the reinsurance cover. Because in this case non-proportional reinsurance for the current business year is not taken into account, this is a conservative approach for the ceding insurer.

4.182 **Coinsurance:** Under a coinsurance agreement, the leading insurer has to divide gross claim expenditure into fixed proportions (shares) for deduction with participating insurers. If it is not possible to allocate these shares correctly to the
corresponding development year then the following proxies could be applied:

- The leading insurer of an insurance pool treats co-insurance as proportional reinsurance;
- the participating insurer treats co-insurance similar as claims settlement expenses and uses a scaling-to-completion proxy.

**Proxies for the risk margin**

4.183 One of the results of the Quantitative Impact Studies was the fact that for most lines of business in non-life insurance the risk margin was rather small (but not negligible) in comparison to the best estimate. A proxy solution for a best estimate cannot be so well founded as a full actuarial approach. Therefore the risk margin can be calculated in a rather simple way, which corresponds to the necessarily lacking exactitude of the proxy for the best estimate.

4.184 The risk margin – measured as a percentage of the best estimate – depends heavily on the pay-out pattern for a certain line of business. Moreover, the duration of these pay-out periods may differ not only for different lines of business, but for the same line of business also for different countries. Therefore a matrix of lines of business and countries seems reasonable, where the entries define the risk margin as a percentage of the best estimate. This matrix could be built up on the experience of the past Quantitative Impact Studies.

4.185 Based on this analysis, it is proposed to test the following proxy under QIS4:

**Recommendations for QIS 4**

**Risk margin proxy**

*Description*

4.186 The risk margin is calculated by applying a percentage figure to the best estimate amount (calculated by using a proxy method). These percentages are given per line of business and per member state in the form of a matrix. The entry values of this matrix are fixed by CEIOPS as a result and on the experience of the preceding Quantitative Impact Studies depending on the Cost of Capital risk margins calculated by companies within these QIS. They will reflect the average pay out patterns which depend on the different line of business and which may differ for different member states.

*Input*

4.187 Amount of best estimate (for each company per line of business), matrix with the following entries: Proxy amount of the risk margin as a percentage of the best estimate. The columns of this matrix contain the different lines of business, the rows the
different member states. CEIOPS has to provide this matrix based on the experience of the preceding QIS.

**Output**

4.188 Amount of risk margin per line of business.

**Calculation**

4.189 The application of the percentage figure in this matrix on the best estimate of a line of business results in the proxy of the corresponding risk margin for the best estimate of a line of business.

**Criteria for application:**

4.190 Application of a proxy method for the calculation of the best estimate.

**Other remarks:**

4.191 None.

---

**Proxies for the treatment of annuities**

4.192 Following the ‘substance over form’ principle, annuities arising from non-life insurance contracts are to be treated as life-insurance obligations for solvency valuation purposes. Nonetheless, it should be considered whether simplified treatments of annuities would be appropriate in cases where such annuities represent only a very small part of the overall technical provisions in the given LOB, or where the given data doesn’t allow a separation.

4.193 In this respect, the following proxies have been developed so far by the national groups:

<table>
<thead>
<tr>
<th>Suggested by</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>🇩🇪</td>
<td>Valuation of HUK annuities is integrated in P&amp;C provisions.</td>
</tr>
</tbody>
</table>

**Condition for all three proposals:** HUK-annuities in P&C insurance are an immaterial part (below 10%) of the provisions for claims outstanding

**Valuation principle under this condition:** Annuities are not valued in accordance with life insurances guidelines but together with the risks and/or technical provisions of P&C insurance respectively.

**Proposal 1 (no separation):** Annuities are included in cash

---

40 With regards to the standard formula, the risk stemming from these annuities is then reflected in the life underwriting risk module.
flows for claims outstanding. The best estimate of claims outstanding automatically includes the best estimate of annuities.

**Proposal 2 (Scaling-to-completion):** If annuities are separated from the development pattern of the cash flows for claims outstanding, then the market consistent value of the liabs MVL0 is increased proportional by the ratio of the provisions for annuities to MVL0:

\[ MVL = MVL0 \times \left(1 + \frac{\text{provisions\_for\_annuities}}{MVL0}\right). \]

This factor is also used to increase the SCR for the reserve risk and the interest rate risk.

**Proposal 3 (scaling-to-completion by occurrence years):**

For sufficiently "old" occurrence years (adjustments of the liability and of the height of the payments are finalized) calculate mean ratio of all liabilities of annuities over all cumulated payments of claims outstanding in the past per occurrence year. This ratio is used to adjust provisions for annuities for later occurrence years.

**Description:**

Discussion is underway. Available data is being analysed and design of proxies will pretty much depend on the quantity and quality of the available data and results.

**Segmentation:**

Based on the particular specificities of the Portuguese market, for the Workers’ compensation LoB the following segmentation is proposed:

- Annuities in payment (probably broken down by legal status of claim and/or by severity of incapacity)
- Regular payments due to life assistance: in practice, these (very) long-tailed claims are estimated by approximation to an annuity

**Calculation formula:**

A first formula that is on the table:

Mathematical Provision = Frequency × Average cost × Activity Risk factor

The frequency describes the % of claims that are expected to lead to the payment of annuities.

The average cost describes the product of the ‘market’ average pension amount by an annuity factor relating to the age of the beneficiary (eventually an average ‘market’ age can be considered).

The activity risk factor is an adjustment factor that tries to take into account the different risk profiles of different professional activities.

**Parameters:**
Criteria:
- The claims portfolio of the company is considered to be comparable to the average “market” portfolio
- (other criteria will follow depending on results of statistical analysis)

Other comments:
- **Target Building blocks**: This proxy intends to estimate the mathematical provision for annuities stemming from Non-life claims and the claims provision of claims that, due to their very specific nature, can be adequately approximated by life annuities
- **Gross or Net**: Gross of reinsurance
- **Discount**: It seems possible to allow for discounting (through the technical rate of interest used in the annuity factors), but it is probably feasible to use a single rate only and not the whole term structure

4.194 From the above proposals, the Coordination Group decided to test 2 different designs: one based on the first proposal developed by the German group, and one based on the PT proposal.

4.195 The calibration of the Portuguese proposal will, for the time being, relate directly to the workers’ compensation LOB. Currently, studies are undertaken, based on the data available within the supervisory authority. The final shape of the design of the 2nd proxy alternative may be revised accordingly depending on the quality of the calibration exercise.

**Recommendations for QIS 4**

**Annuity proxy**

**Description and calculation**

4.196 If the amount of provisions for annuities is considered to be not negligible (e.g. > 10%) relative to the size of the provisions for claims outstanding of the relevant Non-life LoB, annuities are to be separated from the other Non-life cash flows and valued according to Life principles.

4.197 If the amount of provisions is very small (e.g. < 1%) relative to the size of the provisions for claims outstanding of the relevant Non-life LoB, as a **first proxy**, it is suggested that annuities are included in cash flows for claims outstanding. Thus the best estimate of claims outstanding automatically includes the best estimate of annuities.

4.198 A **second proxy** proposal is proposed for those cases where the amount of provisions relative to the size of the provisions for claims outstanding of the relevant Non-life LoB is neither not negligible not very small but between these two limits (e.g. >= 1% and <= 10%). (This may specifically apply for the
workers’ compensation business.) Here the following formula is suggested:

$$Provision = Frequency \times Average\ cost \times Activity\ risk\ factor$$

4.199  For annuities in payment, the frequency parameter denotes the number of annuities. For processes where there is uncertainty regarding the final incapacity level of the beneficiary, the frequency describes the % of claims of a severe nature that are expected to lead to the payment of annuities.

4.200  The average cost describes the product of the ‘market’ average pension annual amount (for pensions in payment, this should be the estimate derived from the company’s annuity portfolio) by an annuity factor relating to the age of the beneficiary (eventually an average ‘market’ age can be considered).

4.201  The activity risk factor is an adjustment factor that tries to take into account the different risk profiles of different professional activities.

**Input**

4.202  This will depend on the calibration exercise. The ideal situation is for the 3 factors – frequency, average cost and activity risk factor – to be given in the QIS4 specifications, calibrated using market data. However, if the calibration exercise does not give suitable results, we may have to ask the firms to use their entity-specific parameters (for QIS4).

**Output**

4.203  The proxy will deliver the best estimate of claims provision relating to annuities stemming from Non-life claims.

**Criteria for application:**

4.204  Annuities stemming from Non-life claims. This may be extended to those cases of regular claims payments, contingent on the life of the beneficiary, that, due to their nature, are, in practice, currently valued using life annuities (e.g. PT life assistance under the workers’ compensation LoB).

**Other remarks:**

4.205  If the amount of provisions for annuities is not negligible within the non-life LOB, the principle "substance over form" should apply and the annuities should be treated as similar business within life.

   The first proxy is made because of proportionality considerations (very small amount of provisions).

4.206  The second proxy is made for all other cases.
Proxies for claims handling costs provisions

4.207 The determination of the best estimate of claims provisions needs to take into account all the cash in- and out-flows required to settle the insurance obligations. This includes expenses associated with the settling of claims, in addition to the claims payments.

4.208 Claim expenses include both allocated and unallocated claim expenses. Allocated claims expenses relate to expenses assigned to and recorded with a specific claim, including defence and investigation costs. Allocated claim expenses have more significance in liability insurance because of the legal costs involved in defending liability claims.

4.209 Unallocated claims expenses relate to expenses that cannot be assigned to and recorded with a specific claim. This may include claim department operating expenses such as salaries, rent, heat and electricity, or other overhead expenses.

4.210 In cases where the determination of the claims provisions does not reflect unallocated claims expenses, an additional provision – the claims handling provision – needs to be established to cover these costs.

4.211 The following proxies have been developed by the national groups to calculate this provision:

<table>
<thead>
<tr>
<th>Suggested by</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Claims handling provisions = ratio * claims provisions.</td>
</tr>
<tr>
<td></td>
<td>New York Method.</td>
</tr>
</tbody>
</table>
|              | Treat settlement costs by the scaling-to-completion proxy. **Condition:** Settlement expenses comprise the servicing costs of all claims to be settled within a business year. If settlement expenses are not separated by year of occurrence then a scaling-to-completion proxy can be used. **Formula:** Estimate claims settlement expenses from a time-series (by linear regression) as a single factor to increase best estimate of
|              | • gross, |
|              | • net, |
|              | • discounted and |
|              | • undiscounted technical provisions. |
|              | Paid to paid method ("New York"). Calculation of ratio $R = \frac{\text{Claims Expenses}}{(\text{gross claims payments}+ \text{subrogation})}$ on a accounting year basis |
R is then applied to:

x\% to Best Estimate provisions plus expected subrogation reserve (e.g. x = 50%); consistency with calculation of R important!
100\% to IBNR

4.212 The Coordination Group suggests to test two approaches:

- a simple factor-based claims handling costs proxy; and
- the “New York” method.\(^{41}\)

4.213 A detailed description of these suggestions is provided below.

**Recommendations for QIS 4**

**Factor-based claims-handling-costs Proxy**

**Description**

4.214 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.

4.215 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.

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

**Input**

4.217 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.

**Output**

4.218 Claims handling provisions per LOB.

\(^{41}\) Cf. e.g. Casualty Actuarial Society (CAS), 1990. Foundations of Casualty Actuarial Science, 4\textsuperscript{th} edition, p. 387-388.
The calculation of the claims handling provisions is based on the claims provisions per line of business (LOB) and factors applied to them.

**Criteria for application:**

4.220 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.

**Other remarks:**

4.221 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 %.

4.222 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.

**“New York” claims-handling-costs Proxy**

**Description**

4.223 Proxy for claim settlement expenses.

**Input**

4.224 Mean ratio R (e.g. over the 2 past exercises) defined as: R = Expenses / (gross claims + subrogations).

**Output**

4.225 Expected claim settlement expenses.

**Calculation**

4.226 R is applied to a specified percentage of claim reserves (including expected subrogations) and 100 % of IBNR. The specified percentage x could e.g. set as x = 50%.

**Criteria for application:**

4.227 This method is relevant if expenses can reasonably be supposed
proportional to provisions (which may not be true for some lines of business).
Annex

A1 This annex comprises:

- Description of availability of data in different Member States;
- A list of the members of the Coordination Group.
Availability of market data in Member States

A2 This sub-section gives an overview of available market benchmark data for claims provisioning in a number of individual Member States.

Belgium

A3 In Belgium, market data are published on the website of the supervisor. One can find the aggregate figures of all the companies for:

- the annual accounts;
- the covering assets;
- the solvency margin (constituted and to be constituted);
- the most relevant items of the annual accounts for 107 categories of products in non life insurance since 2002 (premiums, expenses, provisions for claims, IBNR, ....);
- the data triangles (claims, provisions, ...) of the 18 lines of business defined in the non life directive, the "length" of the data is 10 years; and
- the most relevant items of the annual accounts for 12 categories of product for life insurance.

Italy

A4 For supervisory reporting, since year 2000 data are collected per occurrence year: 13 years for classes 10, 12 and 13; 9 years for the other classes. Before year 2000 data were collected per reporting year. For one line of business (Assistance), no data on the development of claims are provided.

A5 For all classes (except Assistance), ISVAP receives data related to provisions for claims, including management costs. Those data are referred to the balance year and are cumulated for the previous years. Besides, for lines 10 (MTPL) ISVAP also receives details related to the provision for internal management cost and to the provision for external management cost.

A6 ISVAP provides yearly public statistics on principal indicators concerning Motor Third Party Liability. Appointed Actuaries, Auditor Actuaries and, generally, insurance undertakings use those market statistics for comparison with their internal (entity specific) statistics.

Germany

A7 As part of supervisory reporting, non-life insurers have to submit information on a range of aspects of their non-life insurance business. The insurers need to provide this information in a standardised format (including a number of standardised forms) to BaFin. This is intended to supplement information from public reporting, and follows a finer classification than for external accounting.
With regard to claims provisioning, form 242 is of particular interest. This form includes details on:

- the number of claims (split between the current financial year and previous years, as well as between reported claims and IBNR claims);
- the composition of the claims provisions into their individual components (reported claims, annuities, IBNR, claims settlement expenditure, amounts recoverable with respect to subrogation, split between the current financial year and previous years);
- the development of claims provisions and claims payments (as well as the number of unsettled claims) subdivided into individual accident years (but without further decomposition into individual components of the claims provisions).

All this information is related to amounts gross of reinsurance. Further details have to be provided on the development of the insurance portfolios (in numbers and premiums) and on underwriting results for miscellaneous non-life insurance business.

From this, run-off triangles (for paid claims, and for the number of unsettled claims) may basically be derived with a length of 12 years for motor third party liability and for third party liability, with a length of 6 years for legal expenses and with a length of 4 years for all other business lines.

The returns of insurers under supervisory reporting as described above are not available to the public. However, aggregated triangle information is made publicly available by BaFin and could principally be used to derive benchmark information for claims run-off patterns in individual lines of business.

**Netherlands**

Run-off triangles by line of business are produced by the Centre of Insurance Statistics, affiliated to the Union of Insurers in the Netherlands. Such runoff triangles are of the following basic type:

- Number of claims;
- Gross Paid Loss;
- Gross Reported loss = Paid Loss + Case Provision;
- Top-Sliced Gross Reported Loss.

A run-off triangle is accompanied by two time series for exposure:

- Number of Policies;
- Gross Earned Premium.

As regards lines of business, only long-tail business is considered. Recently, the first line of business was produced:

- General Liability for Business Firms;
• Accident years: 1991-2006;
• Cover: 40% total market.

A14 It is intended for 2008 on to produce runoff triangles for:
• Personal Motor Car Third-Party Liability;
• Personal Motor Carr Hull;
• Trucks.

**Sweden**

A15 All non-life companies, except the small locally operating ones, yearly deliver the following figures split by accident year and line of business:

- premium income, premium provisions (from which premiums earned can be calculated). The provisions are split between unearned premiums and premium deficiency provision;
- accumulated paid claims, claims provisions (claims handling costs excluded; from this information triangles for payments and estimated total claims costs can be created). The provisions are not split between reported claims and IBN(E)R.

A16 The number of development years reported varies between LOBs, from 3 years for short tailed business (Private liability and property, Motor First Party, Livestock) to 5, 10 (Sickness and accident, Commercial liability and property) or 15 (Motor Third Party liability). The Swedish FSA does not collect any figures on the number of claims. The claims handling provision is reported yearly by LOB (no split on accident year).

A17 Theses figures are not published on the Swedish FSA website but by the Swedish Insurance Federation on its website where they are available for a fee. They can also be obtained from the FSA.

**Portugal**

A18 For supervisory reporting, triangular data is collected annually per accident year for the most representative lines of business: Motor (split between: third party liability and other; property damage and bodily injury), workers compensation (split between: non-life standard type of liabilities and life assistant (information on pensions is collected in a different format)), health insurance (split between group products and individual products).

A19 The length of triangles is 10 years, except for health which considers a split in 12 trimesters. Separate triangles are asked for claims paid, provisions and number of claims. Data on the provisions for claims management costs

---

42 This follows a segmentation specific for the Swedish market, for example Private Liability and Property (Homeowners Comprehensive, Householders Comprehensive,...) is one LOB, Commercial Liability and Property another one.
is also received. Additionally, several specific statistics, which can be useful for the assessment of provisions, are received for each line of business.

A20 The supervisory authority and the national industry association publish yearly statistics on principal indicators related with the main lines of business (motor, health and workers compensation). On an occasional basis, specific studies are published, which provide more refined aggregate statistics on particular aspects.

A21 Insurance undertakings and actuaries commonly use market statistics for comparison purposes with their own indicators.

United Kingdom

A22 Sources for benchmark information available in the UK are the FSA returns, ABI data and the reserving benchmarking exercise performed by Lloyd’s of London.

A23 There may be other, softer, sources of benchmarking data, for example competitors’ report and accounts, industry publications looking at market loss-ratios or claims developments and personal knowledge of one’s own staff.

• FSA returns and its use for benchmarking

A24 All insurers carrying on business in the UK\(^43\) must provide annual accounts and supplementary information in a standardised format to the UK regulator, the Financial Services Authority (“FSA”), in a document called the FSA return. The FSA returns are available to the public. Where it is unduly burdensome to provide the full detail in the returns (especially for smaller firms), the FSA may exempt the firm from providing some of the detailed information required.

A25 Data in the returns is normally split into the following classes of business (no detailed information is provided separately for small classes of business):

• Accident & Health;
• Motor (split between Personal Motor and Commercial Motor);
• Aviation;
• Marine;
• Goods in Transit;
• Property (split between Household & Domestic and Commercial Property);
• Commercial Liability;

\(^{43}\) Other than EEA firms subject to the insurance or reinsurance directives carrying on business through freedom of establishment or provision of services, other EEA firms availing themselves of treaty rights and nondirective friendly societies.
• Financial Loss (split between Personal Financial Loss and Commercial Financial Loss)

• Miscellaneous Direct and Facultative;

• Balance Direct and Facultative (lumping together any small classes);

• Treaty Reinsurance (split between Non-Proportional Treaty, Proportional Treaty and Miscellaneous);

• Balance treaty reinsurance (lumping together any small classes of treaty reinsurance).

A26 The FSA uses the returns as a key source of information to monitor the financial resources of an insurer and, for GI business, to assess retrospectively the adequacy of the insurer's claims provisions, both by reviewing the claims development of a firm over some years and by comparing the level of claims provisions between insurers. However, these analyses tend to be a starting point for discussion with the firms, recognising that there may be sound explanations for an apparent low level of claims provisions. The FSA has no plans at present to publish benchmark information to assist in setting claims provisions.

A27 There are a number of companies (such as Synthesys) which collate FSA returns data and sell software databases containing data from the returns of most or all insurers in the UK market.

• **ABI data**

A28 The ABI collates various statistics from its members. It publishes some of this aggregate data and more detailed information is available on the Member's Only section of it's website. The information covers a range of classes of business. For example, for Motor this includes statistics on premiums and claims, commission and expenses, change in provisions, equalisation reserves, underwriting result, operating ratios, and overseas data, for the UK and worldwide. However, overall the level of information is such that it is considered to be of only very limited assistance for any benchmark proxy methods.

• **Lloyd’s of London reserve benchmarking exercise**

A29 Lloyd’s undertakes an annual relative reserve benchmarking exercise. The main purpose of the exercise is to highlight and gain an understanding of the syndicate’s provision levels within the market. The exercise can also be used to identify potential anomalous reserving positions that may need further investigation.

A30 For each syndicate a unique benchmark is constructed and compared to. The benchmark syndicate is calculated from the market data (excluding the syndicate in question) adjusted to reflect the underlying mix of business of the syndicate. The rebasing is required to ensure suitable correspondence between the syndicate and its benchmark and is conducted at a year of account/class of business level. Lloyd’s works with around 50 “low” level classes of business.

A31 A number of Key Performance Indicators ("KPI”s) are calculated for both the syndicate and the benchmark over various time periods and brought
together during the analysis. Reserve benchmarking necessarily includes large volumes of output as considering single or simple reserving measures can often be misleading. This in turn can lead to results becoming complex and difficult to interpret. To overcome this, Lloyd’s have extended the exercise to include the indexing of results which allows agents to be easily ranked for comparative purposes.

The exercise focuses on four key areas both gross and net of reinsurance:

- Provision strength;
- IBNR utilisation;
- Provisioning over time;
- Quality of business.

These four measures are ranked and combined to form a single overall Reserve Benchmarking Index ("RBI"). Separate RBIs are provided gross and net of reinsurance. The overall RBIs can then be used to directly compare the relative provisioning of syndicates within the market. The results are compiled and fed back to the syndicates within the market. The analyses are presented at varying levels of granularity from single measures for a syndicate as a whole down to information on individual years of account over time.

**Norway**

The risk statistics listed below are collected on an annual basis from the largest players in the non-life insurance markets as well as from some specialised undertakings.

- **Premiums:**
  - Earned gross premium for the last 8–18 insurance years (non-marine lines of business).
  - Written gross premium for the last 6–15 8–18 underwriting years (marine lines of business).

- **Total claims (claim amounts):**
  - Run-off statistics for total claim amounts on a gross basis, i.e. claim amounts distributed according to occurrence/accident years (underwriting years in marine lines of business) and development years. Data for the last 8–18 occurrence/underwriting years – depending on whether the line of business is characterised as short-tailed or long-tailed.

- **Number of claims and single claim amounts:**
  - Run-off statistics for total number of claims, i.e. the total number of claims distributed according to years of occurrence (or underwriting years) and years of notification of claims.
  - For each occurrence year (underwriting year): An empirical distribution of the size of single claim amounts, i.e. the number of
claims distributed according to some intervals of the size of the single claims.

A35 With respect to premiums and total claims (run-off statistics) the above mentioned data is updated in October/November each year with information on estimated premiums for the current year as well as the cumulated claim payments per occurrence/accident year or underwriting year as at the end of the third quarter. The latter information is of interest mainly for the last three occurrence/accident or underwriting years.

A36 So far, the risk statistics as such have not been made publicly available. However, the supervisor uses these statistics to estimate the following parameters for 20–25 lines of business:

- the expected (average) loss ratio on a gross basis;
- the (expected) development pattern of total claims amounts on a gross basis;
- some parameters describing the distribution of the stochastic claim frequency and the stochastic delay probabilities;
- some parameters describing the distribution of the single claim amounts (as functions of certain characterisations characteristics of the approximated reinsurance covers).

An overview of the estimated parameters (per line of business) is made publicly available.
# List of members of the Coordination Group

<table>
<thead>
<tr>
<th>Country</th>
<th>Organisation</th>
<th>Representative</th>
<th>Contact details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belgium</td>
<td>Banking, Finance and Insurance Commission (CBFA)</td>
<td>M. Luc Kaiser</td>
<td>Phone: +32 2 220.57.68 – Fax: <a href="mailto:Luc.Kaiser@cbfa.be">Luc.Kaiser@cbfa.be</a></td>
</tr>
<tr>
<td></td>
<td></td>
<td>M. Peter de Vos</td>
<td>Phone: Tel: +32 2 220 5361 Fax: +32 2 220 5493 E-mail: <a href="mailto:Peter.DeVos@cbfa.be">Peter.DeVos@cbfa.be</a></td>
</tr>
<tr>
<td></td>
<td></td>
<td>M. Emmanuel Cortese</td>
<td>Phone: Tel: +32 2 220 5945 Fax: e-mail: <a href="mailto:emmanuel.cortese@cbfa.be">emmanuel.cortese@cbfa.be</a></td>
</tr>
<tr>
<td>Bulgaria</td>
<td>Financial Supervision Commission (FSC)</td>
<td>Mrs. Marionela Koleva</td>
<td>Phone: +359 20 940 49 83 Fax: E-mail: <a href="mailto:koleva_m@fsc.bg">koleva_m@fsc.bg</a></td>
</tr>
<tr>
<td>France</td>
<td>Autorité de Contrôle des Assurances et des Mutuelles (ACAM)</td>
<td>M. Jean-Marie Lootvoet</td>
<td>Phone: +33 1 55 50 42 69 Fax: +33 1 55 50 41 50 E-mail: <a href="mailto:jean-marie.lootvoet@acam-france.fr">jean-marie.lootvoet@acam-france.fr</a></td>
</tr>
<tr>
<td>Germany</td>
<td>BaFin</td>
<td>M. Olaf Ermert (Co-Chair Coordination Group)</td>
<td>Phone: +49 228 4108 7263 Fax: +49 228 4108 67263 E-mail: <a href="mailto:Olaf.Ermert@bafin.de">Olaf.Ermert@bafin.de</a></td>
</tr>
<tr>
<td></td>
<td>Gesamtvverband der Deutschen Versicherungswirtschaft e. V. (GDV)</td>
<td>M. Ulrich Stienen</td>
<td>Phone: +49 30 2020-5389 Fax: +49 30 / 2020-6389 E-mail: <a href="mailto:u.stienen@gdv.de">u.stienen@gdv.de</a></td>
</tr>
<tr>
<td>Groupe Consultatif</td>
<td>Groupe Consultatif Actuariel Européen (Munich Re)</td>
<td>M. Rolf Stölting (Co-Chair Coordination Group)</td>
<td>Phone: +49 (89) 3891 5228 Fax: +49 E-mail: <a href="mailto:rstoelting@munichre.com">rstoelting@munichre.com</a></td>
</tr>
<tr>
<td>Italy</td>
<td>Istituto per la Vigilanza sulle Assicurazioni Private e di Interesse Collettivo (ISVAP)</td>
<td>M. Stefano Pasqualini</td>
<td>Phone: +39 06 4213 3262 Fax: +39 06 42133638 E-mail: <a href="mailto:stefano.pasqualini@isvap.it">stefano.pasqualini@isvap.it</a></td>
</tr>
<tr>
<td>Ireland</td>
<td>Irish Financial Services Regulatory Authority</td>
<td>Michael Frazer</td>
<td>Phone: +353-1-4104989 Fax: +353-1-4104999 E-mail: <a href="mailto:michael.frazer@financialregulator.ie">michael.frazer@financialregulator.ie</a></td>
</tr>
<tr>
<td>Netherlands</td>
<td>De Nederlandsche Bank</td>
<td>M. Peter ter Berg</td>
<td>Phone: Fax: E-mail: <a href="mailto:P.J.J.M.ter.Berg@DNB.NL">P.J.J.M.ter.Berg@DNB.NL</a></td>
</tr>
<tr>
<td>Country</td>
<td>Organisation</td>
<td>Representative</td>
<td>Contact details</td>
</tr>
<tr>
<td>-------------</td>
<td>-------------------------------------------------------------------------------</td>
<td>----------------------</td>
<td>--------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Netherlands</td>
<td>Actuarieel Genootschap (SII PI Non-life WG Chair of Dutch actuarial association), Groupe Consultatif</td>
<td>M. Peter Franken</td>
<td>Phone: (020) 543 31 84 Fax: E-mail: <a href="mailto:peter.franken@watsonwyatt.com">peter.franken@watsonwyatt.com</a></td>
</tr>
<tr>
<td></td>
<td>Verbond van Verzekeraars, CEA</td>
<td>M. Mathieu Filippo</td>
<td>Phone: Fax: E-mail: <a href="mailto:mathieu.filippo@eureka.cc">mathieu.filippo@eureka.cc</a></td>
</tr>
<tr>
<td>Norway</td>
<td>Kredittilsynet (Financial Supervisory Authority of Norway)</td>
<td>M. Arild Kristiansen</td>
<td>Phone: +47 22 93 98 84 Fax: E-mail: <a href="mailto:arild.kristiansen@kredittilsynet.no">arild.kristiansen@kredittilsynet.no</a></td>
</tr>
<tr>
<td>Portugal</td>
<td>Instituto de Seguros de Portugal</td>
<td>M. Hugo Borginho</td>
<td>Phone: +351 217 982808 Fax: E-mail: <a href="mailto:hugo.borginho@isp.pt">hugo.borginho@isp.pt</a></td>
</tr>
<tr>
<td>Slovenia</td>
<td>Insurance Supervision Agency</td>
<td>M. Jernej Merhar</td>
<td>Phone: + 386 1 25 28 600 Fax: E-mail : <a href="mailto:jernej.merhar@a-zn.si">jernej.merhar@a-zn.si</a></td>
</tr>
<tr>
<td>Sweden</td>
<td>Financial Supervisory Authority</td>
<td>M. Erik Elvers</td>
<td>Phone: +46 8 787 81 64 Fax: +46 8 24 13 35 E-mail: <a href="mailto:erik.elvers@fi.se">erik.elvers@fi.se</a></td>
</tr>
<tr>
<td>United Kingdom</td>
<td>Financial Services Authority (FSA)</td>
<td>M. James Upson</td>
<td>Phone : +44 207 066 0240 Fax: E-mail: <a href="mailto:james.upson@fsa.gov.uk">james.upson@fsa.gov.uk</a></td>
</tr>
<tr>
<td>CEIOPS Secretariat</td>
<td>CEIOPS Secretariat</td>
<td>Ms. Pamela Schuermans</td>
<td>Phone: +49 69 95 11 19-25 Fax: +49 69 95 11 19-19 E-mail: <a href="mailto:pamela.schuermans@ceiops.eu">pamela.schuermans@ceiops.eu</a></td>
</tr>
</tbody>
</table>