CEIOPS' Advice for
Level 2 Implementing Measures on Solvency II:

Technical Provisions – Article 86(c)
Circumstances in which technical provisions shall be calculated as a whole

(former CP 41)

October 2009

Table of contents

1.   Introduction

1.1.   In its letter of 19 July 2007, the European Commission requested CEIOPS to provide final, fully consulted advice on Level 2 implementing measures by October 2009 and recommended CEIOPS to develop Level 3 guidance on certain areas to foster supervisory convergence. On 12 June 2009 the European Commission sent a letter with further guidance regarding the Solvency II project, including the list of implementing measures and timetable until implementation.[1]

1.2.   This Paper aims at providing advice with regard to the circumstances in which technical provisions shall be calculated as a whole, as required in Article 86(c) of the Solvency II Level 1 text (herein "Level 1 text").[2]

1.3.   References in this advice to '*undertakings*' embrace both insurance and reinsurance undertakings, unless otherwise explicitly mentioned.

2.   Extract from Level 1 text

2.1 Legal basis for implementing measure

2.1.   According to the guiding principles referred to in the Commission's letter, the legal basis for the advice presented in this paper is primarily found in Article 86(c) of the Level 1 text, which states:

Article 86 – Implementing measures

The Commission shall adopt implementing measures laying down the following: [..]

   c) *The circumstances in which technical provisions shall be calculated as a whole, or as a sum of a best estimate and a risk margin, and the methods to be used in the case where technical provisions are calculated as a whole;*

---

[1] See http://www.ceiops.eu/content/view/5/5/
[2] Latest version from 19 October 2009 available at
http://register.consilium.europa.eu/pdf/en/09/st03/st03643-re01.en09.pdf.

2.2 Other relevant Articles for providing background to the advice

2.2. Article 77(4) of the Level 1 text is the provision the aforementioned implementing measure refers to:

Article 77 – Calculation of technical provisions

4. Insurance and reinsurance undertakings shall value the best estimate and the risk margin separately.

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

3. QIS4 outputs and industry feedback

3.1. In the QIS4 technical specifications[3], there is no reference to the exact terminology used in the Level 1 text, but to the concept of 'hedgeable cash-flows' and 'hedgeable risks'.

3.2. The QIS4 Technical Specifications include the following definition of 'hedgeable cash-flows':

TS.A.II.22. Future cash-flows from obligations towards policyholders and beneficiaries of insurance contracts are hedgeable if they can be replicated using financial instruments for which a market value is directly observable on a deep, liquid and transparent market.

TS.A.II.23. The financial instruments shall completely replicate all possible payments corresponding to the liability cash-flow, taking into account the uncertainty in amount and timing of these payments (theoretical perfect hedge)[4].

TS.A.II.24. A perfect hedge or replication is one that completely eliminates all risks associated with the liability. In practise perfect hedges are expected to be relatively rare. If in practice the hedge is not perfect but the remaining basis risk is immaterial, in the interest of proportionality the undertaking may consider the risks as hedgeable.

TS.A.II.25. Circumstances where cash-flows are hedgeable could include, for example, some options and guarantees embedded in life insurance contracts, some unit-linked (equity-indexed for instance) life

---

[3] http://www.ceiops.eu/media/docman/Technical%20Specifications%20QIS4.doc
[4] (According QIS4 TS) Examples of hedgeable (re)insurance obligations may be unit-linked and index-linked funds, where the amount of the cash-flow is linked to the value of an index or pool of assets and there is no uncertainty as to the timing of the cash-flows.

insurance contracts, cash-flows where there is no uncertainty in the amount and timing, etc.

TS.A.II.26. For a hedged portfolio or replication, the non-arbitrage principle implies that the market consistent value of the hedgeable cash-flow should be acceptably close to the market value of the relevant hedge or replicating portfolio.

TS.A.II.27. A market is defined to be deep, liquid and transparent if it meets the following requirements:

(a) market participants can rapidly execute large-volume transactions with little impact on prices;

(b) current trade and quote information is readily available to the public;

(c) the properties specified in a. and b. are expected to be permanent.

TS.A.II.28. Basis risk originates from differences between the exposure in an undertakings liabilities and the contract terms of what may be purchased from the market.[5]

3.3. QIS4 Technical specifications also refer to 'hedgeable risks' in the context of the risk margin:

TS.II.A.29. Where the cash-flows associated with the (re)insurance obligations contain non-hedgeable financial (due to incomplete markets) or non-financial risks (due to options and guarantees on mortality and expenses for instance) that, when combined in a single insurance contract, cannot be hedged or replicated using instruments on a deep, liquid and transparent market, the obligations may be valued by inter/extrapolating from directly observable market prices. Market consistent valuation techniques may be used to set the assumptions for, say, financial risks within a non-hedgeable contract and, for the remaining risks (the non-financial risks in this example), valued using best estimate assumptions. The risk margin should then be determined according to a cost-of-capital (CoC) approach. The cost of capital calculation excludes market risk as this would otherwise double-count margins which are implicitly included in market prices.

TS.II.A.30. Not all financial risks can be hedged or replicated using instruments traded on a deep, liquid and transparent market. For instance, different kinds of embedded financial options and guarantees in life insurance contracts may include risks where there is a non-traded underlying[6], or risks where the duration exceeds a reasonable extrapolation from durations traded on the financial market, or risks relating to traded financial instruments that are not available in sufficient quantities, etc. Where this is the case and if the remaining

---

[5] Paragraphs TS.IIA.22- TS.IIA.28.
[6] Underlying meaning the assets which determine the payments under derivatives and other contracts with options and guarantees.

risk is considered material, alternative methods to find a "hedgeable cost" may be used to adjust market information and capture an additional market-consistent risk margin. Please see TS.II.D.60 on the calibration of stochastic models.

TS.II.A.31. Even if it would be desirable, the values of hedgeable and non-hedgeable risks might not be separable under all circumstances (for instance, because a market consistent valuation has been used)[7].

3.4. Feedback from QIS4 did not contain substantial remarks to the conceptual framework described, although there was some confusion over the treatment of unit-linked business that shows the need for some clarification:

For unit-linked business, different approaches have been observed:

- *technical provisions were set equal to the unit fund (i.e. applying a surrender value floor);*

- *or the unit fund less present value of future profits emerging from unit-linked business.*

"Unit-linked products were mostly defined as hedgeable obligations"

"One supervisor observed that the risk margin has not been always calculated on unit-linked business independently of its classification as hedgeable or non hedgeable contract"

"Non-life provisions are largely considered non-hedgeable... on average the share of hedgeable elements is about 1.5%."[8]

3.5. The present advice has a two-fold goal: on the one hand it is necessary to adapt the terminology and conceptual framework used in QIS4 to those used in the Level 1 text, and on the other hand it is necessary to provide sufficient clarifications to ascertain that there will be a harmonized application at EU level of the calculation of technical provisions as a whole.

3.6. Harmonization is a core goal in this issue, since different practices will likely lead to different valuations of technical provisions, especially of the risk margin considered, explicitly or implicitly, in the different calculations.

---

[7] Paragraphs TS.IIA.29- TS.IIA.31.
[8] QIS4 report, http://www.ceiops.eu/media/files/consultations/QIS/CEIOPS-SEC-82-08%20QIS4%20Report.pdf, section 7.2.1.

4. Advice

4.1 Explanatory text

4.1.1. Legal conceptual framework

4.1.   From a legal perspective, CEIOPS considers that the general rule set out in the Level 1 text is that the technical provisions should be calculated as the sum of two explicit components which are abeing the best estimate plus an appropriate risk margin. Both components should be valued separately.

4.2.   The calculation of technical provisions 'as a whole' (Article 86(c) is only admissible under the following three *sine qua non* circumstances,:

- The future cash-flows associated with insurance or reinsurance obligations can be replicated reliably;

- This replication shall be provided by financial instruments; and

- Those financial instruments shall have reliable market values which are observable.

4.3.   Within this legal framework it is necessary to define

- what is meant by 'to replicate reliably the future cash-flows associated with insurance or reinsurance obligations'; and

- when a market value is 'observable' and 'reliable'

4.4.   According to the Level 1 text, for the purpose of calculating technical provisions as a whole the replication can only be referred to '*cash-flows associated with insurance or reinsurance obligations*'. Therefore, from now on, CEIOPS will refer in this advice neither to 'hedgeable cash-flows' (or risks or insurance obligations) nor to replicate obligations (or risks). This requires some amendments on the wording and concept used in QIS4.

4.5.   CEIOPS considers that the definitions mentioned in paragraph 4.3. should be developed according to the legal context of Articles 76 and 77 of the Level 1 text. This requires to take into account the role of the calculation of technical provisions in the solvency assessment of an undertaking and the interplay of such calculation with other elements of the solvency assessment. Two features may be identified in this respect:

- Dynamic perspective
- Market consistency

4.6.   **Dynamic perspective**. In the Solvency II framework, the calculation of technical provisions plays a wider role than in the previous legal system. The calculation of technical provisions is required not only to aggregate the total of insurance liabilities, and then to derive the total of basic own funds of the undertaking, but it is also a core element to assess the solvency capital requirement, as a consequence of the use of scenario-approaches on the prudential balance sheet in a good number of modules and

submodules (in the case of life insurance, almost all the modules and submodules require the recalculation of technical provisions).

4.7. As a consequence of this dynamic approach the calculation of technical provisions shall be done under different sets of assumptions, so as to provide legal and technical consistency. CEIOPS considers that this needs to be taken into account in the definition of *'reliable replication of cash-flows'*.

4.8. The conclusion is that *'to replicate reliably the future cash-flows associated with insurance or reinsurance obligations'* means that the cash-flows of the financial instruments need to perform as all risks underlying the cash-flows associated with the insurance and reinsurance obligations in the different scenarios considered in the calculation of the solvency position of an undertaking (including the uncertainty in amount and timing of these payments). This means that the cash-flows of the financial instruments must provide not only the same expected amount as the cash-flows associated with insurance or reinsurance obligations, but also the same degree of variability.

4.9. In order to respect the requirement set out in Article 77(2), first subparagraph[9], of the Level 1 text, for the purposes of the replication, the future cash-flows of the financial instruments shall be risk adjusted to derive the risk-free cash-flow.

4.10. **Market consistency**. From a legal point of view, Article 77(4) sets out a strict framework to allow financial instruments to replicate future cash-flows associated with the insurance and reinsurance obligations. This is explicit in the requirement to use *'reliable market values'* and to restrict that values to those that are *'observable'*.

4.11. In this context, CEIOPS considers that the criteria used in QIS4 remains fully consistent with the Level 1 text. Therefore, the expression *'financial instruments for which a reliable market value is observable'* should be understood as financial instruments quoted in *'deep, liquid and transparent markets'* on permanent basis, which requires to meet all the following requirements:

- a deep market is a market in which a large number of assets can be transacted without affecting the price of the financial instruments used in the replications,

- A liquid market is a market where assets can be easily converted through an act of buying or selling without causing a significant movement in the price ,

- A transparent market is a market in which current trade and price information is readily available to the public[10]

---

[9] The best estimate shall correspond to the probability-weighted average of future cash-flows, taking account of the time value of money (expected present value of future cash-flows), using the relevant risk-free interest rate term structure.
[10] The undertaking who is valuing the Technical Provision should be included within the scope of 'public'.

The properties specified above are expected to be permanent. Where a market meeting continually the two first conditions, exceptionally ceases to satisfy any of them at some point in time, such market will not lose its quality of deep, liquid and transparent if it is reasonably expected to return to meet the condition in a short term. The prices produced during the period where the market does not satisfy any of the two first conditions cannot be considered as reliable for the purposes of this advice.

4.12. CEIOPS notes the importance of drawing lessons from the current crisis. One of the main lessons is the lack of reliability of the valuations of certain OTC financial instruments, a poor identification of the risks underlying some instruments and the lack of transparency when financial investments are not actively traded in deep, liquid and transparent markets. In fact, one of the conclusions of the crisis might be the necessity of avoiding unreliable and speculative mark-to-model practices and material exposure to non-actively traded assets...

4.13. In this context, the fact that Article 77(4) refers twice in the same sentence to reliability is a clear signal of the sensitiveness to this issue. Therefore CEIOPS considers that the proposals developed in this advice are essential in order to prevent in the future crisis like the current one.

4.14. In the light of these considerations and the strict approach adopted by the Level 1 text in Article 77(4), *'future cash-flows associated with insurance or reinsurance obligations'* shall be considered non-replicable when:

   i.   one or several features of the future cash-flow (its expected value, its volatility or any other feature) depend on risks whose specific pattern in the undertaking cannot be found in instruments actively traded in financial markets; [11]

   ii. one or several features of the future cash-flow (its expected value, its volatility or any other feature) depend on the behaviour of the policyholder (unless such behaviour does not affect the value of the obligation);

   iii. one or several features of the future cash-flow depend to any extent on the development of magnitudes internal to the undertakings, such as expenses or acquisition costs; or

   iv. one or several features of the future cash-flow depend to any extent on the development of magnitudes external to the undertaking for which there are no financial instruments for which reliable market values are obsevable.

4.15. Where under the same contract a number of future cash-flows exist, which meet all the conditions mentioned before in order to calculate the technical provision as a whole and other future cash-flows which do not meet some of those conditions, both sets of cash-flows should be unbundled. For the first set of cash-flows, no separate calculation of the best estimate and the risk margin shall be required but a separate calculation shall be required for the second set of cash-flows. If the proposed unbundling is not

---

[11] CEIOPS considers that today no reliable market exists for the replication of the characteristics of biometric-dependent cash-flows, the way replication is defined in this advice.

feasible, for instance when there is significant interdependency between the two sets of cash flows, separate calculations of the best estimate and the risk margin shall be required for the whole contract.

4.16. The main case where Article 77(4), second paragraph, of the Level 1 text is met is when the insurance or reinsurance obligation, according to the clauses of the contract, consists in the delivery of a portfolio of financial instruments for which a reliable market value is observable or in the portfolio's price at the moment of the payment of the benefit. Residually there could be very limited cases of cash-flows that can be replicated reliably, such as a future fixed benefit in an insurance contract where the policyholder cannot lapse the contract.

4.1.2. Examples

Example	Have requirements in Article 76(4), second paragraph, of the Level 1 text been met?	Technical provisions shall be calculated:
The insurance undertaking shall pay the market value of an equity portfolio or shall deliver an equity portfolio (matching an index or not) at the payment date.	Yes, but only under one condition: • a reliable market value for every asset within the portfolio is observable. However there are, for example, fixed expense cash-flows associated with this contract which shall be excluded because they depend on the development of magnitudes internal to the undertaking.	• as a whole (if the condition is met). This also applies when the contract pays the market value of the units at the earlier of maturity, death or surrender. • BE + RM (if not and for the expense cash-flows)
An insurance undertaking investing in assets replicating his future cash-flows provided by a third party (e.g. investment bank).	No: (see paragraphs 4.8, 4.11 and 4.14) This case introduces counterparty and concentration risks with regard to the issuer of the replicating asset. Furthermore, in respect of cash-flows associated with insurance obligations it is necessary to consider 4.14.	BE + RM
Term-assurance contracts and with-profits contracts.	No: In these cases the expected value, the volatility and other features of the future cash-flows associated with insurance obligations depend on the biometric development as well as on the behaviour of the policyholder.	BE + RM
An insurance undertaking signs a contract with a reinsurer to replicate his future cash-flows.	No: a reinsurance contract is not a financial instrument as referred in paragraph 4.11. See also comments to the third example.	BE + RM
Pure Unit-linked	YES: regarding to the number of units	For the calculation of

contract (without any additional guarantees)[12]	guaranteed, and No: expense cash-flows associated with the fact that the contract will be managed till it ends.	the technical provision, these two aspects of the contract must be unbundled: As a whole BE + RM (for the expenses)[13]

4.2 CEIOPS' advice

Legal and technical framework

4.17. CEIOPS notes the importance of drawing lessons from the current crisis.

4.18. From a legal perspective, CEIOPS considers that the general rule set out in the Level 1 text is that the technical provisions should be calculated as the sum of two explicit components which are abeing the best estimate plus an appropriate risk margin. Both components should be valued separately.

4.19. The calculation of technical provisions 'as a whole' (Article 86c) is only admissible under the following three *sine qua non* circumstances:

- The future cash-flows associated with insurance or reinsurance obligations can be replicated reliably;

- This replication shall be provided by financial instruments; and

- Those financial instruments shall have reliable market values which are observable.

4.20. Within this legal framework it is necessary to define

- what is meant by 'to replicate reliably the future cash-flows associated with insurance or reinsurance obligations'; and

- when a market value is 'observable' and when it is 'reliable'

4.21. According to the Level 1 text, for the purposes of calculating technical provisions as a whole the replication can only be referred to '*cash-flows associated with insurance or reinsurance obligations*'.

4.22. In order *'to replicate reliably the future cash-flows associated with insurance or reinsurance obligations'* the cash-flows of the financial instruments should provide the same performance, including the

---

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

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

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

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

4.23. Market consistency. CEIOPS considers that the expression *'financial instruments for which reliable market values is observable'* should be understood as financial instruments quoted in in *'deep, liquid and transparent markets'* on permanent basis, which requires to meet all the following requirements:

- a deep market is a market in which a large number of assets can be transacted without affecting the price of the financial instruments used in the replications,

- A liquid market is a market where assets can be easily converted through an act of buying or selling without causing a significant movement in the price ,

- A transparent market is a market in which current trade and price information is readily available to the public[14],

The properties specified above are expected to be permanent. Where a market meeting continually the two first conditions, exceptionally ceases to satisfy any of them at some point in time, such market will not lose its quality of deep, liquid and transparent if it is reasonably expected to return to meet the condition in a short term. The prices produced during the period where the market does not satisfy any of the two first conditions cannot be considered as reliable for the purposes of this advice.

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

Concrete applications

4.25. The main case where Article 77(4), second paragraph, of the Level 1 text is met is where the benefit cash-flows of the insurance or reinsurance obligation, according to the clauses of the contract, consist in the delivery of a portfolio of financial instruments for which a reliable market value is

---

[14] The undertaking who is valuing the Technical Provision should be included within the scope of 'public'.
[15] CEIOPS considers that today no reliable market exists for the replication of the characteristics of biometric-dependent cash-flows, the way replication is defined in this advice.

observable or are based only on the market value of the portfolio at the time that the benefit is paid.

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

4.27. In the light of all the aforementioned considerations and the strict approach adopted by the Level 1 text in Article 77(4), *'future cash-flows associated with insurance or reinsurance obligations'* shall not be considered to reliably replicated where:

  i.   one or several features of the future cash-flow (its expected value, its volatility or any other feature) depend on risks whose specific pattern in the undertaking cannot be found in instruments actively traded in financial markets [15]

  ii. one or several features of the future cash-flow (its expected value, its volatility or any other feature) depend on the behaviour of the policyholder (unless such behaviour does not affect the value of the obligation);

  iii. one or several features of the future cash-flow depend to any extent on the development of factors internal to the undertakings, such as expenses or acquisition costs;or

  iv. one or several features of the future cash-flow depend on the development of factors external to the undertaking for which there are no financial instruments for which reliable market values are observable.