

QIS4 background document  
Guidance on the definition of  
the reference entity for the  
calculation of the Cost of Capital

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## 1. Purpose of the paper

1. The Directive Proposal defines the current exit value of technical provisions as being a reflection of the amount that an insurance or a reinsurance undertaking would expect to have to pay today if it transferred its contractual rights and obligations immediately to another undertaking.<sup>1</sup> This "another undertaking" is here called the "reference undertaking". Developing the work on the calculation of the Cost-of-Capital risk margin involves making assumptions in relation to this reference undertaking in accordance with the Directive Proposal – i.e. an insurance undertaking authorised and complying with the provisions laid down in the Proposal. In particular, assumptions need to be made regarding the business mix of the reference entity and relating to the reference entity's behaviour when taking over and meeting the insurance obligations. The assumed timing of the transfer needs also to be considered.
2. The risk margin calculation should be consistent with the assumptions made about the reference entity's business mix and behaviour as well as the assumed timing of transfer. In particular, a clear and explicit link needs to be established between these assumptions and the risks that capital is required to be held against in the cost-of-capital calculation.
3. The purpose of this paper is to define the reference undertaking in Cost-of-Capital calculations. This paper does not cover the choice of the Cost-of-Capital rate.  
The paper is being included as a background document to the QIS4 Technical Specifications.

## 2. Cost-of-Capital in QIS3

4. The QIS3 Technical Specifications, Part II, following definition is given:  
"II.1.12 For the purposes of the calculation of the Cost-of-Capital (CoC) margin, it is assumed that – as a result of an economic loss incurred during the solvency time horizon – the undertaking becomes insolvent at the end of the current year and has no available capital left. It is further assumed that, at time  $t=1$ , the portfolio of assets and liabilities is taken over by another undertaking and that the acquiring or purchasing undertaking (the reference undertaking) needs to be compensated for the additional SCR which it has to put up during the whole run-off of the portfolio. The Cost-of-Capital (CoC) risk margin is then defined as the cost of the present value (at  $t=0$ ) of future SCR which the reference undertaking will have to put up during the run-off of the portfolio of assets and liabilities for the in-force book of business at time  $t=1$ .

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<sup>1</sup> Amended Directive Proposal I, COM (2008) 119 final, 26.2.2008, Explanatory Memorandum, p.10.

- II.1.13 As the reference undertaking (i.e. the undertaking that receives the transferred obligations), the “ceding” undertaking shall be taken, i.e. it shall be assumed that the insurer, at time  $t=1$ , transfers its obligations to itself.”
5. This means that, like in the Swiss CoC model, it was assumed that the uncertainty in the valuation of the best estimates related to the cash flows for the first 12 months (= the time horizon for SCR) was taken into account in the capital requirement SCR. Therefore in the risk margin it was necessary to address uncertainty linked to the cash flows after the time horizon only.
  6. Paragraph II.1.12 states the assumption that as a result of an economic loss incurred during the solvency time horizon the undertaking becomes insolvent at the end of the current time horizon and has no available capital left. More precisely, it is assumed that at the end of the time horizon the undertaking has assets exactly the amount that is needed to cover technical provisions but has no available capital beyond that.
  7. In this case there are two ways forward: either the undertaking is recapitalised to the level of SCR or the insurance obligations are transferred to another undertaking. Paragraph II.1.13 specifies that the reference undertaking is the undertaking itself, which means that the recapitalisation alternative was chosen.
  8. The definition of the reference undertaking has a direct impact on the risk margin. For instance, since it was assumed that the undertaking has lost all its available capital as a result of economic loss, we may conclude that of the undertaking’s assets the most liquid ones have been realised first. If the undertaking has to realise its most liquid assets during the time horizon, it seems unlikely that the undertaking at the same time would be able to de-risk its remaining assets. This means that there most likely exists market risk in the reference undertaking at the end of the time horizon. (In QIS3 it was assumed that market risk has to be taken into account in the calculation of the risk margin at least for the first year after the time horizon.)

### **3. Cost-of-Capital in the Directive Proposal<sup>2</sup>**

9. The Directive Proposal has the following definition:

Article 75:

2. The calculation of technical provisions shall be based on their current exit value.

Article 76:

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<sup>2</sup> As published on 10 July 2007.

3. The risk margin shall be such as to ensure that the value of the technical provisions is equivalent to the amount insurance and reinsurance undertakings would be expected to require in order to take over and meet the insurance and reinsurance obligations.
5. Where insurance and reinsurance undertakings value the best estimate and the risk margin separately, the risk margin shall be calculated by determining the cost of providing an amount of eligible own funds equal to the Solvency Capital Requirement necessary to support the insurance and reinsurance obligations over the lifetime thereof.

The rate used in the determination of the cost of providing that amount of eligible own funds (Cost-of-Capital rate) shall be the same for all insurance and reinsurance undertakings.

The Cost-of-Capital rate used shall be equal to the additional rate, above the relevant risk-free interest rate, that an insurance or reinsurance undertaking holding an amount of eligible own funds, as set out in Section 3, equal to the Solvency Capital Requirement would incur to hold those funds.

10. According to Article 75 the technical provisions are based on their current exit value. In other words, it is assumed that the takeover of obligations will take place immediately. This is an essential change compared to the QIS3 framework. The risk margin is here calculated on the basis of all coming years, including the time horizon.
11. The wording in the Directive Proposal "take over and meet the obligations" leaves open both a transfer of obligations and a recapitalisation of the undertaking.
12. The Directive Proposal stipulates that the solvency capital, the cost of which we are assessing, equals to the SCR. Furthermore, according to Article 99, SCR is calculated either in accordance with the standard formula or using an internal model.

#### **4. Risk Margin in the IASB Discussion Paper<sup>3</sup>**

13. The IASB Discussion Paper gives the following definition for current exit value:

"This paper defines current exit value as the amount the insurer would expect to pay at the reporting date to transfer its remaining contractual rights and obligations immediately to another entity." (IN21)

14. According to this definition the rights and obligations are transferred to another entity. This is in line with the general IAS valuation principles and the definition of fair value as being an "arm's length transaction".

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<sup>3</sup> As published in May 2007.

15. The preliminary view of the Board on risk margin is that it does not intend to prescribe specific techniques for developing risk margins. Instead, the Board

“intends to explain the attributes of techniques that will enable risk margins to convey useful information to users about the uncertainty associated with risk margins.” (86 (c))

16. Appendix F of the Discussion Paper contains the objective of the risk margin and a list of characteristics and properties that the risk margin should have. The objective reads:

“The risk margin should be an explicit and unbiased estimate of the margin that market participants require for bearing risk.” (F2)

17. Appendix F also contains an illustrative list of possible approaches to determining risk margins. Cost-of-Capital is one of these altogether eight listed approaches. The Board’s preliminary view is that none of these approaches is in all circumstances demonstrably superior or inferior to all other approaches.

18. Some of the characteristics mentioned in Appendix F are such that they are relatively easy to meet in a Cost-of-Capital framework, such as explicit margins instead of implicit ones or reasonable implementation costs. Some other characteristics are on a more general level and it is open to interpretations whether the Cost-of-Capital approach fulfils these criteria. Examples of such characteristics could be consistency with observable market prices, requirement to reflect all risks associated with the liability or ease to provide concise and informative disclosures. Finally, some of the properties are such that they are generally not satisfied in this framework, such as inclusion of model and parameter risk or the criterion that the less is known about the current estimate (Best Estimate) and its trend, the higher the risk margin should be.

## **5. Reference undertaking**

19. In what follows, the undertaking for which the risk margin is to be measured is called the “original undertaking”.

### 5.1 Undertaking to meet the obligations

20. In the QIS3 framework, the calculations started with a reference undertaking that had no solvency capital left. It was a quite natural idea to recapitalise such an undertaking, and so the reference undertaking was taken to be the undertaking itself.

21. According to the Directive Proposal, the assessment is based on the current exit value. Except for some pathological cases, the original undertaking is usually not insolvent to start with. Therefore the concept of recapitalisation does not fit in this new framework. There would rather be

need to “de-capitalise” the undertaking to the level of SCR if we want the reference undertaking to be the undertaking itself. In such a case all the assets of the reference undertaking would originate from the original undertaking. This would have a direct impact on the value of the risk margin.

22.If the reference undertaking is taken to be another undertaking, there is no need to make any artificial assumptions concerning e.g. the amount of available capital in the original undertaking. As a result, there is more freedom in the choice of the assets for the reference undertaking.

23.As stated before, the IASB Discussion Paper defines the current exit value in reference to another undertaking.

<b>Proposal 1: The reference undertaking is not the undertaking itself but another undertaking.</b>
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## 5.2 Size of the reference undertaking

24.In practice, insurance portfolios are usually transferred to an existing undertaking that, besides the transferred portfolio, has other insurance business, too. Often the undertaking accepting the transfer is much larger than the undertaking whose portfolio is to be transferred.

25.In the SCR formula there are several aggregation levels and at almost every level a reduction of the capital requirement takes place thanks to diversification (through correlations). If the reference undertaking is taken to be a non-empty undertaking, then as a result there will be ambiguity in the assessment of “the cost of providing an amount of eligible own funds equal to the SCR” because of these interdependencies. In order to avoid arbitrariness there would be need for exhaustive guidelines for defining the non-empty reference undertaking.

26.One solution would be to choose the reference undertaking to be an empty undertaking. By empty we mean here an undertaking that does not have any insurance obligations (or any capital requirement) before the transfer. In that case the risk margin would depend only on the transferred obligations and assets that cover them.

27.Another extreme would be to define the reference undertaking as an extremely large and perfectly diversified undertaking. This definition would still leave room for interpretations.

Proposal 2: **The reference undertaking is an empty undertaking.**

5.3 Amount of capital in the reference undertaking

28. According to the Directive Proposal, the risk margin shall be calculated by determining the cost of providing an amount of eligible own funds equal to the Solvency Capital Requirement necessary to support the insurance and reinsurance obligations over the lifetime thereof.
29. In case of an empty reference undertaking this could be interpreted as follows: after the transfer the reference undertaking has eligible own funds exactly the amount of SCR. All the own funds in the reference undertaking after the transfer are necessary to support the transferred obligations.
30. If we assume that the reference undertaking is a non-empty insurance undertaking then the interpretation of the Directive Proposal becomes more difficult. A non-empty undertaking would have own funds and a capital requirement relating to its existing business already prior to the transfer. After the transfer the reference undertaking would have available capital more than what is needed to support the transferred obligations. For simplicity we should assume that the capital requirement is SCR and that the undertaking has available capital exactly the required amount both before and after the transfer. In that case "providing an amount of eligible own funds" could be understood as the increase in the available capital that is needed to maintain own funds at the level of SCR in the transfer.

Proposal 3: **The reference undertaking has eligible own funds exactly the amount of SCR that is necessary to support the transferred obligations only.**

5.4 Assets in the reference undertaking

31. The reference undertaking will have on its balance sheet two kinds of assets, namely assets that cover liabilities and those that cover capital.
32. When insurance obligations are transferred to another undertaking, then in practice there will also be transferred a set of assets that cover those obligations. Furthermore reinsurance cover for the obligations will usually follow the transferred obligations. This means that the assets that cover insurance obligations in the reference undertaking would be based on the assets of the original undertaking. The choice of this subset of assets could either be made by the undertaking "by hand" or it could be based on some average asset portfolio of the undertaking. In general it can be assumed that the undertaking selects the best possible cover for the obligations to be transferred.



33. It can be further assumed that the reference undertaking wants to de-risk its assets. By de-risking we mean that with perfect duration and currency matching together with adequate de-concentration the reference undertaking can bring its market risk charge linked to the assets that cover technical provisions to zero. For practical purposes this idealisation provides a sufficiently accurate approximation of the risk involved.<sup>4</sup>
34. The time needed for the de-risking depends on the selection of assets that are transferred from the original undertaking. For example if all these assets are traded in deep and liquid markets, then the de-risking can take place immediately.
35. The definition of assets that cover obligations includes one extra difficulty. Since the risk margin part of the technical provisions depends on the SCR of the reference undertaking and vice versa, there arises a circularity problem. The impact of the capital charge on the assets that cover risk margin could, however, be ignored for simplicity reasons.
36. Another approach to the assets that cover obligations in the reference undertaking would be to define them to be independent of the assets of the original undertaking. The Proposal for a Directive Proposal stipulates that the margin should take into account the SCR necessary to support the insurance and reinsurance obligations. Since this description does not mention assets, one alternative would be to ignore assets in the context of the transfer of obligations. According to this approach we would assume that the reference undertaking is able to de-risk its assets that cover obligations, to the extent possible, from the very beginning. This approach would considerably simplify the Cost-of-Capital calculations.
37. The preliminary view of the IAS Board would support this approach. One of the characteristics listed in Appendix F of the IASB Discussion Paper states that:
- “The risk margin for an insurance liability should not reflect risks that do not arise from the liability, such as investment risk (except when investment risk affects the amount of payouts to policyholders), asset-liability mismatch risk or general operational risk relating to future transactions.” (F3(d))
38. According to this definition the investment risk would be taken into account only to the extent that it affects the amount of payouts to policyholders. It can be argued, however, that financial options and guarantees are valued using market values instead of separate calculations for the best-estimate and risk margin. Other market related liability cash-flows (such as where revenue on a unit linked policy depends on the value of the fund at future dates) can be mitigated/hedged by futures which have an almost zero current cost. For simplicity, any remaining (basis) risk that cannot be mitigated by futures may be ignored.

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<sup>4</sup> In practice, it may not be possible to cover long duration liabilities with suitable government bonds. In this case, the market risk of the optimal replicating portfolio needs to be allowed for. However, it is rather difficult to determine this residual market risk, which can be assumed to be small. In order to keep the calculation of the CoC margin practicable it may be justified to neglect this market risk.

39. When the obligations have been transferred, the reference undertaking will capitalise itself to the required level. It can be assumed that the reference undertaking takes no market risk on the assets that cover the required capital. This is an expedient assumption also because it helps us avoid circularity in the definition of Cost-of-Capital.

Proposal 4: **The assets of the reference undertaking consist of:**  
**a) Assets that cover Best Estimates net of reinsurance. These assets can be de-risked.**  
**b) Assets that cover Risk Margins. These do not bear any market risk.**  
**c) Assets that cover SCR. These do not bear any market risk.**

### 5.5 Risk categories of the reference undertaking

40. The Directive Proposal states that the Solvency Capital Requirement that is to be used in the measurement of Cost-of-Capital is the one defined in the Directive Proposal. According to Article 100 SCR shall cover at least the following risks:

- (a) Non-life underwriting risk  
The reference undertaking has non-life underwriting risk with respect to the transferred (re)insurance obligations. The risk exists through the whole lifetime of those obligations. Both pre-claim and post-claim obligations have to be taken into account. Underwriting risk with respect to new business is not included. Non-life CAT risk is taken into account only with respect to pre-claim obligations.
- (b) Life underwriting risk  
The reference undertaking has life underwriting risk with respect to the transferred (re)insurance obligations. The risk exists through the whole lifetime of those obligations. Underwriting business with respect to new business is not included.
- (c) Health underwriting risk  
The reference undertaking has health underwriting risk with respect to the transferred (re)insurance obligations. The risk exists through the whole lifetime of those obligations. Underwriting business with respect to new business is not included.
- (d) Market risk  
The reference undertaking does not have any market risk.<sup>5</sup>
- (e) Credit risk  
Since the insurance obligations are transferred net of reinsurance, the reference undertaking has risk of default of the counterparties

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<sup>5</sup> The inclusion of market risk to the extent to which assets affect liability cash-flows was considered. However, financial options and guarantees are valued using market values instead of separate calculations for the best-estimate and risk margin. Similarly, other market related liability cash-flows (such as where revenue on a unit linked policy depends on the value of the fund at future dates) can be mitigated/hedged by futures which have an almost zero current cost. Any remaining (basis) risk that cannot be mitigated by futures may be ignored.

to reinsurance contracts that cover the transferred liabilities. The default risk has to be assessed for the whole run-off period based on the reinsurance cover that the original undertaking has.

The reference undertaking does not have any risk of default of the counterparties to financial derivative contracts.<sup>6</sup>

- (f) Operational risk  
Since the reference undertaking has taken over insurance obligations it has operational risk throughout the lifetime of those obligations.

**Proposal 5: The SCR of the reference undertaking consists of**

- operational risk
- default risk with respect to ceded reinsurance
- underwriting risk with respect to existing business

#### 5.6 Future profit sharing

41. The profit sharing commitments of the reference undertaking are assumed to be the same as in the original undertaking. As a consequence, the risk mitigating effect of future profit sharing should be taken into account to the same extent as in the original undertaking.

**Proposal 6: The risk mitigating effects of future profit sharing in the reference undertaking correspond to those of the original undertaking.**

#### 5.7 Segmentation

42. The IASB Discussion Paper proposes segmentation on the level of homogeneous risk groups (HRG). However, as the SCR is usually calculated according to lines of business (LoB), using HRGs as a basis for segmentation would necessitate the recalculation of the SCR for each HRG for Cost-of-Capital purpose. Such a recalculation may be laborious and raise data issues. Also, as the segmentation into HRGs is left to the undertaking, a requirement to calculate Cost-of-Capital margins on the level of HRGs could disincentivise the prudent identification of HRGs.
43. Therefore it would be appropriate to base the calculation of risk margins on the same segmentation as what is used in the calculation of the capital charges for underwriting risk in SCR. In case of the standard SCR this would mean calculations on the level of LoBs. In case of an internal model for SCR the segmentation could differ from this, but the risk margins should always be valued at least at the level of LoBs.

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<sup>6</sup> The derivatives used to manage the asset-liability mismatch risk are normally guaranteed through the use of an exchange and therefore the default risk is ignored for the purpose of calculating the cost of capital margin.

44. This does not change the fact that the calculation of Best Estimates should, as a rule, be performed on the level of HRGs.
45. In QIS3 (I.1.59) it was assumed that no diversification benefits arise from the grouping of technical provisions calculated per segment. This is in line with the IASB Discussion Paper (May 2007) which states the preliminary view of the Board:
- “Risk margins should be determined for a portfolio of insurance contracts that are subject to broadly similar risks and are managed together as a single portfolio. Risk margins should not reflect the benefits of diversification between portfolios and negative correlations between portfolios.” (202 b))
46. If several segments are transferred to the same reference undertaking then the risk margins calculated for that undertaking do not fulfil this requirement. That is because the aggregation used to calculate the underwriting risk charge in SCR takes into account diversification benefits between segments. Therefore we need to consider every segment separately.
47. In terms of a reference undertaking, an assumption needs to be made that insurance obligations of each segment are transferred to an empty undertaking in isolation. This assumption somewhat complicates the assessment of risk margins but several simplifications can be made to make the calculations feasible.

**Proposal 7: Insurance obligations of each segment will be transferred to an empty reference undertaking in isolation. (There does not arise any diversification benefit between segments.)  
The segmentation is the same as what is used in the underwriting risk module of the SCR of the original undertaking. The segmentation is, however, always at least at the level of LoBs.**

#### 5.8 Standard model and internal models

48. The Directive Proposal stipulates that an amount of eligible own funds in the reference undertaking equals the SCR necessary to support the insurance and reinsurance obligations over the lifetime thereof. When referring to the SCR the Directive Proposal does not make any distinction between the standard model and internal models. From this we may conclude that the capital requirement in the Cost-of-Capital assessment can be based on either a standard model or an internal model.
49. It can be assumed that the internal model of the original undertaking captures the risks inherent in the portfolio better than the standard model. It may also be argued that an internal model can portray levels of risk that are specific to the original undertaking and cannot be assumed to be the same in the reference undertaking. In such a case these entity-specific measurements cannot be used as such for the Cost-of-Capital calculations. The SCR of the reference undertaking should either be modified to fit the

empty reference undertaking or the standard model should be used instead.

50. As a pragmatic approach, it may be assumed that the operational and all other entity specific risks are the same in the reference entity as in the original undertaking.

**Proposal 8: Internal models of the original undertaking (partial or full) can be used to measure the SCR to the extent that they cover the risks in proposal 5 of the reference undertaking.**

#### 5.9 Cost-of-Capital gross or net of reinsurance?

51. It is assumed that the take-over of obligations always includes reinsurer's share of those obligations.

**Proposal 9: The Cost-of-Capital risk margin is defined net of reinsurance only.**

#### 5.10 Calculation of the risk margin in the middle of the year

52. An insurance undertaking should be able to value its liabilities at any time, regardless of whether the SCR is calculated at the same time or not. The starting point in the calculation of Cost-of-Capital is always the identification of future cash flows for the Best Estimates. All other parameters in the SCR formula could be replaced by their value in the previous assessment of SCR.

**Proposal 10: For the valuation of technical provisions in the middle of the year a new assessment of the Best Estimates is necessary. As a simplification (if needed) the parameters needed for the SCR of the reference undertaking can be based on the latest SCR of the original undertaking until a reassessment of the SCR is made.**