

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

SCR Standard Formula
Article 109 -
Structure and Design of Market Risk Module**

(former CP 47)

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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 design and structure of the market risk module of the SCR standard formula, as required by Article 111 of the Solvency II Level 1 text.²
- 1.3. The equity risk sub-module and the correlations between the market risk sub-modules and between the market risk module and other modules are not covered in this draft advice and are being addressed in separate Consultation Papers released in November 2009.³ In addition, advice on simplifications to the standard formula has also been published for consultation in November 2009⁴.
- 1.4. The objective of this Paper is to give draft advice on the structure and design of interest rate risk, spread risk, currency risk, property risk and concentration risk sub-modules. With the exception of concentration risk, the calibration of the market risk module is not covered by this paper. CEIOPS has produced a further Consultation Paper, covering the calibration of the market risk module released for consultation in November 2009.

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>

³ CEIOPS-CP-69/09, see <http://www.ceiops.eu/index.php?option=content&task=view&id=651>. CEIOPS-CP-74/09, see <http://www.ceiops.eu/index.php?option=content&task=view&id=656>.

⁴ CEIOPS-CP-77/09. See <http://www.ceiops.eu/index.php?option=content&task=view&id=659>.

2. Extract from Level 1 text

- 2.1 The legal basis for the advice presented in this paper is primarily found in Article 111 of the Level 1 text which states:

"1. In order to ensure that the same treatment is applied to all insurance and reinsurance undertakings calculating the Solvency Capital Requirement on the basis of the standard formula, or to take account of market developments, the Commission shall adopt implementing measures laying down the following:

[...]

(c) the methods, assumptions and standard parameters to be used, when calculating each of the risk modules or sub-modules of the Basic Solvency Capital Requirement laid down in Articles 104, 105 [...];

(e) where insurance and reinsurance undertakings use risk mitigation techniques, the methods and assumptions to be used to assess the changes in the risk profile of the undertaking concerned and adjust the calculation of the Solvency Capital Requirement;

[...]

2. The Commission may adopt implementing measures laying down quantitative limits and asset eligibility criteria in order to address risks which are not adequately covered by a sub-module. Such implementing measures shall apply to assets covering technical provisions, excluding assets held in respect of life insurance contracts where the investment risk is borne by the policyholders. Those measures shall be reviewed by the Commission in the light of developments in the standard formula and financial markets.

[...]"

- 2.2 Article 104 states the design of the Basic Solvency Capital Requirement:

"1. The Basic Solvency Capital Requirement shall comprise individual risk modules, which are aggregated in accordance with point 1 of Annex IV.

It shall consist of at least the following risk modules:

[...]

(d) market risk

[...]

5. The same design and specifications for the risk modules shall be used for all insurance and reinsurance undertakings, both with respect to the Basic Solvency Capital Requirement and to any simplified calculations as laid down in Article 108.

[...]

It should be noted that there is no possibility based on the Level 1 text (Article 104(7)) for the use of undertaking-specific parameters in the market risk module.

2.3 Article 105 requires that:

"[...]

5. The market risk module shall reflect the risk arising from the level or volatility of market prices of financial instruments which have an impact upon the value of assets and liabilities of the undertaking. It shall properly reflect the structural mismatch between assets and liabilities, in particular with respect to the duration thereof.

It shall be calculated, in accordance with point 4 of Annex IV, as a combination of the capital requirements for at least the following sub-modules:

(a) the sensitivity of the values of assets, liabilities and financial instruments to changes in the term structure of interest rates, or in the volatility of interest rates (interest rate risk);

(b) the sensitivity of the values of assets, liabilities and financial instruments to changes in the level or in the volatility of market prices of equities (equity risk);

(c) the sensitivity of the values of assets, liabilities and financial instruments to changes in the level or in the volatility of market prices of real estate (property risk);

(d) the sensitivity of the values of assets, liabilities and financial instruments to changes in the level or volatility of credit spreads over the risk-free interest rate term structure (spread risk);

(e) the sensitivity of the values of assets, liabilities and financial instruments to changes in the level or in the volatility of currency exchange rates (currency risk);

(f) additional risks to an insurance or reinsurance undertaking stemming, either from lack of diversification in the asset portfolio, or from large exposure to default risk by a single issuer of securities or a group of related issuers (market risk concentrations).

[...]"

2.4 On simplifications in the standard formula, Article 109 states:

"Insurance and reinsurance undertakings may use a simplified calculation for a specific sub-module or risk module where the nature, scale and complexity of the risk they face justifies it and where it would be disproportionate to require all insurance and reinsurance undertakings to apply the standardised calculation."

2.5 The Level 1 text also mentions concentration risk in the following provisions:

Article 13 – Definitions

35) concentration risk means all risk exposures with a loss potential which is large enough to threaten the solvency or the financial position of insurance and reinsurance undertakings; "

Article 132 – ‘Prudent person’ principle

4. (last alinea) Investments in assets issued by the same issuer, or by issuers belonging to the same group, shall not expose the insurance undertakings to excessive risk concentration. "

- 2.6 Title III of the Level 1 text, dealing with group supervision, also refers to to concentration risk (eg. Article 244, which specifically relates to the supervision of risk concentration in a group)⁵. There are also some references to concentration risk in the provisions referred to risk management (Pillar II)⁶. The treatment of concentration risk in this paper is limited to the solo standard formula SCR, since the treatment of this risk in the context of groups and for internal models is being dealt with in other CEIOPS Level 2 advice.
- 2.7 From a legal perspective, it is relevant to point out that Article 13(35) defines concentration risk in the widest and most comprehensive manner. This interpretation shall apply when referring to concentration risk in the Level 1 text (eg. in the context of risk management, capital requirements, investments and group supervision...).

⁵ Former CP 61. See CEIOPS-DOC-53/09 at <http://www.ceiops.eu/index.php?option=content&task=view&id=612>.

⁶ Former CP 33. See CEIOPS-DOC-29/09 at <http://www.ceiops.eu/index.php?option=content&task=view&id=581>.

3. QIS4 outputs and industry feedback

3.1 Market risk (except concentration risk)

- 3.1 From April to July 2008, CEIOPS carried out the fourth Quantitative Impact Study on Solvency II (QIS4). This included testing each of the sub-modules of the market risk module, according to the structure set out in Article 105.
- 3.2 For both life and non-life undertakings, as well as for composites, the quantitative results indicated that market risk represented one of the most significant modules for the standard formula SCR.
- 3.3 The largest components of the market risk charge were interest rate and equity risk (though equity risk is not considered in this paper), with each of these typically contributing around 40-50% of the total market risk requirement. Property risk and spread risk contributed less: property contributed between 8% and 15% of the total market risk, and spread risk contributed 11-21%. Currency risk contributed less than 7% of the total market risk. These statistics are useful to bear in mind when considering the design and structure of the market risk module and when assessing the merits of any simplifications.
- 3.4 In general, feedback from the QIS4 exercise indicated few difficulties with the design and structure of the market risk module and its sub-modules. The main comments were as follows:

Structure

- For the interest rate module, there were suggestions that sensitivity to changes in the shape of the yield curve could be introduced.
- Volatility of interest rates was not modelled in the QIS4 approach.
- Some undertakings suggested use of a correlation matrix for the treatment of currency risk.
- The QIS4 specifications did not address the treatment of inflation-linked bonds.
- For the property risk sub-module, some undertakings felt that the situation where buildings are used for the insurer's own activities rather than as an investment was not adequately reflected in the QIS4 approach.
- Some undertakings suggested that property risks could be split into sub-lines (residential, commercial, offices, etc.)
- In the spread risk sub-module, it was suggested that a distinction should be drawn between losses due to migration risk and default risk, and those due to a general change in the market price of credit risk.
- Some undertakings felt that the approach taken for spread risk in QIS4 did not allow for risk mitigation instruments.
- There were confusions as to which sub-modules should be used to assess the market risk in mortgage-backed securities with one country stating

a preference for treating these instruments via the spread and interest rate sub-modules rather than using the counterparty default risk module.

Practical issues

- It was suggested that the use of a delta-NAV (i.e. change in net asset value) approach is overly complex and would require sophisticated modelling techniques
 - Many insurers found the application of the look-through approach for investment funds impractical.
 - The approach to currency risk was viewed as problematical for undertakings writing international business, particularly if this were to be applied to the currency of the free assets relative to the Euro rather than to the currency in which the liabilities are denominated (or the currency of the local regulator).
- 3.5 This paper takes into account the results and comments from the QIS4 exercise with the aim of refining the design and structure of the market risk module further.

3.2 Concentration risk

- 3.6 According to the QIS4 report, the concentration risk sub-module presented on average 7.2 % (life), 17.9 % (non-life) and 9.5 % (composite) of the market risk SCR (before diversification benefits).⁷
- 3.7 The QIS4 report also contains quantitative references to the impact of concentration risk on each Member State and market segment (non-life, life and composite).
- 3.8 The issues commented on by the industry with regard to concentration risk in the solo SCR in QIS4 report can be summarized as follows:
- 3.9 **Treatment of participations**. The inclusion of participations into the concentration risk sub-module was rejected by some undertakings as double counting. Some undertakings were concerned that intra-group operations are faced with a too high capital charge.⁸
- CEIOPS will produce an advice on participations and their treatment in the solvency assessment of an undertaking at the end of October. Therefore, this advice does not consider the treatment of participations.
- 3.10 **Treatment of properties**. The QIS4 report mentions the need for clarification of concentration risk on properties.⁹
- 3.11 First of all, it is worth clarifying that concentration risk on properties does not refer to having a high percentage of properties in respect of equities, bonds, or the total balance sheet. This lack of diversification is captured with the use of a correlation matrix to add the SCRs derived in each of the market risk sub-modules.

⁷ See CEIOPS' Report on its Fourth Quantitative Impact Study, November 2008, <http://www.ceiops.eu/media/files/consultations/QIS/CEIOPS-SEC-82-08%20QIS4%20Report.pdf>, p. 176. (hereafter: QIS4 report).

⁸ QIS4 report, p. 179,186..

⁹ QIS4 report, p. 179, 186.

- 3.12 When dealing with concentration on properties, the difficulty arises from the fact that the core drivers of diversification are both the type of property (office premises, residential property, grounds, etc) and mainly the geographical spread.
- 3.13 Regarding the first criterion (the type of use of the property) a huge percentage of properties held by undertakings corresponds to office premises and commercial non-residential properties, and therefore this is considered in the calibration of the 'property risk' sub-module. Outliers in respect of this assumption may be better treated via internal models.
- 3.14 The second criterion (geographical diversification) has revealed to be extremely difficult to model in an appropriate manner. Experience from the recent crisis shows that in case of a severe stress, geographical diversification has no significant effect, since property prices tend to contract almost worldwide.
- 3.15 At the same time, it is generally agreed that an undertaking with a significant percentage of its assets invested in a single property, in principle would have a higher exposure to market (concentration) risk than an undertaking with a diversified portfolio of properties.
- 3.16 Having this in mind, this advice only contains a specific provision regarding concentration risk in a single property, considering that the market risk associated to this type of assets is not geographically diversifiable in case of severe crisis, and this feature has been considered in the calibration of property risk sub-module within the standard calculation of the SCR.
- 3.17 **Assets to include in the denominator.** Undertakings asked for a clearer description and rationale of the treatment. In order to solve this point, this advice contains a better definition of the amount to include in the denominator.
- 3.18 **Treatment of bank deposits.** Undertakings in one country criticized the concentration risk sub-module with respect to bank deposits from financial entities under Basel II and investment funds harmonized at a European level. In their view, these elements should be excluded from the module, as their issuers are subject to anti-concentration regulation.
- 3.19 The recent crisis has shown several practical examples demonstrating the inappropriateness of the proposed exemption. Nevertheless, this empirical evidence does not preclude the possibility of taking into account government guarantees provided for bank deposits and cash-accounts. In fact, this allowance seems aligned with the economic assessment underlying Solvency II.
- 3.20 Risks derived from concentration in cash held at a bank are captured in the counterparty default risk module, while risks corresponding to concentration in other bank assets are reflected in the concentration risk sub-module (no-hole, no-overlap).
- 3.21 **Geographical and sectoral diversification.** Although not reflected explicitly in QIS4 report, it seems relevant to comment on geographical and sectoral diversification referring to financial investments. An undertaking concentrating its investments in the same geographical area or in the same economic sector is bearing higher risks than in case of a

geographically/sectorally diversified portfolio. The difficult point here is how to measure these types of concentration.

- 3.22 In the case of geographical concentration, most large groups are present worldwide and it is difficult to find a reliable and publicly disclosed measure of their geographical investments. Management of geographical exposures requires an in-depth insight of each investment and a rather complex monitoring process. Furthermore, the calibration of different parameters according to each geographical area is not immediate. In fact, such differentiation may be not meaningful in an increasingly globalised context. The crisis has shown that diversification benefits (among lines of business, asset classes, geographical, etc.) tend to diminish or not be realizable in stressed times. CEIOPS recognizes the existence of diversification effects (both benefits and risks), but notices that they don't operate in the same way in normal and crisis times.¹⁰
- 3.23 A similar statement is applicable to sectoral concentration, perhaps with a slightly different intensity and some nuances. Examples of tobacco groups with huge dietary business or utilities groups moving towards the service sector are sufficiently illustrative of the blurred frontiers that sectoral limits have in the modern economy. Furthermore, contagion risks and 'domino' effects have increased the inter-sectoral correlations in times of crisis, in such a manner that in some cases the correlation among entities of different sectors closely related is significant, even similar to the correlation of one entity with its sectoral competitors.
- 3.24 Summing up and for all the reasons described above, the present advice does not contain any formula to quantify capital requirements regarding geographical and sectoral concentrations of financial investments. Therefore these risks shall be primarily considered as part of Pillar 2 activities (risk management, ORSA, etc.) and via internal models when it be necessary to ensure that the SCR appropriately reflects the risk profile of each undertaking.

¹⁰ See CEIOPS Lessons learned from the crisis (SII and beyond), March 2009
<http://www.ceiops.eu/media/files/publications/reports/CEIOPS-SEC-107-08-Lessons-learned-from-the-crisis-SII-and-beyond.pdf>, section 1.1.4.

4. Advice

4.1 General structure of the market risk module

4.1.1. Explanatory text

- 4.1 For the purposes of this quantitative advice and from a technical point of view, one issue to consider is which types of concentration can be taken into account a manner that would be compatible with the degree of simplicity desirable for the standard calculation of the SCR.
- 4.2 In general, undertakings and supervisors should verify that the SCR provides an appropriate reflection of the risk profile of the insurance or reinsurance undertaking. Should this not be the case with respect to the concentration of assets or liabilities, necessary action will need to be adopted in a relevant manner, i.e. via internal models or through capital add-ons.
- 4.3 There were no major difficulties arising as a result of the structure of the market risk module and its sub-modules as tested in QIS4 and as set out in the Level 1 text quoted above.
- 4.4 However a number of (re)insurance undertakings highlighted that volatility of interest rates was not captured by the standard formula. In that regard this advice considers the impact of interest rate volatility on the shape (i.e., slope and curvature) of the term structure of interest rates.
- 4.5 With the exception of interest rate volatility, we propose no changes to be made to the module/sub-module structure. Instead, effort will be focused on refining the design of the sub-modules and (later) on reassessing the calibration of the modules.
- 4.6 One suggestion arising from QIS4 has been that liquidity risk could be included in the market risk module. However, this has been discussed as part of the development of the Level 1 text and it has been concluded that this risk is better captured in Pillars 2 and 3.
- 4.7 For clarification, throughout the market risk module, assets which are allocated to policies where the policyholders bear the investment risk are excluded from the module only to the extent that the risk is passed on to policyholders. That is, any market risk in respect of such products that is not passed on to policyholders is included in the scope of this module.
- 4.8 Where the assets held include an investment in a subsidiary undertaking which manages all or part of the insurance undertaking's investments on its behalf, the insurance undertaking, when applying the rules and principles laid down in this CP, take into account the underlying assets held by the subsidiary undertaking.

4.1.2. CEIOPS' advice

General structure of the market risk module

4.9 Throughout the market risk module, assets which are allocated to policies where the policyholders bear the investment risk are excluded from the module only to the extent that the risk is passed on to policyholders. That is, any market risk in respect of such products that is not passed on to policyholders is included in the scope of this module.

4.2 General considerations where a delta-NAV approach is used

4.2.1. Explanatory text

- 4.10 A number of the market risk stresses are based on a delta-NAV (change in value of assets minus liabilities) approach. The change in net asset value should be based on a balance sheet that does not include the risk margin of the technical provisions. This approach is based on the assumption that the risk margin does not change materially under the scenario stress. This simplification is made to avoid a circular definition of the SCR since the size of the risk margin depends on the SCR.
- 4.11 Where a delta-NAV approach is used, the impact of hedging instruments shall be allowed for as part of the sub-module: use of the delta-NAV calculation ensures the impact of the stress scenario on the hedging instrument is captured alongside the impact on all other assets and liabilities. (Re)insurance undertakings shall have regard to CEIOPS-DOC-26/09 in determining whether a financial risk mitigation instrument may be taken into account.¹¹
- 4.12 Furthermore, where a delta-NAV approach is used, the revaluation of technical provisions should allow for any relevant adverse changes in option take-up behaviour of policyholders in this scenario. Here, option take-up behaviour has the same definition as set out in CEIOPS' advice on life underwriting risk (see CEIOPS-DOC-42/09)¹².
- 4.13 Where risk mitigation techniques are permitted to be allowed for in the calculation of the SCR standard formula, the scenarios required for the calculation of the market risk module will incorporate their effect.

¹¹ Former CP 31. See <http://www.ceiops.eu/index.php?option=content&task=view&id=579>.

¹² Former CP 49. See <http://www.ceiops.eu/index.php?option=content&task=view&id=600>.

4.2.2. CEIOPS' advice

Delta-NAV Approach

- 4.14 The change in net asset value shall be based on a balance sheet that does not include the risk margin of the technical provisions.
- 4.15 The impact of hedging instruments shall be allowed for as part of the scenarios. (Re)insurance undertakings shall have regard to CEIOPS-DOC-26/09 in determining whether a financial risk mitigation instrument may be taken into account.
- 4.16 The revaluation of technical provisions should allow for any relevant adverse changes in option take-up behaviour of policyholders in this scenario.

4.3 Interest rate risk

4.3.1. Explanatory text

- 4.17 As set out in TS.IX.B.1 of the QIS4 Technical Specification, interest rate risk exists for all assets and liabilities for which the net asset value is sensitive to changes in the term structure of interest rates or interest rate volatility. This applies to both real and nominal term structures.
- 4.18 Assets sensitive to interest rate movements will include fixed-income investments, financing instruments (for example loan capital), policy loans, interest rate derivatives and any insurance assets.
- 4.19 The discounted value of future liability cash-flows will be sensitive to a change in the rate at which those cash-flows are discounted.
- 4.20 The values of assets and liabilities that are sensitive to changes in interest rates can be determined using the term structure of interest rates – which can change over time.
- 4.21 QIS4 describes a methodology that derives a capital charge for interest rate risk based on a delta-NAV (change in value of assets minus liabilities) approach. Some respondents suggested that this approach is overly complex. However, the quantitative QIS4 results demonstrated the significance of interest rate risk not only within the market risk module but also within the total SCR. As a result, CEIOPS considers the delta-NAV approach should be retained in order to capture as effectively as possible this important risk.
- 4.22 Accordingly, the input information required for this module will be the net asset value (i.e., NAV) calculated as the value of assets minus liabilities.
- 4.23 The capital charge arising from this sub-module will be Mkt_{int} and will be calculated based on two pre-defined scenarios: one scenario will consider an upward shock to interest rates and will deliver Mkt_{int}^{Up} ; the other scenario will consider a downward shock and will deliver Mkt_{int}^{Down} . The capital charge Mkt_{int} will then be determined as the maximum of the capital charges Mkt_{int}^{Up} and Mkt_{int}^{Down} , subject to a minimum of zero.

4.24 The capital charges Mkt_{int}^{Up} and Mkt_{int}^{Down} will be calculated as

$$Mkt_{int}^{Up} = \Delta NAV|_{upwardshock} \text{ and } Mkt_{int}^{Down} = \Delta NAV|_{downwardshock}$$

where, $\Delta NAV|_{upwardshock}$ and $\Delta NAV|_{downwardshock}$ are the changes in net values of assets and liabilities due to revaluation of all interest rate sensitive assets and liabilities based on:

1. Specified alterations to the interest rate term structures
combined with:
 2. Specified alterations to interest rate volatility.
- 4.25 The altered term structures used in calculating the capital charge for this sub-module will be composed of several factors, although there will only be one upward shock and one downward shock to be applied at each maturity.
- 4.26 The intention will be to provide a decomposition of the shocks so that the assumptions underlying the calibration are transparent: the factors will capture changes in level, slope and curvature of the term structure.
- 4.27 The slope and curvature of the term structure of interest rates may be materially affected by the volatility of interest rates. Interest rate volatility has further material impact on the assets and/or liabilities of (re)insurance undertakings that have embedded guarantees in their business.
- 4.28 The proposed increase in interest rate volatility is therefore likely to affect traditional participating business, certain types of annuity business and other investment contracts.
- 4.29 The calibration of the upward and downward interest rate stresses will be considered further in the forthcoming consultation paper on calibration of the market risk module.

4.3.2. CEIOPS' advice

Interest rate risk

- 4.30 The input information required for this module is the net asset value (NAV) calculated as the value of assets minus liabilities.
- 4.31 The capital charge arising from this sub-module will be Mkt_{int} and will be calculated based on two pre-defined scenarios: one scenario will consider an upward shock to interest rates and will deliver Mkt_{int}^{Up} ; the other scenario will consider a downward shock and will deliver Mkt_{int}^{Down} . The capital charge Mkt_{int} will then be determined as the maximum of the capital charges Mkt_{int}^{Up} and Mkt_{int}^{Down} , subject to a minimum of zero.
- 4.32 The capital charges Mkt_{int}^{Up} and Mkt_{int}^{Down} will be calculated as
- $$Mkt_{int}^{Up} = \Delta NAV|_{upwardshock} \text{ and } Mkt_{int}^{Down} = \Delta NAV|_{downwardshock}$$
- where, $\Delta NAV|_{upwardshock}$ and $\Delta NAV|_{downwardshock}$ are the changes in net values of assets and liabilities due to revaluation of all interest rate sensitive assets and liabilities based on:

1. Specified alterations to the interest rate term structures
combined with:
 2. Specified alterations to interest rate volatility.
- 4.33 The calibration of the interest rate shock will capture changes in level, slope and curvature of the term structure.

4.4 Currency risk

4.4.1. Explanatory text

- 4.34 Currency risk arises from changes in the level or volatility of currency exchange rates.
- 4.35 Undertakings may be exposed to currency risk arising from various sources, including their investment portfolios, as well as assets, liabilities and investments in related undertakings. The design of the currency risk sub-module is intended to take into account currency risk for an undertaking arising from all possible sources.
- 4.36 Respondents to QIS4, however, highlighted the situation where an undertaking's liabilities and local currency are not denominated in euros. In such a case, the undertaking should consider currency risks relative to that local currency. Conversion of the components of undertaking's overall solvency position (including SCR, MCR, technical provisions and other) into euros for reporting will not incur currency risk.
- 4.37 A scenario-based approach was used for the assessment of the currency risk capital charge in QIS4. Although this can be considered more complex than a factor-based approach, it is likely that for smaller undertakings the extent of any cross-currency holdings may be sufficiently limited as to make a scenario-based approach relatively simple in practice. Moreover, a scenario-based approach allows currency hedging programmes to be captured appropriately.
- 4.38 We propose therefore to retain a scenario-based approach, but to make some refinements to better capture more complex scenarios without adding excessive complexity to the standard formula methodology:
- 4.39 The QIS4 approach considered the effect of two scenarios (a rise and a fall in exchange rates) on the net value of assets minus liabilities. The scenarios implicitly assumed that all currencies experience the same rise or fall in reference to a local currency, whilst ignoring the inter-dependencies between currencies other than the local currency.
- 4.40 As an example, consider the case of an insurer with regulatory accounts denominated in EUR who has US\$ denominated liabilities of value EUR 1 million and assets in £ sterling of value EUR 1 million at the 2007 year end. In addition, suppose that all other balance sheet items are denominated in EUR. In this case, the scenarios *fx upward* and *fx downward* do not lead to a change in basic own funds, because pound and dollar both are assumed to rise or fall in relation to euro. According to the scenarios, the insurer seems to be perfectly hedged against currency risk. During the year 2008, the value of the US dollar liabilities have risen to EUR 1.05 million and the value of the pound sterling assets have fallen to

EUR 0.77 million. Consequently, there is a loss of basic own funds of EUR 0.28 million, more than a quarter of the initial exposure.

- 4.41 The example shows that significant currency risks may not be detected if the QIS4 approach is applied. The two currency scenarios imply that the exchange rate between pound and dollar is fixed. This is not a realistic assumption. Moreover, the current approach incentives a currency risk mis-management as illustrated in the above example: If no appropriate assets in US dollar are available to cover the dollar liabilities, then the undertaking can reduce its capital requirement by covering the liabilities with another foreign currency. However, if the dollar liabilities are covered with euro assets then the resulting capital charge will be 20% of the liabilities.
- 4.42 This issue can be addressed by refining the QIS4 approach to consider each currency separately.
- 4.43 Under the refined approach, the *local currency* is the currency in which the undertaking prepares its local regulatory accounts. This means the reporting requirements referred to in CEIOPS' advice on supervisory reporting and disclosure.¹³ All other currencies are referred to as *foreign currencies*. A foreign currency is *relevant* for the scenario calculations if the amount of basic own funds depends on the exchange rate between the foreign currency and the local currency.
- 4.44 The capital charge arising from this sub-module will be Mkt_{fx} and will be calculated based on two pre-defined scenarios: for each currency C, one scenario will consider a rise in the value of the foreign currency against the local currency and will deliver $Mkt_{fx,C}^{Up}$; the other scenario will consider a fall in the value of the foreign currency against the local currency and will deliver $Mkt_{fx,C}^{Down}$. All of the participant's individual currency positions and its investment policy (e.g. hedging arrangements, gearing etc.) should be taken into account. For each currency, the contribution to the capital charge $Mkt_{fx,C}$ will then be determined as the maximum of the results $Mkt_{fx,C}^{Up}$ and $Mkt_{fx,C}^{Down}$. The total capital charge Mkt_{fx} will be the sum over all currencies of $Mkt_{fx,C}$.
- 4.45 For each relevant foreign currency C, the capital charges $Mkt_{fx,C}^{Up}$ and $Mkt_{fx,C}^{Down}$ will be calculated as:

$$Mkt_{fx,C}^{up} = \max(0, \Delta NAV | C \text{ upward_shock})$$

$$Mkt_{fx,C}^{downward} = \max(0, \Delta NAV | C \text{ downward_shock})$$

where $\Delta NAV | C \text{ upward shock}$ and $\Delta NAV | C \text{ downward shock}$ are the changes in net values of assets and liabilities due to the rise and fall respectively in value of the foreign currency against the local currency.

- 4.46 Note that for each relevant foreign currency C, the currency position should include any investment in foreign instruments where the currency risk is not hedged. This is because the stresses for interest rate, equity, spread and property risks have not been designed to incorporate currency risk. Note that the look-through approach for funds discussed in section 4.8 below applies equally for currency risk.

¹³ Former CP 58. See <http://www.ceiops.eu/index.php?option=content&task=view&id=609>.

- 4.47 For the example presented above, the modification would require the analysis of a dollar shock and a pound shock. The dollar shock would be an increase of the dollar value compared to the euro by 20%. The pound shock would be a loss in value of the pound of 20%. The resulting capital charge would be $Mkt_{fx} = 0.2 \text{ million} + 0.2 \text{ million} = 0.4 \text{ million}$.
- 4.48 In situations where two foreign currencies are matched as in the example, the proposed approach leads to the assumption that - compared to the local currency - one exchange rate moves up and the other one down. Consequently, the exchange rate between the two foreign currencies moves more strongly than the assumed 20%. This could be considered to be a drawback of the proposed approach. The effect could be avoided by allowing for diversification between the shocks on different currencies. For example the results of the different currency shocks could be aggregated with a correlation matrix. However, there are three arguments against such an amendment: Firstly, it would be difficult to quantify the diversification between two exchange rates, even if the simple approach is taken that the correlation factor for each pair of foreign currencies is the same. Secondly, the amendment would increase the complexity of the calculation. And thirdly, situations as illustrated in the example can usually be avoided in practice.
- 4.49 The calibration of the upward and downward currency stresses will be considered further in the forthcoming consultation paper on calibration of the market risk module.

4.4.2. CEIOPS' advice

Currency risk	
4.50	A scenario-based approach shall be used for the assessment of the currency risk capital charge.
4.51	The local currency is the currency in which the undertaking prepares its local regulatory accounts. All other currencies are referred to as foreign currencies. A foreign currency is relevant for the scenario calculations if the amount of basic own funds depends on the exchange rate between the foreign currency and the local currency.
4.52	The capital charge arising from this sub-module will be Mkt_{fx} and will be calculated based on two pre-defined scenarios: for each currency C, one scenario will consider a rise in the value of the foreign currency against the local currency and will deliver $Mkt_{fx,C}^{Up}$; the other scenario will consider a fall in the value of the foreign currency against the local currency and will deliver $Mkt_{fx,C}^{Down}$. All of the participant's individual currency positions and its investment policy (e.g. hedging arrangements, gearing etc.) should be taken into account. For each currency, the capital charge $Mkt_{fx,C}$ will then be determined as the maximum of the results $Mkt_{fx,C}^{Up}$ and $Mkt_{fx,C}^{Down}$. The total capital charge Mkt_{fx} will be the sum over all currencies of $Mkt_{fx,C}$.
4.53	For each relevant foreign currency C, the capital charges $Mkt_{fx,C}^{Up}$ and $Mkt_{fx,C}^{Down}$ will be calculated as:

$$Mkt_{f,c}^{up} = \max(0, \Delta NAV | C \text{ upward_shock})$$

$$Mkt_{f,c}^{downward} = \max(0, \Delta NAV | C \text{ downward_shock})$$

where $\Delta NAV | C$ upward shock and $\Delta NAV | C$ downward shock are the changes in net values of assets and liabilities due to the rise and fall respectively in value of the foreign currency against the local currency.

- 4.54 For each relevant foreign currency C, the currency position should include any investment in foreign instruments where the currency risk is not hedged. This is because the stresses for interest rate, equity, spread and property risks have not been designed to incorporate currency risk. Note that the look-through approach for funds discussed in section 4.8 below applies equally for currency risk.

4.5 Spread risk

4.5.1. Explanatory text

- 4.55 Spread risk is the part of risk that reflects the change in value of net assets due to a move in the yield on an asset relative to the risk-free term structure. The spread risk sub-module should address changes in both level and volatility of spreads.

- 4.56 QIS4 respondents suggested it would be helpful to have greater clarity on the scope of the spread risk sub-module. There are two particular areas of concern: first, the interaction between this sub-module and the counterparty default module, and second, the way in which certain financial instruments would be treated under this sub-module.

- 4.57 The interaction between the spread risk sub-module and the counterparty default risk module is also addressed in the draft advice relating to the counterparty default risk module. The Level 1 text relating to the counterparty default risk module is the starting point for this analysis: Article 105(6) states:

The counterparty default risk module shall reflect possible losses due to unexpected default, or deterioration in the credit standing, of the counterparties and debtors of insurance and reinsurance undertakings over the next twelve months. The counterparty default risk module shall cover risk-mitigating contracts, such as reinsurance arrangements, securitisations and derivatives, and receivables from intermediaries, as well as any other credit exposures which are not covered in the spread risk sub-module.

For each counterparty, the counterparty default risk module shall take account of the overall counterparty risk exposure of the insurance or reinsurance undertaking concerned to that counterparty, irrespective of the legal form of its contractual obligations to that undertaking.

- 4.58 The definition of spread risk in the Level 1 text allows a certain amount of freedom in setting the boundary between the spread risk sub-module and the counterparty default risk module. However, wherever the dividing line between these two modules is drawn, the principle should be that no risk is left unaddressed and no risk is double-counted.

4.59 The QIS4 Technical Specifications identified three areas of application for the spread risk sub-module:

- bonds
- structured credit products, such as asset-backed securities or collateralised debt obligations
- credit derivatives (e.g. credit default swaps (CDS), total return swaps (TRS), credit linked notes (CLN)) where:
 - The (re) insurance undertaking does not hold the underlying instrument or another exposure where the basis risk between that exposure and the underlying instrument is immaterial in all possible scenarios; or
 - The credit derivative is not part of the undertaking's risk mitigation policy

In QIS4, credit derivatives were only covered in the spread risk sub-module in relation to the credit risk transferred by the derivative: the credit risk of the counterparty to the derivative treaty was not covered, being addressed instead in the counterparty default risk module.

4.60 In general the QIS4 approach seemed to be accepted by the stakeholders. We therefore propose to clarify the scope of the spread risk sub-module as follows:

4.61 The spread risk sub-module should cover the credit risk of:

- credit derivatives
- other credit risky investments including in particular:
 - participating interests
 - debt securities issued by, and loans to, affiliated undertakings and undertakings with which an insurance undertaking is linked by virtue of a participating interest
 - debt securities and other fixed-income securities
 - participation in investment pools
 - loans guaranteed by mortgages
 - deposits with credit institutions

In relation to credit derivatives, only the credit risk which is transferred by the derivative is covered in the spread risk sub-module. Investments for the benefit of life-insurance policyholders who bear the investment risk are included only to the extent that the undertaking assumes spread risk.

4.62 No capital charge shall apply for the purposes of this sub-module to borrowings by or demonstrably guaranteed by national government of an OECD or EEA state, issued in the currency of the government, or issued by a multilateral development bank as listed in Annex VI, Part 1, Number 4 of the Capital Requirements Directive (2006/48/EC) or issued by an international organisation listed in Annex VI, Part 1, Number 5 of the Capital Requirements Directive (2006/48/EC).

4.63 The spread risk module therefore applies to at least the following classes of bonds:

- Investment grade corporate bonds
 - High yields corporate bonds
 - Subordinated debt
 - Hybrid debt
- 4.64 Furthermore, the spread risk module is applicable to all types of asset-backed securities as well as to all the tranches of structured credit products such collateralised debt obligations. This class of securities includes transactions of schemes whereby the credit risk associated with an exposure or pool of exposures is tranching, having the following characteristics:
- (a) payments in the transaction or scheme are dependent upon the performance of the exposure or pool of exposures; and
 - (b) the subordination of tranches determines the distribution of losses during the ongoing life of the transaction or scheme.
- 4.65 The spread risk sub-module will further cover in particular credit derivatives, for example (but not limited to) credit default swaps, total return swaps and credit linked notes that are not held as part of a recognised risk mitigation policy. As indicated above, the spread risk sub-module will also be applicable to all tranches of structured credit products like collateralised debt obligations. In addition, traditional forms of asset backed securities, that is commercial and residential mortgage backed securities, home equity loans, credit card receivables, auto loans, student loans as well as whole-business securitisations, infrastructure finance notes and other covered bonds are also addressed by this sub-module.
- 4.66 Instruments sensitive to changes in credit spreads may also give rise to other risks, which should be treated accordingly in the appropriate modules. For example, the counterparty default risk associated with the counterparty of a risk-mitigating transaction should be addressed in the counterparty default risk module, rather than in the spread risk sub-module.
- 4.67 The QIS4 approach to the spread risk sub-module relied on a factor-based methodology. In general, QIS4 participants seemed broadly happy with this approach.
- 4.68 The proposed design for the sub-module implies that credit spread risk hedging programmes can still be taken into account when calculating the capital charge for this risk type. This enables undertakings to gain appropriate recognition of, and allowance for, their hedging instruments – subject to proper treatment of the risks inherent in the hedging programmes.
- 4.69 The capital charge for spread risk will be determined by assessing the results of a factor-based calculation which considers a rise in credit spreads. Empirically, spreads tend to move in the same direction in a stressed scenario, and therefore the assumption is made that spreads on all instruments increase. This also helps to avoid excessive complexity.
- 4.70 The spread risk sub-module will not explicitly model migration and default risks. Instead, these risks will be addressed implicitly, both in the calibration of the factors and in movements in credit spreads. For

example, the impact of intra-month changes in rating will be reflected in any indices used to inform the calibration of the factors. The factors will also implicitly address not only change in the level of credit spreads but also term structure for the level of spreads. The sensitivity of the underlying portfolio to changes in level of volatility of credit spreads is also indirectly considered in this sub-module.

- 4.71 It would not be proportionate to explicitly test changes in the volatility of credit spreads as part of the standard formula approach. However, these factors will be implicitly taken into account when considering the calibration of the shock scenarios.
- 4.72 In that regard, CEIOPS is considering developing risk factors that vary by spread duration to take into account the non-linearity of spread risk across duration and credit rating.
- 4.73 The factor-based approach will be built from the market value of the instrument in question, and will take into account the credit rating of the instrument and its duration.
- 4.74 The approach to be taken for collective investment vehicles is set out in section 4.8 below. Similarly, a look-through approach should be applied to assets representing reinsurers' funds withheld by counterparty.
- 4.75 For collateralised debt obligations it will be important to take into account the nature of the risks associated with the collateral assets. For example, in the case of a CDO-squared, the rating should take into account the risks associated with the CDO tranches held as collateral, i.e. the extent of their leveraging and the risks associated with the collateral assets of these CDO tranches.
- 4.76 For credit derivatives, the capital charge will be scenario-based. The scenario will consider both a rise and fall in credit spreads. The capital charge is determined by the more onerous of the two scenarios.

4.5.2. CEIOPS' advice

Spread risk

- 4.77 The spread risk sub-module shall cover the credit risk of
- credit derivatives
 - Other credit risky investments including in particular:
 - participating interests
 - debt securities issued by, and loans to, affiliated undertakings and undertakings with which an insurance undertaking is linked by virtue of a participating interest
 - debt securities and other fixed-income securities
 - participation in investment pools
 - loans guaranteed by mortgages
 - deposits with credit institutions

- In relation to credit derivatives, only the credit risk which is transferred by the derivative is covered in the spread risk sub-module. Investments for the benefit of life-insurance policyholders who bear the investment risk are included only to the extent that the undertaking assumes spread risk.
- 4.78 No capital charge shall apply for the purposes of this sub-module to borrowings by or demonstrably guaranteed by national government of an OECD or EEA state, issued in the currency of the government, or issued by a multilateral development bank as listed in Annex VI, Part 1, Number 4 of the Capital Requirements Directive (2006/48/EC) or issued by an international organisation listed in Annex VI, Part 1, Number 5 of the Capital Requirements Directive (2006/48/EC).
- 4.79 The spread risk module applies to at least the following classes of bonds:
- Investment grade corporate bonds
 - High yields corporate bonds
 - Subordinated debt
 - Hybrid debt
- 4.80 Furthermore, the spread risk module is applicable to all types of asset-backed securities as well as to all the tranches of structured credit products such as collateralised debt obligations. This class of securities includes transactions of schemes whereby the credit risk associated with an exposure or pool of exposures is tranching, having the following characteristics:
- (a) payments in the transaction or scheme are dependent upon the performance of the exposure or pool of exposures; and
- (b) the subordination of tranches determines the distribution of losses during the ongoing life of the transaction or scheme.
- 4.81 The spread risk sub-module will further cover in particular credit derivatives, for example (but not limited to) credit default swaps, total return swaps and credit linked notes that are not held as part of a recognised risk mitigation policy. The spread risk sub-module will also address spread risk sensitivities of both mortgages and mortgage derivatives.
- 4.82 The sensitivity of the underlying security to changes in level of volatility of credit spreads should also be considered in this sub-module; notwithstanding that such instruments may also give rise to other risks (which should be treated accordingly in the appropriate modules).
- 4.83 The capital charge for spread risk shall be determined by assessing the results of a factor-based calculation which considers a rise in credit spreads. For credit derivatives, two scenario-based calculations should be performed, considering both a rise and a fall in credit spreads. The capital charge is determined by the more onerous of these two scenarios.
- 4.84 The spread risk sub-module will not explicitly model migration and default risks. Instead, these risks will be addressed implicitly, both in the calibration of the factors and in movements in credit spreads. The factors will also implicitly address not only change in the level of credit spreads but also term structure for the level of spreads as well as features of the volatility surface.

- 4.85 The factor-based approach will be built from the market value of the instrument in question, and will take into account the credit rating of the instrument and its duration.
- 4.86 For credit derivatives, the capital charge will be scenario-based.
- 4.87 The proposed design for the sub-module shall take account of credit spread risk hedging programmes.

4.6 Property risk

4.6.1. Explanatory text

- 4.88 Property risk arises as a result of sensitivity of assets, liabilities and financial investments to the level or volatility of market prices of property.
- 4.89 The capital charge for property risk is calculated based on the impact of a shock scenario on the net value of assets and liabilities. Although feedback from QIS4 indicated that some undertakings found a delta-NAV approach complicated, a shock to net asset value is less complex for property risk, as properties are only likely to be included in the undertaking's assets, making application of the stress scenario more straightforward. Furthermore, property risk can be a significant component of the market risk capital charge, as evidenced by QIS4.
- 4.90 In QIS4, a single stress (a 20% fall in real estate benchmarks) was applied to the net value of assets less liabilities. However, some respondents to QIS4 noted that this does not take account of the differences between different types of properties.
- 4.91 The capital charge for property risk $Mkt_{prop} \Delta NAV$ will be calculated as the result of a pre-defined scenario(s), ΔNAV property shock.
- 4.92 The property shock is the immediate effect on the net asset value of a fall in real estate benchmarks taking account of all the participant's individual direct and indirect exposures to property prices. The calibration of the shocks will be considered in the forthcoming draft advice on calibration of the market risk module.
- 4.93 It would not be proportionate to explicitly test changes in the volatility of property prices as part of the standard formula approach. However, these factors will be implicitly taken into account when considering the calibration of the shock scenarios.
- 4.94 As part of the calibration exercise, CEIOPS will investigate whether distinctions between commercial, retail and other types of property is possible. If this is the case it is possible that more than one scenario will be defined for property risk. CEIOPS believes that there may be merit in this approach, as there are structural market differences between the different types of property.
- 4.95 The following investments shall be treated as property and their risks considered accordingly in the property risk sub-module:
- land, buildings and immovable-property rights;

- direct or indirect participations in real estate companies that generate periodic income or which are otherwise intended for investment purposes;
- property investment for the own use of the insurance undertaking.

Otherwise, the following investments shall be treated as equity and their risks considered accordingly in the equity risk sub-module:

- an investment in a company engaged in real estate management, or
- an investment in a company engaged in real estate project development or similar activities, or
- an investment in a company which took out loans from institutions outside the scope of the insurance group in order to leverage its investments in properties.

- 4.96 Collective real estate investment vehicles should be treated like other collective investment vehicles with a look-through approach.
- 4.97 It would not be proportionate to explicitly test changes in the volatility of property prices as part of the standard formula approach. However, these factors will be implicitly taken into account when considering the calibration of the shock scenarios.
- 4.98 Where undertakings have property investments that consist of properties for their own use, these would be regarded as office properties if no other use is documented.

4.6.2. CEIOPS' advice

Property risk

- 4.99 The capital charge for property risk Mktprop will be calculated as the result of a pre-defined scenario(s).
- 4.100 The property shock is the immediate effect on the net asset value of a fall in real estate benchmarks taking account of all the participant's individual direct and indirect exposures to property prices. The calibration of the shocks will be considered in the forthcoming draft advice on calibration of the market risk module.
- 4.101 As part of the calibration exercise, CEIOPS will investigate whether distinctions between commercial, retail and other types of property is possible. If this is the case it is possible that more than one scenario will be defined for property risk.
- 4.102 The following investments shall be treated as property and their risks considered accordingly in the property risk sub-module:
- land, buildings and immovable-property rights;
 - direct or indirect participations in real estate companies that generate periodic income or which are otherwise intended for investment purposes;
 - property investment for the own use of the insurance undertaking.

Otherwise, the following investments shall be treated as equity and their risks considered accordingly in the equity risk sub-module:

- an investment in a company engaged in real estate management, or
- an investment in a company engaged in real estate project development or similar activities, or
- an investment in a company which took out loans from institutions outside the scope of the insurance group in order to leverage its investments in properties.

4.103 Collective real estate investment vehicles should be treated like other collective investment vehicles with a look-through approach.

4.7 Concentration risk

4.7.1. Explanatory text

4.7.1.1 *Scope of the module*

4.104 The scope of the concentration risk sub-module extends to assets considered in equity, interest rate, spread risk and property risk sub-modules within the market risk module, and excludes assets covered by the counterparty default risk module in order to avoid any overlap between both elements of the standard calculation of the SCR.

4.105 An appropriate assessment of concentration risks needs to consider both the direct and indirect exposures derived from the investments included in the scope of this sub-module.

4.106 Regarding direct exposures, it is relevant to discriminate between at least two cases:

- a) those investments where the failure or default of the issuer is borne, totally or partially, by the holder of the investment. This is the case of equities and a large number of bonds. (Independent of the fact that the risk described in this paragraph could be appropriately hedged);
- b) those investments where the failure or default of the issuer does not imply any economic loss for the holder of the investment under any scenario. This might be the case of some bonds or securitizations (Mitigating tools are not relevant in this case, since the direct exposure risk simply does not exist). Example: Special purpose vehicle created to handle the securitization of asset backed securities in which the default of the SPV does not imply a loss for the undertaking.

4.107 Regarding indirect exposures, two cases can be distinguished:

- a) those investments where it is sensible and workable to apply a look-through approach, or where there is no evidence that the indirect exposures are reasonably well-diversified, and therefore for the sake of prudence it is relevant to require a look-through approach. This may be the case of instrumental holdings or hedge funds.
- b) those investments where there is an evidence or legal guarantee that indirect exposures are reasonably well-diversified, in such a manner

that it is possible to reach a certainty on the lack of materiality of each individual indirect exposure.

- 4.108 Government bonds are exempted from the application of this sub-module. The exemption concerns borrowings by or demonstrably guaranteed by national government of an OECD or EEA state, issued in the currency of the government, or issued by a multilateral development bank as listed in Annex VI, Part 1, Number 4 of the Capital Requirements Directive (2006/48/EC) or issued by an international organisation listed in Annex VI, Part 1, Number 5 of the Capital Requirements Directive (2006/48/EC).
- 4.109 Due to its frequent presence in undertakings' investment portfolios, it may be worthwhile to clarify the treatment of UCITS.
- 4.110 The UCITS Directive 85/611/EEC includes diversification requirements regarding the issuers of the assets held by the UCITS. Article 22(1) of the UCITS Directive stipulates that a UCITS may invest no more than: [...]
- 5% of its assets in transferable securities or money market instruments issued by the same body, and
 - 20% of its assets in deposits made with the same body.
- 4.111 There are several Member State options to relax these limits. For example, the 5% limit may be raised to: [...]
- 10% (without further conditions);
 - 35% for bodies which are states, local authorities and certain public international bodies;
 - 25% for credit institutions which are supervised in a certain way;
 - 35% if the UCITS tries to replicate an index and certain conditions are fulfilled;
 - 100% for bodies which are states, local authorities and certain public international bodies if additional requirements are met.
- 4.112 Obviously, the diversification requirements in the UCITS Directive are not sufficiently strict to exempt all UCITS from the concentration risk sub-module. However, for most UCITS the degree of concentration is known, for example measured with the relative share of the largest exposure. This allows setting up an exemption rule as contained in this advice.
- 4.113 The method proposed in this advice may be illustrated with a simple example, where we assume the concentration threshold to be equal to 2%. The reference magnitude $Assets_{xl}$ in the example is equal to 100. The undertaking holds a UCITS investment with a market value of 20 (i.e. quite a relevant investment). The UCITS is exempted from the concentration sub-module if the share of no single investment of the UCITS exceeds $2\% \cdot 100 / 20 = 10\%$.
- 4.114 This approach ensures that no single counterparty exposure of an exempted UCITS exceeds the concentration threshold (CT). Compared to applying a look-through approach to all UCITS, concentrations may be missed if they are spread over several UCITS or spread over UCITS and the remaining assets of the undertaking. Moreover, the definition of a body in the UCITS Directive and the definition of the independent counterparty in the concentration module may differ. It is difficult to

capture in a simple manner within the standard SCR calculation all these more sophisticated or complex to identify types of concentration. In these circumstances, the approach proposed below seems acceptable and workable in order to maintain the balance between simplicity and accuracy.

- 4.115 Considering its practical importance in some markets, this advice also contains specific rules regarding mortgage covered bonds and public sector covered bonds.
- 4.116 CEIOPS would like to hear stakeholders' views on a preferred option for the concentration threshold for mortgage covered bonds and public sector covered bonds:
- 4.117 Threshold applicable shall be 15 per cent when all the following requirements are met:
- the asset has a AA credit quality
 - the portfolio of mortgages backing the asset is diversified into a sufficiently high number of borrowers
 - there is no evidence of high correlation or connection among the default of one or few borrowers
 - the covered bond meets the requirements defined in Article 22(4) of the UCITS directive 85/611/EEC
- 4.118 While QIS4 specifications considered some national exemptions, this advice proposes specific thresholds for the assets referred in the previous paragraph, thereby removing any national reference.
- 4.119 Specific thresholds are considered to be a more economically consistent solution than exemptions, since it cannot be ascertained that the aforementioned assets are fully riskless, both from a default perspective, from a look-through approach and from a managerial consideration. Obviously the application of specific thresholds is subject to adequate requirements, taking into account which categories of these instruments have demonstrated to provide sufficient safety during the current crisis.
- 4.120 Another feature to consider in this advice refers to the treatment of assets which are allocated to policies where the policyholders bear the investment risk. To the extent that the risk in these assets is passed on to policyholders, it lacks economic sense to consider those assets in the calculations of this sub-module.
- 4.121 Financial derivatives on equity and defaultable bonds should be properly attributed to the net exposure, i.e. an equity put option reduces the equity exposure to the underlying 'name' and a single-name CDS ('protection bought') reduces the fixed-income exposure to the underlying 'name'. The exposure to the default of the counterparty of the option or the CDS is not treated in this module, but in the counterparty default risk module. Also, collaterals securitising bonds should be taken into account. Similarly, a look-through approach should be applied to assets representing undertakings' funds withheld by counterparty.
- 4.122 Exposures via investment funds or such entities whose activity is mainly the holding and management of an undertaking's own investment need to be considered on a look-through basis unless otherwise stated in this

advice. The same holds for CDO tranches and similar investments embedded in 'structured products'.

4.7.1.2 Design of the module

4.123 Market risk concentration in financial investments presents an additional risk to an insurance or reinsurance undertaking because of:

- additional volatility that exists in concentrated asset portfolios; and
- the additional risk of partial or total permanent losses of value due to the default of an issuer.

4.124 In the case of properties, the second bullet point above is not applicable. Since for the sake of simplicity the calculations of this sub-module for properties are those applicable to financial investments, the lack of relevance of the second bullet point is reflected in the parameters proposed for properties.

4.125 The model approach included in this advice is the same used in QIS3 and QIS4, since it is simple to understand and captures the targeted risk in a rather straightforward manner, which was confirmed in QIS4.

4.126 The approach is based on the setting of certain thresholds depending on the credit quality of the exposure. For those exposures that are kept below the threshold there is no capital charge, while above it a capital requirement is triggered.

4.127 All exposures to the same party are cumulated. Exposures of different entities within the same group considered in the calculation of own funds are taken jointly, in order to provide a fair reflection of the group risks, whose importance has been demonstrated in the current crisis.

4.128 In particular, entities (regulated or not) which belong to the same group as defined in Article 212 of the Level 1 text¹⁴ or to the same financial conglomerate as defined in Article 2(14) of the Financial Conglomerate Directive (2002/87/EC) should be treated as dependent exposures. Consequently, the different legal entities of the group or financial conglomerate considered in the calculation of own funds should be treated as one exposure in the sub-module calculations and no diversification effects between the entities are taken into account in the capital requirement. Cross-sectoral developments on the treatment of intra-group relations may be taken into account for further developing the notion of dependency.

4.129 The process of calculation is simple. The bulk of the analysis lies in the identification of all the exposures borne, directly or indirectly, explicit or hidden, by the undertaking. Since this analysis and identification of the exposures is necessary to achieve an appropriate risk management and to allow for a risk-oriented SCR, the concentration risk sub-module uses as input the results of other existing risk management actions.

4.130 As one of the lessons learnt from the crisis and as a reflection derived from some comments of the industry on QIS4, the present advice

¹⁴ "Group" means a group of undertakings, which consists of a participating undertaking, its subsidiaries and the entities in which the participating undertaking or its subsidiaries hold a participation, as well as undertakings linked to each other by a relationship as set out in Article 12(1) of Directive 83/349/EEC.

proposes a reduction of the thresholds of this sub-module. The crisis has demonstrated that should QIS4 thresholds be used, the impact of failures (such as for example Lehman Brothers), or downfalls of equities prices (such as for example Fortis or AIG), would most likely have had devastating consequences.

- 4.131 Considering that on average own funds represent around 25 per cent of total assets, setting a 5 per cent threshold referring to total assets, would mean that an undertaking would be allowed to risk about 20 per cent of its own funds with a single exposure, without imposing any capital requirement for such concentration. The crisis has demonstrated the inappropriateness of this allowance, not only with respect the worst credit quality exposures, but even with respect to the best ones.
- 4.132 Therefore, this advice proposes using thresholds of 2 per cent in respect AAA-AA-A rated exposures, which means on average not to require capital up to 8 per cent of total own funds. For other rated and all non-rated exposures, the proposed threshold is 1 per cent of total assets. Furthermore, it is likely that the equity risk stress and the credit spread risk factors will be calibrated based on well diversified indices. For example, the MSCI World Index that was used to calibrate the equity stress of the previous QIS exercises comprises about 1600 titles and the largest constituent contributes about 2% to the total market capitalisation of the index. Since the concentration risk charge is the mechanism for correcting the assumption underlying the equity stress that the insurer holds an equally well diversified portfolio, CEIOPS believes that the proposed reduction in the thresholds is reasonable.
- 4.133 The calibration process and methodology have been adapted to give appropriate allowance to this reduction.
- 4.134 In the case of properties, the thresholds proposed are higher in order to take into account the different features mentioned at the beginning of this section.

4.7.1.3 Calibration

- 4.135 CEIOPS points out that the calibration in this advice is being considered to be in line with 99.5% VaR and a one year time horizon, incorporating the experience from the current crisis. QIS5 will give an indication of the overall impact of the proposed calibrations, not limited to the SCR but including technical provisions and own funds.
- 4.136 The calibration of this sub-module is based on quite simple evidence: the risk (volatility - VaR) of a badly diversified portfolio is higher than in the case of a well-diversified basket of investments.
- 4.137 The calibration process, detailed in annex A to this advice, is based on the comparison of the historical VaR of a well-diversified portfolio and the VaR of a set of portfolios where the representativeness of a concrete exposure is increased step by step by 1 per cent. In other words, the initially well-diversified portfolio is progressively being transformed in a more and more badly diversified portfolio, by increasing successively the importance of a single concrete exposure.
- 4.138 In each step the initial VaR (well-diversified portfolio) is compared to the VaRs of the progressively worsened portfolios, deriving a raw line charting the 2-dimensional link between the increase in the level of concentration

of investments and the increase of VaR. Fitting a straightforward function is the final step to deliver the parameters reflected in this advice.

- 4.139 The aforementioned process is repeated for each of the exposures of the initially well- diversified portfolio, in order to derive specific parameters for exposures with different credit quality.
- 4.140 This calibration process was applied in QIS3 and QIS4 without receiving substantial comments. The current calibration has included the experience of the current crisis till 30 April 2009.

4.7.2. CEIOPS' advice

A. Assets covered by concentration risk sub-module

- 4.141 The concentration risk sub-module covers assets considered in equity, interest rate, spread risk and property risk sub-modules within the market risk module, to the extent that those assets are not covered by the counterparty default risk module, in order to avoid any overlap among both elements of the standard calculation of the SCR.
- 4.142 The assessment of concentration risk needs to consider both the direct exposures and the indirect exposures derived from the investments considered in this sub-module.
- 4.143 Assets which are allocated to policies where the policyholders bear the investment risk should be excluded from this risk module. However, as these policies may have embedded options and guarantees, an adjustment (calculated using a scenario-based approach) is added to the formula to take into account the part of the risk effectively borne by the undertaking.
- 4.144 For the sake of simplicity and consistency, the definition of market risk concentrations regarding financial investments is restricted to the risk regarding the accumulation of exposures with the same counterparty. It does not include other types of concentrations (e.g. geographical area, industry sector, etc.).
- 4.145 Undertakings and supervisors shall verify that the SCR provides an appropriate reflection of the risk profile of the undertaking. Should this not be the case with respect to any type of concentration of assets or liabilities, necessary actions shall be adopted in a relevant manner, i.e. via internal models or through a capital add-on.
- 4.146 According to an economic approach, exposures which belong to the same group as defined in Article 212 of the Level 1 text or to the same financial conglomerate as defined in Article 2(14) of the Financial Conglomerate Directive (2002/87/EC) should not be treated as independent exposures. The legal entities of the group or the conglomerate considered in the calculation of own funds should be treated as one exposure in the calculation of the capital requirement.
- 4.147 Government bonds are exempted from the application of this module. The exemption concerns borrowings by or demonstrably guaranteed by national government of an OECD or EEA state, issued in the currency of the government, or issued by a multilateral development bank as listed in

Annex VI, Part 1, Number 4 of the Capital Requirements Directive (2006/48/EC) or issued by an international organisation listed in Annex VI, Part 1, Number 5 of the Capital Requirements Directive (2006/48/EC).

- 4.148 Risks derived from concentration in cash held at a bank are captured in the counterparty default risk module, while risks corresponding to concentration in other bank assets shall be reflected in the concentration risk sub-module (no-hole, no-overlap).
- 4.149 Furthermore, bank deposits considered in the concentration risk sub-module can be exempted to the extent their value is covered by a government guarantee scheme in the EEA area, the guarantee is applicable unconditionally to the undertaking and provided there is no double-counting of such guarantee with any other element of the SCR calculation.
- 4.150 UCITS are included in the scope of this module to the extent outlined in section E below.
- 4.151 CEIOPS will produce an advice on participations and their treatment in the solvency assessment of an undertaking at the end of October. Therefore, this advice does not refer to participations. This exclusion does not mean any position in advance regarding the treatment of participations in concentration risk sub-module.
- 4.152 In general, undertakings and supervisors should verify that the SCR provides an appropriate reflection of the risk profile of the insurance or reinsurance undertaking. Should this not be the case with respect to the concentration of assets or liabilities, necessary action will need to be adopted in a relevant manner, i.e. via internal models or through capital add-ons.

B. Inputs required for financial concentration risk

- 4.153 Risk exposures in assets need to be grouped according to the counterparties involved.

E_i = Net exposure at default to counterparty i

$Assets_{xi}$ = Amount of total assets considered in this sub-module according the paragraphs contained in this advice in the item '*Assets covered by concentration risk sub-module*'. Government bonds should be included in this amount, notwithstanding the exemption specified in 4.147.

$rating_i$ = External rating of the counterparty i

- 4.154 Where an undertaking has more than one exposure to a counterparty then E_i is the aggregate of those exposures at default. $Rating_i$ should be a weighted rating determined as the rating corresponding to a weighted average credit quality step, calculated as:

Weighted average credit quality step = round (average of the credit quality steps of the individual exposures to that counterparty, weighted by the net exposure at default in respect of that exposure to that counterparty)

- 4.155 The net exposure at default to an individual counterparty i shall comprise all assets contained in Section A of this advice (*Assets covered by concentration risk sub-module*), including hybrid instruments, e.g. junior debt, mezzanine CDO tranches

4.156 When calculating the net exposures, financial mitigation techniques shall be considered in this sub-module except to the extent that they have already been taken into account in other modules or sub-modules. They shall be considered only when they meet the requirements set out for financial mitigation techniques (see CEIOPS-DOC-26/09 at <http://www.ceiops.eu/index.php?option=content&task=view&id=579>).

4.157 Financial derivatives on equity and defaultable bonds should be properly attributed to the net exposure, i.e. an equity put option reduces the equity exposure to the underlying 'name' and a single-name CDS ('protection bought') reduces the fixed-income exposure to the underlying 'name'. The exposure to the default of the counterparty of the option or the CDS is not treated in this module, but in the counterparty default risk module. Also, collaterals securitising bonds should be taken into account. Similarly, a look-through approach should be applied to assets representing undertakings' funds withheld by a counterparty.

4.158 Exposures via investment funds or such entities whose activity is mainly the holding and management of an undertaking's own investment need to be considered on a look-through basis unless otherwise stated in this advice. The same holds for CDO tranches and similar investments embedded in 'structured products'.

C. Output

4.159 The module delivers the following outputs:

Mkt_{conc}	=	Total capital charge concentration risk sub-module
$Mkt_{conc\ financial}$	=	Capital charge for financial concentration risk
$Mkt_{conc\ properties}$	=	Capital charge for properties concentration risk

D. Calculation

4.160 Based on the assumptions contained in the explanatory text, CEIOPS has calibrated the sub-module according to 99.5% VaR and a one year time horizon.

4.161 The calculation is performed in three steps: (a) excess exposure, (b) risk concentration charge per 'name', (c) aggregation.

4.162 The excess exposure is calculated as:

$$XS_i = \max\left\{0; \frac{E_i}{Assets_{xl}} - CT\right\},$$

where the concentration threshold CT, depending on the rating of counterparty i, is set as follows:

rating _i	Concentration threshold (CT)
AA-AAA	3%
A	3%
BBB	1.5%

BB or lower 1.5%

4.163 The risk concentration charge per 'name' i is calculated as:

$$Conc_i = Assets_{xl} \cdot XS_i \cdot g_i + \Delta Liab_{ul}$$

where XS_i is expressed with reference to the unit (i.e. an excess of exposure i above the threshold of 8%, delivers $XS_i = 0.08$) and the parameter g , depending on the credit rating of the counterparty, is determined as follows:

rating _{i}	Credit Quality Step	g_i
AAA	1	0.12
AA		
A	2	0.21
BBB	3	0.27
BB or lower, unrated	4 – 6, -	0.73

and where

4.164 $\Delta Liab_{ul}$ is the impact on the undertaking's liabilities (for policies where the policyholders bear the investment risk) of a change in the value of the assets of the issuer attracting a concentration risk charge by $XS_i \cdot g_i$ (subject to a minimum of nil).

For "names" which can only be found on the assets used as the reference to the valuation of the liabilities, the risk concentration charge per name ' i ' is calculated as follows: $Conc_i = \Delta Liab_{ul,i}$

4.165 The capital requirement for financial concentration risk is determined assuming a correlation of 0.25 among the requirements for each counterparty i .

$$Mkt_{conc_financial} = \sqrt{\sum_i \left(Conc_i^2 + \sum_j 0.25 * Conc_i * Conc_j \right)}, \text{ for } j \neq i$$

4.166 This sub-module (as for the whole of the market risk module) is in the scope of the approach for the loss absorbency of technical provisions as set out in CP54.

E. Special reference to UCITS

4.167 Investments in a single UCITS i are exempted from the concentration risk sub-module if the maximum share of the UCITS assets which are invested in a single body does not exceed

$$CT_{UCITS,i} = CT \cdot \frac{Assets_{xl}}{MW_{UCITS,i}},$$

where

$CT_{UCITS,i}$ = concentration threshold for UCITS i

$MW_{UCITS,i}$ = market value of the undertaking's investment in UCITS i
 CT = concentration threshold of the sub-module, as defined above
 $Assets_{x,i}$ = comparative measure of the sub-module

4.168 Whether the UCITS is sufficiently diversified to meet this criterion, may for example be determined

- from the composition of the UCITS' assets at the valuation date (e.g. from list of top holdings),
- if the UCITS' investment policy is to replicate a certain index, from the composition of the index or
- from the diversification requirements for UCITS of the Member State that the UCITS is situated in.

4.169 A look-through approach should be applied to all UCITS which are not exempted from the sub-module.

F. Special reference to mortgage covered bonds and public sector covered bonds

4.170 In order to provide mortgage covered bonds and public sector covered bonds with a treatment in concentration risk sub-module according to their specific risk features, the threshold applicable shall be 15 per cent when all the following requirements are met:

- the asset has a AA credit quality
- the portfolio of mortgages backing the asset is diversified into a sufficiently high number of borrowers
- there is no evidence of high correlation or connection among the default of one or few borrowers
- the covered bond meets the requirements defined in Article 22(4) of the UCITS directive 85/611/EEC

G. Concentration risk capital in case of properties

4.171 Undertakings shall identify the exposures in a single property higher than 10 per cent of 'total assets' considered in this sub-module according to contained in Section A of this advice (*Assets covered by concentration risk sub-module*). Government bonds should be included in this amount, notwithstanding the exemption specified above.

4.172 For this purpose the undertaking shall take into account both properties directly owned and those indirectly owned (i.e. funds of properties), and both ownership and any other real exposure (mortgages or any other legal right regarding properties).

4.173 Properties located in the same building or sufficiently nearby shall be considered a single property.

4.174 This capital charge is calculated for properties concentration risk under the

condition that the assumptions on future bonus rates (reflected in the valuation of future discretionary benefits in technical provisions) remain unchanged before and after a presumed change in volatility and/or default level of concentrated assets.

4.175 Additionally, the result of the calculation should be determined under the condition that the participant is able to vary its assumptions in future bonus rates in response to the shock being tested. If this calculation is not feasible in a reliable manner, the capital requirement for financial concentration risk shall be the obtained according the previous paragraph.

4.176 Exposures exceeding the threshold shall deliver a capital requirement calculated applying the formula reflected in this sub-module for financial investments rated as AA. Capital requirements for different properties shall be aggregated assuming a correlation factor 0 between the requirements for each property. The concentration risk component (in respect of properties only) is

$$Mkt_{conc} = \sqrt{\sum_i Conc_i^2} .$$

H. Aggregation of capital requirements reflecting financial and properties concentration risks

4.177 The total concentration risk capital requirement Mkt_{conc} for financial investments and properties shall be calculated by using the same correlation applied to sub-modules regarding properties and equity risk.

4.8 Treatment of investment funds

4.8.1. Explanatory text

4.178 Respondents to the QIS4 exercise suggested it would be helpful to have greater clarity as to the treatment of collective investment vehicles, and other investments packaged as funds, in the market risk module.

4.179 In order to properly assess the market risk inherent in these instruments, it will be necessary to examine their economic substance. Wherever possible, this should be achieved by applying a look-through approach in order to assess the risks applying to the assets underlying the investment vehicle. Each of the underlying assets would then be subjected to the relevant sub-module stresses and capital charges calculated accordingly.

4.180 The same look-through approach shall also be applied for other indirect exposures.

4.181 Where a number of iterations of the look-through approach is required (e.g. where an investment fund is invested in other investment funds), the number of iterations shall be sufficient to ensure that all material market risk is captured.

4.182 The above recommendations can be applied to both passive and actively managed funds, except for investments in funds that track a well-diversified index including only listed equity from developed markets.

4.8.2. CEIOPS' advice

Investment funds

- 4.183 In order to properly assess the market risk inherent in collective investment vehicles, and other investments packaged as funds, it shall be necessary to examine their economic substance. Wherever possible, this shall be achieved by applying a look-through approach in order to assess the risks applying to the assets underlying the investment vehicle. Each of the underlying assets would then be subjected to the relevant sub-module stresses and capital charges calculated accordingly.
- 4.184 The look through approach shall also be applied for other indirect exposures.
- 4.185 Where a number of iterations of the look-through approach is required (e.g. where an investment fund is invested in other investment funds), the number of iterations shall be sufficient to ensure that all material market risk is captured.
- 4.186 The above recommendations can be applied to both passive and actively managed funds except for investments in funds that track a well-diversified index including only listed equity from developed markets.

4.9 Treatment of risks associated to SPV notes held by a (re)insurance undertaking

4.9.1. Explanatory text

- 4.187 One of the main cornerstones of the Level 1 text measures regarding investments, is the obligation imposed to undertakings to invest only in those assets whose risks the undertaking can identify, measure, monitor, manage, control and report, and appropriately take into account in the assessment of its overall solvency needs in Article 45(1) (article 132 of the Level 1 text).
- 4.188 According the Level 1 text, the standard calculation of the SCR should take account of the risks inherent to all assets held by an (re)insurance undertaking.
- 4.189 Notes issued by a SPV and held by an undertaking are assets, and therefore the aforementioned requirements apply.
- 4.190 Due to their intrinsic legal and financial architecture, SPV notes are one of the investments where the requirements of the Level 1 text, in particular article 132, are more complex to meet, and at the same time their inappropriate application may endanger significantly the solvency position of an undertaking holding significant exposures in SPV notes.
- 4.191 CEIOPS is aware that in some cases (i.e. SPV notes materializing securitization of insurance risks of one or various undertakings), the note-holder will likely not be able by its own to meet the aforementioned requirements of the level 1 text, in particular if it holds a material

exposure to SPV notes. But this cannot be called to propose a relaxed application of article 132 or an inadequate treatment of the risks of SPV notes in the standard calculation of the SCR.

4.192 For this purpose, it is necessary to have in mind that the same issuance of notes uses to have different tranches with substantially different risk profiles. For example, the tranche where losses are firstly passed to the note-holders is the riskiest one, in such a manner that is commonly named as '*equity tranche*', which is sufficiently illustrative of the perception markets have about the nature and risks of this tranche.

4.193 CEIOPS distinguishes two types of SPV notes, and their corresponding treatment in the calculation of the standard solo SCR of the undertaking holding SPV notes:

- **SPV notes internal to the group** (for this purpose the definition set out in CEIOPS advice on Special Purpose Vehicles ¹⁵ shall apply accordingly to the principle of substance over form).
- **SPV notes that are not internal to the group the holder belongs to,**

4.194 Non-intra-group SPV notes, considering as such those materializing a securitization of risks of entities external to the group the undertaking belongs to, should be treated as follows:

a.1) Non-intra-group SPV notes having mostly the features of fixed-income bonds, authorized and subject to the requirements set out in CEIOPS-DOC-32/09 on SPV's¹⁶, and rated BBB (stable) or better: Their risks shall be considered in the 'spread risk', 'interest rate risk' and concentration sub-modules according its rating.

a.2) Non-intra-group SPV notes having mostly the features of fixed-income bonds, authorized and subject to the requirements set out in CEIOPS-DOC-32/09, rated below BBB(stable) or unrated: Their risks shall be considered in the 'equity risk' sub-module as non-traded equities, unless they are traded actively in a financial market.

a.3) Others non-intra-group SPV notes, including those having significant features of equities (i.e. equity tranche notes): Their risks shall be considered in the 'equity risk' sub-module. For this purpose the SPV notes shall be considered as non-traded equities, unless they are traded actively in a financial market.

4.195 Intra-group SPV notes, considering as such those materializing in a major part a securitization of risks of entities belonging to the group of the undertaking. In this respect CEIOPS-DOC-32/09 advises [See final document for the final reference]:

'...SPVs could be used by more than one undertaking within the same group, to transfer risk to outside this group. However an SPV should only be used by one group and not by a number of undertakings from different groups...

Where separate undertakings within a group use an SPV, that SPV should be established in such a way that the SPV is protected from the

¹⁵ Reference to former cp 36

¹⁶ Former CP 36. See <http://www.ceiops.eu/index.php?option=content&task=view&id=584>

impact of a related undertaking within a group being wound up ("such as a bankruptcy remote vehicle")...

An important mandatory condition for authorising an intra-group SPV is that the undertaking cannot use an internal SPV (i.e. one where no element of finance is raised externally) to achieve a regulatory capital reduction at group level in the absence of any financing external to the group.

... In the absence of external financing, only the solo undertaking who has the contract with the SPV may take regulatory capital relief for the SPV.

CEIOPS considers that, as separate undertakings within a group using a SPV should ensure the SPV is structured in such a way that the SPV is protected from the impact of a related undertaking within a group being wound up, the same principle should apply to intra-group SPVs.

The requirements should be assessed in relation to the solo undertaking.

- 4.196 An undertaking holding intra-group SPV bears various and complex risks (not only underwriting risks, but might also bear operational risks, market risks, counterparty default risks, and additionally group specific risks). By its own nature and complexity, CEIOPS considers that such risks cannot be captured appropriately in the standard formula. Therefore, in order to ascertain that the SCR will reflect the risks assumed by the undertaking, it is expected according to the Level 1 text that an undertaking aiming to assume a material exposure in intra-group SPV notes will develop appropriate internal model, to capture each of the risks associated to the holding of the SPV notes, and provide evidence that the SPV does not reallocate artificially the capital requirements among the entities of the group.
- 4.197 If in application of the proportionality principle an undertaking without meeting the requirement of the previous paragraph, holds SPV notes, they should receive similar treatment as in the case of external SPV notes, being considered in any case as non-traded assets.
- 4.198 Normally, intra-group SPV notes materializing securitization of insurance risks, even when they are formally listed in a concrete financial market, will in substance represent assets without a deep, liquid and transparent market, in such a manner it is not possible to ascertain that their prices are formed by the concurrence of multiple independent parties willingness to trade the SPV note.

4.9.2. CEIOPS' advice

Investments in SPV notes

4.199 Non-intra-group SPV notes, considering as such those materializing a securitization of risks of entities external to the group the undertaking belongs to, should be treated as follows:

- a.1) Non-intra-group SPV notes having mostly the features of fixed-income bonds, authorized and subject to the requirements set out in

CEIOPS-DOC-32/09, and rated BBB (stable) or better: Their risks shall be considered in the 'spread risk', 'interest rate risk' and concentration sub-modules according to its rating.

a.2) Non-intra-group SPV notes having mostly the features of fixed-income bonds, authorized and subject to the requirements set out in CEIOPS-DOC-32/09, rated below BBB(stable) or unrated: Their risks shall be considered in the 'equity risk' sub-module as non-traded equities, unless they are traded actively in a financial market.

a.3) Others non-intra-group SPV notes, including those having significant features of equities (i.e. equity tranche notes): Their risks shall be considered in the 'equity risk' sub-module. For this purpose the SPV notes shall be considered as non-traded equities, unless they are traded actively in a financial market.

4.200 Intra-group SPV notes, considering as such those materializing in a major part a securitization of risks of entities belonging to the group of the undertaking. In this respect CEIOPS-DOC-32/09, advises [In case of discrepancies, see the final text of CEIOPS-DOC-32/09]:

'...SPVs could be used by more than one undertaking within the same group, to transfer risk to outside this group. However an SPV should only be used by one group and not by a number of undertakings from different groups...

Where separate undertakings within a group use an SPV, that SPV should be established in such a way that the SPV is protected from the impact of a related undertaking within a group being wound up ("such as a bankruptcy remote vehicle")...

An important mandatory condition for authorising an intra-group SPV is that the undertaking cannot use an internal SPV (i.e. one where no element of finance is raised externally) to achieve a regulatory capital reduction at group level in the absence of any financing external to the group.

... In the absence of external financing, only the solo undertaking who has the contract with the SPV may take regulatory capital relief for the SPV.

CEIOPS considers that, as separate undertakings within a group using a SPV should ensure the SPV is structured in such a way that the SPV is protected from the impact of a related undertaking within a group being wound up, the same principle should apply to intra-group SPVs.

The requirements should be assessed in relation to the solo undertaking.

4.201 An undertaking holding intra-group SPV bears various and complex risks (not only underwriting risks, but might also bear operational risks, market risks, counterparty default risks, and additionally group specific risks). By its own nature and complexity, CEIOPS considers that such risks cannot be captured appropriately in the standard formula. Therefore, in order to ascertain that the SCR will reflect the risks assumed by the undertaking, it is expected according to the Level 1 text that an undertaking aiming to assume a material exposure in intra-group SPV notes will develop appropriate internal model, to capture each of the risks associated to the

holding of the SPV notes, and provide evidence that the SPV does not reallocate artificially the capital requirements among the entities of the group.

4.202 If in application of the proportionality principle an undertaking without meeting the requirement of the previous paragraph, holds SPV notes, they should receive similar treatment as in the case of external SPV notes, being considered in any case as non-traded assets.

4.203 Normally, intra-group SPV notes materializing securitization of insurance risks, even when they are formally listed in a concrete financial market, will in substance represent assets without a deep, liquid and transparent market, in such a manner it is not possible to ascertain that their prices are formed by the concurrence of multiple independent parties willingness to trade the SPV note.

ANNEX A Calibration of concentration risk sub-module, within the market risk module

Description

A.1. The general goal of this calculation is to provide a workable evidence of the impact that a concentration in a single counterparty may have in the risk profile of a well-diversified portfolio of assets.

A.2. The methodology applied for this purpose is in its essence that used to calibrate QIS4, since it did not pose any practical problem or conveyed misleading results

This method may be described as follows:

A.3. **1st. step.- The starting point is the design of a well-diversified portfolio of investments in individual names with the following characteristics:**

a) The portfolio has a mix, representative of EU average undertakings' portfolios of investments in bonds and equities. The mix proposed is 80% - 20% corresponding bonds – equities respectively according the data of asset allocation 2008 released by CEIOPs.¹⁷

b) Within each of these two groups, a sector-distribution of investments is built, also according to an EU expected average, as follows:

a. Investment in bonds: We have assumed that 25 % of total portfolio is invested in risk-free bonds. Then 55% of the total portfolio (55=100-20-25) is invested in corporate bonds of different sectors and ratings as described below.

b. Investment in equities: To the extent that this exercise assumes as starting point a well-diversified portfolio, consequently it should replicate some equity index sufficiently representative and well-known. In a first instance the selected names were those belonging to the index **Eurostoxx 50**, and the period used to record data of prices, ranges **from 1993-april-1 until 2009-april-30th**. The length of this period guarantees sufficient historical data to derive VaR 99.5% with a high degree of reliability.

c. After having collected the data prices, an individual assessment of the historical vector of prices for each equity has revealed that for a number of elements of the index the records of data prices are only available for a significantly shorter period than that above mentioned or are not homogeneous¹⁸.

¹⁷ The mix used in QIS4 was 30-70 according the data existing with reference to 2007.

¹⁸ As part of the initial steps of calibration exercise of concentration risk, a complete set of tentative checking-tests was carried out to optimize the design of the method. The outputs of these preliminary calculations may be summarized as follows:

- Dealing with concentration risk requires obviously the use, as starting point, of a sufficiently high number of exposures,

d. Therefore, to obtain a sufficiently numerous and well-diversified portfolio, after filtering the components of Eurostoxx 50 as mentioned above, other additional names have been added to complete all the buckets of the cross-table resulting from, on one dimension rating categories considered, and on the other dimension economic sectors included in this exercise. These additional elements have been chosen aiming also a wider geographical representativeness than that derived from Eurostoxx 50.

Description of bonds-portfolio

A.4. In order to avoid the effect of the change in Macaulay Duration (as times goes by and the life of the bond shortens), the effect of renewal of the investment once matured¹⁹ and, what is more important, to reflect the whole risk belonging to each sector/rating it was decided:

1. Bonds used in the computation are notional bonds, all of them issued at 5% rate and pending 5 years to maturity. At any moment of the simulation each bond maintain these features (which could be accepted as representative average features of the bonds existing in insurance portfolios)

2. To capture and summarize market information about each sector/rating, notional bonds described in point 1) are valued with Bloomberg corporate yield curves, according the corresponding sector/rating. The following table lists these yield curves:

1	F888 EUR BANK AAA
2	F462 INDS AA+
3	F890 BANK AA
4	F580 UTIL AA
5	F892 BANK A
6	F583 UTIL A
7	F465 INDUS A
8	F898 BANK BBB
9	F625 TELEF A
10	F468 INDUS BBB
11	F469 INDUS BBB-
12	F682 TELEF BBB+
13	F470 INDUS BB

-
- Nevertheless, as important as the number of different exposures is to guarantee that the selected names reflect a variety of behaviours sufficiently disperse, in such a way that almost all existing and possible equities/bonds fall in the range of behaviours considered
 - Under the above assumption, increasing the number of names did not have a significant added value (the outputs were rather similar), while the computational burden increases and the analysis of a higher number of names became less transparent.

¹⁹ This avoids contaminating the method with a rather arbitrary decision, since one should have to select a replacing bond to substitute those previously matured.

A.5. Finally, the first step of the calibration exercise has calculated the historic 1-year VaR 99.5% of a mixed portfolio (20% invested in the equities portfolio, 25% in risk-free bonds and 55% in corporate bonds). This measure is calculated twice:

1. Firstly, taking into account all the names and its corresponding yield curves as listed above:

$$\text{VaR (99.5 \%)} = 21.73 \%$$

2. Secondly, excluding worse than BBB names and its corresponding yield curve, as listed above.

$$\text{VaR (99.5 \%)} = 17.27 \%$$

3. In both cases, risk-free bonds are priced with the German sovereign curve.

A.6. As one can appreciate, there is sufficient rationale to calibrate firstly BB polynomial using the whole portfolio and afterwards, in a second step, to calibrate BBB, A and AA-AAA polynomial with a less volatile portfolio. Also a calibration using less rating classes may give some confirmation of results obtained with a wider range of ratings.²⁰

A.7. **2nd step.- Concentrating exposures in the initial portfolio:**

A.8. First of all, we have established a bijective correspondence between each equity name and one of the interest rates curves above listed, taking into account its sector / rating. This means that when we concentrate the whole portfolio we concentrate at the same time the investment in the selected equity and its correspondent notional bond.

1. The exercise begins selecting a concrete name with a certain rating, (i.e. a bank rated AA) and its relevant notional bond (Banks AA). Then, we increase in steps of 1 per cent its total weight in respect of the whole portfolio, obviously reducing simultaneously the participation of the rest of counterparties (to isolate purely the effect of concentration on the selected name).

2. Increases of concentration levels range from the starting weight up to the starting weight plus 70%, (as above mentioned, using 1% steps). For each level of concentration, we calculate the difference between the historic 1-year VaR 99.5% of the starting portfolio (well-diversified) and historic 1-year VaR 99.5% of the concentrated portfolio, and this difference is considered a raw proxy of an eventual concentration charge (it is called *Variation VaR.*)

3. Points of raw-concentrations charges obtained in the successive increases of concentration for each name are drawn, interpolating a straight line, and then deriving the parameter g.

²⁰ One has to bear in mind that due their high volatility, considering BB curve and BB-B equities increases (in relative terms) the goodness of the rest of names/ratings.

Thus, for each level of rating i we will have:

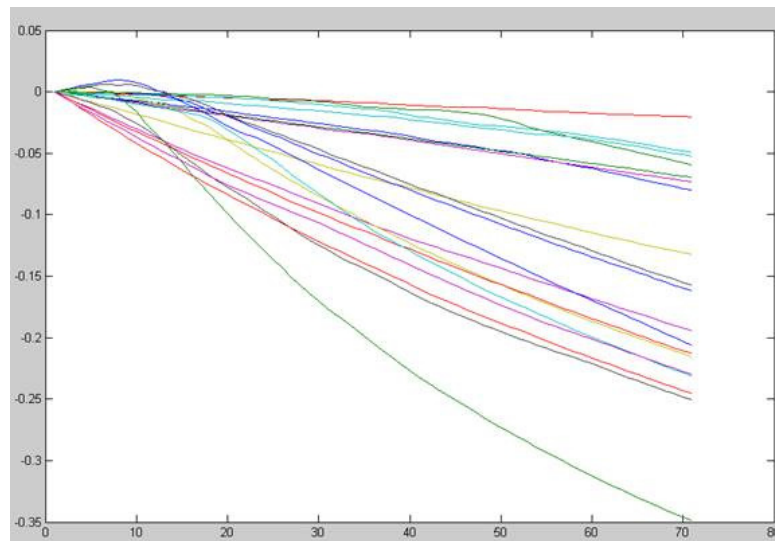
$$Conc_i = Assets_{xl} \cdot XS_i \cdot g$$

- A.9. **3rd step.- The same procedure is repeated for names rated AA, A, BBB and worse than BBB, and for different sectors.**
- A.10. Note that the initial investment in risk-free bonds remains unchanged. Therefore **concentration** exercise refers to the whole equity portfolio and the non-risk-free bonds portfolio.
- A.11. Once reached this point and analysed the graphs obtained, the interpolation of a straight line is carried out taking into account the worst-behaved names are. This criterion is necessary to guarantee the consistency of the calibration exercise with the rationale grounding the standard SCR formula, which focus on stressed scenarios.²¹

Final result

- A.12. The previous chart graphs an example of the different runs where all ratings and sectors are considered.

**Worsening of VaR when a well-diversified portfolio
(left common point to all curves)
is transformed in badly diversified portfolio**



Lines = effect of concentrating in different ratings and sector
Horizontal edge: Degree of concentration in each run

²¹ Due to its own characteristics, the mean VaR for each group of rating (BB, BBB, A and AA-AAA), tends to smooth the risk of concentration, thus understating the corresponding capital charge.

A.13. According the advice, financial concentration risk model for each group of rating i is calculated with the following formula:

$$Conc_i = Assets * XS_i * g + \Delta Liab_{\text{future profits}}$$

where

XS_i = Excess exposure at each group of rating i

A.14. The values resulting from the fitting are

rating _i	Credit Quality Step	G
AAA	1	0.12
AA		
A	2	0.21
BBB	3	0.27
BB or lower, unrated	4 – 6, -	0.73

A.15. This calibration delivers similar parameters to those used in QIS4 (0.15, 0.18, 0.30 and 0.73, respectively) which gives some cross-check of the quality of the calibration process. This stability of the comparative results of both pre and post-crisis calibrations is reasonable, to the extent that the calibration of this module does not base on the absolute VaR, but on the comparison of the VaR of a well-diversified *portfolio* and the VaR of concentrated portfolios²².

²² In the same line, absolute VaR figures on top of page 22 are significantly higher than those obtained in QIS4 (even reducing the mix of equities from 30 to 20 per cent). Once again a cross-check of results in both calibrations shows consistent outputs.