CEIOPS-FS-12/07

QIS3
Technical Specifications

PART II: BACKGROUND INFORMATION

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Section 1

Valuation assumptions: standard approach

Assets

II.1.1 A valuation of assets at their market value is taken as a reference standard for the calculation of investments and eligible capital. For illiquid and hard to value instruments it should be noted that they normally have a value lower than otherwise similar but more marketable instruments.

Technical provisions

Hedgeable and non-hedgeable risks

II.1.2 Note the two-step approach for hedgeability and non-hedgeability. The first step focuses on the split of the risks into hedgeable and non-hedgeable and the second step focuses on how the solvency capital requirement for hedgeable and non-hedgeable risks is to be calculated (the treatment of hedgeable and non-hedgeable risks associated with the solvency capital requirement is in more detail specified under the risk margin section).

II.1.3 A perfect hedge or replication is one that completely eliminates all risks associated with the liability. In practise perfect hedges are expected to be relatively rare. Circumstances where perfect hedges could possible be derived include for instance some options and guarantees embedded in life insurance contracts, some unit-linked (equity-indexed for instance) life insurance contracts, cash flows where there is no uncertainty in the amount and timing etc.

II.1.4 For a perfect hedge or replication the non-arbitrage principle implies that the market consistent value of the hedgeable risk should be equal to the market value of the relevant hedge or replicating portfolio

II.1.5 Even if it would be desirable, the values of hedgeable and non-hedgeable risks might not be separable under all circumstances (for instance, because a risk-neutral probability method has been used).

II.1.6 Non-hedgeable financial risks include for instance different kinds of embedded financial options and guarantees in life insurance contracts that are not traded on a financial market (non-traded underlying for instance), risks where the duration exceeds a reasonable extrapolation from durations traded on the financial market, traded financial instruments that however are not available in sufficient quantities etc.

II.1.7 If within a cash-flow an option or guarantee can be completely separated and as such be perfectly hedged on a deep, liquid and transparent

market the separated risk is classified as hedgeable. On the other hand, if the cash-flow contains non-hedgeable financial (due to incomplete markets) or non-financial risks (due to options and guarantees on mortality and expenses for instance) that cannot be hedged on a deep, liquid and transparent market, they should be valued by inter/extrapolating directly observable market prices or as a best estimate plus risk margin valuation.

II.1.8 It should be noted that on a deep, liquid and transparent market a perfect hedge has no basis risk. Note also that a risk margin has to be added to the best estimate.

Best estimate

II.1.9 The main valuation issue within an incomplete market is: which of the possible prices should be picked for the valuation? The selection procedure is clearly dependent on the user of the information, the user's preferences and the user's attitude towards risk. Therefore the most appropriate approach should be chosen for the valuation of the best estimate.

II.1.10 The reference to different methods within the valuation of the best estimate implicitly also concerns fitting distributions to statistical samples (such as for instance mortality and morbidity) that are used within the valuation of best estimate. However, since changes to for instance mortality occurs slowly on a rather long term basis, alternative methods and approaches to this kind of samples would be expected to be carried out less frequently than annually. Hence life firms often only have one available method.

Assumptions

II.1.11 Appropriate assumptions for future inflation should be built into the cash flow projections. For some products or markets it could be appropriate to assume that future inflation rates can be expected to be comparable to inflation rates experienced in the past.

Risk margin

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

II.1.13 As the reference undertaking (i.e. the undertaking that receives the transferred obligations), the "ceding" undertaking shall be taken, i.e. it shall be assumed that the insurer, at time t=1, transfers its obligations to itself.

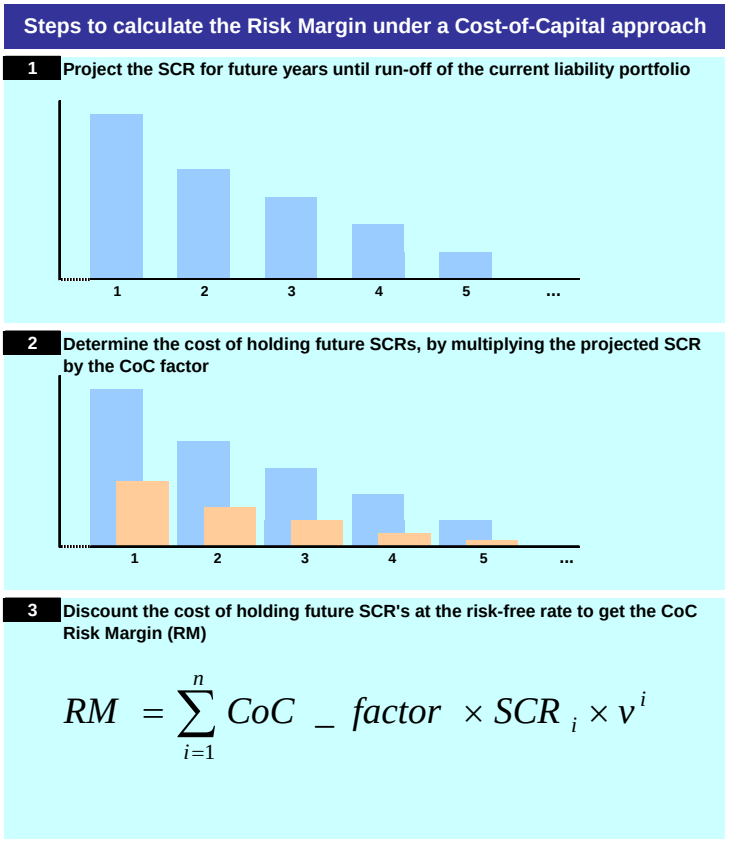
General description of the Cost-of-capital methodology

II.1.14 The steps to calculate the risk margin under a Cost-of-Capital methodology can be summarised as follows (it is assumed that the valuation date is the beginning of year 0, i.e. t=0):

- Determine the SCR for years 1, 2, … until the run-off of the portfolio (the SCR for year 0 corresponds to the capital requirements that the firm should hold today, being calculated exactly as described in Part I, Section 3). The SCR projected for years 1, 2, should also be based on the SCR calculation described in Part I, Section 3. However, it should only take into consideration certain risks – this will be discussed further below.

- Multiply each of the future SCRs by the Cost-of-Capital factor (e.g. 6% above the risk-free rate) to get the cost of holding the future SCRs.

- Discount each of the amounts calculated on the previous step using the risk free yield curve at t=0. The sum of the discounted values corresponds to the risk margin to be attached to the best estimate of the relevant liabilities at t=0.



II.1.15 The main practical difficulty of the method is deriving the SCR for future years. A sophisticated approach requires the projection of the risk factors underlying the liabilities for the whole run-off period. However, simpler approximations may be envisaged. This will be explored below.

II.1.16 While the SCR at t=0 is fully calculated as defined in Part I, Section 3 (i.e. the capital requirements covering the one year solvency period immediately starting at the valuation date which should not be included on the calculation of the risk margin of technical provisions) the design of the future SCR depends on the assumptions chosen for the implementation of the CoC method.

Cost-of-Capital specifications

SCR at year 1 (and from year 2 onward if no proxies are used): use of the standard formula

II.1.17 Since SCR calculated with an internal model and SCR calculated with the standard formula will be different, calculation of the risk margin on a 'standard formula SCR' or on an 'internal model SCR' will lead to different figures.

Future SCRs: credit reinsurance risk

II.1.18 Though subject to possible discussion or to variations among insurers, it is assumed that reinsurance or other mitigation continues to be used during the run–off process.

Aggregation of Technical Provisions calculated per LoB

II.1.19 In line with recognised actuarial practice, the valuation of technical provisions should generally be determined on the basis of homogeneous risk groups. In particular, the risk margin "should be set at the level of a portfolio of independent but similar obligations" (para. 50 of IAIS 2nd liabilities paper).

Life Technical provisions

Best estimate

Grouping of contracts

II.1.20 The grouping of policies for valuing the costs of guarantees, options or smoothing, and their representation by representative policies, is acceptable provided that it can be demonstrated that the grouping of policies does not materially misrepresent the underlying risk and does not significantly misstate the costs.

II.1.21 The grouping of policies should not inappropriately distort the valuation of technical provision, by for example, forming groups containing life policies with guarantees that are "in the money" and life policies with guarantees that are "out of the money".

II.1.22 Sufficient validation should be performed to be reasonably sure that the grouping of life policies has not resulted in the loss of any significant attributes of the portfolio being valued. Special attention should be given to the amount of guaranteed benefits and any possible restrictions (legislative or otherwise) for a firm to treat different groups of policyholders fairly (e.g. no or restricted subvention between homogeneous groups).

Policyholders' behaviour

II.1.23 When assessing the experience of policyholders' behaviour appropriate attention should be given to the fact that the behaviour when an option is out of or barely in the money is an unreliable indication of likely policyholders' behaviour when an option is significantly in the money.

II.1.24 Appropriate considerations should also be given for an increasing future awareness of policy options as well as policyholders' possible reactions to a reduced solvency of a firm.

II.1.25 In general policyholders' behaviour should not be assumed to be independent of financial markets, a firm's treatment of customers or publicly available information unless proper evidence to support the assumption can be observed.

Management actions

II.1.26 The reflection of management actions in the valuation would normally require that the assumptions used, the calculations carried out, the numerical results obtained and the performed sensitivity analysis are based on objective, reasonable and verifiable bases. The applied principles and practices should normally also be maintained in time unless there is sufficient evidence about the necessity of their updating.

II.1.27 It should be noted that management actions cannot follow a different path under a risk-neutral valuation relative to real-world circumstances. Changing the real-world probability measure to a risk-neutral probability measure will change the distribution of the random variables but not the random variables themselves. The two probability measure gives different weights to paths in a model. They nevertheless agree upon which paths are possible and only disagree on what these positive probabilities are.

Distribution of extra benefits

II.1.28 The term guaranteed benefits includes any benefits (including extra benefits from realised profits) to which policyholders are already individually and unconditionally entitled, irrespective of how the extra benefits are described (e.g. vested, declared or allotted).

II.1.29 By a constructive obligation is meant (IFRS definition) an obligation that derives from a firm's actions where

- by an established pattern of past practise, published policies or a sufficiently specified current statement, the firm has indicated to other parties that it will accepts certain responsibilities; and

- as a result, the firm has created a valid expectation on the part of those other parties that it will discharge those responsibilities.

II.1.30 In some products the smoothing of extra benefits in time imposes a so-called “soft guarantee” that can have more or less restrictions attached to it. These should be given appropriate attention.

II.1.31 In some cases, such as extra benefits, options, guarantees, the valuation of technical provision is intrinsic on the assets held by the firm. The assets assumed in such circumstances may be chosen accordingly to one or several combinations of the following principles:

- the actual assets held to back a specific liability (assuming a segmented investment portfolio);

- the assets considered most reasonable to back the specific liability and that attribute future investment returns to that fund;

- a proportion of the assets allocated in accordance with the cover of technical provisions; or

- a proportion of the assets allocated in accordance with the general investment portfolio.

II.1.32 The valuation of extra benefits, including any projections or assumptions on future returns of the firm’s asset portfolio, should be consistent with the choice of the risk-free interest rate curve used for discounting. The assumptions on future asset returns underlying the valuation of extra benefits should not exceed the level given by the forward rates derived from the risk-free interest rates.

Unit-linked business

II.1.33 Applying the outlined valuation principles also for unit and index-linked business, the technical provision could in some cases be less than the current value of the fund value reflecting the excess of future charges over expected expenses.

Options and guarantees

II.1.34 If an option or guarantee is related in some way to the value of underlying assets actually held and managed by the firm in accordance with principles and practices set by the firm, the underlying assets should be chosen accordingly to principles given in paras I.1.102 - I.1.104 and in para. II.1.31.

II.1.35 The Black-Scholes option formula is based on the existence of two assets (one risk-free bond and one risky asset) and it assumes a continuous rebalancing (dynamic hedging) of the amounts invested in the risky asset

and the risk-free bond taken into account the path followed. Unless a similar (discrete) rebalancing actually occurs in practise it might lead to an underestimating of the true liability. On the other hand an appropriate asset/liability management could reduce the risks related to the liability, which might in the Black-Scholes environment not be adequately reflected leading to an overestimation.

II.1.36 Generally dynamic hedging strategies should not be assumed in the valuation of options and guarantees unless it forms an integrated part of a firm's principles and practices to run the business.

II.1.37 A guarantee is defined as a benefit that is the larger of a quantity related in some way to the value of the underlying assets and a guaranteed amount (which may be time dependent and increasing on future valuation dates when extra benefits are added). A guarantee thus defines the possibility to receive extra benefits in excess of the guaranteed benefits. In financial terms a guarantee is linked to option valuation.

II.1.38 For a with-profit life insurance contract with an investment guarantee the intrinsic value represents the amount that the extra benefits are in the money at the valuation date. The intrinsic value can be estimated by using representative deterministic assumptions of possible future financial outcome (see para. II.1.32).

II.1.39 The time value of the guarantee captures the potential for the cost to change in value in the future, as the guarantee move into or out of the money (additional costs related to the variability of investment returns linked to assets actually held by the firm).

II.1.40 Thus, under certain economic scenarios where additional shareholder contributions are required to meet policyholder's payments, the average additional cost of these events forms the time value of the guarantee.

II.1.41 Where the option or guarantee is relatively simple in nature and is capable of being hedged, then the cost of the guarantee or option would be the market cost of hedging the option or guarantee.

II.1.42 The use of stochastic simulation is preferable for material groups or classes of with-profits insurance contracts unless it can be shown that more simplistic or alternative methods are both appropriate and sufficiently robust.

II.1.43 For the purposes of valuing the costs of options and guarantees, a stochastic simulation approach would consist of an appropriate market-consistent asset model for projections of asset prices and returns (such as equity prices, fixed interest rate and property returns), together with a dynamic model incorporating the corresponding value of liabilities and the impact of any foreseeable actions to be taken by management. Under a stochastic simulation approach, the cost of the option or guarantee would be equal to the average of these stochastic projections.

II.1.44 When performing the projections of assets and liabilities under the stochastic approach, the following aspects should be taken into account:

- The projection term should be long enough to capture all material cash flows arising from the contract or groups of contracts being valued. If the projection term does not extend to the term of the last policy, it should be verified that the shorter projection term does not significantly affect the results.

- The number of projections should be sufficient to ensure a reasonable degree of convergence in the results. The firm should test the sensitivity of the results to the number of projections.

- The assets projections should be based on assets actually held by the firm and reflect the principles and practices a firm has in place for managing the assets.

II.1.45 A holistic approach to stochastic simulation is preferable, that is to value all items of costs together rather than using separate methods for different items. This approach requires the projection of all material cash flows arising under the contract or group of contracts for each stochastic projection, rather than only those arising from the guarantee or option within the contract. The advantages of this approach are that it ensures greater consistency in the valuation of different components of the contract and explicitly takes into account the underlying hedges or risk mitigation between components of the contract or group of contracts being valued.

II.1.46 For the purposes of the deterministic approach, a series of deterministic projections of the values of the underlying assets and the corresponding liabilities should be made, where each deterministic projection corresponds to a possible economic scenario or outcome.

II.1.47 A range of scenarios or outcomes appropriate to both valuing the costs of the options or guarantee and the underlying asset mix, together with the associated probability of occurrence should be set. These probabilities of occurrence should be weighted towards adverse scenarios to reflect market pricing for risk. The costs of the option or guarantee should be equal to the expected cost based on a series of deterministic projections of the values of assets and corresponding liabilities. In using a series of deterministic projections, a firm should consider whether its approach provides a suitably robust estimate of the costs of the option or guarantee.

II.1.48 When performing the projections of assets and liabilities under the deterministic approach, the following aspects should be taken into account:

- The projection term should be long enough to capture all material cash flows arising from the contract or group of contracts being valued. If the projection term does not extend to the term of the last contract, it should be verified that the shorter projection term does not significantly affect the results.

- The series of deterministic projections should be numerous enough to capture a wide range of possible out-comes and take into

account the probability of each outcome's likelihood. The costs will be understated if only relatively benign or limited economic scenarios are considered.

- The assets projections should be based on assets actually held by the firm and reflect the principles and practices a firm has in place for managing the assets.

Other charges than expenses

II.1.49 Other charges than expenses could be assessed by applying one or several of the following approaches:

- If the charges are fixed in some way (e.g. they are a fixed percentage of future regular premiums or fund value), then it may e sufficient to discount the expected future charges at the appropriate risk-free interest rate.

- If the future charges are to be reassessed periodically in the light of the then future cost of guarantees, options or smoothing, possibly net of residual accrued past charges and costs, then the valuation of them should allow for future changes to the charges if appropriate and material.

- Especially if a firm can exercise discretion the reasonableness of the projected charges should be considered. A firm should consider the actual costs of guarantees, options or smoothing and the firm's possible obligations to policyholders, whether through policy wordings, marketing literature or other statements that give rise to policyholder expectations of how the management will run the business.

Calibration of stochastic asset models

II.1.50 It should be noted that few (if any) asset models can replicate all the observable market values for a wide range of asset classes.

II.1.51 Professional judgements need to be applied in order to determine suitable estimates of those parameters which cannot be implied from observable market prices (due to incomplete markets, long-term volatility etc.). In this situation it is acceptable to calibrate a model to the longest available price data, or the closest available moneyness, or the nearest available credit quality of issuer. This parameterisation of the model should then be adjusted to the term, moneyness or desired credit quality of the calibration. A range of reliable parameters which to be used in the valuation should be determined. (see II.1.53 for more guidance on implied volatility)

II.1.52 Where a firm has large cohorts of guarantees and uses stochastic or deterministic approaches, a firm should have regard to whether the cost of the guarantees determined under those approaches bears a reasonable relationship to the market cost of hedging similar guarantees (where it exists).

Implied volatility

II.1.53 For non-hedgeable financial risks the valuation is commonly outside the scope of tradable financial instruments (maturities outside the range of tradable instruments, non-tradable or ill-liquid assets etc.) and therefore appropriate implied volatility assumptions cannot be derived from currently tradable instruments. In such cases the historical volatility (if available) should be used corrected with any observable differences from past historical and implied volatilities. If no volatility data is available an asset which may share some similar characteristics with the original asset may be used, however appropriately adapted to the original asset.

Small firms or portfolios

II.1.54 It should be noted that the simplifications for small firms or portfolios are in principle equally well applicable for larger insurers and larger portfolios especially where risks are not considered to be significant following the principle of proportionality. For more detailed information than that outlined below and examples see supplementary guidance note on life technical provisions in Annex C.

II.1.55 Assumptions should generally reflect both past experiences and any foreseeable trend. A more pragmatic approach could be allowed, where this distinction is not explicitly made, but is nevertheless qualitative explored. Thus more approximate methods sets a reasonable best estimate where the historical experience and the trends are not separated and therefore some prudence is expected to be included in the estimate in order to cover model and parameter uncertainties. The prudence level set should however not be such that it includes prudence related to adverse deviations.

II.1.56 Concerning mortality assumptions a birth-year cohort approach does not need to be followed, even if it normally would be appropriate to do so. Moreover, any biometric risk could be considered to be independent from any other variable.

II.1.57 The probability weighted guaranteed benefits form the base of the liability valuation and it is therefore generally assumed that the current IT-infrastructure of a firm is sufficient to derive reliable estimated for the guaranteed liability at a given point in time.

II.1.58 Generally, where there is considerable variation in the cost of option and guarantees relative to time and the conditions prevailing at that time single deterministic scenarios cannot capture the best estimate costs reliable. Since policyholder’s option to surrender and commonly also investment guarantees can be seen to constitute a material part of the valuation approach and the overall liability they need to be explicitly modelled. However, a pragmatic approach leading to approximate closed form formulas could be adopted.

II.1.59 Concerning policyholders’ option to surrender it may be assumed that the process of surrendering is independent of financial markets and firm specific information. This assumption simplifies the modelling and enables

the process to be modelled for instance with the use of hazard-rates. Care should be taken to define the surrender intensity in an actuarially sound manner.

II.1.60 The level of extra benefits should be consistent with the future return on investments assumed (these should be consistent with forward rates derived from the risk-free interest rates) and possible management actions. Even if the valuation of extra benefits would induce path-dependencies these might be disregarded or only partly addressed. Possible path-dependencies should however be qualitative assessed.

II.1.61 Concerning the amount that the extra benefits are in the money a historical average distribution ratio (reflecting past management actions) applied to the appropriate risk-free forward rate could be used. If extra benefits are also distributed from a guarantee related to mortality or expenses these may be taken into account as an increment of the distribution ratio related to investment returns and hence these do not have to be stochastically modelled. If the firms aims at extra benefits in excess of those that are generated from the policy fund, these can be taken into account by an appropriate increment of the distribution ratio to reflect the amount distributed from excess assets.

II.1.62 For the time value of an investment guarantee it may be assumed that a Black-Scholes framework holds. This commonly enables closed form approximations.

II.1.63 Other options and guarantees should also be qualitative assessed. This includes identifying them and an assessment of key drivers (including any possible changes in value as time passes), triggering events and possible impacts on the firm. If considered material other options and guarantees could be given a subjective ad hoc cost approximation given by an expected intrinsic amount increased with an amount that equals the expected probability that the option will move more into the money as time passes times the expected costs given that the event will occur.

II.1.64 In general future premiums are not paid independently from the financial market or a firm's solvency position. This creates complicated path-dependent structures. It may be assumed that future premiums are paid independently from the financial market and the firm's solvency position. Possible path-dependencies should however be qualitative assessed.

II.1.65 In general expected future expenses should be explicitly recognised in the cash flow projection. A pragmatic approach could be to recognize as a liability the future expense loadings expected to incur increased with possible historical deficiencies in the expense loadings.

II.1.66 If an entity lack sufficient capabilities to derive a proxy for the best estimate values as outlined above a first insight exclusive for QIS3 purposes could be obtained as follows (see illustrative example B in the supplementary guidance note on life technical provisions in annex C):

- Make any necessary simplification of assumptions as outlined above.

- Project the amount of guaranteed benefits and related expense loadings to future points in time.

- Probability weight the guaranteed benefits and related future expense loadings for a given point in time by assuming for the surrender process a constant Poisson hazard intensity and for the expected mortality a constant scaling factor of current mortality assumption in use.

- Calculate the present value of the probability weighted guaranteed liability and related future expense loadings.

- Subtract the present value of the probability weighted guaranteed benefits and related present value of future expense loadings from the amount of reserves currently held (by applying current liability valuation principles) creating a calculatory profit/loss fund.

- If the calculatory fund is positive, assume (if so appropriate) that the present value of expected future expense loadings related to extra benefits equals the calculatory fund multiplied with the present value of expected future expense loadings related to guaranteed benefits divided by the present value of expected future guaranteed benefits. The expected amount of future extra benefits before any considerations of firm specific strategies for distributing extra benefits then equals the calculatory fund less the sum of future expense loadings related to extra benefits and any possible historical average deficiency in the overall expense loadings.

- Take into account firm specific strategies for distributing extra benefits by determining a distribution ratio that takes into account past practise, any contractual or commercial commitments towards the policyholders. The expected amount of future extra benefits after firm specific strategies for distributing extra benefits is then the distribution ratio times the amount of expected future extra benefits before any considerations of firm specific strategies for distributing extra benefits.

- Approximate the expected future expenses by first adding the expected expense loadings from the guaranteed liability and the potential additional expense loadings related to the extra benefits and by multiplying this sum with a possible historical relative deficiency in the expense loadings.

- If the calculatory fund is zero or negative set the expected amount of future extra benefits equal to zero.

- Value other options and guarantees pragmatically for instance by applying the following three steps:

    1. Estimate the effect on the liability (by also taking into account possible policyholders' behaviour) if the option or the guarantee is out of the money for all future dates.

2. Estimate the effect on the liability when the option or the guarantee is for any future date at its maximum amount in the money and also exercised.

3. The expected cost of the option or guarantee allowing for the probability that the options or guarantee is at the time of exercising in the money or out of the money could be approximated by determining a subjective ad hoc probability that times the difference in 2) and 1) create an estimate for the cost.

Section 2

Calculation of eligible capital

Introduction

II.2.1 CEIOPS is developing a framework for eligible capital to cover the MCR and the SCR that builds on earlier advice[1] given, taking into consideration responses to CP 20 and developments in the European Commission's thinking on the issue. The framework has, to date, not been specified in all its details.

II.2.2 In an effort to assure that QIS3 produces relevant information within this context, while minimising the administrative burden on participants, CEIOPS has concluded that QIS3 should take the European Commission's proposed framework for eligible capital as a starting point, although this proposed framework does not represent a final position.

II.2.3 The European Commission envisages certain implementing measures. With this in mind, CEIOPS has concluded that it would be appropriate to request, in QIS3, a certain level of detail which would facilitate the development of those measures in the future.

Accounting framework

II.2.4 CEIOPS' answer to CfA19 recommended that, insofar as determining eligible capital, the application of a particular accounting regime should be neutral. Differences in national accounting standards complicate the achievement of this goal. In order to apply the principles of IAS/IFRS as far as possible and, at the same time, optimize the comparability of the outcome of the calculations, QIS3 takes the market consistent valuation of assets and liabilities as the reference standard for eligible capital.

II.2.5 If participants use a different valuation basis, they are requested to state this, providing, for each asset and liability item for which a different valuation basis is used, the impact on eligible capital, indicating the component of capital which is affected. Balance sheet items for which the impact is insignificant can be ignored. The purpose of this request is to enable CEIOPS to consider the impact which the revised valuation of assets and liabilities is expected to have on the existing composition and quality of eligible capital, before providing its final advice.

[1] Provided in CEIOPS' answer to the European Commission to Call for Advice 19 (CfA 19 published May 2006) and section 4 of Consultation Paper 20 (CP 20 published November 2006).

Categorisation of eligible capital

II.2.6 For the purposes of QIS3, participants are requested to categorise eligible capital in three tiers according to the guidance in I.2.7 to I.2.9. Elements which are mentioned in I.2.7 to I.2.9 and elements which are not mentioned in I.2.7 to I.2.9 should be categorised on the basis of the following qualitative characteristics:

(a) subordination: in the case of winding-up, the repayment of the item is refused to its holder until all other obligations, including insurance and reinsurance obligations towards policyholders and beneficiaries, have been met;

(b) loss-absorbency in a winding up: the total amount of the item, rather than only part of it, is available to absorb losses in the case of winding-up;

(c) loss absorbency in a going concern and winding up situation: the item is available, or callable on demand, to absorb losses on a going-concern basis, as well as in the case of winding-up;

(d) perpetuality: the item is not dated, or long-dated relative to the duration of the insurance and reinsurance obligations of the undertaking;

(e) absence of requirements or incentives to redeem the nominal sum;

(f) absence of mandatory servicing costs: the item is free from mandatory fixed charges and is clear of any encumbrances.

Tier 1 capital

II.2.7 Tier 1 capital (t1) represents the highest quality of eligible capital. Tier 1 capital consists of:

- the excess of assets over liabilities; and
- subordinated liabilities which possess the characteristics of subordination, loss-absorbency in both a winding up and going concern situation, and substantively possess the characteristics of perpetuality, absence of requirements or incentives to redeem the nominal amount and absence of mandatory servicing costs.

Tier 2 capital

II.2.8 Tier 2 capital (t2), while not meeting the requirements of categorisation as tier 1 capital, provide a certain degree of loss absorbency. Tier 2 capital consists of:

- subordinated liabilities which possess the characteristics of subordination and loss-absorbency in a going concern and winding up

situation, and substantively possess the characteristics of perpetuality, absence of requirements or incentives to redeem the nominal amount and absence of mandatory servicing costs;

- letters of credit and guarantees, provided by credit institutions authorised in accordance with Directive 2006/48/EC, and held in trust for the benefit of insurance creditors by an independent trustee;

- members' calls by way of supplementary contribution from members of Protection and Indemnity Associations;

- other contingent capital which possesses the characteristics of subordination, loss-absorbency in a going concern and winding up situation, and substantively possesses the characteristics of perpetuality, absence of requirements or incentives to redeem the nominal amount and absence of mandatory servicing costs.

Tier 3 capital

II.2.9 Tier 3 capital (t3) only provides a degree of loss absorbency in particular circumstances. Tier 3 capital consists of subordinated liabilities and contingent capital which do not qualify for inclusion in tier 2 capital.

Limits on eligible capital

II.2.10 CEIOPS has not finalised its view on potential eligibility limits to be applied to elements of capital. For the purpose of QIS 3 participants are asked to report elements of capital without applying any limits. CEIOPS will use these data to assess the need for eligibility limits.

Valuation of contingent capital

II.2.11 Contingent capital should be reported at its nominal value unless the item does not have a nominal value or has a maximum nominal value, or the nominal value does not reflect the loss-absorbing capacity of the item. In this case, the amount of the item to be taken into account should be based on prudent and realistic assumptions.

Valuation adjustments

II.2.12 For QIS3 purposes, the following items should be valued at zero in the calculation of tier 1 capital:

- Own shares held directly
- Intangible items

II.2.13 Where market consistent valuation is not applied to certain assets or liabilities, participants should deduct from tier 1 capital any material

losses of the current year which would have been recognised under market consistent valuation.

II.2.14 CEIOPS has not finalised its view on the treatment, under Solvency II, of holdings/participations of 20% or more in insurance, reinsurance and insurance holding companies and credit institutions, investment firms and financial institutions. Under Solvency I such participations are deductible from capital unless they are within the scope of supplementary supervision in which case they need not be deducted. For the purposes of QIS3, these investments are subject to a market risk charge under the SCR market risk module. However if such investments are deducted, to avoid double counting no market risk charge should be applied. Participants are requested to report separately the amount of investments which have been included in the market risk module, the amount which has not been included in the market risk module and the amount subject to deduction.

Comparison of eligible capital with Solvency I

II.2.15 Participants are requested to provide a comparison of eligible capital determined in accordance with the valuation principles for assets and liabilities under Solvency I and Solvency II. This information should be provided in such a way that CEIOPS can readily assess how the revised valuation principles impact eligible capital. The information can, for example, be provided as a reconciliation, indicating for each significant asset and liability item, and for technical provisions, the impact of the revised valuation. There is a presumption that this only relates to tier 1 capital, excluding subordinated liabilities. If otherwise, this should be indicated in the information provided.

Section 3

Solvency capital requirements: standard formula

Calibration

II.3.1 The parameters and assumptions used for the calculation of the SCR are intended to reflect a VaR risk measure (calibrated to a confidence level of 99.5%) and a time horizon of one year.

II.3.2 To ensure that the different modules of the standard formula are calibrated in a consistent manner, these calibration objectives have been applied to each individual risk module, while also taking account of any model error arising from the particular technique chosen to assess that risk.

II.3.3 For the aggregation of the individual risk modules to an overall SCR, linear correlation techniques are applied. The setting of the correlation coefficients is intended to reflect potential dependencies in the tail of the distributions, as well as the stability of any correlation assumptions under stress conditions.

General approach to risk mitigation

II.3.4 A broad assumption is made that the effect of risk mitigation techniques should be given adequate recognition in reducing the relevant risk capital charges.

II.3.5 Risk mitigation is taken to include both traditional and non-traditional risk transfer instruments on the asset side (e.g. financial hedging) and on the liability side (e.g. hedging instruments, reinsurance).

II.3.6 The SCR should allow for the effects of risk mitigation through:

- a reduction in requirements commensurate with the extent of risk transfer; and
- appropriate treatment of any corresponding risks that are acquired in the process.

II.3.7 To simplify the overall treatment of risk mitigation in the context of the standard formula calculation of the SCR, these two effects are separated:

- the extent of the risk transfer is recognised in the assessment of the individual risk modules; and

- the acquired counterparty risks (e.g., in the case of reinsurance, in the event of the reinsurer's default) are captured in the counterparty default risk module.

Implicitly, the operational risk charge also addresses the risk of risk mitigation failure.

Requirements on the recognition of risk mitigation instruments

(see annex B)

II.3.8 The underlying impact on risk associated with risk mitigation should be treated consistently, regardless of the legal form of the protection. Risk mitigation arrangements should be legally effective and enforceable in all relevant jurisdictions.

II.3.9 Risk mitigation arrangements should provide appropriate assurance as to the risk mitigation achieved, having regard to the approach used to calculate the extent of risk transfer and the degree of recognition in the SCR.

II.3.10 In the annex, a tentative set of principles on financial risk mitigating tools is laid out which may be used to define minimum requirements on the allowance of such tools with respect to a standard formula calculation of the SCR. These principles are inspired by requirements in the banking sector on the credit quality of the provider of the risk mitigation instrument, and some CEIOPS members believe that they may usefully complement the advice on risk mitigation instruments that CEIOPS has given in its answer to CfA12.

II.3.11 CEIOPS has not yet reached a final position on this issue, and participants are invited to comment on the appropriateness of these principles in the context of a standard formula calculation of the SCR.

II.3.12 In cases where participants apply risk mitigation instruments for the calculation of the QIS3 standard formula SCR which do not fulfil the principles included in the annex, and where such mitigating instruments have a significant impact on the SCR, it is recommended that the participant indicates which of the principles were violated, and gives an estimation of the impact of the instruments out of the scope of the annex on the SCR estimate.

Composites (insurers carrying out both life and non-life business)

II.3.13 Recently the EC has pointed out that the application of the standard solo SCR formula to composites produces a lower capital requirement than the separated application of the same formula to two insurers (one specialized in life insurance and the other one in non-life insurance),

having both of them jointly the same activity as the composite. To solve this issue some proposals are being analysed, although for the time being there is not a sufficiently definitive decision on this issue.

II.3.14 Under QIS2, composites were allowed to make one global calculation.

II.3.15 A major issue with respect to QIS3 is that introducing substantial changes in QIS2 specifications regarding composites would overburden this type of insurers and could likely dissuade composites from participating in the QIS3. This is particularly true for composite insurers belonging to groups. For some countries, where the composites have an important market share, this argument weighs heavily on the decision.

II.3.16 Since one of the main goal of the QIS3 exercise is to achieve a participation rate as high as possible, exclusively for QIS3 purposes, the calculation of SCR standard formula is maintained as it was in QIS2. Composites will therefore apply the SCR standard formula and aggregate capital requirements regarding life and non-life activities using the corresponding correlation matrix included as part of such formula. The same solution applies to the calculation of MCR.

II.3.17 This decision should be understood only as a practical expedient to promote QIS3 participation.

II.3.18 At the same time CEIOPS wants to underline that the treatment of composites in Solvency II needs further analysis to guarantee that, if any, no discrimination exists among insurance companies with the same business lines, but a different institutional structure. CEIOPS will further analyse this point during its coming meetings following the initiative of the EU Commission.

II.3.19 Summing up, exclusively for QIS3 purposes:

- Composite insurers will calculate a single standard solo SCR and a single MCR, applying the formulas reflected in the relevant chapters of these specifications,
- In the qualitative part of QIS3 exercise, composites are allowed to offer information about
    - Alternatives to solve the problem described regarding composites when compared with separated entities,
    - On voluntary basis, comparison of standard solo SCR with the capital requirement obtained by: a) in a first step, calculating solo SCR for each type of business separately, and b) in a second step adding both capital requirements obtained in a), following for example QIS3 specifications regarding Groups SCR (see as reference EU Commission issues paper 'Treatment of Composite insurers under Solvency II', reference Markt 2505_07, in particular pages 4 and 5).

- Participant's views on how to deal with composites when developing internal models.

- Additionally CEIOPS should be able, on the basis of the information collected in the non-life and life risk modules, to approximate the proposal of the EC by modifying the correlation matrix between both risk modules

Adjustments for the risk mitigating properties of future profit sharing

II.3.20 For with-profits business in life insurance, the specification of the standard formula calculation as set out in this specification takes into account the risk absorption ability of future profit sharing. This is achieved by a three step "bottom up" approach as follows:[2]

II.3.21 The **first step** is to calculate the capital requirements for individual sub-risks – for example, interest rate risk – under two different assumptions:

- that the insurer is able to vary its assumptions on future bonus rates in response to the shock being tested, based on reasonable expectations and having regard to plausible management decisions ($nMkt_{int}$); and

- that the insurer is not able to vary its assumptions on future bonus rates in response to the shock being tested ($gMkt_{int}$)

The difference between the two capital requirements ($gMkt_{int} – nMkt_{int}$) is termed KC (KC_{int}).

II.3.22 Performing these two calculations for different risks reflects the fact that the ability to vary policyholder benefits will depend on the nature of the shock to which the insurer is exposed. For example, the potential for risk mitigation might be more significant in the case of yield curve movements than, say, a shock to property values.

II.3.23 The **second step** is to aggregate capital requirements for risks within the same category (equity, interest rate, property etc.) using the relevant correlation matrices. To preserve the coherence of the modular approach, the aggregation uses the capital requirements produced assuming no change in the assumptions used to estimate policyholder benefits. For instance, the capital requirement $gSCR_{mkt}$ for market risk is derived by combining $gMkt_{int}$, $gMkt_{eq}$ and so on. The KCs should also be combined using the same correlation matrices.

II.3.24 The **final step** is to repeat the aggregation process for the major risk categories. $gSCR_{mkt}$ is combined with $gSCR_{life}$ and all the other risk

[2] Under this approach, the top-level 'K-factor' adjustment used under QIS2 is replaced by adjustments at the level of individual SCR risks. This new approach is intended to be better aligned with the modular structure of the SCR calculation, and to lead to a more objective and transparent determination of the risk absorption ability of future profit sharing in the context of a standard formula calculation.

modules using the relevant correlation matrix. KC_{life}, KC_{health} and KC_{mkt} are combined by also using the relevant correlation matrix. The resulting 'gBSCR' is reduced by the minimum of the aggregated KC and the total amount of technical provisions corresponding to future discretionary benefits.

II.3.25 More detailed descriptions of this "three step approach" are included in the technical specifications for the individual modules laid out below. For reasons of simplification, the adjustment at the level of individual SCR risks is restricted to the sub-modules of the market risk (with the exception of the sub-module for risk concentrations), life underwriting risk (with the exception of the sub-module for revision risk) and health underwriting risk modules.

II.3.26 If a participant wishes to simplify the process – particularly in cases where the risk mitigating effect is not expected to be material – it may simply declare the calculation "net" of the risk mitigating effects of future profit sharing to be equal to the "gross" calculation (i.e., it may put $nMkt_{int}=gMkt_{int}$ and $KC_{int}=0$).

Fund structure in life insurance

II.3.27 Where an undertaking has one or more funds where the assets of such funds are not transferable to other parts of the undertaking's business, the SCR standard formula for the fund should be calculated as if that fund were a separate insurer. Similarly, a calculation should be carried out for the undertaking's remaining business as if it were a separate insurer. The overall SCR should be calculated as the sum of the SCR for each fund and for the remaining business.

II.3.28 Where an undertaking has an internal model, the results of applying that model to each of its funds and for the rest of its business should be disclosed for comparison with the results of applying the SCR standard formula. The result of applying the model to its entire business should also be disclosed.

II.3.29 Undertakings should provide feedback on the reasonableness of applying this approach, given their particular circumstances.

Additional guidance

II.3.30 In a number of sub-modules of the life underwriting risk module, as well as in the market risk module, the capital charge is derived by estimating the effects of pre-scribed scenarios. Participants should be responsible for calculating the impact of these scenarios, including the choice of the most appropriate calculation method.[3] However, CEIOPS recognises that this process will be demanding, and that smaller undertakings may face particular difficulties given constrained actuarial resources.

[3] see para. S. 8 in the supplement to CP 20

II.3.31 To encourage the participation of small and medium sized undertakings in the QIS, guidance on simplified, formula-based treatments is provided for some of these sub-modules that may be used by undertakings with a less complex risk profile. However, these formula-based approximations are not to be seen as factor-based alternative options to the scenario-based approach; rather, they are intended to illustrate potential simplified approximations which could be used to estimate the impact of the scenarios prescribed under the scenario-based approach.

Factor-based approximations for Mkt_{eq} equity risk

II.3.32 The determination of the capital charge $Mkt_{eq,i}$ with respect to an individual index i could be carried out by taking into account hedging and risk transfer mechanisms using a two step process.

II.3.33 The **first step** relates to the level of the individual equity. If there are hedging instruments for single equities they have to be taken into account at the level of the single equity. The hedge reduces the stress with the change in market value of the instrument itself. The impact has to be determined by the companies itself.

II.3.34 The calculations within this first step would be carried out as follows:

II.3.35 For each index *i* the market value of individual equities allocated to *i* in the event of the stress scenario *equity shock*$_i$ would be calculated, taking into account hedging instruments[4]. The "stressed" market values would be calculated as follows:

$$Equity\_stress_{i,j} = Equity_{i,j} * (1 - volafactor_i) + Hedge_{i,j}$$

$Equity_{i,j}$ = Market value of the equity *j* allocated to *index i*

$Equity\_stress_{i,j}$ = Market value of $equity_{i,j}$ after stress

$Hedge_{i,j}$ = The change in Market value of hedges per individual $equity_{i,j}$ under stress

$volafactor_i$ = Prescribed volatility factor depending on the confidence level and standard deviation of the index *i*

and where the volatility factors (consistent with the specification of the scenarios *equity shock*$_i$) are determined as follows:

	Global	*Other*
$volafactor_i$	32%	45%

[4] Note that in the two level process of reflecting hedging, the instrument has to be taken into account on the relevant step: single equity or index.

II.3.36 In a **second step**, hedging instruments for sub-portfolios e.g. indices or special funds would be taken into account. The risk mitigation would be reflected by the change in market value of the hedging instrument per index (which stands for the sub-portfolio). If there would be a global hedge for all equity positions in force, it would be allocated on a market value weighted basis to the relevant equity indices (excluding Alternative investments).

II.3.37 Within this second step, the changes in market value for all equities under index *i* would be aggregated to a capital charge taking into account hedging instruments for equity risk for the individual index *i* as follows:

$$Mkt_{eq,i} = \sum_{j} (Equity_{i,j} - Equity\_stress_{i,j}) + Hedge_{i}$$

where

$Mkt_{eq,i}$ = Risk capital charge for equity risk for index *i*

$Hedge_{i,}$ = The change in Market value of hedges per individual index *i* under stress

II.3.38 Finally, the overall capital charge for equity risk would be derived by combining the capital charges for the individual indices using a correlation matrix as described above.

Factor-based approximations for $Life_{mort}$ mortality risk

II.3.39 The results of the mortality scenario may be approximated as follows:

$$Life_{mort} = 0.0015 \bullet Capital\_at\_Risk$$

where

Capital_at_Risk = The sum of the (net of reinsurance) capital at risk in the portfolio i.e. the sum of the amounts currently payable on death less the (net of reinsurance) technical provisions held for each policy

II.3.40 The factor 0.0015 represents 10% of the assumed average probability of death times an average duration. In order to simplify the calculation, no differentiation has been assumed for different time periods into the future.

Factor-based approximations for $Life_{long}$ longevity risk

II.3.41 The results of the longevity scenario for trend/uncertainty risk may be approximated as follows:

$$Life_{long} = 0.06 \bullet Potential\_release$$

where

Potential_release = total of (net) technical provisions, net of any benefits payable on immediate death

II.3.42 The factor 0.06 represents an estimate of the effect of a 25% permanent decrease (or of a 2.5% p.a. rate of improvement) in mortality rates.

Factor-based approximations for $Life_{dis}$ disability risk

II.3.43 The results of the disability scenario may be approximated as follows:

$$Life_{dis} = 0.01 \bullet Capital\_at\_Risk$$

where the input term *Capital_at_Risk* used above may be approximated as:

$$Capital\_at\_Risk = \sum_i (SA_i + AB_i \bullet Annuity\_factor - TP_i)$$

TP_i = For each policy i: the (net of reinsurance) technical provision held

SA_i = For each policy *i*: where benefits are payable as a single lump sum, the sum assured (net of reinsurance) on disability. Otherwise, zero.

AB_i = For each policy *i*: where benefits are not payable as a single lump sum, the annualised amount of benefit (net of reinsurance) payable on disability. Otherwise, zero.

Annuity_factor = Average annuity factor for the expected duration over which benefits may be payable in the event of a claim

II.3.44 The factor 0.01 shall represent 40% of the assumed average probability of disability times an average duration. In order to simplify the calculation, no differentiation has been assumed for different future time periods.

Factor-based approximations for $Life_{lapse}$ lapse risk

II.3.45 The results of the lapse scenario may be approximated as follows:

$$Life_{lapse} = 0.2 \bullet (Surrender\_release + Surrender\_strain)$$

where

Surrender_release	=	The sum of the differences (where positive) between the technical provisions held for policies which can be lapsed or surrendered, and the amount currently payable on surrender
Surrender_strain	=	The sum of the differences (where positive) between the amount currently payable on surrender, and the technical provisions held for policies which can be lapsed or surrendered

Factor-based approximations for $Life_{rev}$ revision risk

II.3.46 The results of the revised scenario may be approximated as follows:

$$Life_{rev} = 0.03 \bullet TP_{rev}$$

where

TP_{rev}	=	Total of (net) technical provisions for annuities exposed to revision risk (see para. I.3.125)

Factor-based approximations for $Life_{exp}$ expense risk

II.3.47 The results of the expense scenario may be approximated as follows:

$$Life_{\exp} = 0.12 \bullet f_{fixed} \bullet E_{fixed} + 0.03 \bullet f_{adj} \bullet E_{adj}$$

where

E_{fixed}	=	total annual amount of the expenses for business with fixed loadings
E_{adj}	=	total annual amount of the expenses for business with adjustable loadings[5]
f_{fixed}	=	average outstanding duration of business with fixed

[5] Policies with adjustable loadings are those for which expense loadings or charges may be adjusted within the next 12 months.

loadings

f_{adj} = average outstanding duration of business with adjustable loadings

Section 4

Minimum capital requirement

II.4.1 The MCR section provides instructions for testing CEIOPS' modular MCR proposal, which aims to provide simple, robust treatments for the main risk which insurers are exposed to. In addition, CEIOPS provides guidance for testing an alternative MCR proposal presented by CEA.

II.4.2 The calibration of the MCR follows a one-year time horizon like the SCR, but with a 90% VaR target level of confidence. The calibration will be adjusted through further quantitative impact studies taking into account as a benchmark the current Solvency I capital requirement.

II.4.3 In addition, CEIOPS provides a spreadsheet that will automatically calculate the MCR according to an alternative proposal presented by the CEA[6]. Since the CEA proposal suggests that the MCR should be calculated as a fixed percentage of the SCR of an insurer (calculated by either the standard formula or an internal model), testing this proposal does not require further specifications on the part of CEIOPS.

RPS Reduction for profit sharing

II.4.4 This component reflects the loss reduction potential of future non-guaranteed bonuses. Following the Supplement to CP 20, the modular MCR should reflect in a robust manner the risk absorption properties of future non-guaranteed bonuses included in technical provisions. It should remain an auditable, robust and simple requirement, calculated by means of a factor-based approach.

II.4.5 The approach specified below does not represent a final position on part of CEIOPS. The calculation assumes that, in the context of the MCR, a risk reduction factor (*k*-factor) of 100% can be assumed; however, on the other hand, the reduction is capped by a surrender value limit.

II.4.6 The scope of the reduction includes both life and health insurance business.

MCR market risk component

II.4.7 Two alternatives are tested: Alternative 1 is a simple factor-based approach based on asset-side volume measures. Alternative 2 is a more sophisticated factor-based approach, taking into account also the liability side and durations.

II.4.8 The two alternatives are tested on an equal footing, without specifying a placeholder. Testing results will assist CEIOPS' assessment of the two approaches and the eventual choice between them.

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6 For further information on the CEA's MCR proposal please refer to the CEA Working Paper on the MCR and the Proposed Ladder of Intervention, 16 November 2006.

II.4.9 The 'no free assets' alternative is provided parallel to the similar alternative approach for the SCR. In the case of the SCR, free assets are those assets that go beyond the amount necessary to cover liabilities and the SCR. For the SCR, an iteration is performed to find an equilibrium position where an undertaking has the same amount of assets as needed to cover liabilities and the SCR. To avoid an iterative MCR calculation, or reference to the SCR in the MCR calculation, a simplified approach is suggested for the MCR where all assets not needed to cover liabilities are considered 'free'. (This could be regarded as the first step in a bottom-up iteration.) However, this may change the level at which the ultimate intervention is triggered; therefore such an approach needs further careful consideration.

II.4.10 CEIOPS is aware of the fact that there are circumstances where the "no free assets" approach may lead to a higher interest rate risk charge. The simple calculation method suggested above, together with the basic asset-liability formula in MCR market risk Alternative 2, may in some cases amplify this effect. CEIOPS will further examine this aspect of the calculation.

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MCR special risk component: Health underwriting risk

II.4.11 This module is concerned with underwriting risk in health insurance that is practised on a similar technical basis to that of life assurance.[7]

II.4.12 This risk module covers:

- Claim risk or per capita loss risk arising in cases where the actual per capita loss is greater than the loss assumed in the pricing of the product;
- Mortality risk arising when the actual funds from provisions for increasing age becoming available due to death are lower than those assumed in the pricing of the product; and
- Cancellation risk arising when the actual funds from provisions for increasing age becoming available due to cancellations are lower than those assumed in the pricing of the product.
- Expense risk arises if the expenses anticipated in the pricing of a product are insufficient to cover the actual costs accruing in the accounting year. There are numerous possible causes of such a shortfall, therefore all cost items of private health insurers have to be taken into account.

II.4.13 The MCR health underwriting risk module does not cover the epidemic/accumulation risk.

[7] Health insurance within the meaning of Article 16a (4) of the EU-directive 73/239/EEC (as amended by EU-directive 2002/13/EC)