

GN46: Individual Capital Assessment

Classification

Recommended Practice

MEMBERS ARE REMINDED THAT THEY MUST ALWAYS COMPLY WITH THE PROFESSIONAL CONDUCT STANDARDS (PCS) AND THAT GUIDANCE NOTES IMPOSE ADDITIONAL REQUIREMENTS UNDER SPECIFIC CIRCUMSTANCES

Purpose

The FSA Handbook of Rules and Guidance requires insurance companies and friendly societies, other than those set out in PRU 2.3.1, to carry out an *Individual Capital Assessment (ICA)*. The *ICA* is the regular assessment, required by the FSA in its Handbook, by a firm of the adequacy of its financial resources. The FSA Handbook also sets out rules and guidance to follow in carrying out an *ICA*. SUP 4.3.15G requires firms to take appropriate professional advice on financial and risk analysis for, inter alia, *ICAs*. SUP 4.3.13R (1) requires the *actuarial function holder* to advise the firm's management on the risks that the firm runs in so far as they may have a material impact on, amongst other things, the capital needed to support the business. These provisions establish the role of actuaries in the calculation of an *ICA*. This note provides additional guidance on how to meet these requirements.

Definitions

Defined terms appear in italics when used in the standard.

Reference

Definition

actuarial function holder

An actuary who has been appointed by a firm to perform the *actuarial function*

Individual Capital Assessment (“ICA”)

The assessment required by PRU 1.2.26R of the capital which a firm needs to hold to meet PRU 1.2.22R (adequate financial resources, including capital resources)

Individual Capital Guidance (“ICG”)

Guidance given under PRU 2.3.13G on the amount and quality of capital resources which the FSA considers that a firm needs to hold to meet PRU 1.2.22R

RCM

risk capital margin

scenario analyses

Changing simultaneously the values of a number of parameters that affect the financial position of a firm and determining the combined effect on the firm (PRU 1.2.42G)

stress testing

Changing the values of individual parameters that affect the financial position of a firm and

determining the effect of each change on the firm's business (PRU 1.2.41G)

The following terms have the same meaning as in the FSA Handbook of Rules and Guidance:

actuarial function
long-term insurance business
long-term insurance capital requirement
long-term insurance liabilities
mathematical reserves
Principles and Practices of Financial Management ("PPFM")
resilience capital requirement
risk capital margin
with-profits actuary
with-profits business
with-profits fund
UK firm

Legislation or Authority

The Financial Services and Markets Act 2000
The FSA Handbook of Rules and Guidance: Integrated Prudential sourcebook ("PRU")
The FSA Handbook of Rules and Guidance: Supervision Manual ("SUP")
The Financial Services and Markets Act 2000 (Communications by Actuaries) Regulations 2003 (the "Regulations")

Application

A firm to which PRU 2.1 applies in respect of long-term insurance business.

Author

Life Board

Status

Approved under Due Process

Version Effective from

1.0 31.12.04

1.1 31.12.04

Adopted by BAS 19.05.06

2.0 31.10.06

1 General

1.1 This Guidance Note is drafted in terms which are not addressed to actuaries specifically. Nevertheless, actuaries performing work covered by this Guidance Note are required to apply it according to its classification. However, where a firm requires an actuary to produce work conflicting with this Guidance Note, the actuary may do so provided the work clearly and

unambiguously states that the actuary has done so under instructions and that the work does not conform to this Guidance Note.

- 1.2 This Guidance Note provides guidance on carrying out an *Individual Capital Assessment* (“ICA”). This guidance is supplementary to the rules and guidance of PRU 1.2 and PRU 2.3 and any individual guidance given to a firm by the FSA. It also includes some summarised references to, or quotations from, particular provisions of the FSA Handbook of Rules and Guidance (the “FSA Handbook”), but users should be aware that this is not exhaustive and does not provide a substitute for referring to the FSA Handbook.
- 1.3 PRU 1.2.22R requires that “a firm must at all times maintain overall financial resources, including capital resources and liquidity resources, which are adequate, both as to amount and quality, to ensure that there is no significant risk that its liabilities cannot be met as they fall due.” An *ICA* is the method by which a firm must demonstrate its compliance, or otherwise, with this rule. It is also a key input to the FSA’s assessment of its *Individual Capital Guidance* (“*ICG*”) to that firm.
- 1.4 PRU 1.2.29G requires that the assessment of the adequacy of a firm’s financial resources is reported to its senior management as often as necessary. This should be read in the context of both PRU 1.2.27R, which requires only that the processes and system for assessing the adequacy of a firm’s financial resources must be “... proportionate to the nature, scale and complexity of the firm’s activities”, and PRU 1.2.36G which requires *stress testing* and *scenario analyses* to be carried out at least annually. In addition, PRU 1.2.29G provides that “... a firm would be expected to reassess the adequacy of its financial resources should the firm experience some material change to the nature or scale of its activities”. Similarly PRU 1.2.36G states that “... a sudden change in the economic outlook may prompt a firm to revise the parameters of some of its stress tests and scenario analyses”.
- 1.5 Since the conditions that give rise to the *ICA* have a low probability, there are necessarily limited data on which to base the assumptions required for the *ICA*. There is therefore an element of subjectivity involved in setting these assumptions. Despite this, it is not necessary to introduce any prudence within the assumptions, although the sensitivity of the results to the key assumptions should be investigated. Where more prudent methods or assumptions than those detailed in this Guidance Note have been used, the firm may still state that the approach taken has complied with this guidance.
- 1.6 All reasonable steps must be taken to ensure that the data used in carrying out an *ICA* are complete and accurate. Allowance should be made in the calculation for the risk that data quality is inadequate.
- 1.7 When considering the result of an *ICA* calculation, some analysis of the change in available capital and *ICA* from previous such calculations should be carried out. This can act as a check on the accuracy of the calculation and shows how the risks that the firm is exposed to are developing over time.

- 1.8 The FSA expresses its requirements regarding *ICAs* largely in the form of guidance rather than rules. This reflects that *ICAs* are a new and developing field and that the FSA expects firms to be at different levels of development, for example using approximate methods in some areas, although still meeting both the minimum requirements expressed in rules and the underlying objectives of the guidance. There may be other practices not set out in this Guidance Note that constitute generally accepted actuarial practice in this area and failure to comply with this note does not necessarily imply failure to follow generally accepted actuarial practice. This note deals with a developing area of practice and firms will need to consider the extent to which plans should be put in place to continue development of their *ICAs*, with particular consideration being given to how all material aspects of this Guidance Note, or justified equivalent alternatives, could be met. If any aspect of this Guidance Note or of the FSA's guidance is not being complied with, the extent of non-compliance and the alternative adopted should be documented in the report on the *ICA*.
- 1.9 Any *ICA* for an overseas life insurance subsidiary of a *UK firm* which would influence the overall *ICA* of the *UK firm* should be carried out in accordance with this guidance, interpreted as necessary in the context of that subsidiary and the result combined with that of the parent in a manner which makes appropriate allowances for correlation of risks between the subsidiary and the parent.

2 Involvement of Actuaries

- 2.1 SUP 4.3.15G requires firms to take appropriate professional advice on financial and risk analysis for, inter alia, *ICAs*. SUP 4.3.13R (1) requires the *actuarial function holder* to “advise the firm's management ... on the risks the firm runs in so far as they may have a material impact on ... the capital needed to support the business, including regulatory capital requirements”.
- 2.2 When carrying out an *ICA*, it is not necessarily appropriate for firms only to seek the advice of the *actuarial function holder*. In some risk areas, for example operational risk, it may be more appropriate to take the advice of a non-actuary expert. Expert actuarial advice from other actuaries may also be of assistance. However, to satisfy SUP 4.3.13R(1), the *actuarial function holder* should be provided with the advice of any other expert consulted and the firm should request the *actuarial function holder's* advice on the total capital requirements of the firm.
- 2.3 It would normally be expected that the firm's *with-profits actuary*, if it is required to have one, would be requested to provide an opinion to the governing body of the firm on those parts of the *ICA* which involve assumptions about the future exercise of discretion in respect of *with-profits business* if he or she had not been responsible for advising the governing body about those assumptions.

3. The derivation of available capital

3.1 Assets

3.1.1 Where reliable, observable market values exist, asset values should be set equal to these market values. Where reliable market values do not exist, asset values should normally be marked to model, where marking to model is defined as any valuation which is benchmarked, extrapolated or otherwise calculated from market input with the aim of producing a market consistent price. Justification should be provided for the assessment of the value of illiquid or untraded assets, or assets requiring a mark-to-model valuation, particularly in the changed conditions of *ICA* stress tests or *scenario analyses*.

3.1.2 For the avoidance of doubt, there is no need to exclude assets that fail to meet the definition of admissible assets in the FSA Handbook or to exclude admissible assets that exceed the limits set out in PRU 3.2.22R. The appropriate approach for such assets is to include their value, calculated as described in paragraph 3.1.1 above, and to reflect the risk relating to these assets in the *ICA*.

3.1.3 In some circumstances, a firm may wish to treat the present value of future profits from non-profit policies as an asset rather than reflecting this in the realistic value of the liabilities. The valuation of such business should usually be carried out in accordance with the principles set out in GN45. However, the application of these principles should not be restricted to non-profit business written inside a *with-profits fund*.

3.1.4 Where the asset portfolio includes loans made to, or other financial instruments issued by, a company within the same group, the firm should consider the ability of the borrower/issuer to repay that loan in stressed conditions. For example, a loan may be made to a holding company whose only asset is the firm. In this circumstance, care needs to be taken to avoid any double counting of the firm's embedded value.

3.1.5 Consideration should be given as to how to reflect the credit risk associated with the reinsurance counterparty, for example by valuing reinsurance contracts which are assets at a higher discount rate than risk free.

3.2 Liabilities

3.2.1 The value of the liabilities brought into the *ICA* should generally be the realistic value of the liabilities, consistent with the principles set out in PRU 7.4 and in GN45. These principles should be assumed to apply to business written both within and outside any *with-profits fund*.

3.2.2 In particular, the realistic value of non-profit liabilities, whether within or outside a *with-profits fund*, should usually be calculated either as the *mathematical reserves* less the present value of future profits determined in

accordance with the principles set out in GN45 or by directly valuing the non-profit insurance contract cashflows using assumptions of future experience and discount rates consistent with the principles set out in GN45.

- 3.2.3 The methods and assumptions used for valuing the liabilities should be consistent with those used when taking management decisions relating to running the business (e.g. setting investment strategy) including with the firm's *PPFM* (if required to produce one) and should reflect the firm's duty to treat customers fairly.
- 3.2.4 PRU 1.2.23G excludes from the definition of "liability" any liabilities that might arise from transactions that a firm has not entered into and those which it could avoid taking on in the future, for example by closing to new business. However, it requires that the costs of moving to a closed fund or similar status should be included as liabilities. A firm which is open to new business should therefore calculate as a minimum the capital required to close to new business and to run the fund off, meeting its liabilities as they fall due, and in accordance with its *PPFM* (if required to produce one), whilst continuing to treat customers fairly. In the closed fund scenario, an appropriate rate of exercise of any capital-consuming options by policyholders should be assumed (e.g. the payment of additional premiums on favourable terms). It may be assumed that closure to new business will take place as soon as practically possible, but normally in not less than one year's time, if new business is potentially loss making in adverse scenarios, or immediately if the writing of such business reduces the required *ICA*.
- 3.2.5 There is no requirement to treat a dividend as a liability unless the company has committed to paying it. It is reasonable to disregard future dividends to the extent that a firm's management decision processes relate the payment of a future dividend to the adequacy of its capital resources.
- 3.2.6 The liabilities should have regard to any commitments made by the firm to provide pensions and other benefits for its past or present employees.

3.3 Available capital

- 3.3.1 The available capital is determined as the value of assets minus the value of liabilities.
- 3.3.2 Checks must be made to identify any barriers to the transfer of capital between funds that could create situations in which liability cash flows cannot be met as they fall due in each fund without breaching the firm's *PPFM* (if required to produce one), the duty to treat customers fairly or any other restrictions. It may be necessary (and often is) to perform a separate calculation of the *ICA* and available other capital on a fund by fund basis.
- 3.3.3 Where the firm's capital is not fully loss absorbent, for example the capital is not fully subordinated to all liabilities or is dated in nature, the firm may consider it appropriate to set aside a provision for repayment of capital.

4. Valuation of subsidiaries

- 4.1 Where a firm has one or more subsidiaries, the firm will need to consider the value to place on these assets in stressed conditions. For an insurance subsidiary, the value of its capital in excess of its *ICA* may be an appropriate value. For a non-insurance subsidiary, the value from a sale of the business given an environment consistent with the *ICA* for the firm may be more appropriate. The consistency of the method used to value the subsidiary with the method used to value the firm, and the consistency of the assumptions chosen with the stresses considered when calculating the firm's *ICA*, should be carefully justified.
- 4.2 Where a firm believes that there are diversification benefits between risks in two or more subsidiaries (or between risks within subsidiaries and within the firm) and that the capital between the firm and the subsidiaries is fungible in a stressed scenario, the capital required may be reduced. The firm should justify why the capital is fungible and where the benefit of diversification between group companies should be recognised.

5 Identification of Risk

- 5.1 PRU 1.2.31R requires the firm to use processes and systems which enable it to identify the major sources of risk to its ability to meet its liabilities as they fall due.
- 5.2 PRU 1.2.31R lists five major categories of risk sources. Group risk is also mentioned as a separate category in, for example, PRU 2.1.7G. However, PRU 1.2.31R also requires that other sources of risk not within these categories must also be identifiable using the processes and systems required by PRU 1.2.26R. Standards relating to the identification and assessment of capital required in respect of market, credit and insurance risk can be found in sections 8 to 10 below.
- 5.3 This Guidance Note contains limited guidance relevant to the identification and assessment of capital required to meet operational or group risks. Nevertheless, if credible historic data on any relevant operational or group risks are available, either within the firm or from relevant industry or non-industry sources, the data should be regarded as an important input to the assessment of the potential exposure to risks of the type to which the data apply. More subjective methods will need to be used in the absence of credible data. Account should be taken of any obligation which may exist in some adverse scenarios to provide financial support to associated companies.
- 5.4 PRU 5.1.12G makes clear that liquidity risk for PRU Category 2 firms (which includes life insurance companies and friendly societies) refers only to the management of risks arising from short-term cash flows rather than from longer-term asset/liability mismatching, which is part of insurance risk. Examples that may be relevant for *long-term insurance business* include:

- contracts where a cancellation or an acceleration of cash-flows may occur in the event of, say, a ratings downgrade or breach of covenant
- a commitment by a company with limited liquid assets of its own. For example, the ability to provide business continuity in the face of an operational event may depend on sufficient liquidity being provided to a service company
- a significant short-term increase in voluntary terminations that would lead to difficulties in making payments to policyholders when due or whether it is reasonably foreseeable that sufficient of its assets could become unrealisable at prices or in quantities sufficient to meet its expected short-term cash flow needs
- illiquid assets, in particular real estate held in unit-linked funds

Liquid capital sufficient to bridge any reasonably foreseeable deficit should be held, mitigated by any guaranteed short-term borrowing facilities to which the firm has access.

- 5.5 Whilst holding capital might be an appropriate response to mitigate the impact of most risks to the firm's ability to meet its liabilities, PRU 1.2.34G makes clear that some risks, such as those relating to control weaknesses, including liquidity risks, may more appropriately be dealt with by rectifying the weaknesses. It may therefore not be necessary to hold capital in respect of such risks, provided that the rectification measures intended are adequate. Consideration should also be given to the necessary capital while the rectification measures are implemented.

6. *Stress Testing and Scenario Analyses*

- 6.1 PRU 1.2.35R requires firms to carry out *stress testing* and *scenario analyses* appropriate to the nature of each major source of risk identified. Their purpose is, according to PRU 1.2.40G, to enable a firm better to understand its risk exposure in extreme events or circumstances (although, under PRU 1.2.45G, there is no requirement to carry out *stress testing* and *scenario analyses* in those circumstances that are not reasonably foreseeable and a firm should also take into account the relative costs and benefits of carrying out the stress tests and the *scenario analyses*).
- 6.2 When carrying out *stress testing* or *scenario analyses* it is important to consider the impact on all of the firm's assets and liabilities including, where relevant, the present value of future profits from non-profit policies.
- 6.3 *Scenario analyses* are usually carried out within the *ICA* for one of two purposes:
- 6.3.1 Scenarios may be generated which, for a given model, accurately reflect the selected confidence level for a number of risks when considered simultaneously. Consequently, such scenarios may be used to calculate the *ICA* or a component of it directly.
- 6.3.2 Scenarios may be used to give additional comfort as to the accuracy of an *ICA* calculated using other methods. Examples of potential weaknesses that may

be highlighted by *scenario analyses* include non-linearity in the way in which the required capital responds to multiple risks rather than single risks, double-counting of best-estimate profits or benefits from assumed management actions, constraints on the fungibility of capital between funds and group companies in stressed conditions and the impact of adverse scenarios on the tax position of the firm. In this use of *scenario analyses* more approximate methods may be acceptable for generating the scenarios for investigation.

- 6.4 *Stress testing* may be used to calculate the capital sufficient to meet the liabilities with a chosen level of confidence for a particular risk. To the extent that a firm is exposed to more than one risk, the results of *stress testing* for individual risks will need to be combined using an aggregation technique.
- 6.5 PRU 1.2.46G makes clear that the *stress testing* and *scenario analyses* should be more detailed if the firm's capital strength is low or if its risk prevention and mitigation measures are not robust. A firm's capital strength is not known at a particular time until an *ICA* is carried out at that time. However, if a previous *ICA* has shown that a firm's available assets are significantly in excess of the sum of the required capital (or of any higher *ICG* set by FSA), and no significant changes to the firm's circumstances or external environment have occurred since that previous *ICA*, then it is reasonable to assume that the firm's capital position remains strong for this purpose. If less detailed *stress testing* or *scenario analyses* reveal a material deterioration in the capital position, more detailed tests must be carried out.

6.6 Combinations of Risks

- 6.6.1 PRU 2.3.5G makes clear that a key assumption is the method of aggregating the results of the effects of different risks for which the capital should provide. It is not necessary to provide capital sufficient to cater for all reasonably foreseeable worst outcomes occurring together. Where statistical distributions are fitted to different risks, forming the joint distribution, either in closed form or by Monte Carlo simulation, is an appropriate method of aggregation. Correlations, positive or negative, or dynamic deterministic relationships should be allowed for between variables (in either case of a magnitude justified by relevant historical observation or in accordance with any underlying economic or demographic model).
- 6.6.2 If statistical distributions are not fitted, or if the determination of a joint distribution is not possible, then more approximate methods of combination must be used. Where it is reasonable to assume that risks are largely independent and approximately normally distributed, then it may be appropriate to take the square root of the sum of the squares of the capital requirements for each individual risk as the aggregate capital requirement. Where risks are considered to be materially correlated or deterministically linked via a dynamic relationship, it is important not simply to add (or subtract) individually calculated capital requirements for each risk. Rather, the cumulative effect of the related stresses should be considered, which may be either more or less than the simple sum of the capital requirements.

- 6.6.3 Careful justification should be given to the appropriate correlations to assume between variables in the more extreme stresses relevant to *ICAs*. In some cases, it may be appropriate to assume a higher correlation than that historically observed to reflect relationships which only come into play in more extreme stresses.
- 6.7 It is not appropriate to assume that any of the stresses prescribed in PRU 7.4 for the calculation of the *RCM* will, either individually or in aggregate, necessarily satisfy part or all of the requirements of PRU 1.2.35R nor of this Guidance Note. This is in part because the prescribed *RCM* stresses have been determined in respect of a well-run, well-diversified model firm with relatively straightforward risk exposures. Allowance was made for some exposure to risks other than those explicitly stressed in the *RCM* calculation and for some future management actions. The stresses were then selected as those which, when applied instantaneously, resulted in the same capital requirement as from the wider range of risks, allowing for correlations and management actions, over a one year timeframe at a 99.5% confidence level.
- 6.8 It may be concluded after due consideration that an approach which expands upon the *RCM* stresses might satisfy PRU 1.2.35R. Factors which should be considered include:
- the firm may be exposed to different relative levels of risk than the model firm
 - the firm may be exposed to risks not considered for the model firm
 - the firm may contain different types or proportions of non-profit business than the model firm
 - the range of possible management actions may be narrower or wider than for the model firm
 - the economic or business environment may have changed from that which prevailed when the *RCM* stresses were first calibrated
- 6.9 It is not necessary for any firm to assess the capital which would be necessary if the regulatory basis solvency requirements had to be met in the stressed scenarios. Whilst this approach may be followed as a conservative proxy, it is only necessary to stress the reserves without the margins of prudence explicitly or implicitly incorporated in the regulatory basis. Consequently, it is not necessary to ensure that the *resilience capital requirement* or *long-term insurance capital requirement* are covered in the stress scenarios.
- 6.10 PRU 2.3.14G states “... individual guidance will be given taking into consideration *capital resources* consistent with a 99.5% confidence level over a one year timeframe or, if appropriate to the firm's business, an equivalent lower confidence level over a longer timeframe. *Firms* should therefore prepare an *individual capital assessment* on the same basis”. It is not necessarily appropriate to assume that a one-year timeframe, 99.5% confidence level calculation will comply with PRU 1.2.35R and firms should carefully justify the timeframe and confidence level selected.

- 6.11 There is no scientific method of determining exactly the equivalent confidence level over a longer term to a 99.5% level over one year. Nevertheless, it will require careful justification for it to be appropriate to assume less than a $(100 - 0.5N)\%$ confidence level for an assessment of the capital necessary using an N-year projection where N is:
- for a projection for a fixed number of years, that number of years;
 - for a projection until all but an immaterial liability remains, an assessment of the term until all but 10% of the (undiscounted) liabilities have expired.
- 6.12 It may be possible to justify an *ICA* based on instantaneous extreme adverse stresses, including an instantaneous worsening of the reserving basis rather than projecting the balance sheet forward over time. Similar considerations apply to this approach as to a one-year projection, and the instantaneous stress approach may be more conservative than a one-year projection. However, it will be important to document the basis for concluding that there are no path-dependent factors that may increase the capital requirement if a one-year projection approach had been used (for example, the effect of management actions) or, if there is such path-dependency, how it has been allowed for in adjusting the instantaneous stress test approach.
- 6.13 There is no standard treatment for risks which, in isolation, have probabilities of occurrence lower than the confidence level chosen for the *ICA*. In some cases, it may be possible and appropriate to convert the risks into a continuous distribution either by considering the value changes (for example, decreasing the value placed on a reinsurance contract as the creditworthiness of the reinsurer declines rather than considering only the likelihood of default) or by considering portfolios of similar risks. However, this will not always be possible or appropriate.

6.14 Occupational Pension Schemes

- 6.14.1 The *ICA* should have regard to any commitments on the firm to provide pensions and other benefits for its past or present employees. The *stress testing* and *scenario analyses* should recognise that risks affecting the long term insurance business (such as market movements and increasing longevity) may also affect any defined benefit pension schemes to which the firm contributes. The impact on the *ICA* will depend upon the precise nature of the firm's pensions arrangements. A distinction may be made between those elements of pensions funding which are contractual and those which might be variable or negotiable. Where discretion exists, allowance can be made for management actions in the scenarios tested provided that such management actions have been agreed to be realistic by senior management.
- 6.14.2 It should not necessarily be assumed that the liability in respect of a joint pensions arrangement with other companies in the same group is limited to an increase in the contribution rate for active members. In particular, where all parts of the group are required to produce *ICAs*, the total stressed pensions cost must be distributed between the relevant firms in an appropriate way.

- 6.14.3 Care should be taken to ensure that the ongoing funding contributions and deficit funding contributions are reassessed appropriately in each scenario and that the contributions are not double-counted in expense projections and historic expense fluctuations.
- 6.14.4 Where stochastic modelling is used for the *long-term insurance liabilities* then the costs of funding pensions arrangements could be modelled in parallel using the same scenarios. However, this approach may be impractical for some firms. In this case it would be appropriate to:
- identify the scenarios that are generating the capital requirement for the *long-term insurance business* and consider the requirements for additional pensions funding that might arise in these scenarios; and
 - consider which scenarios would generate the highest requirement for additional pensions funding and establish that these scenarios would not lead to a higher overall capital requirement when taking account of both the *long-term insurance business* and the pensions arrangements.

7. Stochastic Modelling

- 7.1 Where a firm uses stochastic techniques to assess the value of certain aspects of its *with-profits business* for the purposes of PRU 7.4, it would normally be appropriate also to use stochastic techniques in its *ICA* to determine the value of certain aspects of its *with-profits business* in stressed scenarios.
- 7.2 When a stochastic model is being used to assess capital requirements, it is necessary to examine the more extreme outcomes generated and to consider whether they imply a sufficiently severe stress when considered in the light of current conditions and relevant historical experience.

8. Market Risk

- 8.1 Market risk will normally either be modelled stochastically, or by selecting appropriate deterministic scenarios. Where a run-off approach is used, in selecting such deterministic scenarios, attention should be paid not just to the end value of the parameters modelled (e.g. total return) but also to the path followed. This is because the cost of guarantees if asset prices follow smooth as opposed to fluctuating paths may differ, especially where the incidence of guarantees is itself materially non-uniform or the impact of management actions is different under the different paths.
- 8.2 The cost of the inefficiencies associated with dynamic hedging strategies needs to be allowed for either by stochastic modelling of the strategies or by estimating the costs in an extreme, deterministic scenario (again, the cost is likely to be larger in non-smooth as opposed to smooth paths).
- 8.3 Where the assumed management action is to put a hedge in place if a specified price movement occurs, capital should be allowed for the loss which would result if it was reasonably foreseeable that a larger price movement

could occur before the hedge could be put in place, including the likely additional cost of the hedge following that price movement. Careful consideration needs to be given to the likely capacity and pricing spreads in the relevant markets in such extreme scenarios and any assumptions in this regard should, if possible, be justified relative to recent historic experience at times of large price changes.

- 8.4 The capital required in connection with a reasonably foreseeable change in implied asset volatility should be allowed for where this is a material risk for the firm.
- 8.5 Fixed interest exposures should be subject to stresses which allow for changes in the shape of the yield curve, as well as to uniform changes of level, where the impact of this may be material.
- 8.6 Firms should also consider the impact of any exposure to movements in exchange rates. Particular attention should be paid to ensuring the movements allowed for within the stress tests or stochastic projections are consistent with the market conditions implied by each scenario considered. Alternatively a separate test may be performed, provided appropriate allowance is made for the correlation between exchange rate risk and other market risks.
- 8.7 If a firm purchases an asset type in which it has not previously invested, it should ensure that the risks of holding this asset are identified and that the amount of capital consistent with these risks is included in the *ICA*. An example would be the purchase of a swaption, in which the firm should consider the risk that the difference in yields between the swap and the risk-free rate increases, reducing the value of the asset without a corresponding reduction in the liability.

9. Credit Risk

- 9.1 The variation in market prices and proceeds from corporate bonds could either be treated as a credit risk or as market risk. If variations in corporate bond spread and default risk for a diversified holding are modelled stochastically within the same model as is used for other market risks, then the combined result may be reported under a combined heading.
- 9.2 Variations in the market price of a corporate bond other than those arising from the risk-free rate can arise from:
- a change in the credit rating of that bond;
 - a change in the corporate bond spread without any such change in credit rating;
 - a change in the market view of the credit rating.

All of these aspects should be considered.

- 9.3 Not all of the variations in the corporate bond spread are necessarily due to changes in credit risk. It may therefore be appropriate to allow for some of

the change in corporate bond spread in the value of the liabilities that are backed by the corporate bonds. Any such allowance should be carefully justified.

- 9.4 PRU 7.4.84R defines, in the context of the *RCM*, certain fixed interest securities which do not need to be subject to spread stress. Consideration should be given to whether it is necessary to include any capital in an *ICA* in respect of such securities.
- 9.5 The probabilities associated with the partial or complete default of reinsurance, outsourcing or other counterparties should be consistent with their credit rating or other measure of their credit standing, adjusted as appropriate for any higher or lower priority of the reinsurance and for other special features such as financial penalties under an outsourcing contract. The capital requirements should be calculated allowing for the potential exposure in terms of amount and timing under the scenarios considered and allowing for the correlation of the financial strength of the counterparty with other variables in the scenario. Loans to or reinsurance payments expected from associated companies should be given value in a scenario only if, or to the extent that, the associated company would, in that same scenario, be able to repay all or part of the loan or make the reinsurance payments.
- 9.6 The exposure under derivative contacts can be considered to be net of margin payments and collateral arrangements. Where regular marking-to-market margining occurs, the maximum loss in an extreme scenario is the movement between margin intervals, less the value in that scenario of any collateral. In addition, if the calculation of the liabilities in the extreme scenario is dependent upon the existence of the derivative contract, consideration should be given to the cost (in spread terms) of obtaining identical derivatives from another counterparty. It is not necessary to assume that the UK financial market as a whole has ceased to function, although where the original derivative was of an infrequently traded type, consideration should be given to the time which may be necessary to arrange a replacement (with the consequential unprotected period) and the terms which a replacement provider may be likely to demand.
- 9.7 Cash deposits, including collateral received and placed on deposit, should be assumed to be subject to credit risk, unless it can be reasonably justified that no such risk exists.
- 9.8 Particular care is required for relatively new asset classes. For example, for collateralised debt obligations (CDOs) the distribution will not be the same as that for a corporate bond with the same credit rating, and it is necessary to consider the return for such assets in extreme circumstances.

10. Insurance Risk

10.1 Expense Risk

- 10.1.1 Expense risk can generally be sub-divided into:

- the risk of an adverse shock in expense levels relative to the best estimate; and
- long term adverse trends where the rate of increase in expenses is higher than expected. Most types of expense are generally subject to the risk of increased price or wage inflation increasing the expense at a more rapid rate than the income to be used to meet it.

Both of these risks should be considered.

- 10.1.2 A deterministic or stochastic approach may be used. In either case, the expense inflation assumption should be considered in the context of other economic assumptions.
- 10.1.3 If a one-year timeframe or instantaneous stress approach is used and if it is considered that inflation is an unhedged material risk, care should be taken to ensure that the liability valuation basis assumed after the period or stress allows for adequately stressed future inflationary expectations (or uses a market-consistent model calibrated relative to such expectations) consistent with paragraph 8 above.
- 10.1.4 On closed to new business assumptions the number of policies in force would be expected to reduce over time. The effect of increasing diseconomies of scale should be brought into account in an appropriate manner. If an outsourcing arrangement with a third party is in place on guaranteed terms, it is acceptable to assume that those terms will continue to apply for the duration of the guarantee. However, allowance must be made under credit risk or elsewhere for the possibility and impact of default by the outsourcer. Appropriate allowance must be made for a reversion to a full internal cost or a market-benchmarked outsourcing cost basis at the end of the guaranteed terms period if the terms of renewal of the contract are not constrained. Conversely, if a firm has a contractual commitment under an outsourcing agreement which results in minimum payments, appropriate allowance for this feature must be made.
- 10.1.5 Where services are shared between a number of companies in a group, it is necessary to identify reasonably foreseeable combinations of group company closures and correlations with other variables and assess the impact of these on the expense burden on the firm in each scenario modelled, allowing for the assessed probability of the combination.
- 10.1.6 Allowance should also be made for the risk of mismanagement of expenses generally, the extent of the allowance reflecting the effectiveness of the controls in place. This may alternatively be classified as operational risk.

10.2 Mortality and Morbidity Risk

- 10.2.1 Mortality and morbidity risks can be divided into three broad categories:
- large-scale events;
 - long-term adverse trends; and
 - year-on-year volatility.

ICAs must allow for the impact and likelihood of all these types of risk.

10.2.2 Large scale events include:

- events which significantly increase claims globally or nationally for a limited time period; and
- events which significantly increase claims only for the firm (e.g. as a result of multiple claims under a group life or income protection policy).

10.2.3 Material advances in the treatment of a significant critical illness of the aged (e.g. cancer or heart disease) or the development of a commonly available treatment to delay significantly the normal ageing process could be considered a 'large scale event' for a portfolio of annuities or guaranteed annuity options.

10.2.4 Long-term adverse trends are particularly important where policy terms are guaranteed (whether assurance or annuities). The *ICA* should consider firstly, with justification, how any historically observed trends (including cohort effects) might continue, or might continue to accelerate or decelerate. Extreme adverse events should then be significant worsenings of the expected trend or its rate of acceleration or deceleration. It may be necessary to assume different rates or even directions of change for different groups of lives or at different ages.

10.2.5 If a one-year timeframe or instantaneous stress approach is used, care should be taken to ensure that the liability valuation basis assumed after the period or stress allows for adequately stressed future longevity expectations consistent with paragraph 10.2.4 above.

10.2.6 If it is intended to use a combined economic and mortality stochastic model to value deferred annuities, guaranteed annuity options or other liabilities, the stochastic variation most relevant for mortality is likely to be in the rate of mortality improvement rather than mortality levels. The mortality element of the stochastic model should produce extreme outcomes that satisfy the criteria of paragraph 10.2.4 above.

10.2.7 The possibility of adverse selection by policyholders terminating their life contracts early may need to be taken into account in assessing the range of possible future mortality experience. For reviewable rate products, the resulting increases in premium rates (to the extent permitted by policy terms and the duty to treat customers fairly contained in Principle 6 of the FSA's Principles for Businesses) may exacerbate selective lapse experience.

10.2.8 It is allowable to estimate the impact of any risk net of recoveries under reinsurance arrangements. However, allowance must be made under credit risk for the possibility and impact of default by the reinsurer, in particular in the event of more extreme outcomes which also severely affect other insurers.

10.3 Persistency

- 10.3.1 Rates of early termination and option take-up can be affected both by a general change and by specific causative factors (including large scale events). For example, the rate of surrender of with-profits bonds at a date on which no market value reduction (MVR) may be applied may depend on the size of the MVR which would otherwise apply. Both a general change and possible causative factors should be considered in an *ICA*. The direction of the change should not be assumed to be the same for all classes of business unless this can be justified.
- 10.3.2 General changes in persistency could be modelled stochastically, if a reasonable distribution can be derived, or deterministically, in both cases taking into account historic variations in experience not attributable to specific causative factors. Consideration should also be given to step changes due to external factors, to the extent that these are reasonably foreseeable.
- 10.3.3 Under either approach, it may be necessary to assume that the ‘central’ rate of persistency varies over the lifetime of a policy, reflecting both the early experience of recently written business and, in time, the possibility of improving persistency as term remaining to maturity reduces.
- 10.3.4 The take-up rate of options or the persistency of business subject to guarantees should be assumed to be adversely correlated or dynamically related to the variation (or trend) of factors which increase the value of the option or guarantee (e.g. in the case of GARs, to reducing interest rates and increasing longevity; in the case of “no MVR” guarantees, to investment underperformance) unless the firm has credible evidence to the contrary.
- 10.3.5 If a one-year timeframe or instantaneous stress approach is used, care should be taken to ensure that the liability valuation basis assumed thereafter allows for adequately stressed future persistency and option take up rates consistent with paragraphs 10.3.1 to 10.3.4 above.