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

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 need to hold to meet PRU 1.2.22R
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's business (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:

Principles and Practices of Financial Management ("PPFM")
Realistic basis life firm
Regulatory basis only life firm
With-profits Actuary
With-profits Insurance Capital Component

Legislation or Authority
The Financial Services and Markets Act 2000
The FSA Handbook of Rules and Guidance Integrated Prudential sourcebook (for Insurers) ("PRU")
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.

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Approved under Due Process (technical amendment). Adopted by the Board for Actuarial Standards on 19 May 2006.

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1.0	31.12.04
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from which time it ceased to operate (and cannot, with effect from that time, be relied upon) as guidance issued by the Profession. Members needing to comply with professional standards on matters covered by this Guidance Note should in future consult the standards published by the Board for Actuarial Standards.

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 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 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 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 must 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 capital-consuming, or immediately if new business releases capital.

1.6 The methods and assumptions used 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 it has one).

1.7 All reasonable steps must be taken to ensure that the data used in carrying out an ICA is complete and accurate. Allowance should be made in the calculation for the risk that data quality is inadequate.

1.8 The FSA express their 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 expect 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 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. It is recognised that 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 GN or of the FSA's guidance are not being complied with, the extent of non-compliance and the alternative adopted should be documented in the report on the ICA.

1.9 This GN does not specifically contain guidance on carrying out a combined ICA for a group of firms. Nevertheless, any guidance in this GN that would be relevant in the context of a group ICA should be applied, adapted as appropriate for the context.

1.10 Similarly, this GN does not specifically contain guidance on carrying out an ICA for an overseas life insurance subsidiary of a *UK firm*. Nevertheless, any such ICA which would influence the overall ICA of the 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 SUP4.3.13R(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 Identification of Risk

3.1 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.

3.2 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 of and assessment of capital required in respect of market, credit and insurance risk can be found in sections 6 to 8 below.

3.3 This GN does not contain any specific standards relevant to the identification of and assessment of capital required to meet operational or group risks, which need to be considered. Nevertheless, if credible historic data on any relevant operational or group risks is 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 applies. 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.

3.4 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 insurance risk or longer term asset/liability mismatching. Firms nevertheless need to consider whether a significant short-term increase in voluntary terminations 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. 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.

3.5 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.

4 Stress Tests and *Scenario Analyses*

4.1 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 to better understand its risk exposure in extreme events or circumstances (although, per PRU 1.2.45G, not in those circumstances that are too remote a possibility and only after taking into account the relative costs and benefits of doing so for the events and circumstances).

4.2 PRU 1.2.46G makes clear that the *stress testing* and *scenario analyses* should be deeper and more detailed if the firm's capital strength is low or if its risk prevention and mitigation measures are not robust. To an extent, this is a circular argument in that 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 deep or detailed *stress testing or scenario analyses* reveal a material deterioration in the capital position, deeper and more detailed tests must be carried out.

4.3 GN45 sets standards for the calculation of a firm's *with profits insurance capital component* (WPICC). ICAs for firms required to calculate a WPICC should be carried out consistently with the calculation of that firm's WPICC. In particular, sections 3.3 (future policy-related liabilities), 4.5 (management actions) and 4.6 (policyholders actions) of GN45 should be considered, where relevant, as recommended practice in the context of the ICA. Certain assets which have no value for the purposes of PRU 7.4 may, however, be given value if considered appropriate in the ICA.

4.4 Combinations of Risks

4.4.1 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 historical observation or in accordance with any underlying economic or demographic model).

4.4.2 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 to simply add (or subtract) individually calculated capital requirements for each risk. Rather, the cumulative effect of the related stresses should be considered.

4.4.3 When aggregating results without determining a joint distribution, the methods used should ensure that adequate weight is given to the capital requirement calculated for each of the individual risks. The methods should

be theoretically sound and not inappropriately dilute or average out the capital requirements resulting from high impact risks.

4.4.4 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.

4.5 For *realistic basis firms*, 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 GN. This is 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 time horizon at a 99.5% confidence level.

4.6 It may also 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 to 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-profits business
- The range of possible management actions may be narrower or wider
- The economic or business environment may have changed from that which prevailed when the RCM stresses were first prescribed

4.7 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 (including the resilience capital requirement and the minimum capital requirement) explicitly or implicitly incorporated in the regulatory basis.

4.8 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 any decision that it does.

4.9 A longer timeframe than one year may be particularly appropriate where there are exposures to long-dated, unhedged guarantees or to a long-term deterioration in insurance experience (e.g. longevity).

4.10 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 or for a run-off projection in respect of a firm with a mean term of liabilities of N years.

4.11 PRU 2.3.14G also states "Throughout whatever timeframe is adopted by *firms*, *firms* should ensure that their projected assets are, and will continue to be, sufficient, to enable their projected liabilities to be paid, and it would be reasonable for *firms* to test that this is the case at the end of each year of the timeframe". At each year end (or at the end of the year for a one-year projection), this expression should be interpreted consistently with any guidance issued by the FSA.

4.12 When using an Xth percentile one-year projection, it is necessary to assume that reserves are established for all liabilities at the end of the year on a basis whose setting, in conjunction with the outcomes over the year of projection, together represent the Xth least likely outcome. When considering the non-economic elements of the reserving basis at the end of the year of projection in particular, it is necessary to bring into account similar considerations to those which would be brought into account if a run-off projection was being used.

4.13 It may also be possible to justify an ICA based on an instantaneous extreme adverse stress, including an instantaneous worsening of the reserving basis. Similar considerations apply to this approach as to a one-year projection, although clearly no mitigating management actions can be allowed for. However, the justification should consider whether there might be capital-heavier 'path-dependent' outcomes under one-year stress scenarios before determining that an instantaneous stress is necessarily more conservative at the same percentile.

4.14 It is not appropriate to ignore material risks which, in isolation, have probabilities of occurrence lower than the confidence level chosen for the ICA. This is because they still contribute overall to the distribution of overall capital required.

4.15 **Occupational Pension Schemes**

4.15.1 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 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 should be made for feasible management actions in the scenarios tested.

4.15.2 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.

4.15.3 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.

5 Stochastic Modelling

5.1 GN47 sets standards for the use of stochastic modelling in various contexts, including that of an ICA.

5.2 PRU 1.2.43G permits the use of stochastic modelling techniques in substitution for a range of deterministic stresses or scenarios. In addition, PRU 2.3.56G states, in the context of the use of capital models for some of a firm's risks, "For *long-term insurance business* which includes options or guarantees that change in value significantly in certain economic or demographic circumstances, a stochastic approach would normally be appropriate". 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, for assessing either the extreme outcomes of those aspects of its business or the value of certain aspects of its with-profits business in stressed scenarios.

5.3 For a short-term time horizon (or instantaneous stress) approach, it may not yet be within firms' capability to use 'nested' Monte Carlo models to calculate stochastically the value of liabilities at the end of each stochastic projection over the time horizon. If so, it is acceptable either to:

5.3.1 use a closed-form approximation for the liability value at the end of each projection over the time horizon, in which case the validity of the

approximation in the extreme scenarios most relevant to capital assessment needs careful justification or

5.3.2 to select one or more appropriately extreme deterministic projections over the time horizon, perhaps derived with reference to a stochastic model, and to use the Monte Carlo model to value the liabilities at their end.

5.4 Similarly, for a long-term time horizon, it is acceptable to use closed-form solutions to determine the value of liabilities at the end of each year, if such a determination is necessary to ensure that PRU2.3.14G is satisfied.

5.5 When a stochastic model is being used, it is necessary to examine the more extreme outcomes generated and to consider whether they adequately meet the definition of "extreme circumstances", including in the context of relevant historical experience.

6 Market Risk

6.1 Market risk will normally either be modelled stochastically, using a model compliant with GN47, or by selecting deterministic scenarios considered consistent with the confidence criteria of PRU 2.3.14G. Where a run-off approach is being taken, 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 non-smooth 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.

6.2 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).

6.3 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 additional cost of the hedge after that larger movement had occurred. 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.

6.4 The capital required in connection with a reasonably foreseeable change in implied asset volatility should be allowed for, either via a stochastic model which includes varying volatility or by determining the effect on guarantees of what is considered, from examining historic experience (of implied volatility, not of actual price/yield volatility), to be an adverse change in implied volatility consistent with the confidence criteria in PRU 2.3.14G.

6.5 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 this may be material.

6.6 Care should be taken that models of fixed interest markets or volatility prudently reflect the possible extreme behaviour of the very long end of the interest rate or volatility curve if the firm has liabilities which extend beyond the term of regularly traded assets and which are effectively unhedged.

6.7 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 make for the correlation between exchange rate risk and other market risks.

7 Credit Risk

7.1 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.

7.2 PRU 7.4.84R defines, in the context of the RCM, certain fixed interest securities which do not need to be subject to stress. It is not necessary to include any capital in an ICA in respect of such securities.

7.3 The probabilities associated with the partial or complete default of reinsurance, outsourcing or other counterparties should be consistent with their credit rating, adjusted as appropriate for any higher or lower priority of the reinsurance, financial penalties under the outsourcing contract, etc. and 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 the loan or make the reinsurance payments. Equity interests in associated companies should only be given the value which it is reasonable to attribute to them (e.g. on a 'look-through' basis) in each scenario.

7.4 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 limited to the maximum reasonably foreseeable (or modelled) movement between margin intervals, less the value in that scenario of any collateral. In addition, consideration should be given to the cost (in spread terms) of obtaining identical derivatives from another counterparty. It is not "reasonably foreseeable" 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.

7.5 Cash deposits, including collateral received and placed on deposit, should be assumed to be subject to credit risk, unless issued or guaranteed by a body listed in PRU 7.4.87R.

8 Insurance Risk

8.1 Expense Risk

8.1.1 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. A deterministic approach must consider the impact and possibility of a return, for a material period of time, to materially higher levels of inflation on both the expense and the income from which to meet them. Stochastic modelling may be necessary, especially for non-profits business, providing that the model generates sufficient scenarios of the type described in the previous sentence. In either case, historically justified correlations between investment returns and inflation may be assumed.

8.1.2 If a one-year time horizon 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 8.1.1 above.

8.1.3 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, these must be appropriately allowed for.

8.1.4 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.

8.1.5 Allowance should also be made for the 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.

8.2 Mortality and Morbidity Risk

8.2.1 Mortality and morbidity risks can be divided into three broad categories: large-scale events, long-term adverse trends and year-on-year volatility of non-homogeneous blocks of business. ICAs must allow for the impact and likelihood of all types of risk.

8.2.2 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.

8.2.3 Large scale events include:

8.2.3.1 events which significantly increase claims globally or nationally for a limited time period (although only those falling within the 'reasonably foreseeable' definition);

8.2.3.2 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).

8.2.4 Significant 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 significantly delay the normal ageing process could be considered a 'large scale event' for a portfolio of annuities or guaranteed annuity options.

8.2.5 Long-term adverse trends are particularly important where policy terms are guaranteed. 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 reasonably foreseeable worsenings of the expected continuation 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.

8.2.6 If a one-year time horizon 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 8.2.5 above.

8.2.7 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 is likely to be in the rate of improvement of longevity rather than variation in individual longevity. It would be reasonable to assume independence of such variation from economic

circumstances in a combined stochastic model. The mortality element of the stochastic model should produce extreme outcomes that satisfy the criteria of paragraph 8.2.5 above.

8.2.8 The possibility of adverse selection by early terminating life policyholders 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 policyholders' reasonable expectation and Principle 6 of the FSA's Principles for Businesses) may exacerbate selective lapse experience.

8.3 Persistency

8.3.1 Rates of early termination and option take-up can be affected both by a general deterioration and by specific causative factors. For example, a change in the tax treatment of lump-sum retirement benefits might result in a step change in the rate of full take-up of guaranteed annuity options; or 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 deterioration and reasonably foreseeable causative factors should be taken into account in an ICA.

8.3.2 General deterioration 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. However, it is more likely that a deterministic approach will be taken.

8.3.3 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.

8.3.4 When modelling the take-up rate of options or the persistency of business subject to guarantees, whether deterministically or stochastically, the experience should be assumed to be positively 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 MVRs, to investment underperformance).

8.3.5 If a one-year time horizon 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 persistency and option take up rates consistent with 8.3.1 to 8.3.4 above.