

## **CEIOPS Preparatory Field Study for Life Insurance Firms**

### **Summary Report**

#### **1 GENERAL OBSERVATIONS AND CONCLUSIONS**

##### **1.1 Introduction**

CEIOPS has been asked to prepare advice for the European Commission on the introduction of Solvency II supervisory framework for insurance companies. For this purpose some insight into the possible quantitative impact of this new standard will be essential. In advance of the Quantitative Impact Studies (QIS) of the Solvency II framework, CEIOPS conducted a Preparatory Field Study (PFS) by asking national supervisors to collect some relevant information from individual life insurance undertakings. The PFS focused on infrastructure issues and it was conducted by asking for reports from life insurance undertakings on an attempt to evaluate assets and liabilities on a broadly market consistent valuation basis. In addition, the effect of applying some stress tests on balance sheets constructed from such a market oriented valuation of assets and liabilities was tested. There were 20 European countries and 84 (mostly larger) firms that participated in this PFS. Market shares of samples varied generally between 25% to 75% of market premiums.

This report is structured in the following way. After this summary of general observations and conclusions (chapter 1), infrastructure issues (chapter 2), methodological issues (chapter 3), and quantitative issues (chapter 4) are discussed. The annex presents the qualitative industry response.

##### **1.2 Main findings**

Based on the country reports, the following picture emerged:

- Time needed by insurers for the PFS calculation varied from one to several weeks and it was noted that the time needed for future QIS would depend significantly on which part of the year the exercise was performed (due to existing reporting requirements).
- Due to resource and infrastructure constraints, some companies were unable to participate in the PFS, and some other companies were

unable to follow all the specifications of the PFS and therefore had to rely on their current model results and readily available data.

- Differences were observed in the methods for determining key factors such as future bonuses, risk margins, and values of embedded options.
- Companies and supervisors requested clear guidance for the forthcoming QIS, in particular with respect to valuation of liabilities and the application of stress tests. This guidance is expected to be developed in line with the Solvency II framework.
- The sample of companies participating may not be fully representative of each market.

For these reasons the quality, comparability and reliability of results may not be sufficient to draw firm conclusions from the figures. However, the overall picture is that:

- In general, provisions according to PFS-specifications were lower than the current technical provisions (in some cases even a considerable decline was observed), but this result should be treated with some caution. For example, many firms did not include any risk margins, provision for bonuses etc elements in their results. The liabilities may not therefore all have been calculated on a fully market consistent basis.
- In general, interest rate risk and equity risk seemed to be the most important single risk factors tested in the PFS. However, actuarial risks (underwriting and lapse risk) are key factors in assessing prudent technical provisions.
- Regarding assets, market values were widely available for most assets in almost all countries, and most of the fixed income portfolio held by firms is usually credit rated.
- Solo basis reporting was generally adopted for the PFS although some firms indicated that they are also able to report on a consolidated basis for QIS, if asked.

### **1.3 Conclusions and recommendations**

- The PFS showed a high level of participation among European countries and important information and useful ideas were received that will facilitate the work with respect to the development of a new supervisory standard and, related to that, future QIS. Valuable input on the methodology for valuing liabilities emerged from the discussions with the participating insurers.
- It also showed that calculations are likely to be practicable if they are defined in sufficient detail.

- At least for the time being, and for SMEs in particular, materiality considerations, simplifications and approximations may be needed, due to time and resource constraints, but these may reduce the comparability of figures.
- The main findings mentioned above, as well as more detailed information explained below, will be taken into account in future work for the QIS. In particular, it is acknowledged that guidance on methodological issues relating to technical provisions and solvency requirements will be important for the reliability and comparability of results.
- The time schedule outlined by the Commission for the Solvency 2 impact assessment will require full commitment and co-operation from firms and supervisors participating in the QIS. Participating companies should be kept informed about the schedule of future exercises to be able to plan their internal activities.

## 2 INFRASTRUCTURE ISSUES

The primary purpose of the PFS was to test the infrastructure and responsiveness of the companies. In the guidelines to PFS, many options were left open, either on the methodology to use or on the way to deal with specific aspects. The consequences of this degree of freedom are twofold. On the one hand, it allowed the participating companies to make any adjustments or choices, so as to be able to conduct any calculations on a best effort basis and to be ready on time. On the other hand, the need for clear guidance in the future was frequently reported, as well as the perceived low comparability of results and doubts about their accuracy. This point raises some questions about the validity and comparability of the results of the PFS across firms and across countries.

While some PFS were performed on a group basis, but none on a cross border basis, most were conducted at the legal entity level with, in some countries, a mix of choices by the responding entities. Explanations given for the legal entity approach were that it was easier, or that prudential reporting and capital requirements are at the entity level. A group approach seemed motivated by the availability of central risk management capability.

At first sight, few data availability problems were reported but this may be a consequence of the flexibility allowed in performing the PFS. Some reports noted that the results were obtained with pre-existing modeling capacity that were not exactly fitted to the PFS and that modifying this capacity, while feasible if needed, could be time consuming and expensive. For example switching from a modified duration approach to a full yield curve may be resource consuming. Others added that smaller enterprises may have more difficulties and that complexity should be kept to a minimum for less material risks.

Few methodological problems were reported on the asset side, except for the need for a classification of assets and some queries about the

reinsurance recoverable. Questions were also raised on the scope of the stress test. For example, should all assets, including free assets, be taken into account or only assets covering liabilities?

With respect to the liability side, no clear tendency emerged concerning the choices made between a full yield curve for discounting or the modified duration fallback method.

Some concerns were raised about the capital charge differences between the Basel II methodology and the credit spread test, and more generally about applying a capital requirement concept to a specific stress test.

When no national framework and thus no experience existed, which is the current situation except for a few countries, the main methodological concerns reported were:

- The value of embedded options;
- The discretionary, contractual or legal future bonuses, when they exist, were not always evaluated;
- What management action concerning product mix or asset mix can be anticipated and what would be the effect on the valuation of the embedded options?
- The surrender value (should it be a floor?), surrender rates, and negative provisions (are they allowed?).

For the companies able to evaluate these embedded options, the splitting of main insurance liabilities from embedded option or risk margin posed also some difficulties depending on the tools used (embedded value valuation or dynamic financial analysis).

Very few firms were able to give an indication on the level of risk margin. It seems that the level of prudence in current provisions is mainly unknown.

### **3 METHODOLOGICAL ISSUES**

A number of important methodological issues were identified by firms and supervisory authorities. A number of countries observed that it is very important to achieve more harmonisation concerning the technical provisions in the forthcoming QIS. Setting the confidence level is not enough; CEIOPS should also strive to have the valuation bases for realistic liabilities comparable with each other from company to company. Therefore firms need a common understanding of what is meant by a realistic valuation of liabilities, and then clear principles for doing the valuation (harmonisation).

The valuation issues raised by firms can be broadly subdivided into requests for clarification of the methodology to be applied, and issues about the

practicability of some of the requests made of firms in the PFS. It was requested by many firms and supervisors that practical principles should at least be developed for Solvency-II in the following areas:

- Choice of mortality rates;
- Assumed expenses of management;
- Rates of discontinuance;
- Future premiums and renewals;
- Future bonuses;
- Method of valuing options and guarantees;
- Assumed take-up rate for options;
- Risk margins;
- Surrender value floors;
- Stochastic simulation;
- Contract-by-contract valuation or for homogenous groups;
- Management actions;
- Classification of assets;
- Claims on reinsurers;
- Application of Basel II credit risk approach to assets held by insurance firms;
- How to take into account the interaction of assets and liabilities;
- Valuation of unit-linked policies and;
- Approach to be adopted for 'other assets' and 'other liabilities'

#### 4 **QUANTITATIVE ISSUES**

Although the focus in the PFS was on the infrastructure issues, it also produced valuable quantitative information. This chapter sketches a first picture about the possible effects of a shift in the regulation into a more market consistent one, and applying more risk-sensitive formulas for the solvency calculations.

#### 4.1 **Effect on assets and liabilities**

The valuation of assets in the PFS brought no change for those countries in which a market-consistent valuation of assets is already applied. Besides, the market value of assets is usually higher than their value under the current local valuation system. There are also examples of companies which reported a decrease in the value of assets (e.g. the value placed on subsidiaries or on reinsurance assets). It was also reported by most firms that over 90% of their fixed-interest securities had an external credit rating available.

The effect on liabilities is very diverse, but as a general rule of thumb in most countries the value of liabilities under the conditions as described in the guidance of the PFS decreases. This may have been the result of the inclusion of some safety margins in the calculation of the current provisions, the absence of a risk margin in the provisions according to PFS, and possibly for many companies the absence of an explicit valuation of future bonuses. In at least one country with a currently high interest rate environment, the main reason for the considerable decline in the value of liabilities was the difference between the applied discount rates, the lower technical interest rates in the current system and the high risk free spot rates in the PFS.

#### 4.2 **Stress test results**

The PFS asked the insurers to perform a number of simple, standardized stress tests on the simplified balance sheets to determine their impact on the insurers' capital requirement. The single events are only relevant for this initial study, have not all been calibrated to the same level of probability, and do not aim to prejudge the outcome of Solvency II. This holds both for the description of the risk factors and the corresponding parameters. Notwithstanding, the stress tests may provide a tentative insight into the insurers risk profile and ultimately the quantitative effects for the several European countries.

Two single events, a moderate shock and a severe shock, were analysed for each of seven risk classes:

	<b>moderate shock</b>	<b>severe shock</b>
<b>interest rate risk</b>	20% in-/decrease of interest rate	30% in-/decrease of interest rate
<b>credit risk</b>	Basel II standardized approach for government securities, or credit spread * 1,4	Basel II standardized approach for corporate bonds, or credit spread * 1,6
<b>equity risk</b>	20% decrease of equities	35% decrease of equities
<b>real estate risk</b>	15% decrease of real estate	25% decrease of real estate
<b>foreign exchange risk</b>	10% in-/decrease of exchange rates	25% in-/decrease of exchange rates
<b>underwriting risk</b>	10% in-/decrease of probability factors	15% in-/decrease of probability factors
<b>lapse risk</b>	25% in-/decrease of lapse rate	50% in-/decrease of lapse rate

According to the results of the PFS stress tests, interest rate risk and equity risk in general seem to be the most important risks. Regarding the other risks, the outcome of the stress tests is mixed:

- Credit risk is an important<sup>1</sup> risk factor in four countries;
- Underwriting risk in three countries;
- Lapse risk in three countries;
- Foreign exchange risk in two countries; and
- Real estate risk in one country.

Two countries indicate that the most important risk factors differ between the moderate and severe shock.

Interest rate risk stems from a duration gap of insurance liabilities and fixed income investments. Usually, the duration of liabilities is longer than the duration of fixed income investments. In one country, due to the use of derivatives to hedge interest rate falls, an increase of the interest rate causes a higher loss than a decrease. Typically, if equity risk is dominant, a larger share of assets is held in equities. One member state noted that equity risk was dominant even if the share of assets held in equity was minor (10%). Another member state noted that the importance of the risk factors varies materially between companies and heavily depends on the type of product. This may also be the case for other countries.

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<sup>1</sup> A risk factor was considered important, if its share of the sum of shock effects is more than 20% in at least one of the scenarios.

### 4.3 Solvency effects

In addition to individual effects CEIOPS calculated some combined solvency effects. For the purpose of the PFS, CEIOPS did not presume any dependencies between the risk factors to be stress tested. Instead, the solvency effects of the single events were summed by either assuming full correlation (sum formula) or no correlation (square-root formula). The combined solvency effect can be interpreted as a risk-sensitive solvency requirement measure that could be compared to the currently required solvency level.

Generally, on the country level, the aggregated results of the stress tests (linear formula and square-root formula; moderate and severe shock) produced higher numbers than the current solvency requirement under the Solvency 1 Life Directive.

### 4.4 Overall capital effect

Generally, the firms in almost all countries showed a rise in the free surplus under PFS valuation. Only two members reported that the free surplus lies within the range of current results. If the effect of liabilities and solvency are combined, resulting in an overall capital effect, it is hard to draw strong conclusions. The conclusions largely depend on the scenario (moderate or severe) and the way they are calculated (linear versus square root). Above all, the approach has not been harmonized for the PFS, but the study at least shows that the capital effects will not necessarily result in higher requirements compared to the current regulation.

### 4.5 General considerations regarding the plausibility of the results

The overriding idea of the PFS was to test the infrastructure for the forthcoming QIS. Regarding the valuation of liabilities it should be noted that due to the high degree of methodological freedom in the PFS the results may not be comparable and reliable in all the cases. Regarding the impact of the single events, the results described above can only be seen as indications of the risk profile of the insurers, inter alia for the following reasons:

- For each of the single events neither the moderate nor the severe shocks were calibrated to the same level of probability;
- The effect of the shocks on the future bonuses were not taken into account by some insurers;
- Some of the single events were interpreted in different ways by firms and;
- The participating companies may not be representative for the national market for some countries.



## ANNEX QUALITATIVE INDUSTRY RESPONSES

Insurance companies were asked to answer several qualitative questions on infrastructure and methodological issues. The summary below gives some interesting information on the initial capability of the insurance industry to conduct these types of exercises and it may also provide useful ideas for future Solvency II work.

### *Standard tables or other parameters (e.g. mortality & morbidity rates) in the valuation of liabilities*

Many firms and countries did not give details of their approaches and some replies indicated a lack of data and methods to define the best estimate rates. In the reports received, a reference to the standard national mortality table was commonly made. In some cases it was adjusted (reduced) by a simple approach to reflect own experience and to give an approximation of the best estimate. Morbidity rates were commonly based on own experience, or for example reinsurer's data. In one country reference was made to the European Embedded Value reporting standard, and the rates were assessed separately from an analysis of the relevant experience for each significant product line.

### *Assumed rates of discontinuance of policies at different durations*

Approaches varied a lot, which is not unexpected as this issue has not been considered as being particularly relevant in many countries. Moreover, additional challenges arise from country specific practices regarding profit-sharing, taxation and legal rights of policyholders.

In a couple of cases, firms' data allowed appropriate estimates (by product line and duration) while in some other cases, simple approaches were used by firms (e.g. flat rate methods where the risk groups varied and no external key-driver was reported). In another market no assumptions concerning lapse risk/persistency risk have been included in the calculations of any of the participating companies (e.g. because of restrictions on policyholders' right to surrender, and/or the use of surrender value floor). In between were cases where some insurance firms didn't take into consideration the lapse rate for calculating liabilities or where the approaches were significantly different. In one case the firms did not calculate the effect separately. Some firms commented that applying a 1 year horizon to the chosen stresses on persistency for the PFS is not sufficient in practice.<sup>2</sup> One report underlined the fact that results are heavily dependent on assumptions about policyholder behaviour.

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<sup>2</sup> This comment on the plausibility of chosen stresses was directed to other risks as well in some markets, e.g. equity stresses were mentioned.

### *Assumptions to quantify the level of future bonuses*

This was a difficult area of valuation where approaches were significantly different not only between countries but also within the same market. In many countries bonus provisioning has traditionally been done implicitly by using prudent technical interest rates. The following examples were reported.

In three cases stochastic modeling that links (arbitrage free) asset scenarios and management decisions to bonus levels was commonly established. Some approaches linked bonus levels deterministically to market interest rates or to recently declared bonus levels. However the bonus levels did not in many cases fully reflect the equity shock scenario. In some cases no assumptions on the value of future bonuses were made, because these are at the discretion of insurance company and not guaranteed. Another reason was time and methodological constraints. A different approach was taken by some firms in another country where such bonus values were included into the current estimate of liabilities, as these were not viewed as being fully at the discretion of the insurer (due to competitive pressure to distribute profits in the form of bonuses). In some cases bonuses could not be separated from the current estimate by all firms (one reason being the standard software packages used).

The difficulties relating to the modeling of management behaviour were pointed out in one report where it was anticipated that most insurers would be able to transfer most of the stress impacts onto the policyholders, if needed or decided. Indeed, another report stated that the impact of the stress tests on the capital requirements is seriously overestimated in the PFS because the results of the single events have not been distributed appropriately between customers and owners. It was also pointed out that changing the valuation bases may have a side effect of changing the contract economy.

In one country which has experience of market-based valuation, it is required that the companies notify the supervisory authority of their policy for allocation of profits between owners and policyholders. The insurers have some discretion regarding their policy for allocation and more discretion regarding the timing, but the law requires firms to respect the overall objective of fairness in relation to policyholders. A separate item in the balance sheet is formed for bonus potentials.

### *Available policyholder's options and the valuation of liabilities*

The survey sought some information about the nature of options and guarantees offered by firms in their policies, and also how these are valued by firms.

### *Nature of main financial guarantees and options*

- Guarantee of sum assured plus accrued regular bonuses on contractual exits on death or maturity;
- Contractual guarantees (such as 'No Market Value Reduction' applied) for retirements or surrenders of policies on specified dates, or for regular withdrawals of money;
- Option to pay additional premiums (commonly limited to a predefined maximum amount) with guaranteed interest rate declared at policy issue, or right to increase the sum assured on guaranteed terms;
- Guaranteed annuity rates on retirement;
- Policyholders' right to have a share of the surplus (related to principles and rules of fairness and how it is defined);
- Right to convert to a paid-up policy on guaranteed terms;
- Alterations to policies;
- Right to defer payment of premiums;
- Guaranteed insurability option (where a policyholder can effect some new insurance cover without any further underwriting being required);
- Continuation or renewal options on some protection policies;
- Embedded options due to the mismatch in asset and liabilities;
- Mortgage endowment promise – non contractual but included in realistic liabilities;
- Certain unit-linked policies offer maturity guarantees, guaranteed minimum death benefits and guaranteed annuity options and;
- Change of investment fund for unit-linked policies

### *Approach that has been followed to placing a value on these options*

In some countries a market-consistent value of the cost of 'investment-type' options, guarantees (and smoothing of bonuses) has been calculated using a stochastic model with risk-neutral calibration, and allowing for an assumed rate of take-up of any options. The cost of guaranteed annuity options has typically been valued using a market value replication technique (to reflect the current option value of swaptions with similar characteristics).

Some other countries reported that their firms were working towards a full market-consistent valuation of embedded options and guarantees. A major

problem identified in the valuation of options was the assessment of an appropriate take-up rate for these options (see below).

In other countries, simple approximations were made, firms only considered economically relevant options, a deterministic approach was applied, or options were valued implicitly or taken into account in the cash flow projection.

*The methods and assumptions by which firms assess the level of any 'risk margins' that are included within the technical provisions (i.e. the margin between the provisions currently held in the balance sheet and the expected value of the liabilities that have been calculated for the purpose of this preparatory field study)*

This topic drew rather little attention as in the EU the exact level of prudence in current provisions is mainly unknown. Some supervisors request that the observed experience should be compared each year with the assumptions made in the calculation bases of firms. Some firms compared market interest rates to the regulatory technical interest rates as a proxy for the risk margin. In another market, some firms estimated risk margins as spreads in interest rates. Some commentators stated that the current method of establishing technical provisions for statutory purposes is different and incomparable to the discounted cash-flow method used for PFS. Therefore the difference between them should not be regarded as a margin, since its origin is methodological (there are no margins in economic value of liabilities as the calculations are held on best estimate basis. In this approach any margins come from adverse stress tests).

*Practical difficulties that were encountered in compiling the figures for this study*

As discussed in chapter 2, there were many difficulties relating both to the theory and practice. All felt the need to have precise definitions and guidelines for the valuation of liabilities, and an appropriate amount of time to perform the calculations. This problem in effect partly undermines the quality and reliability of the PFS results. In some countries there were significant difficulties when producing the cash flow projections. The insurance firms in one country listed the following difficulties: the amount of work was high especially when stochastic approach to model options and guarantees is regarded, a major difficulty was the assessment of the future administration costs and overhead expenses attributed to the policies, and there are also difficulties in assessing the percentage of discontinuance for products.

*Calculation simplifications that could be made without losing too much precision in the numbers*

A big question when performing PFS or any future QIS is how far the harmonisation of principles for a realistic valuation of liabilities has extended

among the companies and to what degree will their IT-infrastructure support the calculations. Some thought that in the future QISs, it may not be desirable to simplify the calculations, since the area of realistic valuation is constantly developing, and the more complex IT-infrastructure that is needed will be built up progressively. Some countries preferred to use several simplifications in the PFS for practicality and reliability reasons (e.g. leaving out unit linked contracts and reinsurance and risk margin, valuing bonuses and options collectively and deterministically in the cash flows). Also the companies made use of models (e.g. embedded value) they had already been applying although they do not suit perfectly the expectations of PFS. Difficulties encountered depend very much on the product portfolio (for some firms the PFS was easy while the exercise would be time-consuming and expensive for more complex portfolios).

The insurance undertakings in one country had the following suggestions: a reasonable materiality limit for defining homogeneous risk groups used in establishing capital requirements under stress tests would help; projection lengths might be tailored to the business characteristics; a stochastic approach might be omitted when guarantees and options are not significant or where these are being valued using a formula-based approach; to make the results of different companies more comparable, more detailed calculation sheets should be provided. One jurisdiction had the following suggestions: stress tests for minor risks might be kept fairly simple, rather than adopting a sophisticated approach; it was thought that the foreign exchange stress test, and also perhaps the real estate stress test, added little value and could be aggregated with the other market risk stress tests; regulators might specify the appropriate credit spreads for reinsurers, or ask reinsurers in their jurisdiction to provide this information; provisions for minor classes of business might be calculated on a simplified but conservative basis. One suggestion to simplify the calculations for mortality and lapse risks would be by using standard solvency margins percentages (for the current estimate and interest rate sensitivities no simplifications should be allowed).

#### *Views on risk margins*

One commentator suggested that the most appropriate method would probably be to use stochastic simulation of the variation in liability cash flows. Once the distribution has been obtained, one can estimate the required risk margin to be included over and above the best estimate, or the amount needed to estimate the mean or equalize the variation to a given confidence level. As an interim approach one could for each risk factor fix the confidence level with a point estimate and then repeat the liability calculation in order to obtain a higher liability, which is then compared to the realistic valuation in order to derive an approximation of the risk margin. The work of the International Actuarial Association (IAA) was mentioned as a useful reference (the IAA's report entitled "A Global Framework for Insurer Solvency Assessment").

Most of the participating undertakings in one country used a risk margin of 0 as they find that the definition of current estimate already includes a risk

margin and any additional risk margin should be in the SCR only. One participating undertaking has used a risk margin corresponding to a 5% reduction in the discount rate, which was used as a proxy when anything better was not available. In the opinion of insurers of one country, an approach in this matter should follow IFRS – such a convergence should form a coherent reporting and solvency monitoring basis.

Some firms commented that these risk margins should be related to the degree of confidence with which the best estimate assumptions had been chosen (e.g. for future mortality rates or expense levels). Where a distribution of outcomes was available, it could be assessed on this basis at an appropriate level of confidence (e.g. 75%). This would probably require a combination of statistical analysis, market data (where available) and actuarial judgement. One institution mentioned that the use of utility functions and the principle of equivalent utility in determining the market-consistent risk margin seem promising.

One country referred to the approach adopted under their legislation, namely that the risk margin is included in the 'Guaranteed benefits', and defined as the margin that the undertaking expects to pay to an acquirer of the undertakings insurance contracts in order for the acquirer to take on the uncertainty of the size and time of payment of the 'Guaranteed benefits'. Another country referred to the margins in the current premium rates as being relevant to consideration of the risk margins to be included in the provisions.

It was stated in one report that the appropriate level of risk margin should have regard to the underlying variability of the experience and take account of the company's experience where relevant. The appropriate level of risk margin will therefore depend on the assumption. Some assumptions should be company specific e.g. expenses, claims experience but others could be the same for all companies in a country e.g. inflation. In three countries risk margins were estimated by several companies. The companies set the risk margin at a 75 % or 90% confidence level or shifted parallel the discount rates by -10%. However, there were fundamentally different interpretations regarding the scope of the risk margin. The main questions were how to deal with non-financial vs financial, and non-diversifiable (or unavoidable) vs. diversifiable risk elements.

#### *Application of stress tests*

One firm mentioned that single factor stress tests are only of limited benefit for with-profits business, because credit for management actions is taken in each individual stress. This means the aggregated result overstates the extent of management actions possible. They preferred a combination scenario, which could be more powerful as it took account of scenarios where more than one factor might change at the same time. As an example, they pointed out that credit risk on a reinsurer may be much more significant if it happens in conjunction with deterioration in the underlying experience.

The time horizon for the stress test needs to be considered carefully, including how the underwriting risk factors affect the valuation basis after the stress (in recognition of possible continuation of adverse trends in these risk factors), and for group policies where premiums may be reviewable at particular time intervals.

A number of firms expressed a keen interest in any proposals on how to aggregate the stress tests, including the correlation structure, and the allowance to be made for diversification of risks. Several firms suggested that stress tests of minor economic impact (e.g. exchange rate risk) might be omitted or combined.

In many cases, the results of the calculation from the stress tests depended on the degree of management action assumed in response to the shock scenario (eg changes in bonuses, asset mix, or level of charges to policyholders). This would be particularly relevant for with-profit business

#### *Credit risk tests*

One firm applied both the Basle II method and the credit spread method when carrying out the credit risk test and provided some comparative figures. These showed that for their portfolio of assets, the spread widening approach seems to generate higher capital requirements for the moderate stress but lower for the severe stress. This was due to inclusion of a risk-weighting on assets rated at AA- or above only in the severe stress. Several of their funds had substantial holdings of government securities which do not feature in the spread widening approach.

Appropriate guidance is likely to be needed on how to apply the Basel II approach to the range of assets held by insurance firms, including reinsurance assets and long duration assets. One firm advised not to use banking-subdivisions for asset classes (related to Basel II), because it is time consuming and does not add value. Another firm pointed out that the credit spread test was much stronger than the Basel approach for commercial mortgages.

For claims on reinsurers, it was pointed out that some adjustment for credit spread might be appropriate when calculating the value of the asset in the balance sheet, though this would mean that the method of valuing the reinsurance asset would no longer be fully comparable with the method of valuing the corresponding insurance liability. Obtaining credit spreads for specific reinsurers was also an issue.