

## European Solvency II Discussions - Preparatory Field Study

### Introduction

1. The Committee of European Insurance Supervisors (CEIOPS) has been asked to prepare some advice for the EU Commission on the introduction of a new solvency standard for European insurance firms, under a project commonly known as Solvency II. For this purpose, CEIOPS would first like to acquire some insight into the possible quantitative impact of a new Solvency-II standard, by collecting some relevant information from a sample of life insurance firms about the likely value of their assets and liabilities under a range of different assumptions. We would be grateful therefore if you could respond to this request for information by 1 June 2005.
2. In addition, we hope that this preparatory field study (PFS) may help to identify some of the practical problems that may be encountered when the calculations are refined as the Solvency II discussions progress. At this early stage, the precise figures obtained are less important than the general order of magnitude of the figures and the information that we obtain about the practicability of the calculations. Even if you are unable to complete all of this survey, we would appreciate receiving as much information as possible. The results of this initial exercise will be aggregated by national supervisors, to maintain anonymity for individual firms, and presented at the CEIOPS board meeting on 27 June 2005.
3. It should be stressed that this initial exercise does not in any case seek to prejudge the outcome of the discussions that are taking place about possible Solvency II rules, and should therefore not be used as a guide to future rules. However, the data obtained from this PFS will be invaluable in assisting CEIOPS to develop their advice about an appropriate framework for the Solvency II rules. It is expected that after this initial study, there may be further studies needed to test different possible approaches and sets of assumptions. It is also intended that each such study will be more refined than the previous one.
4. For this initial study, CEIOPS proposes a two track approach. First, the PFS is intended to obtain a value for the life insurance liabilities on companies' balance sheets based on a 'best estimate' of the present value of future cash flows, and then compare the results to the bases currently in use. Secondly, it aims to apply a number of simple, standardized stress tests (single events) on these simplified balance sheets to determine their impact on insurers' capital requirements. Further details can be found in the paragraphs below. It is not intended to collect any new information about the liabilities held in respect of general insurance policies at present.
5. Theoretically, the best estimate value thus established for the liabilities should have an additional margin added when shown on the balance sheet, because of possible shortfalls compared with the expected value of the liabilities. However, we are not yet at a stage where a decision can be taken about how this margin should be assessed. Therefore quantitative information about risk margins has not been requested in this PFS. However, we would welcome any information (either quantitative or qualitative) that firms can provide.

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### **General working hypotheses**

- The reported values should be based on the situation at December 31, 2004 (or December 31, 2003 if end-2004 data is not available).
- Insurance companies may either report the values on a consolidated group basis, without taking into account any revaluation of non-EEA subsidiaries, or may report for the largest insurance entities within the group (i.e. either on management group, or legal entity).
- The focus in this PFS is on life insurance activities. However, for the PFS, firms may choose to report on a consolidated basis both the life and non-life activities undertaken within the group.
- All figures are reported in thousands of Euros (or in the firm's local currency; the national supervisor is then responsible for the conversion to Euros).
- The desired accuracy of results is such that the results are materially of the right order of magnitude, but they need not be precise.
- Firms should report a value of liabilities that represents broadly a market-consistent assessment of the firm's liabilities, consisting of a best estimate and a risk margin (see paragraph 6 below). For this PFS, it is not mandatory to report the split into the best estimate and the risk margin.
- Liabilities for unit-linked insurance policies should be determined by reference to the value of assets covering these liabilities
- Liabilities for all other life insurance policies should be assessed as the best estimate of the present value of future cash flows, taking account of expected mortality rates, interest rates and expenses of administration.
- Appropriate assumptions should be made about the take-up rate for options to secure guaranteed amounts of cash on voluntary discontinuance.
- For with-profit policies, the expected amounts of future bonuses that are discretionary or which depend on the experience of the firm should be shown separately.
- Where possible, reinsurance assets should be assessed on assumptions that are consistent with the value placed on the liabilities.
- For this PFS, liabilities for general insurance policies should be shown at their current balance sheet value.
- To maintain anonymity for individual firms, the results of the individual firms will be aggregated by national supervisors. Should individual firm information be needed for calculations by the FSC or its Task Force, anonymity will be guaranteed by allocating anonymous identifiers for each country and for each firm following the practice for Basel 2 QIS work. Clear guidelines to guarantee anonymity will be observed,

### **Valuation of liabilities**

6. The PFS aims to gain an insight into a value of liabilities that should represent a market-consistent assessment of the firm's liabilities including its liabilities to policyholders, both contractual and discretionary. A market-consistent value is the amount that a firm would rationally pay to settle the obligation at the balance sheet date or to transfer it to a third party at that time. Where a firm is able to report options or guarantees embedded in policyholder liabilities these should be valued using methods that produce market-consistent valuations, so would include both the intrinsic value and time value of an option (see also paragraph 16 on the treatment of embedded options). Where there is a range of possible outcomes stochastic modelling may be a useful technique in valuing liabilities, provided the assumptions made are calibrated to observed market values.
7. The valuation of liabilities consist of a best estimate and a risk margin. The risk margin covers possible shortfalls compared with the expected value of the liabilities. For this PFS, it is not mandatory to report the split into the best estimate and the risk margin. Nonetheless, the PFS aims to gain a better insight into the current practice of institutions with respect to risk margins. Therefore, it is requested that firms, where possible, report information on the risk margin (both the value and the applied method).

#### *Risk groups*

8. In order to determine the liabilities adequately, each homogenous risk group needs to be valued. A homogeneous risk group consists of a set of contracts with similar characteristics. For this initial study, we are not prescribing the definition of homogeneous risk groups. Insurers may use the composition that is most suitable for their portfolio. The information provided by insurers with respect to the reported risk groups will be taken into account in the future work of CEIOPS.

#### *Mortality and Morbidity rates*

9. Firms should make their best estimate of likely future mortality and morbidity rates. For annuities in payment, this should include allowance for expected increases in longevity.

#### *Expenses of administration*

Allowance should be made for the likely costs of administering the policies, along with relevant overhead expenses, including any staff pension costs.

#### *Persistency rates*

10. Appropriate assumptions should be made by the firm about the expected rate of discontinuance of policies at points of time where there is a guarantee as to the amount of the cash sum that may be taken. However, no discontinuances should be assumed at points of time where the amount of any payment to policyholders would be at the discretion of the insurance firm.

#### *Bonus rates*

11. Any guaranteed future bonus additions for with-profit policies should be included in the cash flows that are to be valued for those policies. For with-profit policies where the payment of future bonus is at the discretion of the insurer, or where it is expected that the level of bonus

will depend on the future experience of the insurance firm, then this potential bonus should not be included in the cash flows that are to be valued. However, the present value of this expected bonus should be shown separately in the table.

#### *Technical interest rates*

12. Two alternative valuation methods are proposed in this study for calculating the insurance liabilities of life insurers, namely:
  - discounting the cash flows with the full term structure (default), or
  - the duration approach (fallback option).
13. Under the full term structure approach, the whole cash flow projection is constructed and each year's cash flow is then discounted at the corresponding interest rate for that duration. The relevant interest rates for different currencies at each particular duration can be found in the attached table.
14. Under the duration approach, the main difference from present practices is the replacement of the fixed technical interest rate by a discount rate that corresponds to the duration of that insurance portfolio. This discount rate is based on the expected rate of return from government securities of an equivalent duration. Thus, if the liabilities have a maturity of 8 years, the most suitable discount rate is one at an 8-year spot rate.

#### *Treatment of Options*

15. Qualitative information is to be provided about the nature and extent of any options (such as the option to take an annuity on guaranteed terms) given to policyholders. However, it is not obligatory to model embedded options in this initial study. Should a firm be able to report the values of its embedded options, it would give CEIOPS a better insight into the different components of the liabilities. Therefore, institutions are encouraged to provide figures on their embedded options where possible, preferably on assumptions that are consistent with the basis on which comparable types of options may be traded on the market.

#### **Valuation of assets**

16. It is expected that most investment assets are already reported on market value basis. For assets that are not regularly traded, they should be shown here at the value for which it is thought they could have been sold if the firm had been attempting to sell them for one month before the balance sheet date. If no market prices are available, the value might be determined by applying mark-to-model techniques.
17. For the purpose of this study, all relevant assets should be reported on the balance sheet, including derivatives and other off-balance sheet items. Derivatives should be reported corresponding to their underlying risk category. Thus, a derivative based on equities should be reported under the equities. Firms should follow a principle-based approach.

#### **Single events**

18. In order to have more risk-sensitive capital requirements, CEIOPS proposes that a solvency capital requirement (SCR) should be determined in relation to the net risk profile of an

institution. This net risk profile may be examined quantitatively by calculating the impact of a set of single events on the financial position. The single events are assumed here to occur in isolation on the balance sheet date. In future, combinations of single events are likely to be tested.

19. Following common current practice in some EU countries, we consider two types of shocks: a moderate and a severe shock. The single events to be considered are the same; only the parameter values are different. The moderate shock represents parameter values that are likely to occur more frequently than the parameter values in the severe shock scenario.
20. For this initial PFS, the following single events to consider are
  - interest rate risk
  - credit risk
  - market risk (equity, real estate, and foreign exchange)
  - underwriting risk
  - lapse risk
21. As mentioned earlier, these single events are only relevant for this initial study and do not aim to prejudge the outcome of Solvency II. This holds for both the description of the risk factors and the corresponding parameters.
22. The single events, for which the capital effects should be calculated, are presented below. Note that generally the firm should calculate both an increase and a decrease of the risk factor but only report the worst outcome of the two stress tests in the spreadsheet. In the calculations only the investments and liabilities for which the insurer bears the risk are taken into account. Thus, institutions may omit from the stress test the unit-linked liabilities for which the policyholder bears the investment risk, together with the investments that are covering these unit-linked liabilities.

#### *Interest rate risk*

23. Firms are asked to consider both a rise and fall in the term structure of interest rates. This takes the form of a parallel shift in the term structure with a corresponding value equal to a rise or fall of 20% (moderate shock) or 30% (severe shock) in the 5-year spot rate. The attached spreadsheet ('PFS\_RTS\_collected\_2004.xls') details the term structures for participating countries under each scenario.

#### *Credit risk*

24. For credit risk, the default method is broadly in line with the standardized approach of Basel II. As an alternative, institutions may also use credit spreads. The institutions are allowed to apply both approaches on a case-by-case basis. For details please refer to Annex B.

#### *Market risk*

25. Firms should evaluate separately the effect of a 20% fall (or rise) in the value of equities, a 15% fall (or rise) in the value of real estate, and a 10% rise (or fall) in the exchange rate for the moderate shock. They should then evaluate separately a 35% fall (or rise) in the value of equities, a 25% fall (or rise) in the value of real estate and a 25% fall in the exchange rate for

the severe shock. For foreign exchange risk, the firm should calculate its sensitivity to a shock its local currency relative to other currencies.

#### *Underwriting risk*

26. For underwriting risk, firms should evaluate the effect of the more severe for each risk group of either an increase or decrease of the factors in the survival or sickness tables by 10% (moderate shock) or 15% (severe shock).

#### *Lapse risk*

27. Lapses are also important to consider. Therefore firms should calculate the effect of an increase in the lapse rate of 25% (moderate shock) or 50% (severe shock).

### **Additional notes accompanying the spreadsheet**

28. In general, green labelled fields should be reported; orange labelled fields show results that are derived from the input.
29. In the first tab page 'Input form' some general information is requested. The insurer must specify the discounting method used (full term structure or duration approach). If the full term structure is chosen, the institution should describe on this sheet the applied term structure of interest rates if this is different from that prescribed for this study by CEIOPS. If the duration approach is used to discount cash flows, then in the tab page 'Liabilities' a column should appear labelled 'Corresponding discount rate'. Given the maturity/duration of the homogeneous risk group, the corresponding discount rate should be reported in the spreadsheet. The box entitled 'reference date' should only be filled in if different from 31 December 2004. The same holds for the 'applied term structure': if the values suggested here by CEIOPS are applied, the column in the spreadsheet should not be filled. The box 'reporting basis' provides information about whether the institution reports for the PFS on a consolidated group basis, or only for the legal entity. If it reports on a consolidated group basis, then in the box 'legal entities within the group', it is requested to list the legal entities for which the calculations are performed.
30. In the second tab page 'Liabilities', the insurer should separate its liabilities portfolio into suitable homogeneous risk groups. If possible, the value of any risk margins included in the liabilities should be reported here in a separate column. The modified duration follows the generally accepted definition.
31. In the fourth tab page 'Claims on reinsurers' firms should provide information on the reinsurance contracts.
32. In the tab page 'Single events – surcharge' firms should report the effect of a single event on both the asset and liability side. Given the input, its net effect, 'delta solvency', is calculated by the spreadsheet. In the calculations, institutions should leave out of account those investments and liabilities for which the insurer does not bear the risk. In the column 'applicable test', the institutions should report whether the result of an increase or decrease in the risk factor is presented.
33. In the notes page, it would be helpful to have a note of
- Assumed mortality or morbidity rates for key products
  - Assumed rate of discontinuance of policies at different durations

- A description of the assumptions that have been made about the level of future bonuses in quantifying the liabilities in the various shock scenarios
  - A description of the nature and extent of any options available to policyholders, and how, if at all, these have been taken into account in the valuation of the liabilities.
  - If options have been taken into account, the approach that has been followed to placing a value on these options.
  - If options are valued either fully or partially, the rate of take-up of options that is assumed?
  - If options cannot be valued fully, an indication of why this is not possible?
  - A description of the nature and extent of options available to policyholders, and how, if at all, these have been valued. Any quantitative valuation of the options should also be stated.
  - A description of the methods and assumptions by which you currently assess the level of any 'risk margins' that are included within your technical provisions
34. Besides the factual numbers, it would be helpful if firms could provide additional notes and explanatory comments about the numbers and how they compare to the existing technical provisions.
35. Firms are also invited to comment on any practical difficulties that were encountered in compiling the figures for this study.
36. The notes page also asks several questions that are not strictly necessary for this initial study, but may give valuable background information regarding the state of the industry.
37. The questions are:
- What proportion of the assets is already reported on a market value basis? (%)
  - What proportion of the assets are actively traded (%)?
  - What proportion of the (fixed-income) portfolio is credit-rated (%)?
  - Do you have any views about how an appropriate set of 'risk margins' might be determined for the purpose of evaluating the liabilities on the balance sheet?



## **Annex A: How to value the liabilities**

### ***Details of discounting with the full term structure (default method)***

1. The expected value of the pension and insurance liabilities is the present value of the expected cash flows arising from pension and insurance contracts. The expected cash flows are based on underwriting principles (mortality rates, claims frequency, surrender rates, frequency of transfers of value, etc.) that are deemed to be realistic. An institution must take into account expected demographic, legal, medical, technological, social or economic developments. This means for example, that the foreseeable trend in life expectancy must be reflected in the expected value.
2. The present value of the expected cash flows is equal to the value of an investment with identical cash flows to these expected cash flows which will be paid with certainty. Such an investment replicates the expected cash flows of the liabilities. The expected value is, therefore, not affected by the institution's actual investments.
3. Embedded options are, if possible (not obligatory for this initial study), taken into account as a replication of the conditional cash flows (contingent claims) based on methods and assumptions that are deemed to be realistic. This value may be determined for example, by option valuation techniques.

### ***Details of the duration approach (fallback option)***

4. Under the duration approach, the institution discounts the insurance liabilities using the present (actuarial administrative) valuation techniques at the most suitable discount rate. Thus, it replaces the current fixed technical interest rate by the most suitable discount rate corresponding to the average expected duration of the portfolio.
5. The idea is as follows: each homogenous risk group in the portfolio of liabilities, consisting of various cash flows and associated maturities, is regarded notionally as a single cash flow at a single moment corresponding to the average duration of these cash flows. The appropriate spot rate of interest corresponding to this duration can then be established from the attached table. Discounting the original liabilities portfolio using this spot rate of interest then provides the approximation required for the expected value.

## **Annex B: Treatment of credit risk**

1. In order to determine the capital surcharge corresponding to the credit risk, two possible approaches are proposed for this study, which may also be applied interchangeably on a case-by-case basis:
  - Default method: standardized approach of Basel II
  - Alternative: Credit spread method

### ***Default method: standardized approach of Basel II***

2. The standardised approach of Basel II applies a risk weight that is assigned from the external rating of the exposure of the financial contract. For specific details we refer to the Basel Capital Accord<sup>1</sup>. We propose here a simplified version of the Basel II standardised approach.

#### *Use of external ratings*

3. External ratings may be used to establish a risk weight in the Standardised Approach. External ratings are widely available for (exposures on) central governments and institutions, and to a lesser extent for corporates. For the purpose of this study, exposures on all bonds and other counterparties (including claims for example, on reinsurers or intermediaries) have to be risk weighted as follows:

<b>External rating</b>	AAA-AA-	A+ to A-	BBB+ to BBB-	BB+ to B-	Below B-	Unrated
<b>Risk weight</b>						
Moderate shock	0%	20%	50%	100%	150%	100%
Severe shock	20%	50%	100%	150%	200%	150%

4. With respect to the default method in the standardised approach, we distinguish two shocks: a moderate and a severe shock. The moderate shock is equal to the values assigned in Basel II for government securities. The severe shock uses values broadly corresponding to the values assigned in Basel II for corporate bonds.
5. The method for computing the capital requirement is as follows. An investment in a AAA rated treasury bond of €100 issued by a central government with a risk weight of 20% is, therefore,  $20\% \times 8\% \times €100 = €1.6$ .

### ***Alternative: using credit spreads***

6. Credit risk is expressed in the credit spread. This is the difference between the effective yields on a collection of cash flows whose payment depends on the creditworthiness of counterparties and the effective yields on the same collection of cash flows as if they were certain to be paid. Generally, bonds of a highly creditworthy government are regarded as default free. In practice, therefore, the credit spread of, say, corporate bonds is derived by

<sup>1</sup> Basel Committee on Banking Supervision (June 2004), *International Convergence of Capital Measurement and Capital Standards. A Revised Framework*, pages 15-47 (<http://www.bis.org/publ/bcbs107.htm>).

comparing the effective yield on a corporate bond with the effective yield on a government bond of the same duration. As well as corporate loans, a claim on a counterparty, for example, a reinsurer, intermediary or counterparty in a private derivatives contract, may also carry credit risk.

7. For the purpose of this study, the required solvency does not need to be determined for every single investment with credit risk or claim on a counterparty. The stress test is to be performed by changing the observed credit spread on the investment portfolio (including claims for example, on reinsurers or intermediaries) by a certain fixed factor. This means that the shock is lower in absolute terms if the credit spread observed at the reporting date is low. The extent to which an institution is sensitive to the shock in the credit spread depends on the maturity characteristics of the cash flows and claims in the portfolio.
8. For the purpose of this study, firms may determine the credit risk in the following way. Given the total investment portfolio, including claims on counterparties, the firm has to determine the effect on the assets of an immediate increase in credit spreads of 60% (severe shock) or 40% (moderate shock) compared to the actual credit spread at the reporting date. For example, if the observed spread on the portfolio is equal to 100 basis points, the effect on the value of assets is determined by calculating the effect of an increase of the spread to 160 basis points. The effect on the surplus of assets over liabilities of a rise of 60 basis points on the assets is the required adjustment for credit risk.