QIS1 spreadsheet guidance

Overview

1. For this first Quantitative Impact Study (QIS), CEIOPS has developed a QIS1 package, which includes a cover note, a spreadsheet accompanied by specifications and guidance plus a qualitative questionnaire. Thus, QIS1 contains both qualitative and quantitative information. The spreadsheet and its guidance focus on the quantitative part. The specifications of the technical provisions provide valuable information about the relevant principles and how to perform the calculations for this QIS.

    The Excel file comprises the following sheets:

    1. Index

    2. Participant information

    3. Term structure (if different from default)

    4. Life risk groups (9 sheets)

    5. Summary of life provisions

    6. Optional questions for life

    7. Non-life risk groups (11 sheets)

    8. Summary of non-life provisions

    9. Optional questions for non-life

2. It is expected that an insurance undertaking only reports one spreadsheet to its national supervisor. If the insurer is active in both life and non-life, it is requested to report on both activities in the corresponding tab pages. If the technical provision contains both life and non-life elements, it is requested to split the report of the life and non-life sheets on the corresponding basis.

3. The focus of the first Quantitative Impact Study (QIS) is on the technical provisions. It is therefore kindly requested to report on the technical provisions taking into account the relevant homogenous risk groups and the risk characteristics as described in the QIS1 specification. If practicable, please report on more than one homogenous risk group, unless the portfolio as a whole can be considered as homogenous.

4.   In this QIS the focus is on the prudence in the technical provisions. It is kindly asked to determine the value of the technical provisions on a current basis and on a realistic basis including an explicit level of prudence. For this latter approach the insurer should determine the best estimate and the 75th and 90th percentile. Even if an insurer is not able to do all the requested calculations, it is encouraged to report at least what it can do, and to be as consistent as possible in its approach to the calculations. A partial submission of results is supported.

5.   In this context, QIS1 will test the above mentioned percentiles, as well as inviting firms to bring the 60th percentile and/or alternative approaches (such as the cost of capital approach) to CEIOPS' attention. If these results are reported in the spreadsheet, please disclose also the applied methodology.

Index

6.   The index lists the names of the sheets of the Excel file. By clicking on a name Excel switches to the corresponding sheet.

Participant information

7.   Here some general information is requested. The 'home supervisor' is the country to whom the spreadsheet is reported. The insurer must specify the 'applied discounting method' used to determine the value of the liabilities (full term structure or duration approach)[1]. The box entitled 'reporting reference date' should only be filled in if different from 31 December 2004, which is the default date. The box 'reporting basis' provides information about whether the institution reports for the QIS1 on a group basis, or only for the legal entity. If it reports on a group basis, then it is requested to list the legal entities for which the calculations are performed (see qualitative questions). Finally, some information regarding the percentage of provisions included in the QIS1 is requested on current bases in order to know the materiality of the relevant figures for a particular insurer.

8.   Note that answers in this area provide helpful assistance in the other sheets, whether a particular sheet might be relevant or not.

9.   For practical purposes CEIOPS delivers a default segmentation for non-life business into lines of business according to the groups of classes of article

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[1]   Two alternative valuation methods are preferred in this study for calculating the value of the technical provisions (see also Annex A), namely:
  • discounting the cash flows with the full term structure (default); or
  • the duration approach (fallback option).
  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.
  Under the duration approach, the cash flow is not discounted with the full term structure but with one fixed discount rate. This fixed discount rate should be the interest rate from the given term structure that corresponds to the duration of that insurance portfolio. Thus, if the liabilities have a maturity of 8 years, the most suitable discount rate is one at an 8-year spot rate.

63 of the Accounting directive (91/674/EEC). However, if an insurer is not able to report according to that segmentation, it might also use its own segmentation. For life, the insurer always uses its own segmentation.

10. If the QIS calculations are based on a participant's own segmentation it is kindly requested to provide the rationale for this segmentation in a separate accompanying note. Please report on more than one homogenous risk group, unless the portfolio as a whole can be considered as homogenous.

11. The labels corresponding to the selected segmentation will appear in the sheets 4 and 7.

Term structure

12. If the value of the technical provisions is determined by discounting the cash flows with the full term structure, 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.

13. CEIOPS provides, if market data is available, a full term structure for all EU- and EEA-countries. Obligations denominated in other currencies should be discounted with an appropriate term structure to be determined by the insurance undertaking. The same holds for liabilities with a duration that is not in the prescribed term structure.

14. It is recognised that the term structure data provided is not a risk-free term structure, but this has been deemed to be adequate for the purpose of QIS1. Please note that in providing term structure data no adjustment as outlined in the QIS1 specification (paragraph 42) has been made to the swap rate, but is intended to include this adjustment in QIS2.

Life risk groups

15. On the sheets 4.1 – 4.9 corresponding to the risk groups 1–9, it is requested to provide information about the technical provisions under current bases and the technical provisions according to the QIS specification.

16. First, it is requested to report the value of the liabilities on current bases (1). If practicable, a segmentation into the categories as identified in the accounting Directive is requested (1a-1d). For a definition of the categories see also Annex B. Additionally, deferred acquisition costs are asked in order to better compare current and QIS1 valuation. If there are also other balance sheet items that might have significant impact on the comparability of valuation of liabilities, please ask your national supervisor how to deal with them.

17. Then, the insurer is asked to report on the total value of the best estimate (2) thereby discounting the cash flow either using the full term structure (default option), or the duration approach (See also footnote 1 and Annex A). When the institution is performing its calculations, please take the following considerations into account:

    - regarding the best estimate, please report, when practicable, separate values for
        o expected expenses (2a),
        o premiums and other charges (2b), including management fees for unit-linked products
        o guaranteed benefits (2c), and
        o future bonuses and profit sharing (2d). If management actions have material impact, take them into account here.

    - "Risk margin": determine, if possible, stochastically the 75th and 90th percentile. Please describe in the accompanying notes the corresponding statistical distribution that has been assumed to derive these percentiles. If the undertaking cannot determine the percentiles stochastically, it might use simplifications, if the approach is prudent and clarified in accompanying notes.

    - All these values (1,2,3,4) should be reported both gross and net of reinsurance.

18. As some background information: provide the discount rate for current bases, and if duration approach has been applied, please do the same for best estimate value.

19. Please select the approach used to determine the Best Estimate. If you are not able to use the mean, please determine the best estimate using 50th percentile as a fallback method.

20. Modified duration: both on current basis and best estimate value.

21. Surrender value floor: for the comparison between the best estimate and the surrender value of the contract, it is requested to do the calculations on a contract-by-contract basis.

22. If the participant has a company view on the risk margin, please report the technical provisions incorporating this risk margin for each homogenous risk group.

Life summary

23. The sheet 5 summarizes the entries of the sheets 4.1 to 4.9 to give the values for the whole of the life portfolio. Except for the first item (coverage of provisions based on QIS-guidelines), no entries need to be made in this sheet.

Life optional questions

24. Besides the information per homogenous risk group, it would be helpful for CEIOPS to receive also information that is more related to the whole portfolio.

25. Where a participant believes that diversification effects may have an impact on the overall value of the technical provisions including risk margins, then if possible, please report the total values for the provisions at the 75th and 90th percentiles (items 1-2) for the whole portfolio.

26. If the participant has a company view on the risk margin, please report the technical provisions incorporating this risk margin for the whole portfolio.

27. In order to assess the provision for future bonuses adequately, some additional information is requested about the available reserves or provisions for bonuses on the balance sheet. Like other balance sheet items, here the shift from current bases to a realistic valuation might affect the value. Therefore, it is asked to report both values (items 6,7). Note that 'provisions for bonuses' consists of both the individual items as reported in sheets 4.1-4.9 (item 2d) and provisions which have not been allocated to a particular homogenous risk group.

28. It is also requested to provide additional information about the role of any existing provisions or reserves for bonuses on the balance sheet in accompanying notes. Provisions already assigned to the homogenous risk groups have been aggregated under item 8.

Non-life risk groups

29. The sheets 7.1 to 7.11 refer to the technical provision of each line of business. As default, insurers might use the following segmentation:

   1. Accident and health (non-life insurance)

   2. Motor, third party liability

   3. Motor, other classes

   4. Marine, aviation and transport

   5. Fire and other damage of property

   6. Third-party liability

   7. Credit and surety ship

   8. Legal expenses

   9. Assistance

   10. Miscellaneous non-life insurance

11. Reinsurance

30. Participants are asked to calculate the technical provisions separately for each of these lines of business, or based on their own segmentation. The sheet should list the corresponding names of the risk groups/business lines within the document.

31. Reinsurers that participate in QIS 1 might report all their business in risk group 11. However, if a segmentation into the ten previous risk groups matches better with the portfolio, this can also be done.

32. Each sheet is divided into two sections. The first section deals with the technical provisions on the current basis. The second section deals with the technical provisions according to the QIS 1 specification.

<u>Technical provisions on the current basis</u>

33. This part of the sheets asks for the technical provisions according to the current national regulation for annual accounts. Participants should fill in the following information about technical provisions held on the current basis, both gross and net of reinsurance:

    1. Provision for unearned premiums

    2. Claims outstanding

    3. Provision for bonuses and rebates

    4. Equalisation provision

    5. Other technical provisions

    6. thereof: provision for unexpired risk

34. Apart from the provision for unexpired risk, this classification follows from Article 6 of the Accounting Directive 91/674/EEC.

35. In case the "Other technical provisions" contain a provision for unexpired risks, the value of this item should be shown separately.

36. It is possible to take only a part of the portfolio of a line of business into account in the technical provisions according to the QIS1 specification. In this case participants should fill in only the technical provisions corresponding to that part of the portfolio. Additional information about the value on the current basis of the excluded business should be given in the questionnaire.

37. Additionally, deferred acquisition costs are asked in order to better compare current and QIS1 valuation. If there are also other balance sheet items that might have significant impact on the comparability of valuation of liabilities, please ask your national supervisor how to deal with them.

<u>Technical provisions according to the QIS1 specification</u>

38. This section of the sheets asks for the technical provisions calculated according to the QIS 1 specification. The section differentiates between

- the level of confidence:
    - Best estimate
    - Standard deviation
    - 75th percentile
    - 90th percentile
- the type of technical provision:
    - Premium provisions
    - Provision for claims outstanding
- the ways to allow for reinsurance:
    - gross of reinsurance
    - net of reinsurance
- the way to allow for discounting:
    - discounted
    - undiscounted

Please refer to the QIS1 specification for the principles of the calculation.

39. In case a participant is not able to calculate the Premium provisions and the Provision for claims outstanding separately, the total value of the two provisions should be filled in the cell for the Provision for claims outstanding. In case a participant is able to take the diversification effects between premium provision and provision for claims outstanding into account, the result can be given under "Premium and claims". Otherwise the sum of the two provisions should be filled in.

40. The spreadsheets refer to the Best estimate, the 75th and the 90th percentile of the Premium provision. The Premium provisions consist of the Provision for unearned premiums and the Provision for unexpired risks. When calculating these values the stochastic nature of the unexpired risk should be taken into account, whereas the unearned premiums should be considered as a deterministic value.

41. In the sheets 7.1 to 7.11 the technical provisions of the line of business should not allow for diversification between different lines of business. (I.e.

such diversification effects should not be allocated to the single lines of business.) If a participant is able to take the diversification effects into account, the resulting total value of the technical provisions can be given in sheet 9.1 (Non-life optional questions).

42. In the sheets 7.1 to 7.11 the technical provisions net of reinsurance should not allow for the possibility of the reinsurer's default. If a participant is able to take the probability and severity of the reinsurer's default into account, the resulting provisions net of reinsurance can be given in the sheet 9.1 (Non-life optional questions).

43. If the participant has a company view on the risk margin, please report the technical provisions incorporating this risk margin for each homogenous risk group apportioned to claims outstanding and premium provisions.

44. Please select the approach used to determine the Best Estimate. If you are not able to use the mean, please determine the best estimate using 50th percentile as a fallback method.

Non-life insurance summary

45. The sheet 8 summarizes the entries of the sheets 7.1 to 7.11 to give the values for the whole of the non-life portfolio. Except for the first item (coverage of provisions based on QIS-guidelines), no entries need to be made in this sheet.

Non-life optional questions

46. The sheets of 9 ask for additional information on the non-life technical provisions.

Technical provisions, including diversification effects

47. In case a participant is able to calculate the diversification effects between the lines of business, the total value of the technical provisions (sum of premium provisions and provisions for claims outstanding), including the diversification effects, should be filled in here.

Technical provisions, allowing for the reinsurer's default

48. In case a participant is able to calculate the net technical provisions taking into account the probability and severity of the reinsurer's default, the resulting total net of reinsurance value (sum of premium provisions and provisions for claims outstanding) should be filled in here.

49. If the participant has a company view on the risk margin, please report the technical provisions incorporating this risk margin for the whole portfolio apportioned to claims outstanding and premium provisions..

<u>Estimate of the level of confidence that is reflected in the provision for claims outstanding on current basis</u>

50. In case a participant is able to estimate the probability that the set current provision for claims outstanding is higher than the random variable of the corresponding cash flow, it should be filled in here. The estimate should refer to an undiscounted technical provision gross of reinsurance.

<u>Duration of gross technical provisions on Best Estimate basis</u>

51. In case a participant is able to estimate the duration of the gross best estimate provision, it should be filled in here. The duration can be given for each line of business.

Annex A: The duration approach

1. In principle, the technical provisions should be discounted as described in the QIS 1 specification (cf. paragraphs 42 to 44 of the specification). In case an insurer is not able to discount the cash flows with the full term structure, it may apply the duration approach.

2. Under the duration approach, the institution discounts the insurance liabilitiy cash flow with a fixed discount rate. This discount rate should be the interest rate from the given term structure that corresponds to the average expected duration of the risk group.

3. 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 the 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: Excerpts from the Accounting directive 91/674/EEC

The accounting directive describes the relevant items of the balance sheet. In this Annex, the sclassification of the technical provisions is summarized, including excerpts from the original wording from the directive.

<u>Technical provisions</u>

1. Provision for unearned premiums

The provision for unearned premium shall comprise the amount representing that part of gross premiums written which is to be allocated to the following financial year or to subsequent financial years.

    a. Gross amount

    b. Reinsurance

2. Life assurance provision

The life assurance provision shall comprise the actuarially estimated value of an insurance undertaking's liabilities including bonuses already declared and after deducting the actuarial value of future premiums.

    a. Gross amount

    b. Reinsurance

3. Claims outstanding

The provision for claims outstanding shall be the total estimated ultimate cost to an insurance undertaking of settling all claims arising from events which have occurred up to the end of the financial year, whether reported or not, less amounts already paid in respect of such claims.

    a. Gross amount

    b. Reinsurance

4. Provision for bonuses and rebates

The provision for bonuses and rebates shall comprise amounts intended for policyholders or contract beneficiaries by way of bonuses and rebates as defined in Article 39 to the extent that such amounts have not been credited to policyholders or contract beneficiaries or included in Fund for future appropriations.

    a. Gross amount

    b. Reinsurance

5. Equalization provision

The equalization provisions shall comprise any amounts set aside in compliance with legal or administrative requirements to equalize fluctuations in loss ratios in future years or to provide for special risks

6. Other technical provisions

This item shall comprise, inter alia, the provision for unexpired risks, i.e. the amount set aside in addition to unearned premiums in respect of risks to be borne by the insurance undertaking after the end of the financial

year, in order to provide for all claims and expenses in connection with insurance contracts in force in excess of the related unearned premiums and any premiums receivable on those contracts.

     a. Gross amount

     b. Reinsurance

Technical provisions for life assurance policies where the investment risk is borne by the policyholders

This item shall comprise technical provisions constituted to cover liabilities relating to investment in the context of life assurance policies the value of or the return on which is determined by reference to investments for which the policyholder bears the risk, or by reference to an index. Any additional technical provisions constituted to cover death risiks, operating expenses or other risks (such as benefits payable at the maturity date or guaranteed surrender values) shall be shown under item C(2)

     a. Gross amount

     b. Reinsurance

Annex C: Term structure methodology for Euro-zone

Note that the applied method is similar to the one DNB uses for the Financial Assessment Framework. This annex does not indicate any intention from Ceiops to make this approach the default approach. It is just meant for information purposes in order to understand how Ceiops determines the prescribed Euro term structure for QIS1.

Abstract

The swap curve is constructed from interest rates at which a fixed rate is swapped against the 6-month EURIBOR. Unavailable maturity points are interpolated on the assumption that intervening forward rates are constant. No smoothing of the forward curve will be applied: the zero coupon spot curve has turned out to be very smooth already, and smoothing it will lead to only marginal adjustments.

Underlying principles

In calculating the zero coupon swap curve the following principles are applied. Together, they represent the best practice as found in the literature.

- The swap curve should fit known and reasonably liquid maturity points. This 'no-arbitrage' condition is characteristic of the swap market because trading tends to concentrate around full-year maturities. As this market is highly liquid, contracts are actually traded at the quoted rates (listed by e.g. Bloomberg).

- The emphasis is on a close fit in the long end of the curve. In practice, in order to keep the curve stable (no sawtooth pattern) towards the long end, the forward curve is estimated, from which the spot curve is then derived.

- Interpolations and extrapolations are based on the assumption that forwards are constant.

- It has been decided to adopt a method that is simple and easy to explain and reproduce. This means, among other things, that no smoothing is applied.

Data

The data source underlying the construction of the nominal interest rate term structure wil be the European swap rates for 1–10-year maturities (yearly intervals) and 12, 15, 20, 25, 30, 40 and 50-year maturities as they are listed on a daily basis by Bloomberg. The intervening maturity points up to 30 years and the 35-year and 45-year swap rates will not be used as input values for the time being. Although Bloomberg does list them, the trade in these maturity points has been decidedly less liquid. In such interest rate swaps, 6-month EURIBOR is exchanged for a fixed interest rate. The rate series used will be the 'composite rates' (code: CMPN) in Bloomberg, which may be said to reflect a market average. The curve is based on the (lower) bid rate; Bloomberg shows a 2 basis point bid/offer spread.

Methodology

An interest rate swap can be explained most easily as a long position in a fixed-rate bond combined with a short position in a variable-rate bond, or vice versa. According to market practice, an interest rate swap is constructed so that no initial payment takes place – in other words, its market value is equal to nil. As the underlying variable-rate instrument is by definition traded at par when the swap is entered into, the same must also apply to the underlying fixed-rate instrument. This implies that rates observed in the market are par yields. The interest convention of the fixed-rate side of an ordinary swap is 30/360, meaning that a month is set at 30 days and a year at 360 days. We will define the following (annually accrued) interest rates:

$$r_t = (\text{par}) \text{ swap rate at maturity } t,$$

$$z_t = z\text{ero coupon swap rate at maturity } t,$$

$$f_{t1,t2} = \text{forward rate between } t1 \text{ to } t2$$

The cash flows of the underlying fixed-rate bond included in a t-year swap are as follows:

date (years)	1	2	...	$t-1$	t
cash flow	r_t	r_t	...	r_t	$1 + r_t$

The value at the time the swap is made equals 1 (= 100%).

The zero coupon rate is derived from the par swap rate by means of bootstrapping, starting with the 1-year swap rate. Since $(1 + r_1) / (1 + z_1) = 1$, it follows that $z_t = r_1$. The 2-year zero coupon interest is determined by calculating the present value, at the 1- and 2-year zero rate, of the cash flows from (the fixed-rate side of) the 2-year swap, and equating this present value to 1. The 1-year zero rate is already known, so that this leaves an equation with a single unknown (the 2-year zero coupon rate):

$$\frac{r_2}{1+z_1} + \frac{1+r_2}{\left(1+z_2\right)^2} = 1 \text{ ,}$$

which may be rewritten as:

$$z_2 = \sqrt{\frac{1+r_2}{1-\dfrac{r_2}{1+z_1}}} - 1 \text{ .}$$

z_3 through z_{10} are derived analogously.

By way of explanation, we also derive the 1-year forward over one year (i.e. the forward interest rate accruing between $t = 1$ and $t = 2$) via:

$$\left(1 + z_2\right)^2 = \left(1 + z_1\right)\left(1 + f_{1,2}\right),$$

and hence:

$$f_{1,2} = \frac{\left(1 + z_2\right)^2}{\left(1 + z_1\right)} - 1.$$

From maturities of 10 years onwards, not all Bloomberg swap rates are used. Intervening rates are derived from the 12, 15, 20, 25, 30, 40 and 50 year maturity points. To calculate, for instance, the 21-year swap rate, we need to make an assumption. Here, the assumption is made that the 1-year forward remains constant between 20 and 25 years. This is a reasonable assumption, because the forward rate is actually a prediction about the 1-year rate that will apply 20, 21 etc. years from now. The market is not very likely to take substantially different views on 1-year interest rates 20 or 21 years forward. Now, based on the assumption that $f_{20,21} = f_{21,22} = f_{22,23} = f_{23,24} = f_{24,25} = f_{20,25}$, we may write the 21-, 22-, 23-, 24- and 25-year zero rates as, respectively,

$$\left(1 + z_{21}\right)^{21} = \left(1 + z_{20}\right)^{20}\left(1 + f_{20,21}\right) = \left(1 + z_{20}\right)^{20}\left(1 + f_{20,25}\right),$$

$$\left(1 + z_{22}\right)^{22} = \left(1 + z_{21}\right)^{21}\left(1 + f_{21,22}\right) = \left(1 + z_{20}\right)^{20}\left(1 + f_{20,25}\right)^2,$$

$$\left(1 + z_{23}\right)^{23} = \left(1 + z_{22}\right)^{22}\left(1 + f_{22,23}\right) = \left(1 + z_{20}\right)^{20}\left(1 + f_{20,25}\right)^3,$$

$$\left(1 + z_{24}\right)^{24} = \left(1 + z_{23}\right)^{23}\left(1 + f_{23,24}\right) = \left(1 + z_{20}\right)^{20}\left(1 + f_{20,25}\right)^4,$$

$$\left(1 + z_{25}\right)^{25} = \left(1 + z_{24}\right)^{24}\left(1 + f_{24,25}\right) = \left(1 + z_{20}\right)^{20}\left(1 + f_{20,25}\right)^5.$$

And consequently, we may formulate the present value of the 25-year swap as:

$$\frac{r_{25}}{1 + z_1} + \frac{r_{25}}{\left(1 + z_2\right)^2} + \dots + \frac{r_{25}}{\left(1 + z_{24}\right)^{24}} + \frac{1 + r_{25}}{\left(1 + z_{25}\right)^{25}}$$

$$= r_{25}\left[\sum_{t=1}^{20}\frac{1}{\left(1 + z_t\right)^t} + \frac{1}{\left(1 + z_{20}\right)^{20}}\sum_{t=1}^{5}\frac{1}{\left(1 + f_{20,25}\right)^t}\right] + \frac{1}{\left(1 + z_{20}\right)^{20}\left(1 + f_{20,25}\right)^5} = 1.$$

A numerical procedure is needed to solve for $f_{20,25}$. Substitution of the result in the above equations will yield z_{21} through z_{25}.

For other maturities, the calculation is analogous. For points beyond 30 years, the 1-year forward is assumed to remain constant for 10 years from 30 to 40 years and again from 40 to 50 years. The assumption of a constant forward rate may also be used in extrapolating beyond 50 years. Based on this latter forward rate, we may calculate spot rates for very long maturities.

No smoothing

The forward curve will not be smoothed, for several reasons. The principal reason is that forward in the long end are already fairly constant, so that smoothing would lead to only marginal adjustments in the spot curve. Differences between the 45-year spot rate as produced by a sophisticated tension spline method and that resulting from a constant forward assumption based on given 40- and 50 year rates tend to be extremely small. Furthermore, as has been noted above, the spot curve itself is already very smooth, even though the forward shows discrete jumps. As a final remark, certain smoothing techniques may lead to 'better' valuation in the shorter end of the curve, but may cause instability in the long end. Because the main focus is on the longer maturities, the drawbacks of smoothing outweigh the benefits. Moreover, the non-smoothing method is easier to understand and therefore more transparent.

No discount

The bulk of the swap market is now collateralised, meaning that the moment the market value of a swap becomes negative (and hence positive to the counterparty), margin is pledged. This mechanism *de facto* almost eliminates credit risk. Because differences between the swap curve and government bond rates are driven in part by scarcity effects, they cannot be interpreted unequivocally as a measure of credit risk on swaps. For this reason, no discount will be applied vis-à-vis the swap curve.

Other potential refinements

No adjustments were made to take account of coupon days falling on weekends or of leap years. These factors may cause cash flows to be higher than the indicated swap rate. This applies to both the fixed and the variable rate. Because shifting of cash flows by one or two days has the strongest impact on the short end of the curve, the effects of a refinement will be strongest in that end, although still minimal (typically less than 0.1 basis point).

DNB has published the interest rate term structure as produced by the above methodology on its website, http://www.dnb.nl/dnb/pagina.jsp?cid=tcm:12-46272.

Annex D: Term structure methodology for the non Euro-zone

The source that has been used for the prescribed non-Euro termstructures is Datastream: All the Interest Rate Swaps are supplied by the broker Intercapital (ICAP). All the rates are taken at 17:30 London close and the rates are available on Datastream shortly after 18:00.

CALCULATING SWAP RATES USING "SPREAD OVER TREASURIES"

Example: 7th June 1994	US "on the run" treasury details		Swap spread	Swap rate
	Price	Yield	(bid side)	SA A.365
5yr - 6.75% of 5.99	100,29	6,533	27 =	6,803
10yr - 7.25% of 5.04	100-057	6,943	33 =	7,273

To calculate the swap rate, take the yield to maturity of the relevant "on the run" treasury and add the swap spread. This gives the correct rate for the swap, but on a semi-annual Actual.360 basis. Because the normal convention for USD swaps is Annual Actual.360, a conversion is necessary. To calculate the conversion (approximately), use the following formulas:

([1 + 6.803.200!squared - 1) * 100 * 360.365 = 6.824

([1 + 7.275.200!squared - 1) * 100 * 360.365 = 7.304

Currency	Fixed Day Count Basis	Fixed Payment Frequency	Floating Payment/ Reset Frequency
Australian dollar	Act/365	Quarterly/Semi*	Semi-Annual
Austrian schilling	30/360	Annual	Semi-Annual
Belgian franc	Act/365	Annual	Semi-Annual
Canadian dollar	Act/365	Semi-Annual	Semi-Annual
Czech krone	Act/360	Annual	Semi-Annual
Danish krone	30/360	Annual	Semi-Annual
ECU	30/360	Annual	Semi-Annual
Euro	30/360	Annual	Semi-Annual
Finnish markka	30/360	Annual	Semi-Annual
French franc	30/360	Annual	Semi-Annual
German mark	30/360	Annual	Semi-Annual
Hong Kong dollar	Act/365	Quarterly	Quarterly
Indonesian dollar	Act/365	Annual	Semi-Annual
Irish punt	Act/365	Semi-Annual	Semi-Annual
Italian lire	30/360	Annual	Semi-Annual
Japanese yen	Act/365	Semi-Annual	Semi-Annual
Malaysian dollar	Act/365	Annual	Semi-Annual
Netherlands guilder	30/360	Annual	Semi-Annual
Norwegian krone	30/360	Annual	Semi-Annual
Portuguese escudo	30/360	Annual	Semi-Annual
Spanish peseta	30/360	Annual	Semi-Annual
Swedish krona	30/360	Annual	Semi-Annual
Swiss franc	30/360	Annual	Semi-Annual
Thailand dollar	Act/365	Annual	Semi-Annual
UK pound	Act/365	Semi-Annual	Semi-Annual
US dollar	Act/360	Annual	Semi-Annual
* Quarterly up to 3 Years and Semi-Annual thereafter			

ZERO CURVES

Historical Swap Rate based Zero Curves from Intercapital DART are available for the following countries:

Country	Start	Country	Start
Australia (AU)	26.04.99	Japan (JP)	01.01.98
Belgium (BG)	02.01.98	Netherlands (NL)	31.01.97
Canada (CN)	26.04.99	Norway (NW)	02.01.98
Denmark (DK)	02.01.98	Portugal (PT)	31.01.97
Euro Vs Libor (EL)	05.02.97	Spain (ES)	01.01.98
Euro Vs Euribor (EM)	25.02.00	Sweden (SD)	02.01.98
Finland (FN)	02.01.98	Switzerland (SW)	05.02.97
France (FR)	05.02.97	United Kingdom (UK)	05.02.97
Germany (BD)	05.02.97	United States (US)	19.03.97
Italy (IT)	03.02.97		

The Zero Curves include zero rates and associated discount factors for each business day for monthly points along the curve up to a maximum of 12Y 8M.

The mnemonic structure for each of the zero rates along the curve is ccyymm, where cc is the Datastream Country Code, y the year and (mm) the month of the required zero rate.

For example, the mnemonic for the 5 year, 3 month Australian zero rate is AU05Y03 and the mnemonic for the Australian spot rate is AU00Y00.

Mnemonic for these rates are always 7 characters.

The discount factor can be obtained using the datatype DS.

The zero yield can be obtained by using the datatype ZY.

Lists containing all the mnemonics for a particular curve are also available.

The mnemonics for the lists are structured as follows:

LccZER where (cc) is the country code.

For example, the list mnemonic for Italy is LITZER.