CEIOPS-SEC-34/10
1 March 2010

Task Force

Report on the Liquidity Premium

CEIOPS e.V. – Westhafenplatz 1 - 60327 Frankfurt – Germany – Tel. + 49 69-951119-20
Fax. + 49 69-951119-19 email: secretariat@ceiops.eu; Website: www.ceiops.eu

Summary

INTRODUCTION

On 29 October 2009 during its Members Meeting, CEIOPS has agreed to lead further work on the issue of the inclusion of a liquidity premium in the risk-free rate for discounting technical provisions as an additional input for Level 2 implementing measures.

In order to carry out this work, a clear concept and mandate were needed and a Task Force was created.

The aim of the Task Force was to consider, from a technical point of view, the implications of allowing for a liquidity premium in order to provide Members with the technical background information to advise the political level in this area. In doing so, the Task Force was to take into account considerations expressed in CEIOPS' advice for Level 2 implementing measures and previous work done by stakeholders.

CEIOPS invited stakeholders to join the Task Force. CRO/CFO Forum, CEA, Groupe Consultatif, AMICE and Prof. Antoon Pelsser from Maastricht University were invited to discuss this issue with a small group of CEIOPS Members. Commission services were invited as observers to the discussions, too.

The Task Force had also to consider the relation of the liquidity premium with the choice of the reference rate (government bond rate and swap rate), developing the adjustments needed for relevant instruments to achieve the criteria that have to be met in order to be consistent with a risk-free rate. Furthermore, the task force was commissioned to develop principles for determining appropriate extrapolation techniques for the interest rate curve.

PART I – LIQUIDITY PREMIUM

Concerning the liquidity premium this chapter strives to give a definition of liquidity of insurance liabilities, explain the relevance of the issue, discuss shortcomings and challenges, examine possible methods of calculation and define the possible scope of a liquidity premium.

In particular answers are provided to the following questions raised in the mandate of the Task Force.

- For which obligations and/or products the inclusion of a liquidity premium could be allowed for. The characteristics of these obligations and/or products will need to be defined (see chapter I-6)
- What the implications would be for a) policyholders, b) financial stability, and c) the investment policy of the undertaking (see chapter I-2)
- Whether the use of a liquidity premium should be limited to business currently in force, or applied to existing and future business, including a transitional period of application upon the introduction of Solvency II, considering implications on markets. (see chapter I-8)
- How to measure the liquidity premium and incorporate it into the discount rate in an objective, reliable and consistent way in order to allow harmonised implementation. (see chapters I-5 and I-6)
- How often should the liquidity premium be revised; (see chapter I-4 principle # 5)
- Consequences of the inclusion of the liquidity premium on the overall solvency position, in particular on the SCR standard formula, and whether any solutions proposed may necessitate changes to other parts of CEIOPS' final advice (see chapter I-7)

I - 1. Definition of liquidity of an insurance liability

For the holder of an asset like a corporate bond, liquidity means the ability to sell or cash in this asset at any time at a price equal to the present value of future cash flows discounted at the risk free interest rate, but adjusted for expected credit risk and credit risk uncertainty (unexpected credit risk).

Illiquidity occurs, for example, where the asset is not readily saleable due to uncertainty about its value or due to the lack of a market in which it is regularly traded.

Where assets are illiquid, investors demand an additional premium as a reward for the risk of incurring additional transaction costs in case where the asset has to be sold. This additional premium leads to an increase in the implicit yield of the instrument, and hence in the spread over and above the liquid risk free rate.

However, the liquidity premium is only one component of the total spread between the yield of an asset and the liquid risk-free rate. This spread also includes a compensation for other components such as expected credit risk, credit risk uncertainty (unexpected credit risk) and management expense risk. Furthermore, a

"residual" element (due to e.g. taxes, conversion costs or costs of market imperfections) remains. Thus, to determine the part of the spread attributable to liquidity risk, the challenge that has to be faced is the accurate breakdown of this spread into its components.

Insofar as credit risk, both expected and unexpected, might ideally be eliminated through the use of a CDS, the part of the spread attributable to credit risk could be approximated by using the market value of the CDS as a reference. Such an approximation should take into account that there is repeated evidence that CDS markets are influenced by a lot of trends and features, in such a manner that a mark-to-model value of a theoretically risk free liquid asset is not necessarily the present value of future cash flows minus the market value of the CDS. Due consideration should also be given to the credit risks associated with the CDS providers.

In the case of an asset represented by a claim on an insurance company, in many cases the policyholder may be unable to sell this asset in the absence of a market or his ability to cash in the policy value may be limited by legal or contractual constraints or by financial penalties. Although such insurance claims present clear illiquidity characteristics, it is not possible to measure directly the attached liquidity premium as for corporate bonds.

A majority of TF members believe nonetheless that a liquidity premium for insurance liabilities can be estimated through the use of a replicating portfolio of assets.

Unlike corporate bonds, insurance liabilities represent a full range of cash flow characteristics with varying levels of uncertainty due e.g. to policyholder options such as surrenders, withdrawals, etc. or to mortality and expenses evolution. These characteristics of an insurance liability have as a consequence that in some cases no replicating portfolio can accurately match the cash flows of the liability in all circumstances or the replicating portfolio has to contain a combination of both liquid and illiquid assets.

The above mentioned majority of TF members consider that the illiquidity of an insurance liability measures thus the extent up to which its cash flows are predictable, i.e. are certain in amount and in timing.

They recognize that this assessment is very complex, given the numerous and complex features involved, and also considering that a number of those features have a behaviour difficult to model in a reliable manner (e.g. policyholders' behaviour in different scenarios). It has to be noted however that the assessment of the predictability of the cash flows of an insurance liability is already required for the valuation of any embedded financial options and guarantees, such as surrender options, and that cash flows will be subject to the same policyholder behaviour assumptions for the valuation of both embedded options and guarantees and liquidity premium.

A minority of TF members consider that there is insufficient evidence that any illiquidity feature regarding insurance liabilities will behave in the same manner as for assets. They consider likely that a liquidity premium associated to insurance liabilities may present substantially different features than any liquidity premium eventually derived for assets by using market observations and applying theoretical models. They assume that liquidity is, only to a certain extent, linked to predictability of cash flows, both concepts being different in their substance and their consequences and

they advocate some caution to the extent that predictability is not always meaning liquidity and vice versa.

These TF members nevertheless accept the criteria based on the degree of predictability of cash flows, not on the ground of a theoretically sound approach to liquidity, but merely as a practical way to reach consensus.

If despite the above reservations a consensus is reached to define the liquidity of an insurance liability by reference to predictability of cash flows, it follows that this liquidity is not a binary concept, but a continuous property with on one side of the spectrum liabilities where the legal and contractual features of the liability do not allow for policyholder options impacting the certainty of future cash flows and where residual uncertainty of future cash flows is not material with regard to the cash flows of a replicating portfolio, and on the opposite end liabilities where the cash outflows are not restricted and are highly volatile[1].

Assessing the uncertainty of future cash flows may be the more challenging as the predictability of different cash flows within the same contract may vary over time (e.g. contracts not granting surrender right within a period or under certain conditions, but granting such right in other periods or circumstances) or may depend on different features difficult to prioritise (i.e. comparing two contracts where one may be more liquid analyzing some features but less liquid from some other perspective).

In assessing this uncertainty, due consideration has to be given to resilience to forced sales (i.e. the possibility to pass on the loss of any liquidity premium arising from forced sales to policyholders).

It has to be noted that while acknowledging that liquidity is a continuous property of an insurance liability, this does not mean that a liquidity premium should automatically be used for liabilities which are only partially illiquid. Indeed applying a liquidity premium to liabilities which are only partially illiquid in an objective and reliable manner may be a challenging exercise and avoidance of arbitrary decisions and unlevel playing field range high among the concerns expressed by supervisors.

Conclusions

The illiquidity of an insurance liability measures the extent up to which its cash flows are certain in amount and in timing due consideration being given to the resilience to forced sales.

Most life insurance liabilities can be considered to be at least partially illiquid.

A prerequisite for the application of a liquidity premium to illiquid liabilities is the existence of objective and reliable methods allowing to measure the degree of illiquidity.

[1] While it is often considered that annuities in force could be ranged in the first category, it is still possible to have reasonable predictions for cash flows for most other life insurance liabilities and these liabilities could thus be considered to be at least partially illiquid.

I - 2. Industry's business case: why a liquidity premium

Although a large body of economic theory on liquidity premiums has existed for many years, the breakdown into its different components of the spreads of corporate bonds versus government bonds and swap rates did not capture general attention by the insurance industry, but was treated by some market participants on a more individual basis. Companies used analysis by organisations such as Moodys to remove the expected credit risk portion of bond spreads. The balance, split between credit risk uncertainty (unexpected credit risk) and illiquidity, received less attention. An analysis of the pricing of credit default swaps and other credit risk mitigating instruments confirms that up to the spring of 2008 the bulk of the spread could be allocated to credit risk, both expected and unexpected.

Things changed radically in 2008 where, even ahead of the crisis, spreads increased sharply, leading to new research work being undertaken by the insurance industry on the decomposition of these spreads. Further substantial increases in spreads followed in September and October. Research work evidenced that by end of 2008 spreads exceeded by far the cost of credit risk mitigation and included a new component which was much less visible in the years before.

In line with the pre-existing theoretical work industry concludes that the new wider bond spreads are attributable, at least to a certain extent, to the existence of a liquidity premium, compensating the investor in corporate bonds for the risk of not being able to get, by selling the instrument, a revenue at any time which corresponds to the future cash flows. This analysis seems to be confirmed by the fact that the new component reached a peak in late 2008 where corporate bond markets experienced a marked lack of liquidity. This peak persisted through March 2009 since when it has declined slowly.

The consequence of the sudden increase of spreads due to illiquidity was a sharp decline in the value of corporate bond portfolios of insurance companies. Even in cases where these portfolios were hedged against default risk of the corresponding issuers, the increase in value of the hedge instruments was insufficient to compensate for the devaluation of the bond portfolio.

CEIOPS members of the task Force generally accept the existence of a liquidity premium on the asset side. It is worthwhile mentioning that this position is in line with the final advice delivered by CEIOPS on the spread risk calibration. Whereas the capital charge was initially calibrated taking into account total return indices on corporate bonds the final advice uses CDS spreads, thus acknowledging that part of observed spreads on corporate bonds are not attributable to credit risk.

On the liability side the value of insurance liabilities was left unchanged, even where these liabilities were almost entirely illiquid on a permanent basis, and not only during the crisis of late 2008.

It is common practise to cover illiquid insurance liabilities with highly predictable cash flows with similarly potentially illiquid assets with corresponding maturities – the alternative to such an approach would be an increase in the price of products for consumers. The appearance of an important liquidity premium implicitly contained in the valuation of these assets created a shortfall in the balance sheet of the concerned companies and the insurance industry claims this shortfall to be artificial insofar that

in case of an efficient hedge against credit risk, the revenues of the assets, both regular and at maturity, were not at risk and were sufficient to match the cash outflows of the insurance contracts.

The introduction of a liquidity premium in the valuation of insurance liabilities aims at eliminating this valuation mismatch and avoiding the situation that such investments no longer become an option for companies with a detrimental impact on both consumers and financial markets.

Although elimination of pro-cyclicality is not the main objective of a liquidity premium, the introduction of such a premium is certainly beneficial in this respect as it prevents corporate bond holders wishing to mitigate the shortfall mentioned above, from selling their bond portfolios in times of stressed liquidity, thus aggravating the overall crisis.

In this regard, setting in the Solvency II regime a prudent and transparent mechanism for the addition of a liquidity premium would provide a coherent framework for an harmonized treatment of distressed market conditions across EU jurisdictions and, at the same time, would introduce the regulatory certainty which is a precondition for allowing insurance undertaking to invest in long term assets.

The insurance industry concludes from the above analysis that the addition of a liquidity premium for the valuation of illiquid liabilities is justified, but adds that such an addition would only occur to a significant extent during the infrequent periods where a similar premium can be identified on the asset side.

While it is the case that many insurance liabilities are illiquid on a permanent basis, the industry accepts that this does not result in a permanent level of a significant liquidity premium. In periods where the additional price asked by markets in compensation for illiquidity is low on the asset side, it seems logical that a similar low credit for illiquidity should be granted on the liabilities side of the balance sheet as well.

Conclusions:

As a conclusion of its work on decomposition of spreads of corporate bonds versus government bonds and swap rates, the insurance industry concludes that:

a) **In normal circumstances the liquidity premium on assets is small and has thus no significant influence on the valuation of insurance liabilities.**

b) **During periods of stressed liquidity the liquidity premium on assets has a positive value, but its application to insurance liabilities aims only to eliminate an valuation mismatch between the valuation of assets and liabilities.**

c) **Although it is not its main objective, the liquidity premium has an anti-cyclical effect and allows a harmonized treatment of distressed market conditions.**

I - 3. Alternatives, risks and challenges

Doubts have been expressed as to the compatibility of the inclusion of a liquidity premium in the calculation of liabilities with the Level 1 text[2]. The EC representative confirms however that the notion of relevant risk free rate allows for the addition of a liquidity premium insofar this premium may be earned by insurance undertakings without incurring credit risk.

The Task Force has further examined whether the mismatch referred to in the industry's business case could not be avoided by an alternative solution consisting in times of stressed liquidity in a valuation of illiquid assets with mark-to-model approaches providing values that represent the economic revenues of the assets, both regular and at maturity.

Although during the last crisis market values still existed for many stressed assets, it could be argued that these market values no longer relied on deep, liquid and transparent markets and that thus the level 1 Directive would have allowed mark-to-model approaches. Under the alternative approach stressed conditions in the markets for the underlying asset prices would be reflected by an adjustment to asset prices rather than to the value of liabilities. If the aforementioned stress is due to illiquidity of markets this adjustment could be referred to as a liquidity premium.

An important advantage of this alternative approach is that it is a so-called total balance sheet approach: all assets and liabilities are based on market prices, but their values are adjusted when their quoted market prices are no longer established in deep, liquid and transparent markets. This makes sense economically, because in such circumstances the quoted market prices are biased and do not represent economically relevant valuation inputs.

The liquidity premium proposal from industry's business case in the previous chapter adjusts the value of **liabilities** for disturbances in the value of the **assets**. The alternative approach would allow an adjustment to the value of the liabilities only if there are disturbances relevant to the valuation of the liabilities. In case of disturbances relevant to the valuation of assets, irrelevant market inputs to calculate the market values of assets should be treated on the asset side of the balance sheet. In that situation the discounting rate (risk-free) should not be affected.

In both cases of adjustments mark-to modelling should be carried out in line with procedures aligned with international accounting standards. So both procedures should be linked to the market consistent valuation of assets on the one hand and of liabilities on the other hand and should therefore independent from the investment strategy adopted by the insurance undertaking.
Providing a single mark-to-model value would however increase the value of illiquid assets even for those insurers not holding illiquid liabilities and incurring the risk of having to sell the assets at a price inferior to the one used for solvency purposes and would thus introduce another possible mismatch in the balance sheet. This requires additional treatment, in creating an additional layer to the liquidity premium formula or in creating a special SCR charge for this mismatch. Anyway this would not lead to less complexity and would necessitate calculations very similar to the ones proposed by industry.

[2] Especially article 77.2 of the Directive 2009/138/EC is meant here which states that "the best estimate shall correspond to the probability-weighted average of future cash-flows, taking account of the time value of money, using the relevant risk-free interest rate term structure."

Despite the support of one member and the willingness of others members to further explore this possibility, the Task Force has not further considered this alternative approach.

In any case it needs to be ensured that the measurement of illiquidity is consistent with the solvency valuation of assets. Under the Solvency II Framework, the valuation of assets shall generally be carried out in conformity with international accounting standards. Whereas the use of quoted market prices in active markets is envisaged to be the default valuation approach, this will require regularly and readily available market prices that are observable in deep, liquid and transparent markets. However, for illiquid assets or markets (which are in the focus when liquidity premia are considered) other valuation techniques (mark to model) may have to be used. Such mark-to-model valuations are based on the modelling of cash flows expected to arise from the asset and may not coincide with observed market prices. In view of this, CEIOPS has already stressed the need to develop more guidance on the solvency valuation in illiquid markets, including criteria for stressed sales, how to determine the solvency "fair value" within the bid-ask spread and how to assess the liquidity premium when markets are inactive.

Before this background, where a liquidity premium is determined it is necessary to ensure that such measurement is consistent with the solvency "fair value" valuation of assets to avoid any double-counting which may arise if such measurement would only be based on observable market prices. Principle #6 included in chapter I – 4 recalls this important issue.

With the exception of a theoretical model based on the work of Merton (cf. structural model described in chapter 1-6), the two other methods based on market observations have only been developed recently and are still not fully stabilised. Due to the reliance on the values of innovative financial hedging instruments (CDS time series), the data series which can be used cover only a short time span. However this does not imply that the liquidity premium was not present in previous periods of high credit spreads.

Even if it can be argued that the liquidity crisis experienced in 2008-2009 is a one in two hundred years event, doubts remain whether methods and data series offer a sufficient degree of reliability. If calibration of a liquidity premium based on only few data points will already prove difficult, even more challenges will arise when it comes to the calculation of the SCR. What will be the upward or downward shock of the liquidity premium to be used in the calculation of technical provisions corresponding 99,5% probability? The argument of limited availability of data points however also holds for other parts of the calculation of the SCR, such as for shocks applied to structured credit used in the credit spread SCR.

Doubts have also been expressed whether illiquidity - while being plausible - is the only possible explanation of the new spread component observed during the financial crisis. If other factors intervene, how is it possible to determine reliably the liquidity part of the spread ?

Supposing that all these problems were solved, the addition of a liquidity premium adds an additional layer of complexity to a solvency framework already criticised in this respect.

Finally while resolving a valuation mismatch issue for some insurers, the introduction of a liquidity premium for the valuation of illiquid liabilities will introduce a new artificial mismatch for other insurers: this will be the case where no illiquid assets will be held for the coverage of the illiquid liabilities.

I - 4. Principles underlying the use of liquidity premiums

This section lays out a number of principles-based requirements which should be met in case a liquidity premium is allowed for in the valuation of technical provisions.

By setting out these principles, it is not intended to pre-empt a decision on whether or not (and if so, to what extent) such an allowance should be made. A minority of task force members, representing a majority of CEIOPS Task Force members, consider that there is a lack of theoretically sound, reliable and appropriately back-tested methods which could be used in practice to include a liquidity premium in the discount rate of cash flows arising from insurance liabilities based on the degree of liquidity of these liabilities consistently with the principles set out below.

Where an allowance for a "liquidity premium" in the determination of risk free interest rates is made, this should be also compatible with the criteria of absence of credit risk, realism, reliability, high liquidity and absence of technical bias as stated in CEIOPS advice on the risk free interest rate term structure and the principles-based requirements laid out below.

It is proposed that the following 9 principles should apply to the use of liquidity premiums.

#1. The risk free reference rate applicable to the valuation of a liability should be the sum of a basic risk free reference rate and a liquidity premium depending on the nature of the liability.

#2. The liquidity premium should be independent of the investment strategy adopted by the company.

#3. The liquidity premium applicable to a liability should not exceed the extra return which can be earned by the insurer by holding illiquid assets free of credit risk, available in the financial markets and matching the cash flows of the liability.

#4. The liquidity premium applicable to a liability should depend on the nature of the liabilities having regard to the currency, the predictability of their cash flows (e.g. the ability to cash back/withdraw/surrender) and the resilience to forced sales of illiquid assets covering technical liabilities (e.g. where any loss of liquidity premium can be transferred to policyholders).

#5. The liquidity premium should be calculated and published by a central EU institution with the same frequency and according to the same procedures as the basic risk free interest rate.

#6. The liquidity premium should be assessed and quantified by reliable methods based on objective market data from the relevant financial markets and consistent with solvency valuation methods.

#7. No liquidity premium should be applied to liabilities in the absence of a corresponding liquidity premium evidenced in the valuation of assets.

#8. The design and calibration of the SCR standard formula should ensure that its calculation is consistent with a recognition of a liquidity premium in the valuation of liabilities and compatible with the set Solvency II target criteria for solvency assessment. The calculation of the SCR with internal models should also include an appropriate recognition of the risk arising from the liquidity premium in order to guarantee the targeted confidence level.

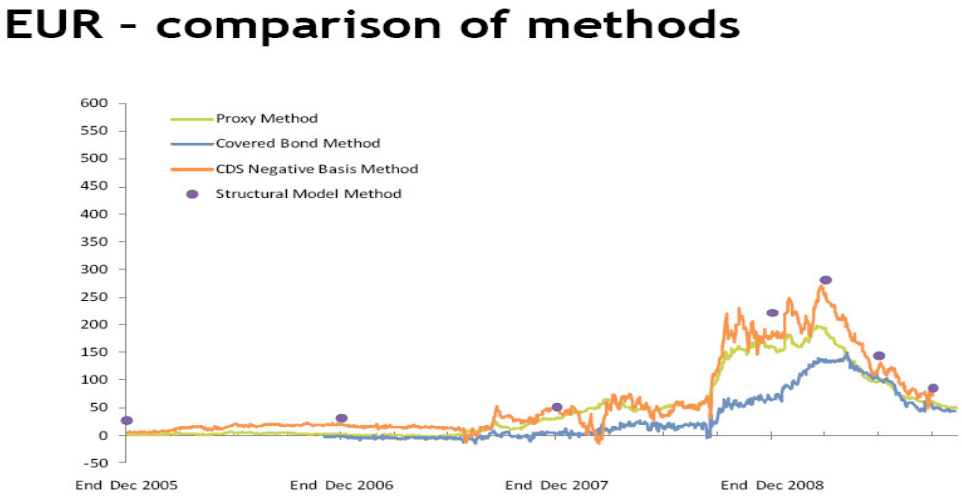
#9. The undertaking should have in place risk management systems and investment policy provisions specifically oriented to the risks inherent to the application of a liquidity premium, including liquidity risks.

I - 5. Methods of calculation of a liquidity premium for assets

Three main methods currently used by practitioners to estimate the liquidity premium in financial markets have been presented by industry.

- the CDS Negative-Basis Method which compares the spread on a corporate bond with the spread of a Credit Default Swap for the same issuing entity, same maturity, same seniority and same currency.
- the Covered Bond Method which involves choosing a pair of assets which, besides liquidity, are assumed to offer equivalent cash flows and equivalent credit risk. The primary example is an index of covered bonds versus swaps.
- the Structural Model Method which involves the use of option pricing techniques to calculate a theoretical credit spread which compensates only for credit (default and spread) risk. The difference between the theoretical spread and the actual market spread is typically taken to be liquidity premium.

The following graph gives the values of the liquidity premium calculated for the period from the last quarter 2005 to the third quarter 2009 for the euro. It should be noted that this chart shows liquidity premium relative to swaps. The proxy method also included in the graph is based on a liquidity premium calculated with a simple formula described in annex A. Similar graphs for other currencies are also provided in the same annex.



Financial literature recognizes drawbacks for each of these methods.

For the CDS Negative-Basis Method an issue is that when bank liquidity is scarce, the CDS spreads may also include an allowance for counterparty credit risk and so it is not necessarily a clean measure. A further issue comes from relying on bond and CDS indices as a quick estimation method. These indices may not be representative of each other, so the method is not comparing like for like.

The covered bond method focuses on specific fixed income instruments that have an actively managed pool of high quality assets as collateral and are protected by legal provisions. These instruments, while providing useful insights into the price of liquidity, may not be representative of the general corporate bond portfolios used by insurers.

Finally an issue with the Structural Model Method is that the models require a number of assumptions to be made which will reduce the reliability of individual estimates.

The private sector TF Members conclude that there is no single correct method to estimate the liquidity premium. Each of the three identified methods in isolation has advantages and disadvantages; however, combined the methods provide not only clear evidence of the liquidity premium, but deliver also consistent results for the size and change in liquidity premiums.

A majority of CEIOPS Members think on the contrary that the methods presented so far are not reliable enough and point to the very divergent results obtained by these methods especially during the financial crisis.

Moreover they estimate that studies produced so far cover only the period 2005-2009 which is deemed too short for an issue of so high an impact on the level of technical provisions.

As calculations according three different methods are complex and involve parameter choice and data collection challenges, a proxy for the liquidity premium has been suggested by the insurance industry which should facilitate the calculation of the applicable liquidity premium to be applied to a given currency at a given point in time both for the central institution in charge of the determination of the risk free interest rate curves and for insurers.

All task force members agreed that both the basic measurement methods and the proxy formula should be regularly revised by the central EU institution in charge of calculating and publishing the liquidity premium.

A possible proxy for the liquidity premium for assets is given in annex A.

I - 6. Methods of calculation of a liquidity premium for liabilities

Under the assumption that a liquidity premium can be reliably calculated for assets, the next question is how to determine a liquidity premium for liabilities.

Bearing in mind that a liquidity premium for insurance liabilities is not directly observable, a consensus has been reached on two following methodological points:

- the existence of a liquidity premium for assets traded in financial markets may be used as a proxy for the liquidity premium applicable in insurance

markets, adequate allowance being given for the error involved in this assumption; and

- the predictability of insurance cash flows may be used as an indicator to identify whether an insurance liability is illiquid or not.

Before developing a calculation method, the following preliminary three issues need to be discussed:

- the determination of the maximum liquidity premium for liabilities
- the granularity of the liquidity premium for liabilities
- the maturities for which a liquidity premium is applicable

a) Determination of the maximum liquidity premium for liabilities

A majority of TF Members estimate that there is no conceptual problem to apply 100% of the liquidity premium for assets to the valuation of liabilities in case of a wholly illiquid liability, whereas a minority are of the opinion that a margin for uncertainty should always be deducted. They argue that even for the "most illiquid" type of products (e.g. annuities) there are still uncertainties in the cash flow projections (such as mortality forecasts, policyholder behaviour assumptions, etc). Given the illiquid nature of the replicating portfolio, any future adjustments to the replicating portfolio induce extra trading costs, and these extra costs have to be deducted from the liquidity premium. In making these deductions due consideration should be given to the extent that such uncertainties in cash flow projections are already reflected in the risk margin and in the valuation of financial options and guarantees.

b) Granularity of the liquidity premium for liabilities

It is recalled that while liquidity is a continuous property of an insurance liability, this does not mean that a liquidity premium should automatically be used for liabilities which are only partially illiquid. Indeed applying a liquidity premium to liabilities which are only partially illiquid in an objective and reliable manner may be a challenging exercise and avoidance of arbitrary decisions and unlevel playing field range high among the concerns expressed by supervisors. However industry notes that the valuation of financial options and guarantees has similar levels of complexity.

The basic choice in this respect is the one between a binary solution - where either the whole premium is applied or no premium at all is applied - a more granular approach.

This issue was among the most controversial in the Task force as CEIOPS Members unanimously are in favour of a binary approach, whereas private sector Members prefer a more granular "bucket" or even a continuous approach.

A major challenge is indeed how to define a degree of partial liquidity of a liability.

Qualitative as well as quantitative approaches have been proposed.

Qualitative approaches focus on policy conditions and on legal and tax environment in order to assess the predictability of future policyholder behaviour and deduct the corresponding degree of illiquidity. A drawback of this kind of approach is that for the same kind of product in the same legal environment and for the same period, policy

behaviour and management discretion may be different between different companies. The classification of products into liquidity buckets would thus be entity specific and involve a certain degree of subjectivity, paving the way for potential unlevel playing field.

Quantitative approaches consider past policy behaviour in terms of surrender/option take up rates as well as other factors of uncertainty such as volatility of expenses and mortality rates and analyse the expected level as well as the volatility of these rates. While still being entity specific, these approaches, which may or even must be complemented by qualitative assessments, in particular for new lines of products, are less subjective in the sense that they rely on auditable data to be provided by the companies. Moreover the expected level of future surrender rates is already a component of the calculation of technical provisions.

The insurance industry proposes to further investigate the possibility to combine the advantages of a simple qualitative approach based on a limited number of buckets with the advantages of a more sophisticated and precise quantitative approach based on modelling the actual degree of liquidity of liabilities.[3]

c) Maturities for which a liquidity premium is applicable

In accordance with principle #3 the addition of a liquidity premium should be limited to maturities where an additional liquidity return may be earned with financial instruments available in deep and transparent markets.

With the exception of one Task Force member, this principle is interpreted in the sense that the instruments must be available at the time of calculation of the liquidity premium.

Industry claims that such instruments – other than corporate bonds – would exist and would cover maturities up to 24 to 48 years, depending on the currency.

Up to these maturities minus 5 years a fixed liquidity premium is added to the risk free forward rate curve, with the exception of maturities below one year where no liquidity component would be justifiable. A linear reduction of the liquidity premium would be put into place for the last five years.

One task force member considers that also the extrapolated part of the interest rate curves should include a liquidity premium. When a liquidity premium is observable for traded assets, extrapolation should distinguish as between the liquid and the illiquid extrapolated rates.

d) Calculation of the liquidity premium for liabilities

Building on the three issues discussed above the following methodology is proposed.

Let $RFIRate_{forward,total,T,curr,i}$ be the risk free forward rate including the liquidity premium for maturity T, currency curr and liquidity bucket i.

$$RFIRate_{forward,total,T,curr,i} = RFIRate_{forward,basic,T,curr} + LP_{liab,\ T,\ curr,\ i}$$

[3] An method is presented by CRO/CFO Forum in annex B

Where:

- $RFIRate_{forward,basic,T,curr}$ is the risk free forward basic rate for maturity T and currency curr,

  and

- $LP_{liab,\ T,\ curr,\ i}$ is the liquidity premium for maturity T, currency curr and liquidity bucket i.

The liquidity buckets are ordered from 1 to n by decreasing illiquidity, bucket 1 having the highest liquidity premium and bucket n having no liquidity premium. CEIOPS members advocate to fix n=2 whereas more buckets would be preferred by industry.

$LP_{liab,\ T,\ curr,\ i}$ is then calculated as follows:

$LP_{liab,\ T,\ curr,\ I} = F(T, curr) * G(i) * LP_{assets}$ [4]

The function F (T, curr) is determined as follows:

F (T, curr)	= 1 where $0 <= T < N_{curr} - 5$
	= $(N_{curr} - T)/5$ where $N_{curr} - 5 <= T <= N_{curr}$
	= 0 where $T > N_{curr}$, N_{curr} designating the longest maturity where assets allowing to earn a liquidity premium for currency curr may be purchased in a deep, liquid and transparent market;

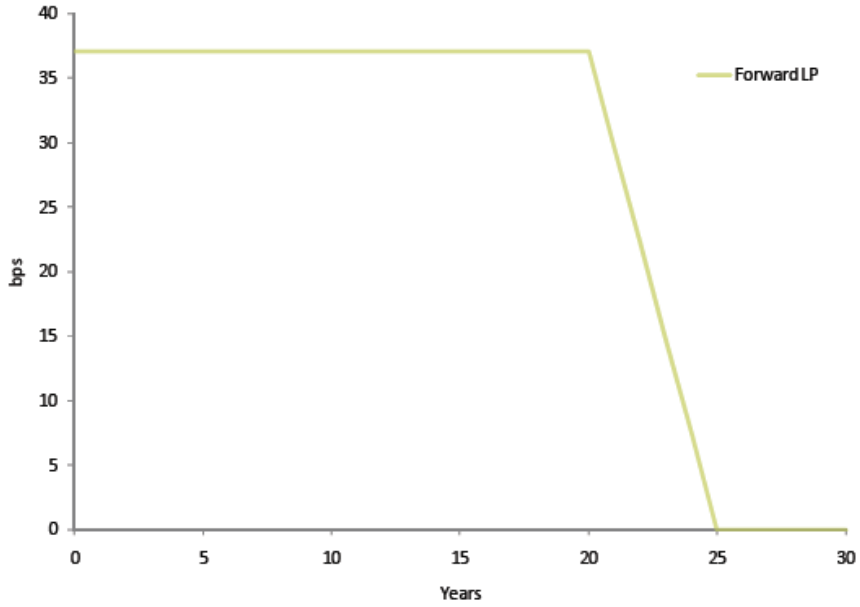
The function G(i) gives the liquidity premium for bucket i. According to a majority of TF members, G(1) < 100%.

The spot rate curve is then derived from the modified forward rate curve.

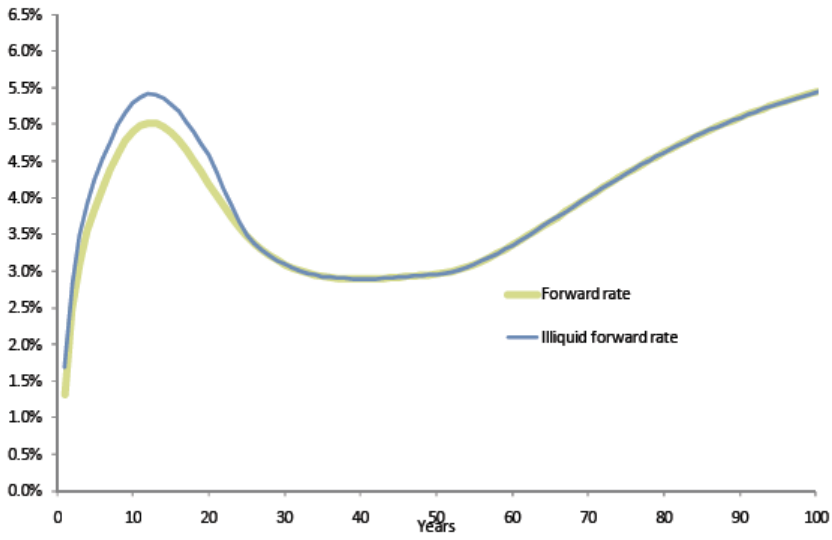
The following graphs illustrate the methodology for the euro. The cut-off point fixed at 24 years is just illustrative and its value shall be fixed by the central EU institution in accordance with principle # 3.

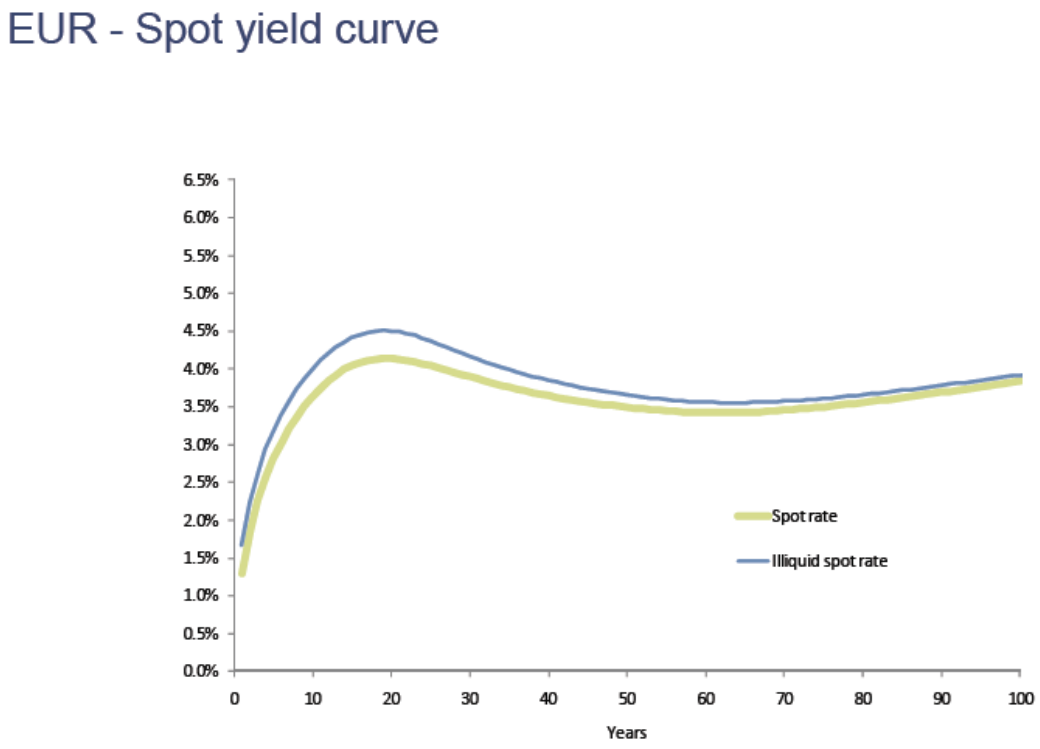
[4] An alternative method presented by CRO/CFO Forum is described in annex B

EUR - Forward liquidity premium



EUR - Forward yield curve





I - 7. Incidence on SCR and risk margin

This subsection considers how an allowance for a liquidity premium for technical provisions would impact other components of the quantitative solvency assessment. It first considers the overall impact on the solvency position of insurers, and then analysis how the design and calibration of the SCR standard formula could be amended to capture the risks arising from a change in the level of liquidity premium. It concludes by considering how a liquidity premium would impact the calculation of the risk margin.

Overall impact on solvency position of insurers

To assess the overall impact of an introduction of a liquidity premium, the impact on the level of own funds as well as on the SCR has to be considered.

For funds and considered in isolation, application of a liquidity premium in periods of high liquidity spreads has the immediate effect of increasing the basic own funds, which are defined as the excess of assets over liabilities.

Compared with the present state of CEIOPS advice, for the SCR the introduction of a liquidity premium should impact the overall capital requirements. Indeed in order to ensure that the capital requirements still meet the 99.5% VaR target criteria fixed by the level I directive, changes to the liquidity premium over the next 12 months need to be tested and will lead to additional SCR requirements. Especially in periods of application of a liquidity premium, a sudden decrease of such a premium – as has been observed after the first quarter of 2009 – will rapidly lead to an increase of technical provisions which has to be captured in the SCR calculations.

The overall incidence of the introduction of a liquidity premium on an insurer's solvency position will depend on the risk characteristics of his solvency balance

sheet. For an insurer which is well-hedged in terms of liquidity, an improvement might be expected since a negative change in the value of assets due to a change in liquidity would be offset by a corresponding change of the technical provisions. For an insurer which is ill-hedged in terms of liquidity, the improvement will still exist but to a much lesser extent.

Hence we can conclude that the solvency position of insurers[5] will be improved by an introduction of a liquidity premium. This effect will be strongest in case the insurer is well-hedged in terms of liquidity.

Recognition of a liquidity premium in the standard formula SCR

Where a liquidity premium is introduced, the design and calibration of the standard formula calculation would need to be reviewed to ensure that it continues to lead to capital requirements which are commensurate with the solvency valuation of assets and liabilities and with the set Solvency II 99.5% VaR target criteria. This would need to have regard to cases where:

- the measurement of a specific risk addressed in one of the risk modules or sub-modules has changed, so that the current design or calibration of the relevant module may no longer be adequate;

- the dependency structure between the risks would change, so that the correlation parameters specified in the standard formula between those risks may no longer be adequate;

- the result of one of the modules of the standard formula would change because the size of technical provisions is used as a volume measure or parameter in the calculation;[6]

- the loss-absorbing capacity of future discretionary benefits in the technical provisions would be impacted, so that the adjustment mechanism in the standard formula to take account of this loss-absorbing capacity may no longer be adequate; or where

- the standard formula would not be adequate to capture the risk of a change or a mis-specification of the liquidity characteristics of technical provisions.

The Task Force has considered these points and has noted that an introduction of the liquidity premium would have an immediate effect on the measurement of spread risk and interest rate risk in the standard formula. Furthermore, it seems likely that changes in the correlation assumptions in the standard formula – especially in the market risk formula – would be necessary. The Task Force has therefore focused its analysis on these issues, which are explored in the following sub-sections.

[5] Defined as the difference between available own funds and the SCR

[6] An example of this is the calculation of the capital charge for operational risk, which uses the size of technical provisions as a volume measure.

Split between interest rate risk and spread risk in the standard formula

The two sub-modules of the market risk module of the SCR standard formula which specifically address the risk arising from potential changes of yields on assets and of interest rates are the following: [7]

- The **interest rate module** reflects the risk arising from changes in the risk-free term structure of interest rates, or in the volatility of interest rates; it applies to all assets, liabilities and capital instruments which are sensitive to changes in the term structure of interest rates or interest rate volatility;

- The **spread risk module** reflects the risk arising from the sensitivity of the values of assets, liabilities and financial instruments to changes in the level or in the volatility of yields relative to the risk-free term structure (i.e. the "spread" over the risk-free interest rate term structure).

We note that this fundamental split between a reflection of the risk arising from changes to risk-free rates (interest rate risk) vis-à-vis the risk arising from changes to spreads over and above risk-free rates (spread risk) has already been specified in the Level 1 text.[8]

In case a liquidity premium would be introduced as an additional component of the risk-free rate, it has to be decided whether the risk of a change in liquidity premium ("liquidity risk") should be captured in the interest rate module or in the spread risk module.

Considering the definition of these modules as described above, it may seem more in line with the level I text to capture this risk in the interest rate risk module. The current design of the interest rate sub-module follows a scenario-based approach, which specifies up-ward and down-ward shocks on both the level and also the volatility of the interest rate curve. First considerations have shown that it may not be feasible to include the risk of a change in liquidity premium in the interest rate module without creating an undue degree of complexity in the formula as a whole. Therefore, from a technical point of view the Task Force would recommend to integrate an allowance for a liquidity premium in the spread risk module, with the exception of two CEIOPS members which consider equally feasible and complex both options.

However, it should be stressed that this conclusion was made on basis of the following assumption:

Assumption on quantification of liquidity premium
The liquidity premium to be applied is quantified as a function of the market yield spread for a specified model portfolio of assets over a basic reference interest rate term structure.

Note that the method proposed in section I.6 satisfies this assumption.

[7] cf. CEIOPS' advice on the structure and design of the market risk module (CEIOPS-DOC-40/09)
[8] cf. Article 105(5) of the Level text

How the spread risk module could be changed to allow for a liquidity premium

The design of the spread risk module in the SCR standard formula relies on a formulaic approach which uses the credit risk exposure of the asset instrument in question as a volume measure, and takes into account the credit rating of the instrument and its duration in the applied factor. In its current design the spread risk module is focused on the asset side and is constructed as a one-sided risk (i.e. only a potential widening of spreads is considered).[9] The capital charge for spread risk is computed separately for bonds, structured credit products, credit derivatives and mortgage loans.

We note that the current calibration of the spread risk module is based on CDS spreads for corporate bonds, rather than on the "full spreads" of bonds or other instruments over and above the risk-free rate.[10] For structured credit no adjustments have been made yet to exclude the liquidity impact.

To allow for recognition of a liquidity premium (in particular even where liquidity premium is effectively measured at nil on the financial markets), the design and calibration of the spread risk module would need to be amended such that:

- The module captures spread risk as a two-sided risks; and

- The module recognises the impact of a change in the illiquidity component of the spread not only on the asset but also on the insurance liability side.

To achieve this, the following steps would seem to be necessary:

- **Step 1**: recalibrate the spread risk factors on basis of "full spreads" rather than only CDS spreads[11]

- **Step 2**: calibrate an additional set of spread risk factors to capture a potential tightening of spreads (so that spread risk becomes a two-sided risk)

- **Step 3**: For each of the two sets of spread risk factors:

  I. Translate the spread risk factors into changes in spread associated with the rating and durations of the assets in the model portfolio;[12]

  II. Use the functional relationship between the spreads in the model portfolio and the liquidity premium to translate this change in spread to a change in liquidity premium;

  III. Apply this change in liquidity premium to the technical provisions in order to determine the impact of the (implicit) spread risk scenario to the liability side.

We note that these steps may be technically rather challenging. For example, the third step would need to take into account that the spread risk factors implicitly

9 With the exception of structured credit products, where both a widening and a tightening of spreads is prescribed.

10 Cf. CEIOPS-DOC-66/10.

11 This is necessary since otherwise in Step 3 we could not quantify the change in the level of liquidity premium implicitly assumed in the spread risk factors.

12 This refers to the model portfolio of assets on basis of which it is assumed that the liquidity premium is quantified, see assumption above. Note that this step is necessary since the spread risk module is factor-based and does not specify shocks to the spreads themselves.

address not only the change in the level of credit spreads, but also the term structure for the level of spreads. Also it would require knowledge of the ratings and durations of the bonds in the model portfolio.

Further we note that it is assumed that these changes are made only to the (sub-)charge of the spread risk module covering the exposure of bonds. The calibration of the other sub-charges (for structured credit products, credit derivatives and mortgage loans) is more complicated and could not easily be amended to allow for a liquidity premium on the liability side.

It should also be pointed out that a re-calibration of the spread risk factors to "full" spreads is likely to lead to a significant increase in the spread risk charge. Indeed, we note that CEIOPS decided to switch to a calibration on basis of CDS spreads in reflection to comments from stakeholders that a calibration of charges on basis of "full" spreads (as CEIOPS suggested in the pre-consultation version of its advice on the calibration of market risk) would lead to an excessive level of the spread risk charge.

Adjustments to correlation assumptions

In its Level 2 advice on correlations in the standard formula, CEIOPS has suggested the following correlation parameters for spread risk in relation to the other sub-risks in the market risk module:[13]

Interest rate risk	Equity risk	Property risk	Currency risk	Concentr. risk
50%/0[14]	**75%**	**50%**	**50%**	**50%**

These factors have been derived on basis of extensive statistical analysis which considered the correlation of a widening of credit spreads with a movement in other market risk drivers in historical data. In case the spread risk module is amended as described above, these factors would need to be revised since then spread risk would be considered as a two-sided rather than one-sided risk.

For example, the current factor of 75% between spread risk and equity risk is based on observing a high correlation in the tail between a widening of spreads and a fall in equity markets. However, this factor would not appropriately describe the correlation between *decreasing* spreads and decreasing equity values (since in practice we would envisage scenarios giving rise to decreased equity values and decreased spreads as rare and as very temporary aberrations). Similar problems would occur with respect to interest rate risk, where already "two-sided" correlations were introduced since interest rate risk is also a two-sided risk.

Implications on the calculation of risk margins

Risk margin is calculated using the cost of capital approach. Under this approach the risk margin is the actual value of future remunerations, above the risk free interest rate, to shareholders due the increase of the SCR at each future point in time used in projections.

13 Cf. CEIOPS-DOC-70/10

14 Depending on whether the insurer is exposed to a rise or a fall in interest rates

An introduction of a liquidity premium is likely to impact the calibration and calculation of the risk margin.

The Task Force has considered in particular the following issues:

- whether the determination of the cost of capital rate over and above the risk-free rate needed to be changed;

- whether the liquidity premium should be reflected in the choice of the risk-free rate with which future SCRs are discounted in the risk margin calculations;

- whether the additional "liquidity premium component" in the SCR would need to be included in the risks captured in the risk margin.

On the first two issues it has been concluded that the introduction of a liquidity premium should not modify the determination of the cost of capital rate nor should a liquidity premium be applied for the discounting of future SCRs.

The Task Force recommends that further technical work should be carried out on the third issue.

Conclusions

- **The solvency position of insurers will be improved by an introduction of a liquidity premium. This effect will be strongest in case the insurer is well-hedged in terms of liquidity.**

- **Where a liquidity premium is introduced, the design and calibration of the standard formula calculation would need to be reviewed to ensure that it continues to lead to capital requirements which are commensurate with the solvency valuation of assets and liabilities and with the set Solvency II 99.5% VaR target criteria.**

- **In particular this is relevant with respect to the design and calibration of the spread risk module and the interest rate risk module, as well as with regard to the setting of correlation assumptions, but other areas in the standard formula may also be affected.**

- **In case a liquidity premium is introduced, the Task Force recommends including a recognition of the associated risk in the spread risk module. Such a change would necessitate a re-calibration of the spread risk module factors and would imply that the correlation assumptions with respect to spread risk would need to be reviewed.**

- **An introduction of a liquidity premium is also likely to impact the calibration and calculation of the risk margin.**

I - 8. Scope of application

Regarding the scope of application the Task Force has considered both the liabilities to which an liquidity premium should apply as the question of a permanent versus transitional application of the liquidity premium.

Concerning the first aspect it has been stated in chapter I-6 that CEIOPS Members unanimously are in favour of an approach applying a liquidity premium only to liabilities the highest possible degree of illiquidity, whereas private sector Members prefer a more granular "bucket" or even a continuous approach. According to CEIOPS views the required illiquidity characteristics can only be found in portfolios of annuities in force.

On the second issue it follows from the business case presented by industry that the aim of a liquidity premium is the elimination of temporary valuation mismatches between assets and liabilities in periods of stressed liquidity of corporate bonds.

Although not frequent such mismatches may occur as long as the holding of corporate bonds will be part of the investment policy for assets covering illiquid liabilities.

Consequently the industry's request is for a permanent mechanism, applicable both to business in force as to future business.

Some CEIOPS Members prefer to limit the liquidity premium to business in force at the time of entry into force of Solvency II.

I – 9. Interplay with the choice of the basis risk free interest rate curve and with extrapolation

As explained in chapter I-7 the liquidity premium will be added to the risk free forward interest rate for maturities where a liquidity premium may be earned in a risk free manner.

It is reasonable to think that these maturities are shorter than or equal to the last observable market data point so that the entry into the extrapolated part of the interest curve shall occur at the time or after the end of the application of the liquidity premium.

One TF member estimates that the extrapolated part of the interest rate curves should also include a liquidity premium when such premium is observable in traded markets.

As regards the interplay between the liquidity premium and the choice of the basis risk free interest rate, this is mainly a problem of calibration. In the simplified formula in annex A the values of x and y were derived from an analysis of the spreads between swaps and corporate bond yields. If a different basis curve were to be chosen, total spreads would widen and the breakdown into individual components would be modified.

PART II – EXTRAPOLATION

CEIOPS advice on the risk-free interest rate term structure CEIOPS includes only 4 paragraphs on the issue of extrapolation, even if different techniques are presented in the annexes. It was felt that this topic would need further refinement already at level 2.

Extrapolation is of crucial importance for certain types of long-term insurance business where slight differences in the extrapolated part of the term structure may lead to huge differences in the amount of technical provisions.

Moreover, the choice of an extrapolation method and its results over time may have systemic consequences on the solvency of the insurers, since changes in extrapolated rates or spread between estimated and actual rates can have broad effects on the balance sheets and results of the insurers.

Depending on the existence of observable liquid data points, the need for extrapolated rates varies for the different currencies.

Common principles governing the methods of calculations should ensure a level playing field between the different currencies.

A central feature is the definition of an unconditional ultimate long-term forward rate to be determined for each currency by macro-economic methods. While being subject to regular revision by the central EU institution referred to in principle #4, the ultimate long term forward rate should be stable over time and only change due to fundamental changes in long term expectations.

The task force does not recommend however to go beyond these principles at level 2 implementing measures, as the precise methods to be used may vary from one currency to another and may vary over time depending on the evolution of the markets.

In particular no precise method should be prescribed at level 2 for the determination of the unconditional ultimate long-term forward rate. An example of a possible method has been indicated in annex E to CEIOPS advice on the risk free interest rate term structure.

II - 1. Principles for extrapolating the basis risk free interest rate term structure

In constructing the extrapolated part of the basis risk free interest rate term structure the following principles should be applied:

#1. All relevant observed market data points should be used.

#2. Extrapolated market data should be arbitrage-free.

#3. Extrapolation should be theoretically and economically sound.

#4. The extrapolated part of the basis risk free interest rate curve should be calculated and published by a central EU institution, based on transparent procedures and methodologies, with the same frequency and according to the same procedures as the non extrapolated part.

#5. Extrapolation should be based on forward rates converging from one or a set of last observed liquid market data points to an unconditional ultimate long-term forward rate to be determined for each currency by macro-economic methods.

#6. The ultimate forward rate should be compatible with the criteria of realism as stated in CEIOPS advice on the risk free interest rate term structure and the principles used to determine the macro-economic long-term forward rate should be explicitly communicated.

#7. Criteria should be developed to determine the last observed liquid market data points which serve as entry point into the extrapolated part of the interest curve and for the pace of convergence of extrapolation with the unconditional ultimate long-term forward rate.

#8. Extrapolated rates should follow a smooth path from the entry point to the unconditional ultimate long-term forward rate.

#9. Techniques should be developed regarding the consideration to be given to observed market data points situated in the extrapolated part of the interest curve.

#10. The calibration of the shock to the risk free interest rate term structure used for the calculation of the SCR should be reviewed in order to be compatible with the relative invariance of the unconditional ultimate long-term forward rate.

#11. Extrapolation should be arbitrage-free across different currencies, taking into account forward and spot foreign exchange rates observable in the financial markets.

II – 2. Incidence on SCR

CEIOPS advice on the calibration of the shocks for the interest rate risk for the calculation of SCR_{market} foresees for maturities of 25 years and above an upward shock of 37% and a downward shock of -49%.

Even if the relative invariance of the unconditional ultimate long-term forward rate does not translate into an invariance of the spot interests before even longer maturities, the interplay the SCR interest rate shock and existence of an unconditional ultimate long-term forward rate will have to be examined.

PART III – CHOICE OF THE BASIC RISK FREE INTEREST RATE TERM STRUCTURE

A majority of the TF members agreed on more work to be done with view to reconsidering the three step approach defined in CEIOPS advice (former CP 40) and look for ways to define the risk free interest rate term structure by taking the swap curve as the starting point.

The TF agreed that the use of swap rates is not exempt of credit risk. Even if the counterparty risk on the swap agreement itself is deemed to be very small, as swap exposures are normally collateralised, the investment necessary to earn the floating leg of the swap may include some credit risk. On the floating side of the swap, the investor will have credit exposure to the institution – or more likely to a group of deposit taking institutions – where money is placed. This is not for the full term of the swap, but for the 3-month or 6-month deposit terms in case of interbank LIBOR/EURIBOR swaps. For overnights markets (EONIA) this credit risk is reduced to its minimum as credit risk is then reduced to a very short term exposure and deposits can be moved if creditworthiness falls below some threshold.

In case of the use of a swap curve as the starting point adjustments aimed to allow for credit risk (both for the instruments necessary for earning the floating leg of a swap and for the swap arrangement) and for basis risk would have to be foreseen where appropriate

In a submission produced late in the process and thus not further discussed in the TF CRO/CFO proposed the following principles:

#1. The basis risk free interest rate should be based on a swap curve appropriately adjusted to remove credit risk.

#2. The adjustment for credit risk should refer to overnight swap rates where these are available and the market is sufficiently liquid.

#3. Where this is not the case, other market swap rates adjusted for long-term through-the-cycle credit risk should be used.

CRO/CFO indicated two options on how to implement the above principles.

Option 1: use overnight swaps rates where liquid then move towards interbank rates adjusted for credit risk

This option requires the fixing of a cut-off point beyond which overnight swaps rates are no longer considered to be liquid, the calculation of a long term adjustment beyond the cut-off point and the definition of the speed of transition between the overnight swap curve and the interbank rate curve.

Option 2: use quoted EONIA overnight swap rates without adjustment

These rates involve negligible credit risk and are attracting an increasing proportion of market liquidity. They are quoted up to 30 years although active trading is concentrated at durations up to 5 years. This can lead to distortions in rates beyond 5

years, which requires consideration to be given to means of extrapolating the rates beyond the reliable data points.

Due to constantly changing market conditions both options ask for some discretion for the central EU institution in charge of the determination of the risk free interest rate term structure.

The options should not to be considered mutually exclusive and different options could be retained for different currencies or different points in time.

Due to time constraints these proposals were not discussed during the TF meetings and reactions of TF members are sought simultaneously with comments from CEIOPS Members.

Annex A – A possible proxy for the liquidity premium on assets

A possible proxy may be given by the following simple formula:

$$LP_{assets} = Max(0; x*(Spread - y))$$

This formula could be interpreted by saying that a fixed portion (y) of the total spread would be an allowance for long-term expected losses and a proportion (x) of the remainder can be considered as the liquidity premium. The difference (1-x) of the remainder represents thus the risk premium for unexpected credit risk (or uncertainty).

The above formula needs as input only the observed total spread between corporate bonds and the basic risk free rate for each currency.

The choice of x and y will depend on the credit spread benchmark used and can be chosen to best match the other methods.

The results of the proxy formula with x=0,5 and y=0,4 are the following.

Estimation of the liquidity premium – Results of simplified formula

Note: The results presented are draft and subject to refinement.

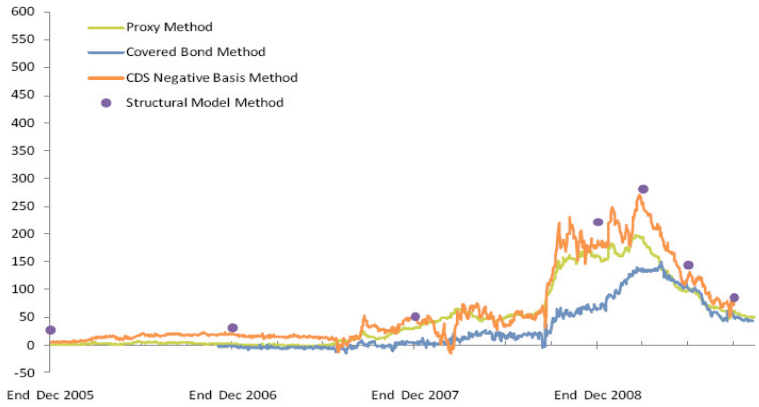
Liquidity premium in per annum bps relative to swaps (with X%=50% and Y=0.4% for all currencies):

Date	EUR	GBP	USD
End Dec 2005	1	4	8
End Dec 2006	1	5	13
End Dec 2007	30	44	44
End Dec 2008	160	216	221
End Mar 2009	193	236	224
End June 2009	97	136	118
End Sept 2009	59	78	81

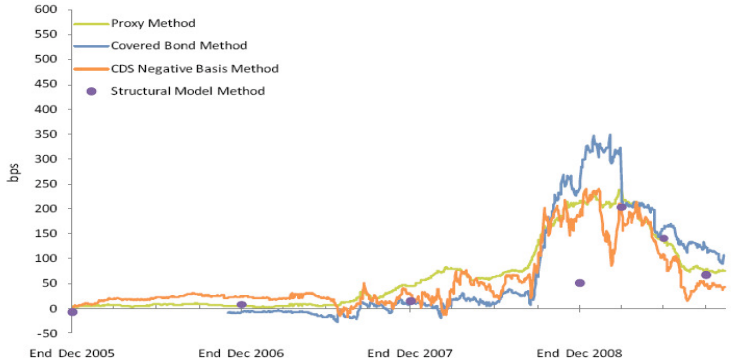
The estimation of x and y is based on observed spreads over swap without taking into account any adjustment for credit risk in the swap rates. When a different risk free curve is used then resulting parameters could change as well

The three following graphs compare the results of the proxy formula with those of the methods described in chapter I-5.

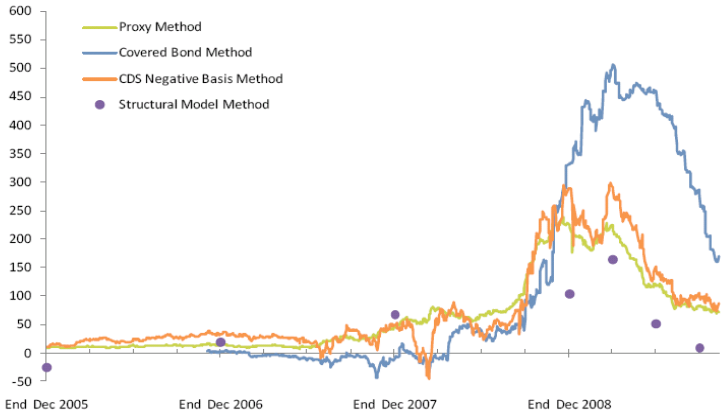
EUR - comparison of methods



GBP - comparison of methods



USD - comparison of methods



Source data:

- Reference portfolio of asset: - Markit iBoxx indices: (i) EUR: iBoxx € Corporates ISIN for TRI: DE0006301161; (ii) GBP: iBoxx £ Corporates ISIN for TRI: DE0005993174; and (iii) USD: iBoxx $ Corporates ISIN for TRI: GB00B0598748
- Swap spreads sourced from Bloomberg.

It has to be stressed that both the simple formula as the values of the parameters are given only for illustrative purposes, as important questions remain unanswered, among which:

- The composition of the total spread over and above the liquid risk free rate is assumed to stay constant for all maturities – is there statistical evidence for such an assumption?

- Expected credit risk as well as unexpected credit risk and liquidity premium are assumed to make up a fixed portion of the total spread. Is there any evidence that justifies these presumptions?

- Which principles should be applied when choosing the relevant credit spread benchmark portfolio?

- Should x and y be chosen in a mechanical way to choose a best match with respect to the other three methods? If yes, how would this address the methodological deficiencies of these methods? If no (i.e. the parameters x any y are chosen on a more subjective basis) – how can it be ensured that the calibration is carried out in an objective and reliable manner?

- There is no allowance for the other components of the spread. Is there any evidence that these components can be neglected (for all maturities, currencies)?

- How can it be ensured that the measurement (which only relies on observed market prices) is fully consistent with the solvency valuation of (illiquid) assets?

ANNEX B – ALTERNATIVE METHOD OF APPLICATION OF A LIQUIDITY PREMIUM TO LIABILITIES

A more sophisticated alternative to the bucket approach described in chapter I-6 has been presented by CRO/CFO where the formula on page 16 is replaced as follows:

$LP_{liab,\ T,\ curr,\ I} = F\ (T, curr)^{*}\ G(T)\ ^{*}\ LP_{assets}$

where the function F is defined as in chapter I-6, but the value of function G depends on the degree of predictability of a cash flow for a certain product at maturity T rather than on a bucket this product would belong to.

For a given maturity this approach requires the calculation of not only the best estimate of a cash flow, but equally of its distribution.

ANNEX C – COMPOSITION OF THE TASK FORCE

Claude WIRION	Illiquidity Premium TF Chair
Benoît HUGONIN	European Commission, Observer
Pamela SCHUERMANS	CEIOPS Secretariat
Perrine KALTWASSER	CEIOPS Secretariat
Yves BAUSTERT	Secretariat
Yanick BONNET	AMICE
Alberto CORINTI	CEA
Bill ROBERTSON	CFO Forum
Jeroen POTJES	CRO Forum
Seamus CREEDON	Groupe Consultatif
Prof. Antoon PELSSER	Maastricht University
Per Plougmand BAERTELSEN	Denmark – CEIOPS Member
Romain PASEROT	France – CEIOPS Member
Olaf ERMERT	Germany – CEIOPS Member
Francesca BUZZICHELLI	Italy – CEIOPS Member
Nic VAN DER ENDE	Netherlands – CEIOPS Member
Daniel PÉREZ	Spain – CEIOPS Member
Anna JEGNELL	Sweden – CEIOPS Member
Paul SHARMA	United Kingdom – CEIOPS Member