**Annex 2** to the Dutch Association of Insurers' response to the EIOPA consultation paper on the 2020 Review

Para 2.325
The safeguards EIOPA mentions in para. 2.325 (especially the risk-correction) will have a pro-cyclical effect. The risk correction should have a relationship with the actual/expected default after the exaggeration of the spreads.
Under (c) EIOPA mentions some safeguards, but EIOPA already collects on a frequent basis asset-by-asset information (QRT S06 02). Therefore we would like to know why this additional information is needed. The NCA can already assess the prudent person principle, the ALM policies, the risk appetite statements and assess whether there is any vulnerability as assumed by EIOPA. Therefore, we see no need for additional safeguards; a supervisory dialogue between the insurer and the NCA will suffice.

An alternative approach to the risk correction:

## Introduction
EIOPA has specified the following deficiencies for the risk correction [1]:
1. Almost insensitive to credit spread changes
2. Does not reflect actual default losses
3. Does not reflect credit risk premium for unexpected losses
4. Unnecessarily reflects cost-of-downgrade

EIOPA has proposed to base the calibration of the risk correction on the academic literature on liquidity risk. In particular, EIOPA has defined the risk correction as everything that is not liquidity premium. However, when addressing the four deficiencies above, it seems more natural to focus on cash flow losses (in particular default risk). The problem with a liquidity premium is that it is very difficult to define and to measure. We argue below in more detail that the risk correction should measure cash flow losses. Cash flow risk can be defined and measured in a direct and objective manner and it is the relevant risk for insurers to address under a buy-and-hold strategy during crisis times.

## Risk correction
We start by introducing some relevant concepts behind the Matching Adjustment (MA), the Volatility Adjustment (VA), the application ratio and the risk correction. When it is conceptually clear what each component should measure, a quantitative framework can be developed. The central reasoning behind the MA is that a certain asset spread, namely for liquidity risk, can be earned with limited risk, if the corresponding asset is used to match an illiquid (stable) liability and is held to maturity. In that case, liquidity risk does not affect the company holding the asset, since the replicating asset is not sold in the meantime. Solvency II regulation allows to include the corresponding illiquidity spread in the valuation on the liability side. The logic is that stable liability cash flows can be hedged with illiquid assets, which makes the liabilities less expensive, because they are replicated by cheaper instruments.
In case of the Volatility Adjustment, the criteria are less strict than for the MA, but the financial background is similar. Insurers avoid forced selling in times of crises, which limits liquidity risk under stress. An application ratio is used for the VA to account for less strict matching and illiquidity criteria compared to the MA (according to the interpretation of EIOPA). EIOPA formulates the main objectives of the VA as follows [1], although the third objective is not included in the recitals of the Directive which introduces the MA and VA as concepts.
1. Prevent procyclical investment behaviour;
2. Mitigate the impact of exaggerations of bond spreads on own funds;
3. Recognise illiquidity characteristics of liabilities in the valuation of technical provisions.

## Concepts
In order to develop a conceptual framework for the risk correction, it should first be specified what the risk correction should measure (and what not). We first note that deviations from the matching assumption and deviations from the forced selling assumption in the VA should be addressed in the application ratio. To avoid double counting we should not address these issues again in the risk correction. We thus assume that (after applying the appropriate application ratio) sufficient cash flow matching and avoidance of forced selling holds. We will refer to these as the key assumptions.
As a next step it is relevant to clarify what is meant by illiquidity risk. Illiquidity risk is naturally defined in this context as all risks that affect the value of (fixed-income) assets without affecting the underlying cash flows. Illiquidity risk is defined in this way as the complement of cash flow risk. From the above discussion it is clear that under a replicating buy-and-hold strategy, only cash flow risks affect the insurer.

An important example of cash flow risk is default risk (or sometimes described as credit risk). In fixed-income contracts without exotic features default risk is the main cash flow risk. In the remainder we focus on default risk, but any other cash flow risks can be measured and included along the same lines.

## Examples

Having specified what the risk correction should capture, namely all potential cash flow losses (both expected and unexpected), we proceed by considering explicit examples.

*Case 1: Expected credit risk*

Because the application ratio should capture deviations from illiquidity and perfect matching, we apply the key assumptions of stable and matched liability cash flows for the risk correction. We denote the cumulative credit loss at maturity $T$ as $CL_T$. Cumulative credit losses for corporate bonds are standardly reported by data reports of credit agencies. We assume in first instance the cumulative credit loss $CL_T$ to be predictable. The reason is to create a setting in which the risk correction can unambiguously be specified. Consider a stable liability cash flow $L_T$ at maturity $T$. The matching asset is a zero-coupon bond with notional $N_T = \frac{L_T}{1-CL_T}$, because $N_T(1 - CL_T) = L_T$ remains at maturity after including credit loss. The value of the replicating asset is given in terms of the risk free rate $r_T$ and the spread $s_T$ as:

$$V_A = N_T e^{-(r_T+s_T)T} = \frac{L_T}{1-CL_T} e^{-(r_T+s_T)T}$$

The value of the liability is by definition of the volatility adjustment $va_T$ given by:

$$V_L = L_T e^{-(r_T+va_T)T}$$

In case of perfect illiquidity and replication, the application rate must equal 1 to avoid inconsistent valuation. Using $va_T = (s_T - rc_T)$ with $rc_T$ the risk correction and $V_A = V_L$, we obtain:

$$RC_T = -\frac{1}{T}\log(1 - CL_T)$$

This is the expression for the risk correction in case of perfect illiquidity and perfect matching in terms of cumulative credit loss over the maturity $T$ of the bond, when credit loss is predictable. Again, deviations from perfect illiquidity and perfect matching should be captured in the application ratio. Typical historical average cumulative credit losses for 5-year BBB bonds are 50 bps, corresponding to an historical average risk correction of 10 bps. During the most recent crisis years cumulative default rates have been somewhat higher than the historical average (e.g. considering 5-year cumulative default rates for the cohort starting 2008), but the observed increase in credit losses has been much less than the increase in spreads.

We note that for financial bonds, the spreads for 5-year BBB bonds have risen to 1500 bps during the most recent crisis. The proposal of EIOPA is to use a risk correction of 60% in these cases. Using the above formula, this risk correction corresponds to a cumulative credit loss of about 35%. Considering a recovery rate of 50%, this means that the cumulative default probability implied by the proposed risk correction is about 70%. The observed 5-year cumulative default rates for BBB corporate bonds issued in 2008, which thus includes all crisis years, is somewhere around 1%. Even though central governments have bailed-out several financial institutions, the default probabilities implied by the EIOPA risk correction are very high, especially compared to observed default rates.

*Case 2: Unexpected cash flow risk*

Since credit losses are not perfectly predictable, it is natural to distinguish between expected credit loss and unexpected credit loss (see EIOPA requirement 3). into a schematic formula, we obtain:

$$RC = \alpha\, ECL + \beta\, UCL$$

Such a decomposition of a risk charge in terms of a best estimate part and the uncertainty around the best estimate is very common. Solvency II has made a very specific choice how to charge unexpected cash flow risks through the risk margin. The charge should be such that the capital costs to maintain solvency each year with a certainty of 99.5% is included over the lifetime of the financial contract. Capital charges and risk margins for default risk under Solvency II are known under the standard formula.

In case of a through-the-cycle risk charge for credit loss, the expected and unexpected credit loss should be modelled by their unconditional mean and risk margin. However, based on requirement 1 and 2, EIOPA seems to prefer point-in-time estimates of the risk correction, which means that the expected and unexpected credit loss should be modelled by the conditional mean and risk margin on the current economy. EIOPA suggests in particular that current credit spreads are related to future credit losses. Although this claim is not supported by the selected literature by EIOPA [2], we have seen in the most recent crisis that increased credit spreads indeed preceded increased migration and default risk.

If we combine the requirements for EIOPA to address expected and unexpected credit risk, as well as to include a dependency on credit spreads, then it is natural to consider:

$$RC = \alpha \max(\text{LTAS},0) + \beta \max(S - \text{LTAS}, 0)$$

The current risk correction of EIOPA has $\alpha = 35\%$ for corporate bonds, which is already quite high compared to historical credit losses for investment grade bonds literature studies. In the literature typically a lower fraction is found for credit losses [3]. In order to calibrate $\beta$ for the risk correction, the relation between observed credit spreads and credit losses in times of enhanced credit risk can be studied. Note that when credit spreads rise more than actual credit losses during crisis times, then $\beta$ is expected to be smaller than $\alpha$. For example in the past crisis, credit spreads for 5-year bonds rose with a factor of 5 to 10 in 2008, while cumulative 5-year credit losses only rose with factor 1 to 2 over the crisis years. As a result, $\beta$ is expected to be a factor 3 to 5 smaller than $\alpha$ if calibration is based on the most recent crisis. If calibration is based on all crises in financial history a weaker relation is expected [2].

A disadvantage for a risk correction that is too high for lower ratings in crisis times, is that it can lead to procyclical behaviour and forced selling of the corresponding bonds when this is unnecessary.

**References**

[1] EIOPA, Consultation Paper on the Opinion on the 2020 review of Solvency II
[2] Giesecke et al., Corporate Bond Default Risk: A 150-Year Perspective, Journal of Financial Economics
[3] Huang and Huang, How much of the corporate-treasury yield spread is due to credit risk?, Review of Asset Pricing Studies