MILLIMAN BRIEFING NOTE

Solvency II 2020 Review – EIOPA's final opinion

A smoothed introduction of the alternative extrapolation

The introduction of the speed of convergence drag

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On 17 December 2020 the European Insurance and Occupational Pensions Authority (EIOPA) published its final opinion on the proposed reforms as part of the 2020 review. It remains in favour of applying the alternative extrapolation methodology. However, EIOPA now suggests implementing a smoothed introduction as long as interest rates stay below 0.5%.

During the smoothing period, that ultimately lasts until 2032, the speed of convergence to the Ultimate Forward Rate (UFR) is reduced. In this paper we summarise the effects of changes to the speed of convergence on the discount curve and the introduction of the speed of convergence (SoC) drag.

Final opinion published

In its final opinion on the proposed reforms EIOPA expresses its favour on the alternative extrapolation methodology. The other alternatives would have significantly affected the solvability of many insurers. The alternative extrapolation methodology steps away from the Smith-Wilson extrapolation methodology and is considered less complex compared to the current approach.

In order to mitigate the impact of implementing the alternative extrapolation methodology, when interest rates remain low, a smoothing solution is introduced. The smoothing solution is an adjustment of the speed of convergence parameter: α.

Recap on the alternative extrapolation method

In our previous briefing notes we have described the technicalities and the impact of lower interest rates on the alternative extrapolation method.[1,2] In these notes we have, amongst other things, discussed the relevance of the speed of convergence parameter on the level of the yield curve.

The alternative methodology introduces a first smoothing point (FSP) from which the curve is extrapolated to the UFR in combination with the Last Liquid Forward Rate (LLFR). The forward rates beyond the FSP are then extrapolated according to the following formula:

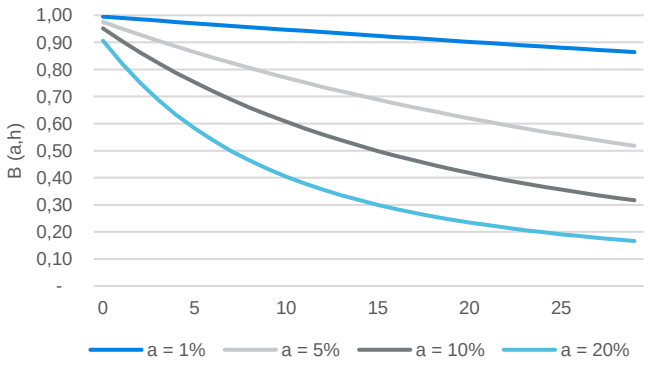
$$f_{20,20+h} = \ln(1 + UFR) + \big(LLFR - Ln(1 + UFR)\big) * B(\alpha, h)$$

$$B(\alpha, h) = \frac{1 - e^{-\alpha h}}{\alpha h}$$

where h takes on values from 1 to the desired maturity beyond the FSP and α is the convergence factor and is in the basis set equal to 10%.

A higher value of α implies a lower speed convergence and vice versa. The impact of α on the weight function B is shown in Figure 1.

FIGURE 1: EXPONENTIAL DECAY FUNCTION IN THE EXTRAPOLATION OF INTEREST RATES FOR DIFFERENT ALPHAS (α)



[1] Introduction of the alternative extrapolation: https://www.milliman.com/-/media/milliman/pdfs/articles/briefing-note-on-dynamics-of-alternative-extrapolation-method-vfd.ashx

[2] Impact of lower interest rates: https://www.milliman.com/-/media/milliman/pdfs/2020-articles/articles/11-5-20-the_impact_of_alternative_extrapolation_methods-v1.ashx

During the phase-in period, the smoothing solution makes *α* dependent on the level of the interest rate at 20Y (the FSP):

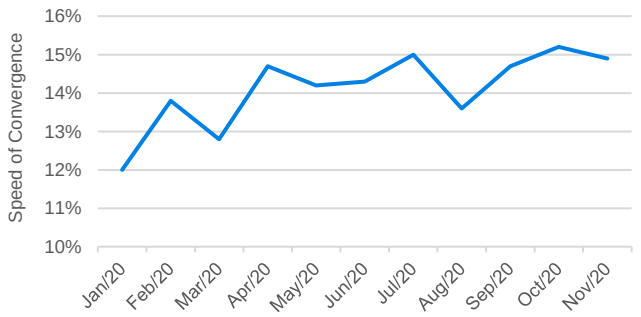
- Ten percent when the interest rate is 0.5% or higher
- X when the interest rate is -0.5% or lower
- Linearly interpolated between 10% and X when the interest rate is between -0.5% and 0.5%

In this formula X is equal to 20% during the first year of application of the alternative extrapolation method and decreases linearly to 10% in 2032.

If we assume November 2020 as the first day of the implementation, the implicit speed of convergence parameter α would be equal to 14.9%, following the interest rate at year 20 equals 0.014%.

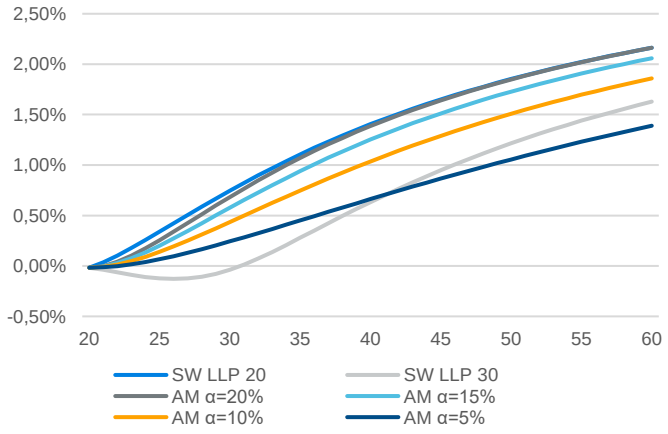
As a reference, we have analysed what would be the implied speed of convergence parameters through 2020. The results are shown in Figure 2.

FIGURE 2: IMPLICIT SPEED OF CONVERGENCE (SOC) PARAMETER THROUGH 2020



The impact of this change on the discount curve is shown in Figure 3, using data as of the end of November 2020.

FIGURE 3: EXTRAPOLATED INTEREST RATE CURVES AS OF END OF NOVEMBER 2020 (SOURCE: REFINITIV, EIKON AND MILLIMAN



The reduced speed of convergence leads to a higher discount curve after the last liquid point (LLP). For the comparison we have also included SoC parameters 20% and 5%. For 20% we observe that the curve is almost identical to the current Smith-Wilson extrapolation technique, whereas an *α* of 5% is more or less in line with an LLP of 30Y (assuming liabilities of 60Y).

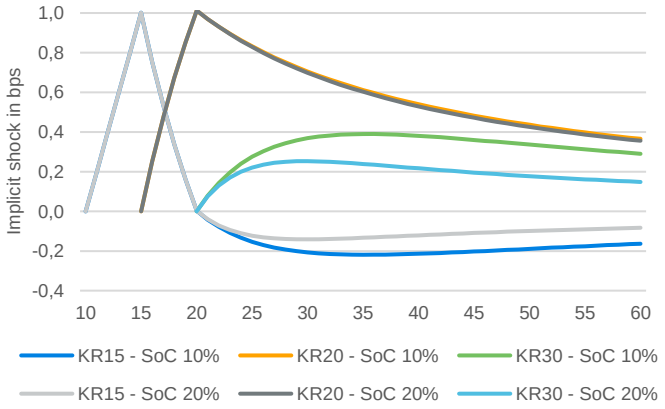
Using the implicit SoC for November 2020, the impact is approximately 21 bps on year 40. This has a 1.3 % lowering effect on a set of proxy liabilities. For this example, we have used a proxy cash flow, internally constructed, representing an average Dutch life insurance company. The cash flow is calibrated to represent a present value of 100 when applying the Solvency II curve including the VA at the end of 2019 with a duration of 16.

Solvency ratio volatility caused by the speed of convergence

The introduction of the smoothing solution does add another layer of complexity and volatility to the discount curve, in particular towards the 20Y interest rate.

The level of the 20Y interest rate is currently already one of the key drivers of the discount curve given its role in the determination of extrapolated curve. Figure 4 shows the implicit key rate sensitivity for the maturities 15, 20 and 30 year, both for a speed of convergence (SoC) of 10% and 20%.[3]

FIGURE 4: KEY RATE SENSITIVITIES, BASED ON 1 BPS SHOCKS, FOR MATURITIES 15, 20 AND 30



We observe that the SoC parameter has a dampening effect on the sensitivities for 15Y and 30Y, but only marginally on the 20Y key rate sensitivity. Consequently, for a stable Own Funds position less interest rate, sensitivity is required in the asset portfolio.

As the speed of convergence will be dependent on the level of the 20Y interest rate, a second order sensitivity is introduced. When the interest rate increases (decreases), the speed of convergence

[3] Please see our white paper on the impact of the alternative extrapolation methods on hedging strategies: https://www.milliman.com/-/media/milliman/pdfs/2020-articles/london-solvency-ii/10-5-20-solvency-ii-hedging-v1.ashx

increases (decreases) as well, which is an implicit dampening of the interest rate sensitivity. The effect is shown in Table 1.

TABLE 1: IMPACT ON BEL OF DIFFERENT SPEED OF CONVERGENCE PARAMETERS ON THE INTEREST RATE SENSITIVITY, AS OF NOVEMBER 2020

Impact on BEL Scenario	10% SoC (A)	Smoothed SoC (B)	Implicit SoC (C)	Relative Impact (B) / (A)
-20 bps	+1,74%	+1,26%	16,9%	72%
-10 bps	+0,87%	+0,62%	15,9%	72%
Base			14,9%	
+10 bps	-/-0,86%	-/-0,60%	13,9%	70%
+20 bps	-/-1,73%	-/-1,19%	12,9%	69%

The results in Table 1 indicate that the smoothed speed of convergence parameter dampens the effects of changes to 20Y interest rate. The sensitivity for up and down shocks is relatively similar.

For completeness, we have calculated the impact of the insurance liability when using different assumptions for the speed of convergence. The results are shown in Figure 5.

FIGURE 5: IMPACT OF SOC PARAMETER ON THE VALUATION OF THE BEL BASED ON END OF NOVEMBER 2020 DATA

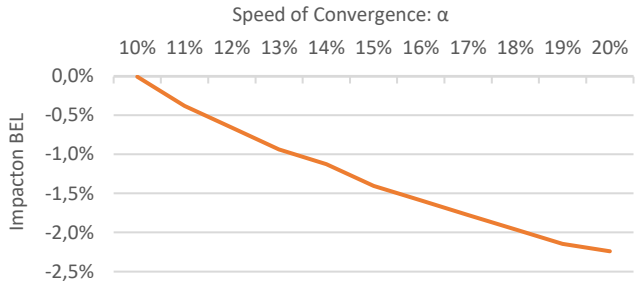


Figure 2 has shown that the implicit speed convergence parameter can be relatively unstable over time which introduces additional volatility to the value of the insurance liabilities and consequently on Own Funds, as can be seen from Figure 5. In this example, every 1% increase of α leads to a decrease of the BEL of approximately 0.25%.

This additional volatility will need to be addressed in the movement analysis and projections. Just like the well-known UFR-drag, a *"Speed-of-Convergence-drag"* will be introduced.

Conclusions

In its final advice to the European Commission EIOPA has emphasised providing a smooth transition to implementation of its suggested reforms. To mitigate the effect of transitioning to a new risk-free curve methodology, EIOPA introduces a smoothing mechanism to the alternative extrapolation method.

The introduction of the smoothing solution will dampen the hit on capital ratios; however, it does add another layer of complexity and volatility to the discount curve.

The additional volatility will need to be addressed in the movement analysis and projections. In addition, companies will need to decide how to deal with this phenomenon in their interest rate risk management should the sensitivity be hedged or not.

It is now up to the European Commission to adapt, amend or reject the proposals made by EIOPA. It is expected that reforms to the Solvency II framework will come into force in three to five years (not earlier than 1 January 2024).

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