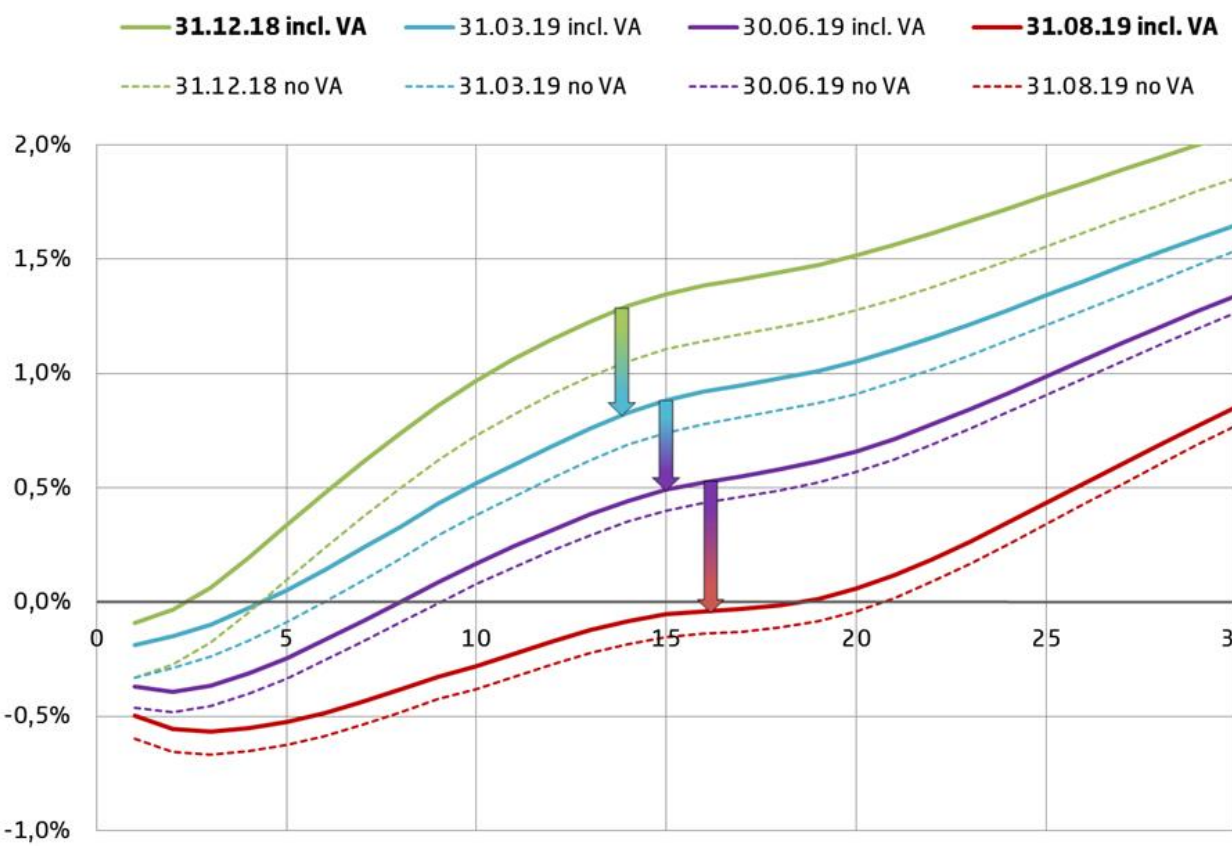
Interest rate risk

Solvency II Working Group

11 September 2019

GDV
DIE DEUTSCHEN VERSICHERER

Risk-free Solvency II term structures



The extremely low rate environment might lead to an overestimation of interest rate risk, especially if **downward shocks are not correctly calibrated.**

The shift approach

The current downward interest rate risk does not provide a procedure for negative interest rates.

In the 2018 SCR review, EIOPA proposed the shift approach to tackle this.

The shift approach works as follows:

- The interest rates are first raised by a constant parameter (the shift).
- Then a relative stress-factor is applied to them.
- Finally, the shift is subtracted again.

Observations:

- The shift needs to be high enough to transform the interest rate into a positive number.
- A **high shift results in an overestimation** of interest rate risk in a low-yield environment.

Determining an appropriate shift

Thus, the choice of the shift is crucial.

Since interest rates tend to increase with the maturity, it is reasonable to choose a **maturity-dependent shift**.

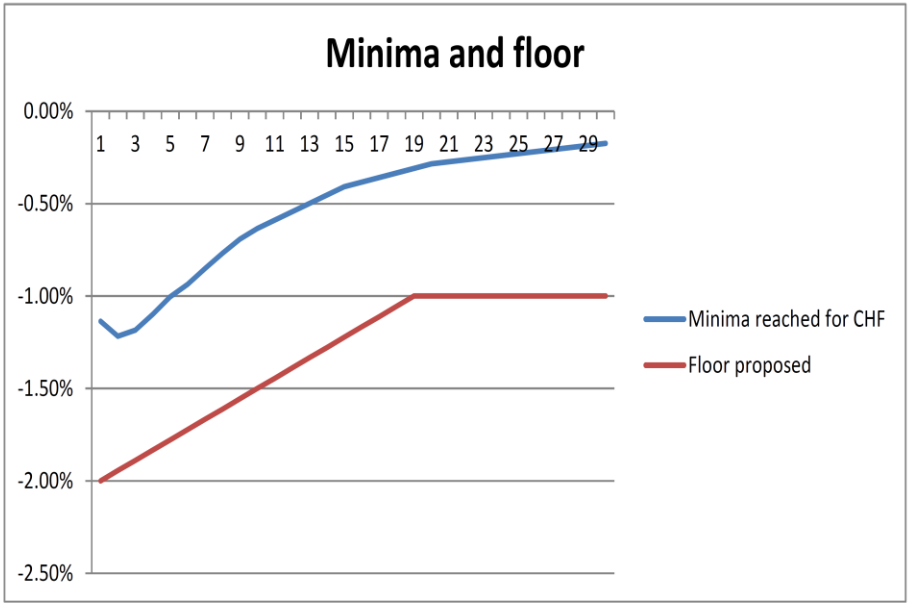
GDV proposes the following choice of the shift parameter for the **downward scenario:**

- The shift parameter for maturity 1 year shall be 1%;
- the shift parameter for maturity 20 years shall be 0%;
- the shift parameters for maturities 2 to 19 years shall be linearly interpolated.

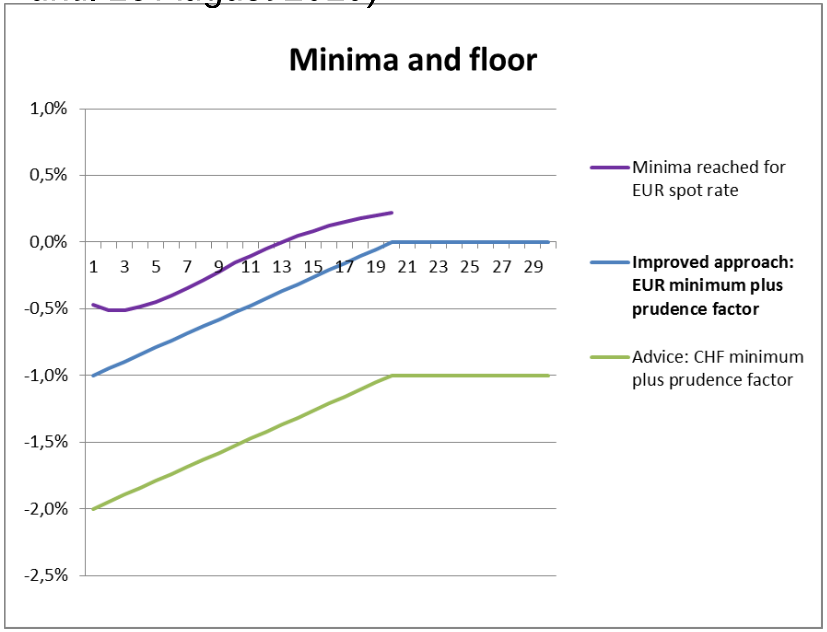
Determining an appropriate shift

Comparison between EIOPA and GDV proposal

EIOPA proposal: shift based on the Swiss Franc (data until 29 December 2017*)



GDV proposal: shift based on EURO (data until 13 August 2019)



Solvency II Working Group, 11.09.2019

**EIOPA's second set of advice to the European Commission on specific items in the Solvency II Delegated Regulation.* EIOPA-BoS-18/075, 28.02.2018

Calibration of risk factors

Given the shift the calibration of risk-factors is straightforward:

- Observed interest rate data are first **shifted by a parameter**.
- Then **annual relative changes** of the shifted time series are calculated.
- The 0.5% quantiles from the empirical distribution of these changes yield **relative risk factors** with respect to shifted interest rates.

This procedure leads to a risk model which **complies with the SII requirements** for the liquid part of the curve.

Illiquid part of the curve

EIOPA proposes fixed risk factors also for the illiquid part of the curve.

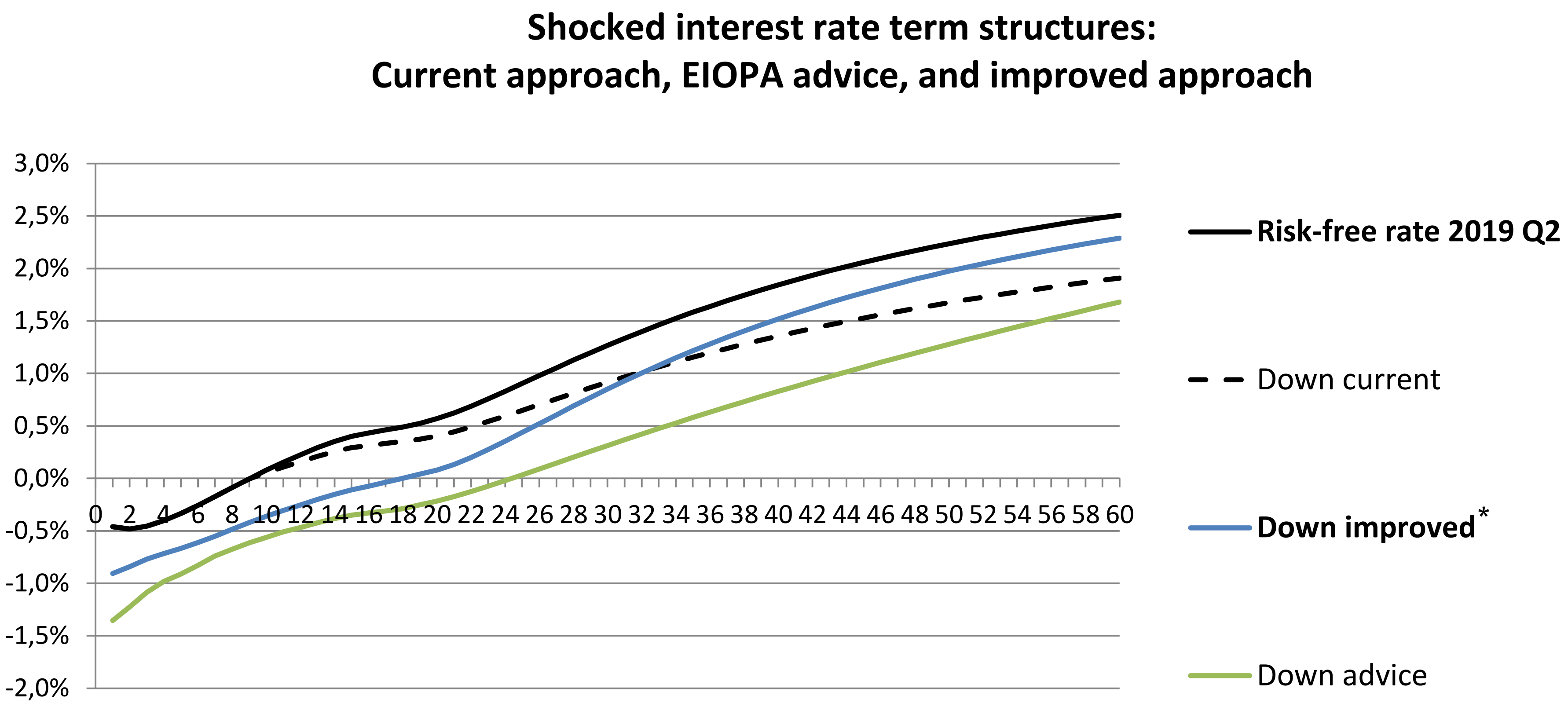
This assumes a change in interest rates which is **not consistent with SII**:

- The interest rate risk should model the change of the term structure which occurs once in 200 years.
- Nevertheless, even if the liquid part of the curve changes as assumed in the risk model, the extrapolation methodology would still take effect.

Thus, GDV proposes to **extrapolate the stressed liquid part** of the term structure:

- First, the previously described risk factors shall be applied to the liquid part before the LLP (currency dependent).
- Then the usual Smith Wilson algorithm shall be applied to extrapolate the illiquid part of the stressed curves from their liquid parts.
- After coming into force of the new provisions, EIOPA should determine and publish the stressed curves in this way.

Comparison: stressed curves



*Improved shift based on data from 15 August 2001 until 13 August 2019

Summary

In the 2018 SCR review, EIOPA proposed a shifted approach which has two main flaws:

– The **downward shift is too high**, as it is based on **Swiss franc data**. From 2011 to 2015, Swiss franc interest rates have been heavily influenced by the Swiss central bank's attempts to enforce the floor on the EUR/CHF exchange rate.

– EIOPA's decision not to extrapolate the shifted curve leads to a **material overestimation of risk**.

If changes to the interest rate risk should be made, GDV proposes **improvements** of the shift approach:

– Apply a **more appropriate shift** for the downward risk: The shift should reflect the experience with **low euro rates** instead of the special case of the Swiss franc

– **Extrapolate the illiquid part** of the term structure from the **stressed liquid part**: This is the only way to derive consistent and economically sound stressed curves needed to compute the loss in basic own funds. Complexity is not increased by this.

The GDV proposal would comply with the SII requirements but avoid a significant overestimation of interest rate risk.