Updated calibration
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as supplement to the

Position Paper

of the German Insurance Association (GDV)
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Improved shifted approach for interest rate risk

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Risk factors

s^{down}	Calibration results for different observation periods (beginning and ending)				EIOPA's advice February 2018 (data until end 2016	Improved approach March 2018 (data until end 2017)	**Improved approach August 2019** (data until 13.08.2019)
	04.01.1999 – 13.08.2019	01.02.2000 – 13.08.2019	15.08.2001 – 13.08.2019	Maximal use of data (maturity dependent)			
1	63.69%	63.78%	63.93%	63.69%	58%	64%	**64%**
2	55.30%	55.41%	55.53%	55.30%	51%	55%	**55%**
3	48.23%	48.36%	48.66%	48.23%	44%	48%	**48%**
4	47.46%	47.66%	48.41%	47.46%	40%	46%	**47%**
5	50.84%	51.00%	51.10%	50.84%	40%	46%	**51%**
6	52.92%	53.30%	53.35%	52.92%	38%	49%	**53%**
7	53.97%	54.14%	54.44%	53.97%	37%	50%	**54%**
8	53.93%	54.05%	54.66%	53.93%	38%	52%	**54%**
9	54.60%	54.82%	54.93%	54.60%	39%	53%	**55%**
10	55.52%	55.81%	56.29%	55.52%	40%	54%	**56%**
11	n. a.	57.12%	57.20%	57.12%	41%	55%	**57%**
12	n. a.	58.22%	58.53%	58.22%	42%	57%	**58%**
13	n. a.	59.43%	59.59%	59.43%	43%	58%	**59%**
14	n. a.	60.56%	60.81%	60.56%	44%	59%	**61%**
15	n. a.	61.74%	61.83%	61.74%	45%	61%	**62%**
16	n. a.	62.95%	63.20%	62.95%	47%	62%	**63%**
17	n. a.	64.07%	64.40%	64.07%	48%	63%	**64%**
18	n. a.	n. a.	65.62%	65.62%	49%	65%	**66%**
19	n. a.	n. a.	66.64%	66.64%	49%	66%	**67%**
20	n. a.	n. a.	68.41%	68.41%	50%	67%	**68%**

Table 1: Calibration results for the multiplicative risk factor s^{down} (in percent) calculated with different observation periods. The proposal is based on the maturity dependent maximal use of information.

b^{down}	Calibration results for different observation periods (beginning and ending)				EIOPA's advice February 2018 (data until end 2016	Improved approach March 2018 (data until end 2017)	**Improved approach August 2019** (data until 13.08.2019)
	04.01.1999 13.08.2019	01.02.2000 13.08.2019	15.08.2001 13.08.2019	Maximal use of data (maturity dependent)			
1	0.64%	0.64%	0.64%	0.64%	1.16%	0.64%	**0.64%**
2	0.52%	0.52%	0.53%	0.52%	0.99%	0.53%	**0.52%**
3	0.43%	0.43%	0.44%	0.43%	0.83%	0.43%	**0.43%**
4	0.40%	0.40%	0.41%	0.40%	0.74%	0.38%	**0.40%**
5	0.40%	0.40%	0.40%	0.40%	0.71%	0.37%	**0.40%**
6	0.39%	0.39%	0.39%	0.39%	0.67%	0.36%	**0.39%**
7	0.37%	0.37%	0.37%	0.37%	0.63%	0.34%	**0.37%**
8	0.34%	0.34%	0.35%	0.34%	0.62%	0.33%	**0.34%**
9	0.32%	0.32%	0.32%	0.32%	0.61%	0.30%	**0.32%**
10	0.29%	0.29%	0.30%	0.29%	0.61%	0.28%	**0.29%**
11	n. a.	0.27%	0.27%	0.27%	0.60%	0.26%	**0.27%**
12	n. a.	0.25%	0.25%	0.25%	0.60%	0.24%	**0.25%**
13	n. a.	0.22%	0.22%	0.22%	0.59%	0.21%	**0.22%**
14	n. a.	0.19%	0.19%	0.19%	0.58%	0.19%	**0.19%**
15	n. a.	0.16%	0.16%	0.16%	0.57%	0.16%	**0.16%**
16	n. a.	0.13%	0.13%	0.13%	0.56%	0.13%	**0.13%**
17	n. a.	0.10%	0.10%	0.10%	0.55%	0.10%	**0.10%**
18	n. a.	n. a.	0.07%	0.07%	0.54%	0.07%	**0.07%**
19	n. a.	n. a.	0.04%	0.04%	0.52%	0.03%	**0.04%**
20	n. a.	n. a.	0.00%	0.00%	0.50%	0.00%	**0.00%**

Table 2: Calibration results for the additive risk factor b^{down} (in percentage points) calculated with different observation periods. The proposal is based on the maturity dependent maximal use of information.

Stressed interest rate term structures (liquid part)

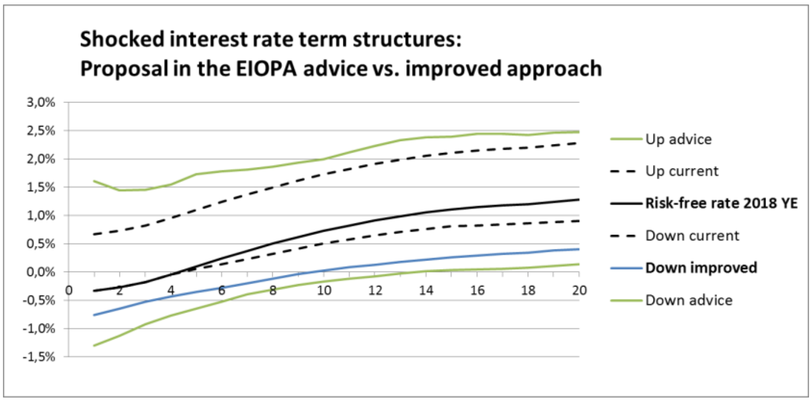

Figure 1: Shocked interest rate term structures according to the improved approach, release August 2019, (*blue*) and to EIOPA's advice (*green*) for **31.12.2018**.

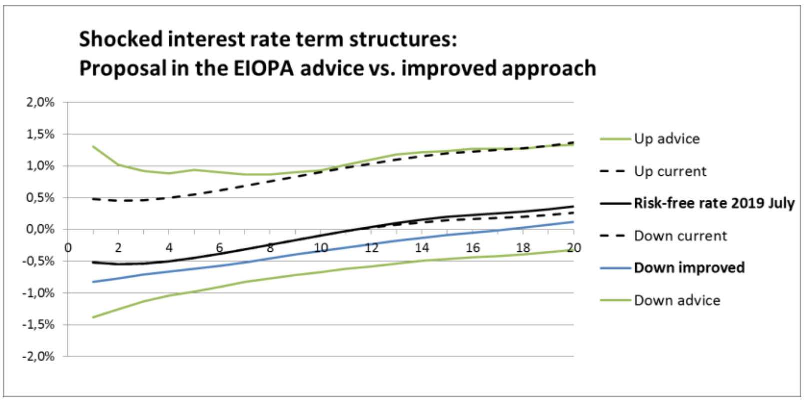

Figure 2: Shocked interest rate term structures according to the improved approach, release August 2019, (*blue*) and to EIOPA's advice (*green*) for **31.07.2019**.

Backtesting

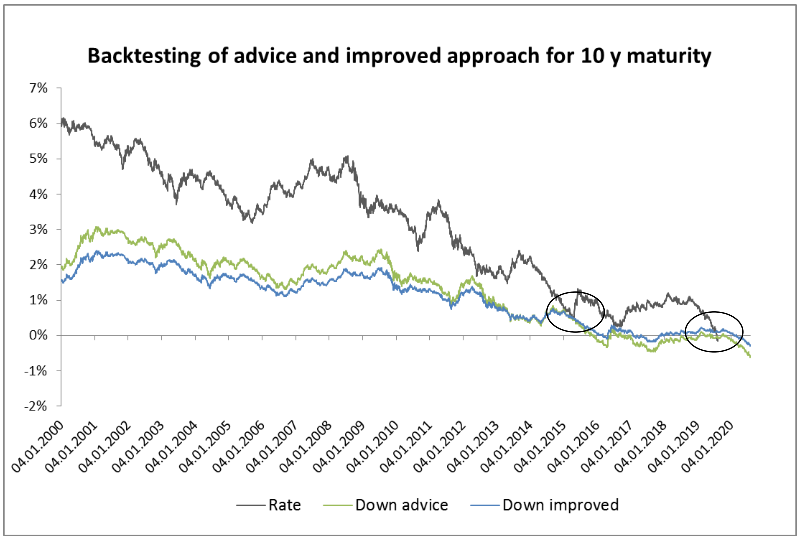

Figure 3: Back-testing of EIOPA's advice (*green*) and the improved approach, release August 2019, (*blue*) for EUR **10 year** maturity as in the advice. The improved approach passes the back-testing as it yields exactly the number of breaches corresponding to the 99.5 quantile (26 of 5116 annual changes in the period 04.01.1999–13.08.2019). The mean extent of the breaches is 11 bp. Note, that compared to the advice the downward stressed interest rate curve of the improved approach is higher in the extreme low yield environment but even lower at other times.

Berlin, 15.08.2019