Updating the Regulatory Interest Rate Shock Scenario for EUR and USD
AFGAP Technical Paper – January 2024

The Association Française de Gestion Actif Passif (AFGAP) is a non-profit association created in 1991 gathering balance sheet management professionals from French financial institutions. It aims to develop the exchanges between Asset and Liability Management (ALM) experts. It also has the mission to train professionals in ALM topics.

This document is the output from technical workshops between experts in statistics and in regulation.

Executive summary

In December 2023 the Basel Committee on Banking Supervision (BCBS) issued a paper proposing a recalibration of shocks for interest rate risk in the banking book. This paper proposes two main evolutions from the 2016 methodology: the use of an absolute interest rate shock instead of a relative shock, the use of a 99.9% percentile instead of 99% to determine the shock severity.

This paper analyses historical data for EUR and USD which are the main currencies for French banks. It **acknowledges the switch to an absolute shock** considering the change of interest rate regime during the dataset horizon. It **rejects the increase of the percentile up to 99.9%** since it appears that the recent interest rate increase is not an outlier and that the switch from a relative to an absolute shock is not less conservative.

As the shock relates to a six-month horizon, it appears inconsistent to assume that it applies *immediately*. **We recommend clarifying that the shock is applied *after* six months.** Without such a clarification, the methodology would not be technically well founded. **Should immediate shocks be elected by the regulator, the shocks that relate to a six months horizon should be scaled *down* to remain consistent.**

I. The BCBS methodology

The proposed methodology consists in calculating a series of six-month percentage absolute shock[1] of interest rates from January 2000 till December 2022. The considered tenors are: 3 months, 6 months, 1 year, 2 years, 5 years, 7 years, 10 years, 15 years and 20 years. Then an average rate change across time buckets is calculated (3M, 6M, 1Y, 2Y, 5Y, 7Y, 10Y, 15Y and 20Y for parallel shock. 3M, 6M, 1Y for short rate shock. 10Y, 15Y and 20Y for long rate shock). The shock equals the 99.9% percentile of the absolute value of the average rate changes.

[1] i.e. $Absolute\ Shock = Rate_t - Rate_{t-1}$

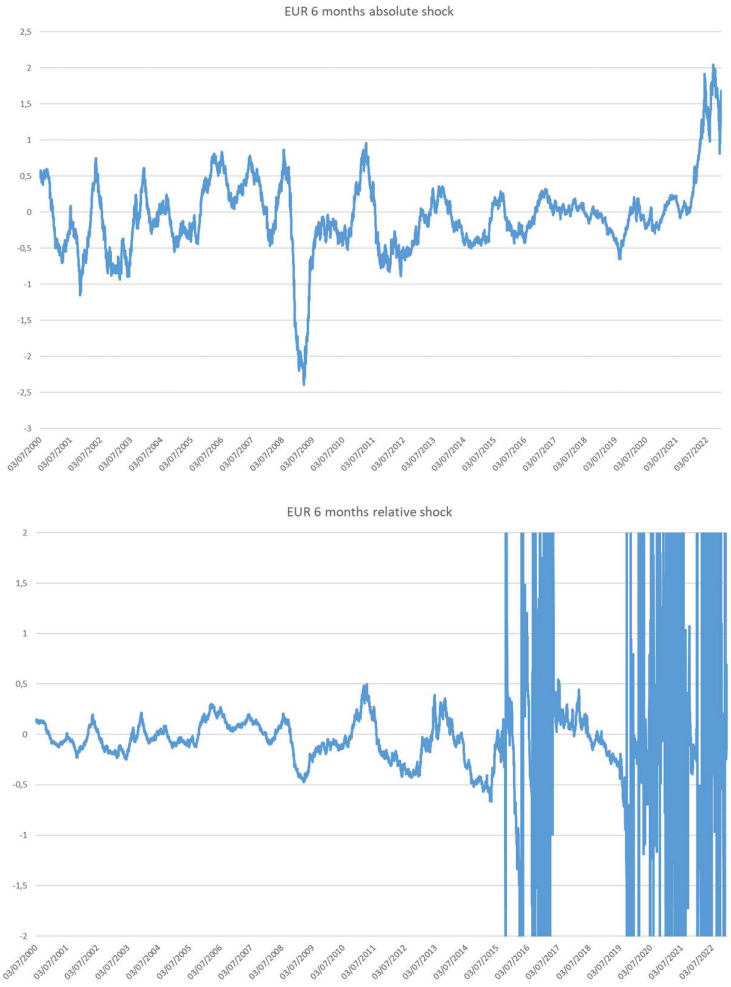
The two main methodological updates compared to the 2016 BCBS methodology are:

- Switch from a relative rate shock[2] to an absolute rate shock[1].
- Use of a 99.9% probability instead of a 99% probability.

These two points are discussed in parts II and III. The gradualness of the shock is discussed in part IV.

II. Switch from a relative rate shock to an absolute rate shock

The following two graphs show the 6 months absolute and relative shocks for EUR across all buckets since July 2000.



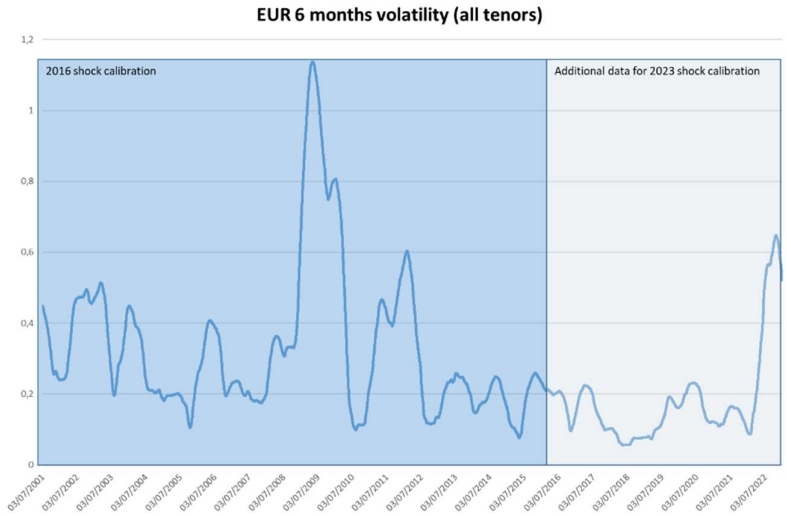
We see that for absolute shocks the level are quite homogeneous during all the time period. This is not the case for relative shocks, reflecting the change to a very low rate of regime in 2016. As mentioned in the BCBS document, it shows that the relative shock methodology is not any more appropriate after 2016. We support this evolution.

[2] i.e. $Relative\ shock = \frac{Rate_t}{Rate_{t-1}} - 1$

III. Use of a 99.9% probability instead of a 99% probability

The BCBS is arguing that the new methodology is accommodative and that keeping the old probability level would lead to a decrease of shock factors for many jurisdictions despite more volatility in interest rates. We don't agree with this analysis considering that:

a. The BCBS writes that there is more volatility in interest rates. But for EUR, looking at historical 1 year volatility of the average 6-months absolute shocks across the 9 buckets, shows that the recent volatility level was already reached in the past.



b. The change of methodology is not accommodative, as shown in the previous section, it is just a switch from a relative to an absolute shock, due to the fact that relative shock is not appropriate for low level interest rates. The other methodology parameters didn't change (6 months rolling shock, nine tenors).
Applying the absolute shock methodology with a 99% probability to the previous date set (i.e. from 2000 till 2015) would have led to the same or higher shock levels (except for short shock for USD) than in the BCBS 2016 methodology for EUR and USD:

	EUR			USD		
	Calculated shock	Rounded shock	BCBS 2016 shock	Calculated shock	Rounded shock	BCBS 2016 shock
Parallel	205	200	200	180	200	200
Short	316	300	250	256	250	300
Long	115	100	100	183	200	150

Extending the data set till 2022 with a 99% probability and an absolute shock shows that the

shock stay stable or increase except for Long USD:

	EUR		USD	
	2023 rounded shock	2016 rounded shock	2023 rounded shock	2016 rounded shock
Parallel	200	200	200	200
Short	300	300	300	250
Long	150	100	150	200

Finally, this is the 99.9% probability level that makes increase the calculated shocks for EUR and USD. Consequently, rounded shocks increase for all EUR shocks and for USD Long shock:

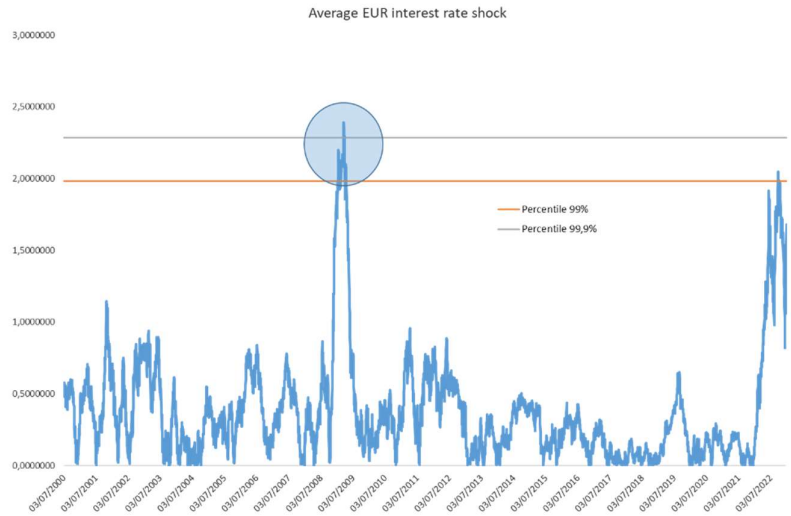
	EUR			
	2023 calculated shock 99% prob.	2023 rounded shock 99% prob.	2023 calculated shock 99,9% prob.	2023 rounded shock 99,9% prob.
Parallel	198	200	228	250
Short	303	300	355	350
Long	157	150	218	200

	USD			
	2023 calculated shock 99% prob.	2023 rounded shock 99% prob.	2023 calculated shock 99,9% prob.	2023 rounded shock 99,9% prob.
Parallel	189	200	214	200
Short	280	300	310	300
Long	165	150	235	250

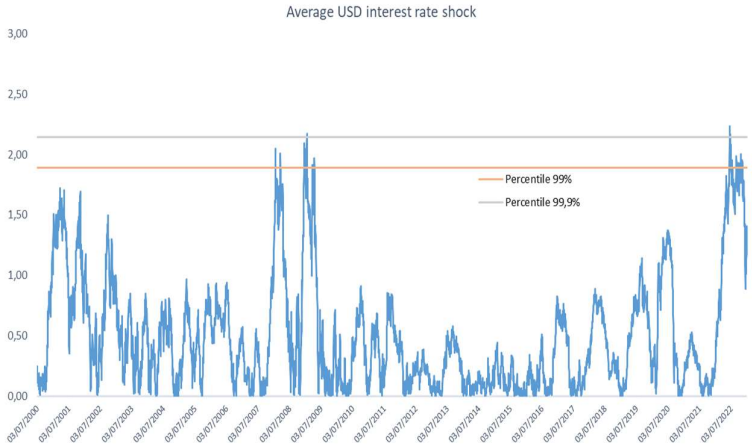
For EUR parallel shock, it is noticeable that the shock increases by 50 bp only because the calculated shock is 3 bp higher than 225 bp.

c. Since BCBS is using daily data from January 2000 until December 2022 to calculate the 6 months rolling shocks, it leads to a little bit less than 6000 observations. It means that the 99.9% empirical quantile is the worst 6^{th} point of the database. This percentile uncertainty is high. The calculation output is then extremely dependent on very few outlier points.

d. For EUR, looking at the historical series of the absolute value of the average shock across all buckets shows that the extreme shocks occurred in 2009, not in 2022-2023. The highest shock value of 2022 is only the 41^{st} highest shock. This means that the 250 bp parallel shock is not coming from the recent interest rate increase but from the 2008-2009 period. These rates shocks correspond to the rate decrease during the Global Financial Crisis (GFC).



For USD, in 2008-2009 we already experienced a shock of same magnitude as the recent interest rate increase. This is coherent with the stability of parallel shock between the 2016 and 2023.



So instead of the USD, the EUR is penalized by this new methodology, but only because the interest rates decrease more in 2008-2009.

e. The Table 8 of the BCBS document shows the shocks for the 2000-2022 period with a 99% probability. The BCBS argues that some of the shocks decrease (compare to the 2016 shock values) due to the fact that the new methodology is more accommodative. But, we see in the table below that 54% of the shocks are unchanged, 22% are increasing and 24% are decreasing[3]. (knowing that the decreases mainly concern the short shock which is much less impacting the SOT than the parallel shock):

[3] The calculation is done for : ARS, AUD, BRL, CAD, CHF, CNY, EUR, GBP, HKD, IDR, INR, JPY, KRW, MXN, RUB, SAR, SEK, SGD, TRY, USD and ZAR.

	Unchanges	Increase	Decrease
Parallel	14	3	4
Short	8	5	8
Long	12	6	3
Total	34	14	15
%	54%	22%	24%

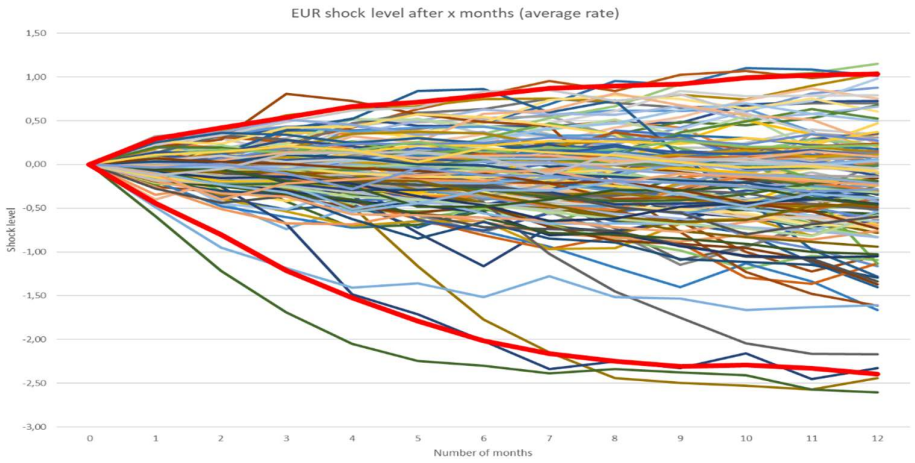
So, it seems not evident that the new methodology is less severe than the former one.

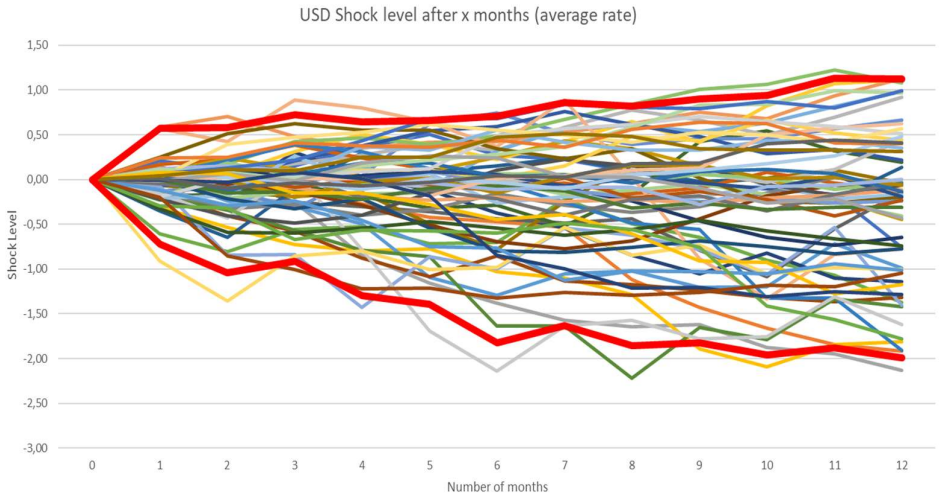
Considering these points, it is not accurate to increase the probability level up to 99.9%.

Gradualness of the shock

The BCBS is considering a sudden and *immediate* shock, which has never occurred immediately in the past.

The following graphs show for EUR and USD the cumulative shock for the average interest rate across all time buckets from month 1 till 12 starting from several historical dates (data set from January 2000 until December 2022). It also gives for each month the 1% and 99% percentile of the cumulative shock (red curves). Considering the 1%/99% percentile, the +200 bp shock level (which corresponds to the parallel shock in EUR and USD in 2016) was not reached before 12 months and the -200 bp was reached *before* 6 months.





In Europe where a Supervisory Outlier Test (SOT) is expected to apply on one year Net Interest Income (NII) and where the same supervisory shock would apply, this clarification should lead to assuming a progressive (e.g. linear) shock over a six months horizon to reach the supervisory shock.

To be consistent, the Supervisory Outlier Test (SOT) on the Economic Value of Equity (EVE) should be clarified as to be calculated at the six months horizon.