The European Banking Authority
20 Avenue André Prothin
92400 Courbevoie
France

Subject: Draft Regulatory Technical Standards on the calculation of the stress scenario risk measure under Article 325bk(3) of Regulation (EU) No 575/2013 (Capital Requirements Regulation 2 - CRR2)[1]

The International Swaps and Derivatives Association ('ISDA') and the Association for Financial Markets in Europe ('AFME'), the 'Joint Associations' and their members welcome the opportunity to comment on the EBA's Consultative Document on the technical standards on capital requirements for non-modellable risks under FRTB.

The Joint associations recognize and appreciate the EBA's substantial efforts in developing regulatory standards on the calculation of the stress scenario risk measure for non-modellable risk factors. The industry is also grateful for the opportunity given to respond to this consultation and provide its viewpoint; over the last few years, the EBA's commitment to providing channels of communication with the industry has benefited the development of a robust market risk methodology that is feasible for market participants. We are confident that the present consultation and the constructive feedback we provide will also help the EBA's decision-making process. Our recommendations objectively aim at aligning firms' economic capital to the risks associated with NMRFs.

Despite the best efforts of the BCBS, EBA and industry, as firms prepare for applying the market risk framework as a binding capital requirement, concerns on the capital impact and operational complexity of the NMRF framework remain significant. This is as various components of the framework create operational challenges, such as banks' ability to calibrate the stressed period using the direct method under the Option A. The calculation proposed is particularly intensive, as it requires seeking the stress period that maximizes the SES for that asset class. It would require a replication of the whole SES calculation for each different possible period, elevating the number of revaluations to a level that is almost unmanageable.

Another source of concern is the prescriptive nature of the RTS: it is unlikely that this level of prescription will be implemented globally, leading to further fragmentation of modelling standards. Globally active banks will be required to develop separate models for different regions in the midst of an uneven playing field. The industry strongly believes that a high-level, principles based approach would provide a more proportionate alternative, as it would allow local

[1] https://eba.europa.eu/eba-launches-consultation-technical-standards-capital-requirements-non-modellable-risks-under-frtb

regulators discretion to adjust the SES calculation in view of how the international standards are implemented globally. It would also provide regulators with a more adaptable framework that they can flex in periods of market turbulence or procyclical behavior, where the stressed period may coincide with the current period.

Furthermore, the industry is concerned that such a detailed framework could be inflexible as the industry improves in modelling capability and as regulators also improve their ability to assess these risks. A more adequate methodology than the one prescribed may be available in the future, but regulators might be unable to adopt it due to restrictions in the legislative text. Firms may also lose a significant benefit derived from choosing IMA, namely the ability to adapt their models to more sophisticated methods of risk-assessment. Over time, the significant standardization in the NMRF methodology —paired with a lack of available data— may create a divergence between capital and risk sensitivity as banks improve their risk assessment framework.

The industry, therefore, support a principles-based framework that is less prescriptive. The response to Question 1 contains a suggestion by industry on how to improve the framework through a combination of both options. Following deliberation on the methodologies discussed in the RTS, the industry overwhelmingly prefers Option B; although at the same time, there are instances where Option A is appropriate due to data availability.

In addition to the recommendation expressed above for a **principles-based approach**, we make further methodological choices in response to the consultation. The industry preferences are supported by the results of an industry survey (see next section for more details), with their rationale being as follows:

- Firms prefer the **contoured shift** to the parallel/representative RF shift: it is more risk sensitive and aligns capital better to economic risk, while taking into account a more granular RF setup.
- Firms prefer **asymmetrical sigma** to sigma, with a cut off at the **median**: it allows for asymmetrical empirical data, and matches the historical method more closely.
- Under the historical method, firms prefer to set the **tail parameter** using **historical data**: calculating the tail parameter directly from data that is already used to calculate the stress range is more accurate than a global estimate.
- The industry believes that the definition of the **rescaling factor mS** under option B is likely to produce unreasonable results and **should be revised**. We provide an alternative proposal in our response to Q19.
- Changes to the fallback methods are proposed to make it more applicable for where it is used.

Furthermore, the industry recommends to maintain the flexibility to use the direct approach where possible. Including the direct approach as part of the framework would make the framework more robust and applicable across a wide range of risk types and situations. The response to Question 3 contains arguments and empirical evidences to support this request.

Finally, it is recommended that within the framework, firms are allowed to apply to local regulator to use an internally calculated adjustment approach. This builds resilience into the overall framework.

We thank you in advance for your consideration and please do not hesitate to contact the undersigned associations with questions or if you would like to discuss our recommendations further. We remain committed to assisting policymakers in achieving the objectives of this important RTS.

Gregg Jones
Director, Risk and Capital
ISDA

Jouni Aaltonen
Managing Director, Prudential Regulation
AFME

ISDA Safe, Efficient Markets

afme/ Finance for Europe

Industry Survey

To provide further insight and context to some of our responses, we conducted an industry survey with 15 participating banks, the results of which show a consensus around adoption of specific methodologies. The results are found below (note that some participating banks only partially answered the survey).

Section 1

The first section of the survey sought to determine support for the choices presented in the methodology.

- 11 banks favoured an approach that combines elements of Option A & Option B as defined in this response. Two banks favoured Option A, and another 2 banks favoured Option B.

	Option A	Option B	Combination of A & B
What is your preferred option among option A (stress period based extreme scenario of future shock) and option B (extreme scenario of future shock rescaled to stress period)? Please elaborate highlighting pros and cons (see question 1 of the consultation).	2	2	11

Corollary question (if banks chose "Combination of A & B"):

- Of the 11 banks that chose a "combined approach", all would prefer Option B as their second preferred choice.

	Option A	Option B
If not A or B, which of the two options provided by the EBA would you choose as a fallback?	0	11

- 12 banks favoured the contoured shift and another 2 banks favoured Parallel shift.

	Parallel	Contoured
What is your preferred option among (i) the representative risk factor – parallel shift option, and (ii) the contoured shift option? Please elaborate highlighting pros and cons (see question 4 of the consultation).	2	12

- 8 banks chose the a-sigma method, and another 6 chose the sigma method.

	Sigma	Asigma
What is your preferred option among (i) the sigma method and (ii) the asymmetrical sigma method for determining the downward and upward calibrated shocks? Please highlight the pros and cons of the options (see question 6 of the consultation).	6	8

- For the a-sigma method, 8 banks chose Median as the split for return, another 2 chose Zero, and another chose the Mean.

	Median	Mean	Zero	Other
In addition, do you think that in the asymmetrical sigma method, returns should be split at the median or at another point (e.g. at the mean, or at zero)? Please elaborate (see question 6 of the consultation).	8	1	2	1

- Under the historical method, 10 banks would prefer to use historical data to determine the tail parameter, and another 3 banks would prefer to set the parameter to 1.04.

	9a	9b
Under the historical method, the EBA has considered the following options (see question 18 of the consultation & pg. 154 of the RTS): Option 9a: Estimate the tail parameter ϕ using historical data Option 9b: Set ϕ=1.04.	10	3

Section 2

The second section of the survey asked questions regarding the calculation frequency of several of the RTS components.

- The first question queried regarding the calculation frequency for the non-linearity adjustment, and whether a frequency less than daily was desirable: 12 voted Yes, 1 voted No, and 1 was Not sure.
- The second question asked regarding the calculation frequency for the Argmax location on the grid, and whether a frequency less than daily was desirable: 9 voted Yes, 1 voted No, and 2 were Not sure.
- The third question addressed the timing misalignment between the stress period determination and the stress range calibration for the current period that is done every month, and whether the frequency of the m ratio calibration should be made more flexible: 10 voted Yes, none voted No, and 4 were Not sure.

	Yes	No	Not sure
The SES calculation is daily (see RTS, pg 14). Would the flexibility to calculate the Non linearity adjustement factor (Articles 13 & 14) less frequently than daily be helpful?	12	1	1
The SES calculation is daily (see RTS, pg 14). Would the flexibility to calculate the Argmax location on the grid (pg 63 & pg 98) less frequently than daily be helpful?	9	1	2
Under option B the stress period determination is "at least every three months" and the M scaling ratio is to be updated at the same time. However, the stress range calibration is aligned to the ES model and done every month (see RTS, pg 24). Should the update frequency of the M ratio have its own frequency defined as "at least every three months" to allow more flexibility?	10	0	4

Individual questions in the consultation

Q1. What is your preferred option among option A (stress period based extreme scenario of future shock) and option B (extreme scenario of future shock rescaled to stress period)? Please elaborate highlighting pros and cons.

Response:

The industry recommends a combination of both approaches, but if the EBA remains committed to a single approach to be used by all banks for all risk factors, then the industry unanimously favours option B (see the survey results discussed above).

Firms do not believe that the universal use of option A is practicable due to concerns of a lack of data quality. There will be large groups of NMRFs (particularly for Equity and Credit) where the fallback method will be applied due to lack of data in the stressed period used. This will result in an excessively conservative capital charge. The stressed period selection will also be operational burdensome as a full set of SES calculations need to be run for every candidate stressed window.

Nevertheless, given the potential improvement in accuracy from using option A for those risk factors where it is appropriate, the industry supports a principles-based approach that combines both option A and option B:

- Banks should be able to calculate NMRF charge calibrated to a stress period if sufficient data is available in the stress period
- If no sufficient data is available in the stress period for the risk factor, the NMRF charge is calculated based on the current period and scaled up based on the stressed to current period scalar

This model captures accurately the risk for NMRFs and allow banks to choose the suitable methodology depending on data availability.

In the Expected Shortfall model, banks have to divide risk factors into two types. There are ones that are used directly where there is sufficient data in the stress period for the data to be used directly (these risk factors use the same data in the reduced set and the full set calculations). Then there are Risk factors that do not have sufficient data in the stress period to be used directly and for these risk factors data is used directly in the full current period and different data is used in the reduced set.

As there is a division of risk factors in the ES model between these two types it makes sense to carry this division over into the SES calculation.

For risk factors with sufficient data in stress period if used directly this avoids the use of a stressed to current period scalar for these non-modelled risk factors. This avoids having to make this current period scalar assumption for these risk factors. The stress sizes for a fixed stress period in the past will not be influenced by new current period data.

For risk factors that do not have sufficient data in the stressed period the use of a scaling allows the use of the current period data and is more aligned to the ES approaches where there is lack of data in the stressed period.

Proposed action:

Use Stress period directly where there is sufficient data and otherwise use a current period data scaled up based on the stressed to current period scalar.

Q2. What are characteristics of the data available for NMRF in the data observation periods under options A and B?

Response:

For Rates and FX data there are often long histories of data available either from internal Front Office marking or from external data vendors. Option A will often, but not always, be suitable for these.

For idiosyncratic risk factors there is a presumption under principle 6 that data in the stress period may not be available for the ES model. If there is a difficulty of data for the ES model this likely to also apply in the SES model. For these type of idiosyncratic risk factors use of Option B may often be more suitable and sole use of Option A would be particularly challenging.

Proposed action:

No action required. Banks already have to divide risk factors into two types for ES. This division is guided by principles already set out.

Q3. Do you think that institutions will actually apply the direct method to derive the extreme scenario of future shock or do you think that given the computational efforts that it requires and considering that the historical method typically provides very similar results it will not be used in practice? As stated in the background section of this CP, the EBA will drop the direct method from the framework if not provided with clear evidence for its need.

Response:

The inclusion of the direct method into the draft methodology published in the consultation is an important feature. The direct method included under Option A should also be able to be applied for risk factors that are using current period data. If it is suitable to scale up risk factor shifts calibrated to an ES stress, it is also suitable to scale up all scenarios from the current period by the scaling factor.
An important feature of the direct approach is that it is, on a methodological point of view, the most straightforward way to compute the SES in accordance with the international standards. As such, including the direct approach in the EBA methodology would make the overall framework more general, applicable and comparable across multiple jurisdictions.

The EBA stepwise approach is efficient but necessarily makes some simplifications. Including the direct approach as part of the framework would make the framework more robust and applicable across a wide range of risk types and situations.
Therefore, the direct approach should be retained as a method for banks to use for the NMRF capital calculation under stressed and current period.

Whilst it is computationally intensive, the direct approach will be applied by institutions seeking additional risk sensitivity in the calculations. The direct approach has some advantages including:

- The methodology is more straightforward compared to shocking risk factors
- It is more aligned with the ES calculation
- It captures the NMRF appropriately for non-standard NMRF P&L profile
- Works well with NMRF buckets and grids where each tenor can have its own shift characteristics

Banks with available capacity to test the EBA methodology conducted an ad-hoc impact analysis comparing the NMRF charge resulting from the direct approach and stepwise Historical Contoured. For illustrative purposes, an FX options desk was used with NMRFs being ATM and Smile risk factors.

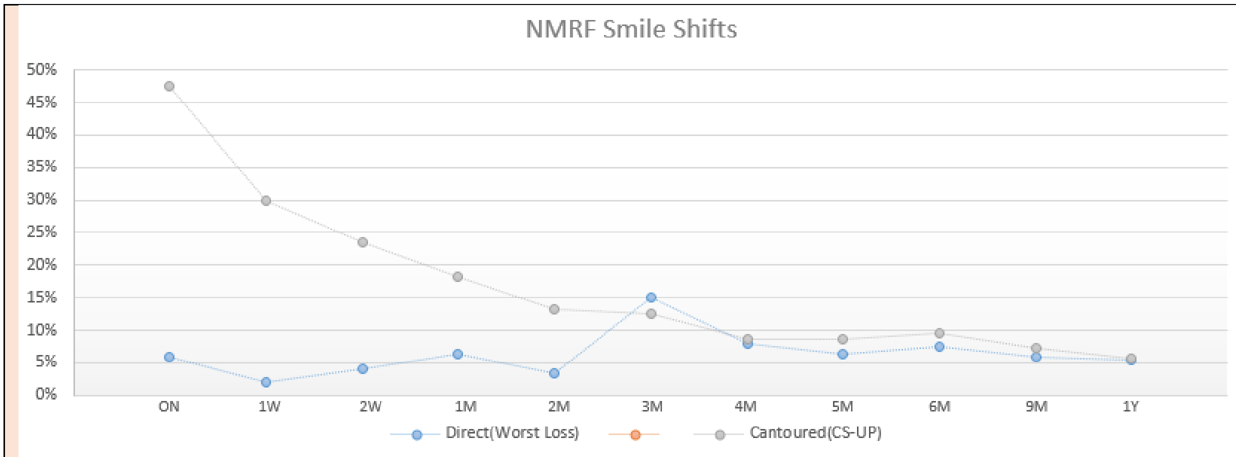
From this analysis, we have noticed that the NMRF charge is overestimated by 21% using the contoured approach as opposed to the direct approach. This is significant and can be an inducement for institutions to increase their computation power in order to use the direct approach.

Adequate representation of scenarios:

- The direct approach captures the true dynamics of a historical scenario for non-modellable buckets, grids and cubes where tenors do not share the same shifts characteristics, with the cost of operational complexity
- The stepwise contoured is the best approach that mimic the true dynamics with some conservatism

Upward scenario example shifts

- The graph below represents the upward basis scenarios that led to the worst loss using the direct and contoured methodologies for an example NMRF smile bucket
- This difference in this shifts can make it understandable that there are different stress loss outcomes



From this impact analysis it is clear that there can be some differences at bucket level between direct and contoured approaches but that on average the contoured approach was close to the direct approach by ~ 20%. In summary, this analysis shows the importance of having the direct method as part of the overall framework to be able to capture risk features where required.

Scaled Current Period Analysis under the Direct Approach

Banks with availability of data also conducted another empirical study to assess the performance of various techniques related to the calculation of the scaled current period SES. This study compares the direct approach using the stressed period as defined under option A and the current period using scaled shocks by the Vol scalar as defined under option B.

The results show that under the direct approach, the current SES scaled shock was 1% lower than the stressed SES.

Furthermore, it is important to highlight that current period could also be a stressed period, therefore, it is appropriate to calculate the direct approach in current period to estimate the stressed SES.

Conclusion

From the evidence provided, this analysis concludes that the stepwise contoured approach provides a good estimation of the risk in most cases and can be used instead of the direct approach. The main advantages of the stepwise contoured approach are detailed in question 4 of this document. However, we would like to highlight that the direct approach would be a preferable approach for some institutions due to the advantages described above; therefore, the EBA shouldn't consider dropping this methodology.

Proposed Action:

- Retain the direct method in the EBA methodology.
- Allow the use of the direct methodology for risk factors that are scaled up from the current period.

Q4. What is your preferred option among (i) the representative risk factor – parallel shift option, and (ii) the contoured shift option? Please elaborate highlighting pros and cons.

Response:

The contoured shift option is the preferred option between the two.

The method has the following advantages:

- In some buckets the shifts of risk factors will be larger at the short end of the bucket than at the long end (e.g. short term ATM vol bucket that ranges from 0 days to 18 months) and applying the contoured shift models this in a more reasonable way.
- The representative risk factor approach can give unreasonable results
- The contoured shift option is more risk sensitive and is not biased toward over-conservatism in the way the representative risk factor / parallel shift option is.
- The contoured shift option does not penalise a more granular RF set up.

When step wise methods are used in conjunction with contour method, there may be cases where some risk factors within a bucket have sufficient data for historical method and others only sufficient data for the asigma/sigma method. This may lead to inconsistent scenarios. We therefore recommend that when using step wise methods for non-modellable risk factors within a bucket, banks are given the option to use consistently the same method for all risk factors.

The use of additional non-linearity scenarios in conjunction with the contour approach can be wasteful versus allowing firms to make alternative adjustments. The contour approach should include within it the provision for firms to use internally developed Kappa adjustment methodology that are applicable for use with curves and surfaces subject to local regulatory approval – as a variation under Article 14.

Proposed action:

- Adopt the contoured shift option.
- Add ability to apply an internally modelled Kappa approach to use in conjunction with the contour approach.

Q5. What are your views on how institutions are required to build the time series of 10 business days returns? Please elaborate.

Response:

The approach set out by the EBA in the draft consultation seems reasonable. The approach avoids using any time differences of 5 days or less, and thus avoids issues found previously when scaling up from shorter periods. The extension of the period by 20 days also is reasonable and practical approach.

Proposed action:

No changes required.

Q6. What is your preferred option among (i) the sigma method and (ii) the asymmetrical sigma method for determining the downward and upward calibrated shocks? Please highlight the pros and cons of the options. In addition, do you think that in the asymmetrical sigma method, returns should be split at the median or at another point (e.g. at the mean, or at zero)? Please elaborate.

Response:

The industry conducted a survey in which firms were asked whether sigma or asymmetrical sigma was favoured: the preferred option, by a close margin, was the asymmetrical sigma approach (8 banks favoured asymmetrical sigma, whereas 6 banks opted for sigma).

Overall, we consider the buildout of this methodology following the EBA NMRF data collection exercise a positive development.

The advantages of it are:

- It allows for asymmetrical empirical data
- It matches the historical approach more closely as evidenced in the detailed EBA analysis and industry sample testing
- As an RF switches from historical method to A-sigma method, there should be less of change than under the sigma method.
- The data is not forced to be mean centred as it is under the sigma method – allowing a greater alignment with the historical method

The preferred option in the asymmetrical approach is to split the data at the **median**. The advantages of it are:

- Sufficient data in each half to calibrate
- Avoids additional complication other methods could introduce
- Operates reasonably under sample testing

Proposed action:

Adopt the asymmetrical sigma method and split the returns at the median.

Q7. What are your views on the value taken by the constant C_{ES} for scaling a standard deviation measure to approximate an expected shortfall measure?

Response:

The industry view is that an unbiased value for this should be used, as there are other levels of uncertainty already built into the calculation. In the data analysis carried out in the EBA data collection exercise, the medians of the empirical distributions for different periods and up and down shifts had a range of 2.52 to 2.72.

Proposed action:

Use a factor of 2.75 for this scaling parameter.

Q8. What are your views on the uncertainty compensation factor $(1+C_{UC}\sqrt{2(N-1.5)})$? Please note that this question is also relevant for the purpose of the historical method.

Response:

The industry view is that the uncertainty compensation factor should be 1 if there is full data used (ie 250 data points in the historical method). The uncertainty formula should be adjusted to achieve that

If that is not done it should be recognised and explicitly stated there is a systematic 5.75% conservative buffer applied across the whole framework in the EBA calibration of the stress scenario measure. And if retained this buffer should be a reference point for reviewing, at overall SES capital level, any simplifications applied.

Proposed action:

Uncertainty can be adjusted by dividing the uncertainty factor by $(1+CUC\sqrt{2}(250))$ where it is applied.

Q9. What are your views on the fallback method that is envisaged for risk factors that are included in the sensitivity-based method? Please elaborate.

Response:

The expectation that the fall-back approach is going to be of limited use is plausible under option B, since most risk-factors in a Risk Management model are expected to have more than 12 observations over the current window.

If fallback methods are relevant to both options, they are even more so under Option A since some risk factors may have not existed in past periods or had even fewer observations than in the current period.

In the response to Q9 we are making comments and proposals with respect to the SBM fallback method while in the response to Q10 we are making comments and proposals with respect to the "other risk factor" and the "changing period" methods. We see merits to all three methods and depending on the NMRF one or the other may be preferable, in other words we see no hierarchy of methods but rather a preference to one or another a case by case basis, depending on the non-modellable risk factor.

The proposed SBM-fallback method is only applicable to non-modellable risk factors that coincide with SBM risk factors or only differ from SBM risk factors in the maturity dimension. However, NMRF are often basis rather than directional risk factors, the more so as a bank may use the flexibility offered under MAR31.13 footnote 3, to keep in the model the systemic risk associated to the risk factors and include only in the NMRF framework the basis or spread risk. We therefore would see it fit to expand the use of the SBM-fallback method as depicted below.

When a non-modellable risk factor is a basis or a spread between risk factors that coincide with SBM risk factors, the risk weight to be used for the SBM-fallback method is the one that would result in the same SBM capital charge when applied to the basis or spread position in the standardised approach.

In general, the risk weight to be used is a function of the correlation between the two SBM risk factors and the SBM risk weights applicable to each of the SBM risk factors:

$$rw_{NMRF} = \sqrt{{rw_1}^2 - 2 \cdot \rho_{1,2} \cdot rw_1 \cdot rw_2 + {rw_2}^2}$$

Where '1' and '2' refers to the SBM risk factor 1 and 2. However, this generic formula may often be simplified since the applicable risk weight to SBM risk factor '1' and '2' are often identical.

This approach should be restricted to instances where the basis or spread relates to the difference of two strongly related SBM risk factors (or two SBM risk factors that differ only in the maturity dimension). Hence, we see this approach fit only for a bucket basis risk or spread risk to a SBM tenor, everything else equal. For example the 12 to 10 year spread risk on an IR curve shall be risk weighted at:

$$rw_{12-10\,Yr\,spread} = rw_{10\,Yr} \cdot \sqrt{2\left(1 - \rho_{10,12\,Yr}\right)} = rw_{10\,Yr} \cdot 0.11.$$

From there onward, the SBM fallback method will apply as depicted in the consultation paper.

Specifically, we do not consider that this approach is applicable to the basis risk between a single name credit spread and a credit index or a single equity stock and an index. Indeed, either the index is a diversified index fulfilling the criteria of MAR21.31 and assigned to an index bucket, in which case the basis will be across buckets, or the index is assigned to the single name credit or equity bucket but, given that the SBM approach does not recognise the higher correlation that should prevail with an index, the correlation will be understated and the risk overstated. Hence, we consider that the case of basis risk between a single name credit spread and a credit index or a single equity stock and an equity index will be better addressed using the fallback "same type of risk factor" method.

Finally, since the SBM risk weights have been calibrated to be conservative for most SBM risk factors within a bucket, including those with limited observability, no uncertainty multiplier is needed: the SBM risk weights are already conservative, i.e. overstated for the majority of risk factors to which it applies. Hence, it is our view that the uncertainty multiplier of the SBM-fallback method shall be set to 1 when the NMRF coincide with a SBM risk factor (or is a basis or spread between two NMRF risk factors that coincide with NMRF risk factors).

When a NMRF coincides with a SBM risk factor except in the maturity dimension, we may be considering, instead of the risk weight of the closest in maturity SBM risk factor, the weighted average of the two closest surrounding SBM risk factors risk weight. In so doing, we make sure that no equivalent SBM risk weight is understated.

Proposed action:

- Extend the use of the SBM fallback method to basis risk (ρ_{basis}) and maturity-spread risk (ρ_{tenor}) within a SBM bucket

Set the uncertainty multiplier to 1 when using the SBM fallback method

Q10. What are your views on the fallback method that is envisaged for risk factors that are not included in the sensitivity-based method? Please comment on both the 'other risk factor' method, and the 'changing period method'.

Response:

In the fallback "same type of risk factor" and the fallback "alternative calibration period" methods (the latter only available under option B), the uncertainty compensation multiplier is set to 2. In both cases it is presented as a way to compensate for the cases where "only few observations are available". Setting the uncertainty multiplier to 2 means that it is considered that only 2.3 observations are available.

Nevertheless, the actual number of observations used in the two methods are either those of the "other" risk factor in the stressed period, or the observations of the same risk factor in the alternative period, and this is taken into account in the uncertainty factor of the calibration of the reference shock.

- In the "other risk factor approach", the actual number of observations used is the one of the "other" risk factor, which is taken into account in its CS. Should a remaining uncertainty be considered and some elements of conservatism added, it is not linked to the number of observations, but to the calibration on a distinct RF. If there is no reason to believe that the representative risk factor is less volatile than the risk factor it is a representative of (it should generally be the case by construct), then no further uncertainty multiplier conservatism there should be (or should be limited to the uncertainty multiplier of the SBM fallback method if any).

We therefore suggest that the calibrated shock of the non-modellable risk factor is expressed as:

$$CS(RF) = [1] \cdot CS(RF_{Other})$$

The uncertainty compensation factor used is the one of the "other" risk factor (captured in the "other" risk factor calibrated shock) multiplied by a factor set to 1 unless the representative risk factor is of lower volatility (which generally should not be the case).

- In the "alternative calibration period" there is no difference in calibration accuracy as we use the same risk factor, and the option B rescaling is calibrated to the alternative period in the same way as it is to the current period for other NMRF.

  We therefore suggest rescaling the calibrated shock in the alternative period, which make used of the uncertainty compensation factor determined in that alternative period, to the current period:

$$CS(RF, C) = \frac{1}{m(P^*, C)} \cdot CS(RF, P^*)$$

An alternative would be to directly determine the scaling of the alternative period P* to the stress period so that the approach taken would be strictly identical to that used for NMRF in the current period:

$$CS(RF, C) = \frac{m(S, P^*)}{m(S, C)} \cdot CS(RF, P^*)$$

It results that $CS(RF, S) = m(S, P^*) \cdot CS(RF, P^*)$, an identical approach to that used for other NMRF, where P* = C. It illustrates that there is no rational to set the uncertainty multiplier to anything higher to that calculated for the RF on the alternative period P*.

Proposed action:

- The uncertainty multiplier shall generally be that of the representative risk factor when using the fallback "same type of risk factor" method
- The uncertainty multiplier shall be that of the non-modellable risk factor in the alternative period when using the fallback "alternative calibration period " method

The scaling of the alternative period calibrated shocks to the current period shall be: m(S,P*)/m(S,C)

Q11. What are your views on the conditions identified in paragraph 5 that the 'selected risk factor' must meet under the 'other risk factor' method? What would be other conditions ensuring that a shock generated by means of the selected risk factor is accurate and prudent for the corresponding non-modellable risk factor?

Response:

(As mentioned in the answer to Q9, this question has more importance under Option A, and we have to take into account that most NMRFs will be bases).

For credit (or equity) risk factors that have been decomposed into a component that is included in the ES model and a basis that is used SES calculation. The basis is not suitable to approximate by SBA RWF method (as SBA method includes systematic and idiosyncratic components – note Q15 where we are required to verify this). The fallback approach using a selected risk factor as defined in paragraph 5 is suitable for these cases and should be allowed..

The criteria applied to the selected risk factor are adequate as long as they can be extended to the "same type of basis". Typically, if the bases are defined vs sectorialXregion systematic risk factors, and if it happens that a specific name has less than 12 data, then its basis would be shocked as a similar basis, coming from a name of the same sector and region, or from a trimmed average taken on a pool of names of the same region X sector.

Proposed action:

In paragraph 3, it should be made clear that idiosyncratic credit and equity basis do not have to use the SBA fallback method.
In paragraph 5, additional criteria added that are applicable to idiosyncratic and equity components.

Q12. What are your views on the definition of stress period under option A (i.e. the period maximizing the rescaled stress scenario risk measures for risk factors belonging to the same broad risk factor category)? What would be an alternative proposal?

Response:

- The number of **instrument revaluations** required to calibrate the stressed window for each BRC can quickly become unmanageable. We explain the point through a comparison with the **UES calibration** approach used for the ES part of IMA.
  - From 2007 to today there are about 3500 10-day returns
  - The calibration of UES for a Bond in (e.g.) CZK for an EU Bank requires **3500** revaluations of the Bond which are then aggregated in 250-sets to identify the one with the highest ES.
  - The calibration of SES for the same bond depends on:

1. # of non Modellable buckets for each RF (e.g. 3 buckets for CS and 4 buckets for IR; FX is instead Modellable → **x7**
2. Use of Direct Method (→**x250**) vs the used of the Step Wise Method (**x6 grid-points**)

- This could hence result in either 3500 revaluations for each NMRF aggregated in 250-sets to identify the set with the highest ES (Direct approach: **3500x7** revaluations of the bond) or **6** revaluations within each of the stressed periods that can be identified between 2007-today; for historical return method, due to the overlap between periods it is conceivable that this results in **3250*5%** windows, where 5% represents the tails over which ES is computed in each window. As a result the number of revaluations of the bond could be **3250*5%x6x7.**
- For sigma method, there is not overlap as even a 1-day change of the period changes the Stdev of the returns and as a result the number of revaluations of the bond could be **3250x6x7.**
- While the calibration through the step-wise method could look computationally lighter than the UES calibration, it nevertheless shows a **linear dependence to the pairs InstrumentWithNMRF x NMRF** that can quickly become larger than the overall number of **Instruments** in the portfolio. In this example the number of revaluations is milder than the UES calibration but it is due to the fact that we are considering a single instrument and 7 NMRF. For a real life portfolio with hundred thousands of instruments and thousands of NMRF the computational burden will clearly blow out.

In the appendix 1, we outline some alternative approaches considered that seek to give a good estimate of the stress period either for the hybrid approach or Option A without intensive portfolio revaluations. Ultimately, we are putting this in an appendix and not directly recommending it as we believe simpler approaches can be used that avoid complexity and achieve reasonable results. See comments in the appendix

A proposed approach would be to use a RF based approach as is used in Option B to identify the stressed period per asset class and to make the assumption that a worse stress period for the modelled risk factors is a suitable period to use for the SES for that broad risk class.

For a broad risk class it is likely there will be a mixture of RF: Some broad risk classes will have good data in the stressed period and some have just good data in the current period. Assuming the proposal recommended under Q1 is allowed the final approach, this will potentially create situation of both types of data in one broad asset class. The same stress period needs to be applied and selected for both types. Choosing the period based on the period that maximises the scale up ratio for risk factors that have insufficient data maximises one component; it should be suitable in both cases and can be a reasonable simplification.

If the proposal to use Option B stress window selection is not acceptable, one alternative could be such that firms are allowed, where they have the ability, to use a sensitivity approach to determine the stress window, even though if those risk factors may be modelled for capital (ES, SES, NMRF) under an full revaluation approach. Use of a sensitivity approach will reduce pricing failures and substantially reduce the computational needs to a manageable level. Other alternative methods if Option B method is not acceptable are set out in the Appendix.

<u>Proposed action:</u>

Use the stress period selection method as set out in EBA methodology (adjusted in answer to Q19) for Option B, for risk factors of both types A and type B under the Hybrid approach proposed in Q1.

Q13. What are your views on the definition of maximum loss that has been included in these draft RTS for the purpose of identifying the loss to be used as maximum loss when the latter is not finite? What would be an alternative proposal?

Response:

The Basel text requires that the stress scenario used for capitalising non-modellable risk factors is "at least as prudent as the ES calibration used for modelled risks (ie a loss calibrated to a 97.5% confidence threshold over a period of stress)" [MAR33.16]. Only when the "bank cannot provide a stress scenario which is acceptable for the supervisor, the bank will have to use the maximum possible loss as a stress scenario" [MAR33.16(3)].

There may be cases where the non-finite loss observed for some calibrated shocks results from the regulatory approach taken in the determination of shocks and the layers of conservatism it involves rather than an inability of the bank to provide a stress scenario at least as conservative as a 97.5% stressed ES.

Hence, we consider that when for a NMRF the maximum loss is non-finite loss, banks should be allowed to provide an alternative stress scenario calibrated to be at least as conservative as a 97.5% stressed ES to the supervisors satisfaction. Only when this alternative stress scenario is found unacceptable, should a 99.95% stress losses be used.

Besides, there may be cases where the maximum loss on the calibrated shocks, though not non-finite, is demonstrably in excess of the actual maximum loss. This may happen when for instance a risk factor is bounded by definition. In such event, the banks should be able to cap the calibrated loss to the actual maximum loss.

Proposed action:

- When the EBA proposed approach fails at determining an extreme scenario of future shock (when the losses on a calibrated shock are non-finite), banks shall be allowed to submit an alternative method for the determination of extreme future shock.
- When the EBA proposed approach results in losses that are demonstrably beyond reach (or demonstrably well in excess of a 97.5% stressed ES), the losses may be capped to the maximum possible losses (respectively a majoring value of the 97.5% stressed ES).

The use of the proposed last resort solution to determine an extreme scenario of future shock (Article 10, Paragraph 2) shall be only applicable if the bank's proposed alternative method is found unsatisfactory by the supervisory authorities.

Q14. How do you currently treat non-pricing scenarios (see section 3.2.5 of the background section) if they occur where computing the VaR measures? How do you envisage implementing them in (i) the IMA ES model and (ii) the SSRM, in particular in the case of curves and surfaces being partly shocked? What do you think should be included in these RTS to address this issue? Please put forward proposals that would not provide institutions with incentives that would be deemed non-prudentially sound and that would target only the instruments and the pricers for which the scenario can be considered a 'non-pricing scenario'.

<u>**Response:**</u>

Shifts to curves or surfaces that are applied to the ES or VAR model are applied in a scenario consistent way in that all points on that curve or surface are shifted in scenarios applied to a curve or a surface. Therefore the potential issue of applying large shifts to only one part or portion of the curve or surface may not systematically arise.

In the Basel/CRR rules for SES calculation a stress shift is applied to only one part of a curve or surface so this is an important point to consider. In practice NMRF will be decomposed into a portion that is included in the ES model and a basis that is used in the SES. The fact that the SES basis shifts will be smaller than the outright RF shifts already embeds a natural mitigation. We are expecting because of this the situation of non-pricing scenario caused by incoherent SES stress shifts maybe rare, but it is difficult to envisage all situations until a methodology is fully implemented and applied. Therefore it would be useful to introduce mechanisms and safety valves that could be applied and give resilience if this does arise.

The fundamental problem, that can occur when a small portion of a curve is shifted a large amount and the other parts are left constant, is that the shift size amount is unrealistically large versus the parts that are not shifted and this breaks the consistency of the curve or surface that is applied in a stress (and what is applied is economically unfeasible).

A solution to this would be to reduce the risk factor shift size for the bucket that is liable to a non- pricing scenario by a fixed factor. Then the stress PL amount can be scaled up by the inverse of the factor. For instance, if the stress shift size is reduced by a factor of 10 the stress PL amount can be multiplied by a factor of 10. Where this would be applied it would be recommended this scaling was applied to all instruments in the bucket irrespective of whether non pricing scenario applied for that product instrument. In this way a consistent scenario would be applied to the whole bucket.

Clearly scaling back a stress scenario could alter the amount of PL that comes from gamma from the scenario. In practice however most of the gamma will have been captured in the component of the RF that is included in the ES model so this should not create any systematic underestimation of risk. The cases where it is applied should be limited and notified to local regulators.

<u>Proposed Action</u>:

Where non pricing scenario is identified as an issue for a bucket on a curve or surface then the scenario shift may be scaled back by a factor 1/L and the stress PL is multiplied by L. The factor L is set at simple level e.g. 10. Where this is applied banks have to report to regulator that they have done this and explain reason why this action is taken.

Albeit supportive to this solution, industry would welcome any other equivalent solution that ensures a robust, consistent framework for non-pricing scenarios.

Q15. What are your views on the conditions included in these draft RTS for identifying whether a risk factor can be classified as reflecting idiosyncratic credit spread risk only (resp. idiosyncratic equity risk only)? Please elaborate.

Response:

The risk factors reflecting idiosyncratic credit spread risk and idiosyncratic equity risk are aggregated with zero correlation. NMRF basis will be created by decomposing NMRF into a component that is suitable to represent the RF in the ES model and a residue basis. This choice of decomposition will be driven by getting as a good representation of the RF in the ES model. The residue basis should not be correlated and this can be tested. The condition under (b) can be too specific, so propose a modification.

Proposed Action:

Change clause (b) as follows: "the value taken by the risk factor should not be systematically correlated with other credit (equity) idiosyncratic factors"
Change clause (c) as follows: " the institution performs and documents the statistical tests that are used to verify point (b). This can include tests that prove values taken are not driven by systematic risk components.

Q16. What are your views on flooring the value taken by non-linearity coefficient κ to 0.9? Please elaborate.

Response:

We note in the consultation paper that the value of k_{min} varies and in some cases 0.9 is used and sometimes 0 is used (ref p85,86,87,120,121,122 = 0.9 and ref p88,89,122,123,124=0)

We only really see the value of k_{min} as an extreme floor level and therefore rather than setting at an ad hoc level set at an extreme floor.

If a floor level is to be set at other than extremal level a cap should be set at the same time. If it's considered necessary to limit operational risk of the approximation on the downside the risk should be limited on the upside as well. The floor and cap could be set at levels that were very rarely used eg at 20% and at 500%. As the equation for kappa has a divisor of the maximum loss without the adjustment the kappa could get very high if this loss amount is low. There is natural mitigation in that when a high multiplier is calculated it is applied to a low stress amount. The risk of perverse outcomes is greater from having a high kappa than a low kappa.

Proposed Action:

Set k_{min} at extreme floor of zero or set both a cap and a floor.

Q17. What are your views on the definition of the tail parameter ϕ_{avg} where a contoured shift is applied (i.e. average of the tail parameters of all risk factors within the regulatory bucket)? Please elaborate.

Response:

As discussed in the answer to Q4 there can be Risk Factors with different shift sizes within one bucket. The empirical PHI factor is highly dispersed between different data series, so taking the average for a bucket the result may produce unreasonable results (an example of the high dispersion is shown from the data collection exercise from Table 5 Page 154 where the median of PHI is 1.01 but the Mean is 1.03 to 1.06).

Reasonable alternatives for calculating PHI at bucket level are to:
(a) take the median or heavily trimmed mean
(b) use a square root transformation of Sqrt(PHI-1), then summarise the data with an average and then retransform back to the original units.

The motivation for using a square root transformation are as follows (i) it removes some of the dispersion and asymmetry that PHI-1 has and which makes the median so different from the average (ii) Sqrt(PHI-1) gives the percentage shift up and down from the end point that would be required to get a reasonable estimate of the ES from just two points. In that sense it is a measure of the width of the tail in the empirical data in intuitive units.

The ability to calculate and use an internally modelled kappa should be included in the framework under articles 13/14 as proposed under answer to q4. This will make the framework more robust and allow firms to make adjustment factor that they can apply to local regulator to use that aligns to the ES standard.

Proposed Action:

- Calculate PHI-1 at for a bucket with N risk factors as follows:

$$(\emptyset - 1)_{bucket} = \left(\frac{1}{N}\sum_{j=1}^{N}\sqrt{(\emptyset - 1)_j}\right)^2$$

- Include ability to calculate an internally modelled kappa under articles 13/14.

Q18. Would you consider it beneficial to set the tail parameter ϕ to the constant value 1.04 regardless of the methodology used to determine the downward and upward calibrated shock (i.e. setting ϕ = 1.04 also under the historical method, instead of using the historical estimator)? Please elaborate.

Response:

No, it would not be beneficial for risk factors where there is enough data to use a fixed tail parameter. Calculating the tail parameter directly from that data that is already used to calculate the stress range is more accurate than a global estimate.

The constant value 1.04 has been set by the EBA by taking the empirical data and using an average of this. The empirical data is highly skewed as can be seen by the difference between the mean and the median. In analysing the empirical data it would be better to transform the data to Sqrt(PHI-1) as these are more natural units of width of tail and are less skewed. Then the average of the Sqrt(PHI-1) empirical data can be taken and then converted in back to units to be used. The result of PHI-1 estimated in this way is expected to be closer to 2% than 4%, which is a large difference. There is no reason to want to overestimate this parameter.

Earlier industry estimates were also biased high by averaging highly skewed data without applying a transformation.

Proposed Action:

Use a calculated tail parameter when using the historical method as already defined – no change required .

Set the constant ϕ-1 parameter to be used in other cases using a revised empirical analysis

Q19. Do you agree with the definition of the rescaling factor ms, under option B or do you think that the rescaling of a shock from the current period to the stress period should be performed differently? Please elaborate.

Response:

Summary

- The introduction of a ratio to scale up the current period stresses is a good development that allows good quality data found in the current period to be modified for use in the stress period. As it is determined from risk factor histories makes the calculation of it efficient.
- The $m_{S,C}$ multiplier should be unbiased in estimating the stressed period standard deviation from the current standard deviation. As opposed, the proposed EBA ratio creates inflated shocks linked to the Jensen inequality. A simple modification of the ratio addresses this issue:

$$m(S,C) = \frac{1}{trimmed\_mean_{1\%}(\frac{\sigma_j^C}{\sigma_j^S})}$$

- This modification also addresses the issue linked to risk factors having a very low standard deviation over the current window and which can lead to artificial very high values and unreasonable results (this can be observed noticeably in major currencies interest rates.)
- We provide an empirical assessment of those effects and of the remediation provided by the modified ratio on several asset classes (FX, GIRR, CSR and equity) based on data since 2008, using a comparison/regression with a reference approach which is comparable to capital on a portfolio equally weighted on all risk factors.

======

Amplification of shocks with the EBA proposed ratio: theoretical background

The $m_{S,C}$ multiplier should be unbiased in estimating the stressed period standard deviation from the current standard deviation. Hence, the ratio of the estimated stressed period standard deviation over the actual stressed period standard deviation is expected to be equal to 1 on average:

Property to be fulfilled by the $m_{S,C}$ multiplier : $\mathbb{E}\left\{\frac{m_{S,C}\cdot\sigma_C}{\sigma_S}\right\} = 1$

However, when using the EBA proposed definition of the multiplier, this property is not fulfilled: the estimated stressed period standard deviation is higher on average than the actual stressed period standard deviation. This results from the Jensen's inequality: $\mathbb{E}\{x\}\cdot\mathbb{E}\left\{\frac{1}{x}\right\} > 1$.

Indeed:

$$\begin{aligned}\mathbb{E}\left\{\frac{m_{S,C}^{EBA}\cdot\sigma_C}{\sigma_S}\right\} &= m_{S,C}^{EBA}\cdot\mathbb{E}\left\{\frac{\sigma_C}{\sigma_S}\right\}\\ &= \mathbb{E}\left\{\frac{\sigma_S}{\sigma_C}\right\}\cdot\mathbb{E}\left\{\frac{\sigma_C}{\sigma_S}\right\}\\ &= \mathbb{E}\left\{\frac{\sigma_S}{\sigma_C}\right\}\cdot\mathbb{E}\left\{\frac{1}{\frac{\sigma_S}{\sigma_C}}\right\} > 1\end{aligned}$$

This bias towards over-estimation of the stressed period standard deviation can be corrected simply by using the following alternative multiplier:

$$m_{S,C}^{Alt} = \frac{1}{\mathbb{E}\left\{\frac{\sigma_C}{\sigma_S}\right\}}$$

With this definition, by construction the desired property of an unbiased estimator of the stressed period standard deviation is achieved:

$$\mathbb{E}\left\{\frac{m_{S,C}^{Alt}\cdot\sigma_C}{\sigma_S}\right\} = m_{S,C}^{Alt}\cdot\mathbb{E}\left\{\frac{\sigma_C}{\sigma_S}\right\}$$
$$= \frac{1}{\mathbb{E}\left\{\frac{\sigma_C}{\sigma_S}\right\}}\cdot\mathbb{E}\left\{\frac{\sigma_C}{\sigma_S}\right\} = 1$$

Empirical study

The first step in the EBA proposed approach calculates a ratio of standard deviations per risk factor, by dividing the stress period standard deviation by the current period standard deviation. For risk-factors with very low standard deviation over the current window the ratios can end up to be very high. These high ratios can then be included in the average if not beyond the trimming range and can dominate the trimmed average of the ratio.

Given this potential tendency of the current defined ratio we want to compare this method to a reference approach that would not have this feature. A reference approach has been developed that uses the same raw inputs namely the per risk factor stress and current period standard deviations. The reference ratio then simply takes the average of the standard deviations in the stress period on the numerator and the average of the current period standard deviations on the denominator. No trimming is applied and in the case where volatilities are in normalised annual vol these are divided by 400bp to make the units of the volatility approximately equivalent to relative volatilities (annualised bp volatilities are often of order of 80bp and this divided by 400bp is 20% which is typical level of annual relative volatility).

This is chosen as a reference as it avoids the issue with a small divisor and is intuitively like summing capital, assuming unit position weights, in stress period over current period using a simple aggregation approach.

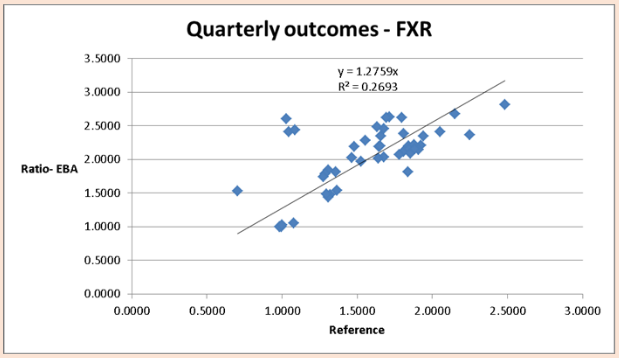
The rescaling factor mS was then compared to this reference approach for different asset classes. The scalar had a tendency to spike very high in some periods and in some testing very large values of mS were found. An example driver of this would be very low volatility due to low/negative rates in EUR in the current period.

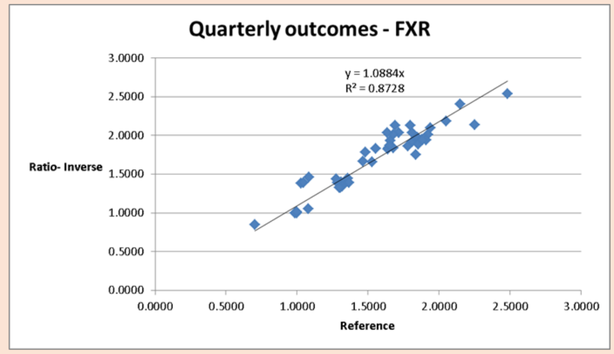
This reference approach is not suitable in a production alternative as it does not have the feature of dividing one volatility by another and therefore making it dimensionless i.e. not subject to units of measurement as a first step.

A modification to the EBA proposed approach is proposed that as a first step for each risk factor divides the current period standard deviation by the stress period deviation. This has the advantage that the standard deviation in the denominator is not liable to be very low as it is from a stress period. The trimmed average is then taken of these ratios. A final step is to take the inverse of this to convert it into a multiplier.

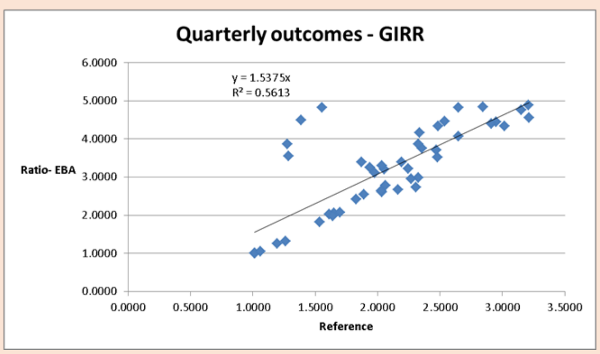
The modified approach and the original approach were then compared to the reference approach previously developed. The results are show below as scatter plots with the reference approach on the x axis and the original EBA and modified inverse approach on the Y axis. The data points are quarterly samples per asset class with an updating current period through time but a fixed stress period in 2008.

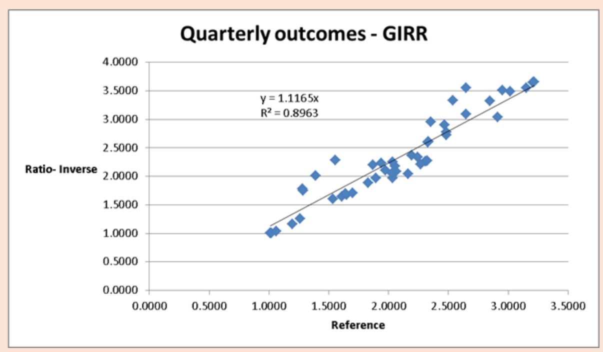
For FX risk class the risk factor are FX rates and FX volatilities. We can see from the scatter plot with a linear trend fit that there are some outliers versus the reference method using the current ratio whereas the alternative invers ratio has a much higher RSQ of 87% (versus 27%). The slope of the trend line is also much closer to 1 (1.08 vs 1.27)



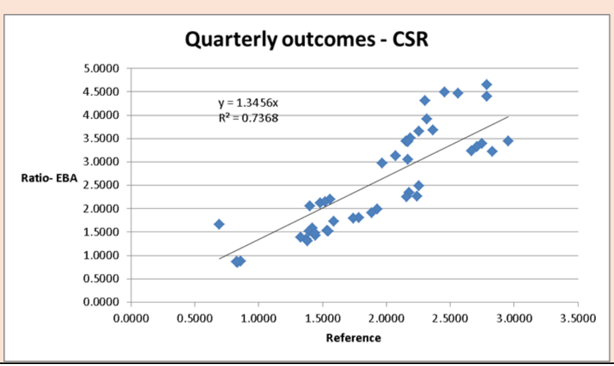


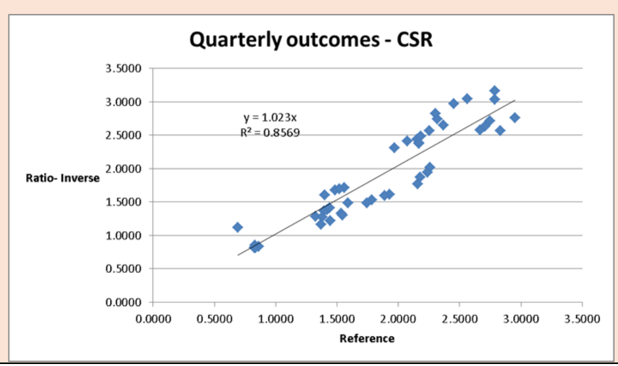
For the rates risk factors that includes IR rates, IR basis, Inflation and IR ATM volatilities. There is also a much better trend fit RSQ 89% vs 56%, and the slope of the fit is much closer to 1 (1.12 vs 1.54). Visually there are less outliers with ratios up to 5 coming from the current approach. Other testing has showed the IR ratio going up to 9 for institutions with EUR based RF predominance.



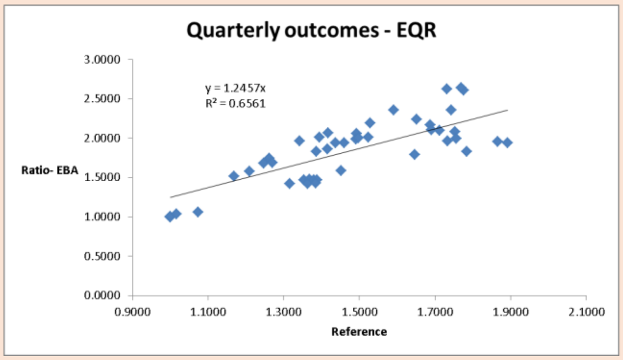


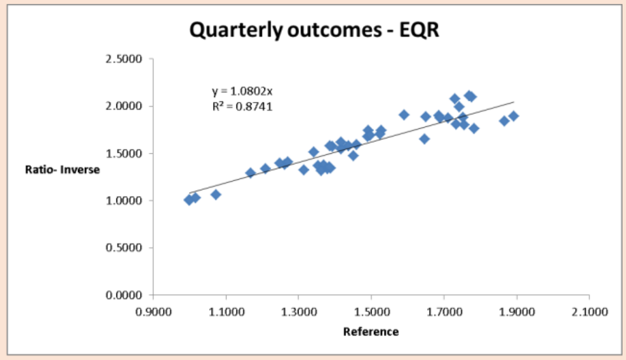
For credit risk factor that are made up of CDS and bond spreads there is a similar picture with a higher RSQ (86% vs 74%) and a slope much closer to 1 (1.02 vs 1.35).





For equity RF made up of equity prices and ATM equity vols. There is again a better RSQ versus the reference (87% vs 66%) and a slope closer to 1 (1.08 vs 1.25).





<u>Proposed Action</u>:

Revise the ratio at Broad asset class level calculated per period as follows:

$$m(P,C) = \frac{1}{trimmed\_mean_{1\%}(\frac{\sigma_j^C}{\sigma_j^P})}$$

The ratio for scenario scaling is from the above series where P = stress period (S) selected following Q12 :

$$m(S,C) = \frac{1}{trimmed\_mean_{1\%}(\frac{\sigma_j^C}{\sigma_j^S})}$$

Q20. The scalar ms_i is obtained by using data related to modellable risk-factors in a specific risk class (i.e. the class i). As a result, such a scalar is not defined where an institution does not have any modellable risk factor in this risk class. How do you think the scalar ms_i should be determined in those cases? Please elaborate.

Response:

This will be as pointed out a rare case. In this case a suitable RF with history should be sourced to represent the risk class. While dealing with edge cases in could be clarified how the trimmed mean should work in the cases of 1 and 2 RF probably by including no trimming.

Proposed Action:

Add a footnote on how trimmed mean works for less than three RF.

Additional questions:

Q21. The frequency of the calculation of the "stress scenario risk measure" is set to be daily in all cases (see section 3.2.2 – General provisions). This is based on the CRR Article 325a. Will this daily frequency of calculation applied in all cases cause issues? Please elaborate.

Response:

The presumed frequency of calculation should be daily, but the framework/methodology should also envisage the possibility that in some circumstances a less than daily frequency can be applied. This would make the framework/methodology more general and suitable for use in a wider range of situations.

The current RNIV and RNIME calculations that are applied in the current capital regimes are often not calculated daily. These can often be calculated monthly or even quarterly. The reason for not calculating these daily currently is operational burden of calculating daily.

While some of these RNIV/RNIME will be migrated to "stressed scenario risk measures" as daily calculations, it is likely with the possibility of less than daily frequency calculation for some of these a wider range of these would be captured by the stressed scenario risk measures rather than migrated to Pillar 2a calculations. Incorporating these into the stressed scenario risk measure would give it a wider scope and greater applicability. These would likely help with more standardisation of market risk capital outcomes across firms.

Further to this point, Article 325bb(4) already grants the derogation to calculate weekly the unconstrained expected shortfall and the partial expected shortfalls at broad risk category level. Therefore, the CRR text derogation provides a basis to extend the less than daily calculation frequency from ES to the stress scenario risk measure.

Proposed action:

The RTS explicity envisages that some Stressed scenario risk measures are calculated less frequently than daily. The treatment of a how a Stressed scenario measure calculated from a previous day and carried over is specified to satisfy the requirement to have daily values under CRR article 352a.

Q22. The stepwise method breaks the calculation down into different steps. The calculation of the non-linearity adjustment (see section 3.5.1) step has a daily calculation frequency. Do you see a benefit in allowing a less frequent than daily update for this component of the calculation? Please elaborate.

Response:

This part of the calculation is a final step used to modify the PL for tail convexity. The multiplier K is expected in many cases to be close to 1 and a minor part of the overall capital. Calculating this component at a less frequent interval e.g. monthly would reduce the number of revaluations made on a daily basis and would not bias the calculation high or low. The impact of the monthly update (ie significance of this component) could be monitored by calculating the impact of the monthly update of this parameter on the overall SES capital charge.

Proposed action:

Allow if firms wish a monthly update of this component of the calculation for all RF

Q23. The stepwise method breaks the calculation down into different steps. The determination of which is the “extreme scenario future shock” scenario of the four possible outcomes (see 3.2.2.4.3 Step S.4 & 3.2.2.4.4 Step R.3 or Step C.2) has a daily calculation frequency. Do you see a benefit in allowing a less frequent calculation than daily for this step in the calculation? Do you see a benefit in allowing a less frequent than daily update for this component of the calculation? Please elaborate.

Response:

This would allow the location of where the stress scenario is on the four point grid to only be updated less frequently than daily e.g. monthly. This would result in a highly efficient stress scenario measure to be calculated on a daily basis as this would only require one stress revaluation on a daily basis.

There is a possibility that the stress location changes during the month and that a suboptimal stress location is used during this period. However the impact of this can be measured by monitoring the impact the change in extreme stress location has when applied and optimised compared to the existing location. This can inform where it is not suitable to apply a monthly update to this component of the calculation.

Moving to a very efficient calculation method, made possible by the EBA stepwise approach, would be a very good achievement for environmental responsibility of the industry.

Proposed action:

Allow if firms wish a monthly update of this component of the calculation. Monitoring put in place for estimation of capital impact of using stale stress location.

Q24. Should the *m* ratio have its own calculation frequency defined as ""at least every three months"" to allow more flexibility? Please elaborate.

Response:

Under option B, the 1 year stress period determination is "at least every three months"" and the *m(s,c)* scaling ratio is to be updated at the same time in lock step with this. However, the current period stress range calibration is aligned to the ES model and performed monthly. In some cases, firms will want to align the update of *m(s,c)* to the update of the stress ranges, while in other cases firms will want to usually update in lock step with the stress window selection; they may in volatile times want to leave the stress window selection as quarterly and make an intermittent update to *m(s,c)* to make it relevant to the current window that it is scaling up. This could avoid some pro-cyclicality.

The frequency at which the stress window selection is made and the frequency at which the *m(s,c)* scalar is updated should not be defined to always be in lock step. If necessary, firms should have the flexibility to calculate the *m(s,c)* ratio more frequently than quarterly, instead of retaining a stale *m(s,c)* ratio over the quarter.

Proposed action:

Update the frequency of the *m(s,c)* calibration to have its own frequency defined as "at least every three months" to allow for more flexibility.

Appendix 1: Alternative approach's to stress window selection for use with Hybrid Approach

In Q12 we have proposed a solution to selecting the 1 year stress window that is simple and should do a good job at efficiently identifying a 1 year stress window. However, unlike the methods specified by the EBA for both Option A and Option B, it may not deliver an absolute largest capital amount. In this appendix we have considered how alternative approaches could work for the 1 year stress window identification when using a Hybrid approach.

All approaches considered use some approximation and avoid a large amount of portfolio revaluations to make these approaches operationally tractable. The methods build off the approach proposed for Option B. They are designed to give a more refined view of the stress window than just using the method under Option B, but in doing so they add some additional complexity.

The methods require different inputs and components: these are defined and then three methods are outlined.

Alt1 – starts with Option B estimate and applies linear scaling. It is similar in spirit to using a delta sensitivity approach i.e. use linear scaling. It is the most complex method.

Alt2 – inspired by Alt1 and tries to make use of existing information that will already be available. It is quite intuitive.

Alt3 – inspired by Alt2 and tries to further simplify and maximise units in terms of M ratio

	Terms/inputs	Description/Definition
1	Se	Existing stress period calibrated last update of stress window
2	M(P,C,reduced)	Series per period P calculated from reduced set factors at BRC - see proposed revised formulation Q19
3	M(P,Se,reduced)	Series per period P calculated from reduced set factors at BRC - starting point is Vol(P)/Vol(Se) and apply trimmed average
4	M(P,Se,j)	Series calculated from individual RF of Type A
5	M(P,C, j)	Series calculated from individual RF of Type A (have to detail how to calc for a bucket)
6	RSSj	Capital for non-modellable risk factor - recent run based on S-exist
7	Sb	Sb is the P where M(P,C,reduced) is maximized
8	CSup,CSdn	Edges of scenario range assuming Sb is stress window
9	WLj	Min(PL_CSup,PL_CSdn)

In setting up method issues identified in Q19, setting up scaling ratios should be avoided.

Alt1 - Approx capital scales from starting guess from Option B method - only uses end points			
Step	*Component*	*Method*	
1	WLapprox(P,j)	If Type A & N>200:	WLj* M(P,Sb,j)
		Otherwise:	WLj* M(P,C,reduced)/M(Sb,C,reduced)
2	SUM_WL(P)	SUM (WLapprox(P,j)	
3	S	Stress Period that maximises SUM_WL(P)	
4	M(S,C)	From M(P,C,reduced) where P=S	
Good points:			
Bad Points: Requires portfolio revaluations and extra steps. Most complex to implement.			

Overall, Alt 1 is not recommended.

Alt2 - Approx capital scales from S-exist			
Step	*Component*	*Method*	
1	RSSapprox(P,j)	If Type A & N>200:	RSSj* M(P,Se,j)
		Otherwise:	RSSj* M(P,Se,reduced)
2	SUM_RSS(P)	SUM (RSSapprox(P,j)	
3	S	Stress Period that maximises SUM_RSS(P)	
4	M(S,C)	From M(P,C,reduced) where P=S	
Good Points: Last stress period calculations available, easy to understand motivation			
Bad points: Needs a new ratio relative to Se			

Alt3 - calculate weighted ave M(P,C)			
Step	*Component*	*Method*	
1	Wj	RSSj/ SUM (RSSj)	
2	M(P,C,j)	If Type A & N>200:	Wj*M(P,C,j)
		Otherwise:	Wj*M(P,C,reduced)
3	M_weighted(P,C)	SUM(M(P,C,j))	

4	S	Stress Period that maximises M_weighted(P,C)
5	M(S,C)	From M(P,C,reduced) where P= S

Good Points: Similar in spirit to Method B, Uses existing ratio M(P,C,reduced)
Bad points: Less intuitive than Alt2