Consultation Paper

Draft Regulatory Technical Standards on Criteria for assessing the modellability of risk factors under the Internal Model Approach (IMA) under Article 325be(3) of Regulation (EU) No 575/2013 (Capital Requirements Regulation 2 - CRR2)

Contents

1. Responding to this consultation

The EBA invites comments on all proposals put forward in this paper and in particular on the specific questions summarised in 5.2

Comments are most helpful if they:

- respond to the question stated;
- indicate the specific point to which a comment relates;
- contain a clear rationale;
- provide evidence to support the views expressed/ rationale proposed; and
- describe any alternative regulatory choices the EBA should consider.

Submission of responses

To submit your comments, click on the 'send your comments' button on the consultation page by 04.10.2019. Please note that comments submitted after this deadline, or submitted via other means may not be processed.

Publication of responses

Please clearly indicate in the consultation form if you wish your comments to be disclosed or to be treated as confidential. A confidential response may be requested from us in accordance with the EBA's rules on public access to documents. We may consult you if we receive such a request. Any decision we make not to disclose the response is reviewable by the EBA's Board of Appeal and the European Ombudsman.

Data protection

The protection of individuals with regard to the processing of personal data by the EBA is based on Regulation (EC) N° 45/2001 of the European Parliament and of the Council of 18 December 2000 as implemented by the EBA in its implementing rules adopted by its Management Board. Further information on data protection can be found under the Legal notice section of the EBA website.

2. Executive Summary

The amendments to Regulation (EU) No 575/2013[1] (the Capital Requirements Regulation 2 – CRR2) implement in EU legislation the internationally agreed Fundamental Review of the Trading Book (FRTB). A new element in this framework is the risk factor modellability assessment, referred to as risk factor eligibility test (RFET) in Basel standards. The modellability assessment is intended to ensure that the risk factors, which institutions includes in their Expected Shortfall (ES) model, are sufficiently liquid and observable.

The EBA proposed methodology hinges on two different criteria to assess the modellability of a risk factor:

a) Identification at a minimum of 24 verifiable prices which are representative for the risk factor over the preceding 12-months, without any period of 90 days or longer with less than four verifiable prices which are representative for the risk factor;

b) Identification at a minimum of 100 verifiable prices which are representative for the risk factor over the preceding 12-months.

For the purpose of this assessment, the EBA specifies in greater detail in the present draft RTS both the requirements a price should satisfy to be verifiable and the representativeness of verifiable prices for risk factors. In addition, the draft RTS specify how the modellability of risk factors belonging to curves, surfaces or cubes should be assessed and the bucketing approaches that are available in this context.

The EBA's proposal for the methodology of the modellability assessment is line with the work the Basel Committee has done in the past years on the requirements for identification of risk factors that are eligible for inclusion in the ES.

These draft regulatory technical standards are part of the set of regulatory technical standards referred to in Articles 325bd(7), 325be(3), 325bf(9), 325bg(4) to be delivered by 28 March 2020. The entry into force of the latest of those regulatory technical standards will trigger the 3 year-period following which IMA institutions that have been granted IMA approval for reporting purposes by their competent authority will be required to report their IMA figures under the specific reporting requirements for market risk set out in Article 430b(3).

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[1] Regulation (EU) 2019/876 of the European Parliament and of the Council of 20 May 2019 amending Regulation (EU) No 575/2013 as regards the leverage ratio, the net stable funding ratio, requirements for own funds and eligible liabilities, counterparty credit risk, market risk, exposures to central counterparties, exposures to collective investment undertakings, large exposures, reporting and disclosure requirements, and Regulation (EU) No 648/2012

3. Background and rationale

In accordance with the amendments to Regulation (EU) No 575/2013, the EBA is mandated in Article 325be(3) to specify the criteria to assess the modellability of risk factors and to specify the frequency of that assessment in Regulatory Technical Standards.

The size of the capital requirement for non-modellable risk factors (NMRF), the stress scenario risk measure SS_t, is determined by three elements:

1. The number of risk factors deemed non-modellable determined through

    a) the assessment of modellability as specified in the draft RTS at hand; and

    b) additional principles related to the data used for calibration of the ES model which modellable risk factors need to fulfil - as will be specified in the Guidelines under Article 325bh(3).

2. The approach to calculate the stress scenario risk measure for an individual NMRF - as will be specified in the RTS mandate under Article 325bk(3).

3. The aggregation of the stress scenario risk measures of the individual NMRF.

The assessment of modellability referred to in point 1(a) shall provide assurance that the risk factors which a bank includes in its ES model are sufficiently liquid and observable to be amenable to modelling. If a risk factor fails the assessment of modellability, it is classified as a NMRF. It is to be excluded from the bank's ES model and is to be included in the stress scenario risk measure SS_t.

Article 325be of the CRR2 deals with the modellability assessment of risk factors. In particular, it specifies that institutions shall assess the modellability of all risk factors of the positions attributed to trading desks for which they have been granted the permission referred to in Article 325az(1) (i.e. permission to use the internal models approach) or are in the process of being granted that permission. All additional requirements are left to be specified in the respective RTS mandate, which shall take into account the final version of the assessment of modellability as specified in Basel[2].

3.1 Scope of the modellability assessment

Article 325be(1) of Regulation (EU) No 575/2013 outlines that '*institutions shall assess the modellability of all the risk factors of the positions assigned to the trading desks for which they have*

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[2] Minimum capital requirements for market risk, January 2019 (rev. February 2019), paragraphs 31.12 to 31.24

been granted permission as referred to in Article 325az(2) or are in the process of being granted such permission'.

Risk factors can be defined as variables which are drivers of the change in value of an instrument. Risk factors are used for the quantification of market risk in the risk-measurement model.

For illustration purposes the following table lists the risk factors in scope of the assessment of modellability for different risk factor modelling approaches that are potentially applied in risk models.

Modelling approach in risk model	Risk factors
Interest rate (IR) curve with granularity reduction in risk model compared to the front office	IR curve with reduced granularity as used in the risk model
Parametric representation of an interest rate curve	Nelson Siegel parameters / Principal components approach (Please note that the assessment of modellability is required to be performed based on the buckets underlying the curve as explained further below.)
IPO (Initial Public Offering) fully proxied by a related stock (with proxy input to the risk-theoretical P&L)	Related stock
IPO proxied by a related stock during stress period, but not during current period (with IPO input to the risk-theoretical P&L)	IPO
Equity multifactor model	Systematic & idiosyncratic factors
SABR model for volatility surfaces: α, β, ν, ρ (suppose β is kept constant)	SABR parameters: α, ν, ρ (Please note that the assessment of modellability is required to be performed based on the buckets underlying the surface as explained further below.)

Considering that an institution's internal risk-measurement model has to be well documented, the RTS require institutions to document all risk factors in their internal risk-measurement model and their definition. This documentation shall provide a clear overview of the scope of the modellability assessment.

3.2   General methodology for the assessment of modellability

For a risk factor to be included into the ES model a necessary condition is that it is classified as modellable following the modellability assessment specified in these draft RTS. The concept of modellability is intentionally linked, in the present context, to the concepts of liquidity and observability of market data: a risk factor can be deemed modellable if a sufficient amount of observable market data, relative to that risk factor, is available.

In line with internal regulatory standards, the draft RTS specify that for a risk factor to be classified as modellable the following two criteria must be met on a quarterly basis:

1. the institution has identified at least 24 verifiable prices which are representative for the risk factor over the preceding 12-months period;

2. there must be no 90 day period with less than four verifiable prices which are representative for the risk factor over the preceding 12-months period.

Alternatively, a risk factor is classified as modellable if the institution has identified, on a quarterly basis, at least 100 verifiable prices which are representative for the risk factor over the preceding 12-months period.

To avoid a double-counting of price observations, no more than one verifiable price per day shall be taken into account for the modellability assessment per risk factor. To facilitate this, institutions must use a consistent timestamp for trades and committed quotes across all data sources (own trade data, data provided by third-party vendors etc.) - also taking into account differing time zones. This timestamp shall correspond to the day of execution for trades and the day on which the quote was committed.

To clarify this requirement, suppose an instrument has been traded by an EU-based institution (via its subsidiary) in Japan. The timestamps are the following:

EU (CET) +0:00	Japan +8:00
15/02/2019 23:00	16/02/2019 07:00

The transaction could thus potentially be counted for the purpose of the modellability assessment either as of 15th February 2019 or as of 16th February 2019. Given that the objective is to avoid any double-counting of observations, it is specified in the draft RTS that the observation date must be recorded based on a consistent single time zone across all data sources.

3.3   Definition of verifiable price

The prices used in the assessment should be proven to be correct and trustworthy. In order to comply with those goals, the EBA proposes to allow only verifiable prices in the aforementioned assessment. To enforce the requirement, a definition of verifiable price is provided. A verifiable price means any one of the following:

a)   the price of an actual transaction to which the institution was one of the parties;

b)   the price of an actual transaction between other parties;

c)   the price obtained from a committed quote made by the bank itself or another party. Here, a quote shall be considered committed only where the provider of the quote is legally obliged to buy or sell the corresponding financial instrument at that price if requested.

Furthermore, as a safeguard to only take into account sound prices in the modellability assessment the RTS lay down the following additional requirements:

a)   Internal trades between entities of the same group shall not be considered as transactions delivering verifiable prices.

b)   Trades shall not be conducted and quotes shall not be provided with the sole purpose to generate verifiable prices.

c)   Only transactions and eligible committed quotes with a non-negligible volume as compared to usual transaction sizes shall be considered as transactions delivering verifiable prices.

d)   For a committed quote to be considered as verifiable price, it shall have a reasonably small bid-offer spread.

Institutions may also consider information on verifiable prices of transactions or quotes provided by a third-party vendor in the modellability assessment of their risk factors, provided that

a)   the transaction or committed quote has been processed through the vendor;

b)   the vendor or the institution has agreed to provide evidence of the transaction or committed quote and evidence of the verifiability of its price to competent authorities upon request;

c)   the vendor communicates to the institution the dates at which the transaction or quote has been observed and the necessary set of "identifier" information to enable the institution to map the verifiable price to its risk factors;

d)   each vendor is subject to an at least yearly, independent audit regarding the validity of its price information, its governance and processes. Audit results and reports shall be made available to the institution and on request to the relevant competent authorities as a

precondition for the institution to be allowed to count verifiable prices collected by the third-party vendor within its modellability assessment.

In the present context, the notion of third-party vendor also encompasses trading platforms and exchanges.

In the case where a third-party vendor does not deliver sufficient information for an institution to check the verifiability of the provided price information, the institution may take into account the provided price information only in the case that the third-party vendor has checked the verifiability of the price.

If a competent authority is not satisfied that a third-party vendor meets the requirements laid down in the RTS, the competent authority may decide to prevent the institution from using data from this vendor. In order to pursue an increasing harmonisation of treatment across EU, competent authorities must notify the EBA whenever they decide to exclude data coming from a third-party vendor for the modellability assessment.

When an institution uses data for verifiable prices for a risk factor from an external source, and this data is provided with a time lag (e.g. data on verifiable price observations for a particular day is only made available some weeks later by a third-party vendor), the period used for the modellability assessment for this risk factor may differ from the foreseen preceding 12-months period by at most 1 month. In this case the institution shall document which time period is used for the modellability assessment for which risk factors and follow the documented approach consistently.

3.4   Verifiable prices representative of risk factors

An institution may identify a verifiable price for more than one risk factor. Indeed, any verifiable price shall be counted as an observation for all of the risk factors for which it is representative.

To this end, the draft RTS specify that, for a risk factor, a verifiable price is representative only if there is a close relationship between the risk factor and the verifiable price and if the institution is capable of extracting the value of the risk factor from the value of the verifiable price. It is understood that in extracting a risk factor from the value of a verifiable price further inputs like the values of other risk factors or input parameters may be used where necessary.

This definition aims at ensuring that the risk factor is a principal driver for each price taken into account in the assessment of modellability.

As part of the documentation of their internal risk-measurement model, institutions must have policies and procedures that clearly describe and define their mapping of verifiable prices to risk factors. This needs to include how the mapping changes in case of changes in the characteristics of a position (e.g. decreased maturity) or in case of changes in the characteristics of a risk factor (e.g. a risk factor representing a credit index which rolls regularly or a risk factor representing implied ATM-volatility where the ATM level changed over the preceding 12 months).

Collateral reconciliations are not considered to deliver verifiable prices, given their lack of verifiability and representativeness.

In the Basel text it is not specified how exactly the counting of verifiable prices shall work for the past 12 months, i.e. which verifiable prices are exactly representative for a risk factor.

Consider the following examples:

- A verifiable price of a 5Y5Y Swaption traded almost 12 months ago at 1% strike (the ATM level at that time). Today's ATM level is 2%. Possible interpretations would be that the price observation is representative for

  o today's ATM implied volatility with a 5y maturity; or

  o today's ATM-100bp implied volatility with a 4y maturity.

- A risk factor representing the iTraxx. Since a new iTraxx series is determined every 6 months, the risk factor is set up to always be based on the respective most up-to-date series. Possible interpretations would be that a verifiable price from 12 months ago for series 29

  o can be counted as observation for a risk factor which was based on series 29 at that time and is based on series 30 now; or

  o cannot be counted as observation for a risk factor which was based on series 29 at that time and is based on series 30 now.

The RTS sets out that a verifiable price shall be considered representative of a risk factor where the institution is capable to extract the value of the risk factor from the verifiable price <u>as of its observation date</u>, which implies options a) above.

In addition, where an institution uses systematic credit or equity risk factors that are designed to capture market-wide movements for a given economy, region or sector, but not the idiosyncratic risk of a specific issuer, verifiable prices of market indices or instruments of individual issuers sharing the same attributes as the systematic risk factor may be considered representative for the systematic risk factor.

3.5 Modellability assessment for curves, surfaces or cubes

Where a risk factor is a grid point of a curve or a surface, in order to count verifiable prices for the modellability assessment, institutions shall use the so-called "bucketing approach". In that respect, institutions shall count all verifiable prices allocated to a bucket to assess whether the bucket "passes" the modellability assessment for any risk factors that belong to the bucket. The modellability of a bucket is based on the same criteria as outlined under section 3.2 for risk factors. A verifiable price must be allocated to a bucket where it is representative for any possible risk factor that belongs to the bucket.

To this end, institutions may choose from the following bucketing approaches:

a) The "own bucketing approach": Under this approach, institutions shall define the buckets around their own risk factors such that each bucket shall include exactly one risk factor.

b) The "regulatory bucketing approach": Under this approach, institutions shall use, at a minimum, a set of standard buckets predefined by these draft RTS in line with international regulatory standards:

   i. For interest rate, foreign exchange and commodity risk factors with one maturity dimension (t – expressed in years) (excluding implied volatilities) the buckets in row i must be used.

   ii. For interest rate, foreign exchange, and commodity risk factors with several maturity dimensions (t – expressed in years) (excluding implied volatilities) the buckets in row ii must be used.

   iii. For credit spread and equity risk factors with one or several maturity dimensions (t – expressed in years) (excluding implied volatilities) the buckets in row iii must be used.

   iv. For any risk factors with one or several strike/moneyness dimensions (Delta – δ) the buckets in row iv must be used. For option markets where alternative definitions of moneyness are standard, banks shall convert the regulatory delta buckets to the market-standard convention using their own documented and independently reviewed pricing models.

   v. For expiry and strike dimensions of implied volatility risk factors (excluding those of interest rate option instruments), the buckets in rows iii and iv below shall be used.

   vi. For maturity, expiry and strike dimensions of implied volatility risk factors from interest rate option instruments, the buckets in row ii, iii and iv below must be used.

Table 1: Regulatory buckets

Bucket no.	1	2	3	4	5	6	7	8	9
i.	$0 \leq t < 0.75$	$0.75 \leq t < 1.5$	$1.5 \leq t < 4$	$4 \leq t < 7$	$7 \leq t < 12$	$12 \leq t < 18$	$18 \leq t < 25$	$25 \leq t < 35$	$35 \leq t$
ii.	$0 \leq t < 0.75$	$0.75 \leq t < 4$	$4 \leq t < 10$	$10 \leq t < 18$	$18 \leq t < 30$	$30 \leq t$			
iii.	$0 \leq t < 1.5$	$1.5 \leq t < 3.5$	$3.5 \leq t < 7.5$	$7.5 \leq t < 15$	$15 \leq t$				
iv.	$0 \leq \delta < 0.05$	$0.05 \leq \delta < 0.3$	$0.3 \leq \delta < 0.7$	$0.7 \leq \delta < 0.95$	$0.95 \leq \delta \leq 1$				

In line with international regulatory standards, the RTS include a specific provision for debt instruments for consultation to address the problem of issuances becoming non-modellable simply because they cross into a new maturity bucket although they maintain an adequate trading volume: as debt instruments mature, verifiable prices for those products that have been identified within the prior 12 months are usually still counted in the maturity bucket to which they were initially allocated. When institutions no longer need to model a credit spread risk factor belonging to a given maturity bucket, banks are allowed to reallocate the verifiable prices of this bucket to the adjacent (shorter) maturity bucket.

For instance, if a bond with an original maturity of 4 years, had a verifiable price on its issuance date 8 months ago, institutions can opt to allocate the verifiable price to the bucket [1.5; 3.5] instead of the bucket [3.5; 7.5] to which it would normally be allocated.

In addition, where systematic risk factors of credit or equity risk factors include a maturity dimension (e.g. a credit spread curve), a bucketing approach shall be used for this maturity dimension to count verifiable prices for the modellability assessment.

3.6 Modellability assessment for parametric curves, surfaces or cubes

Where an institution uses a mathematical function to represent a curve, surface or cube and defines the function parameters as the risk factors in its risk measurement model, the assessment of modellability must still be performed based on the buckets underlying the curve, surface or cube (like in the case where an institution defines grid points of the curve, surface or cube as its risk factors).
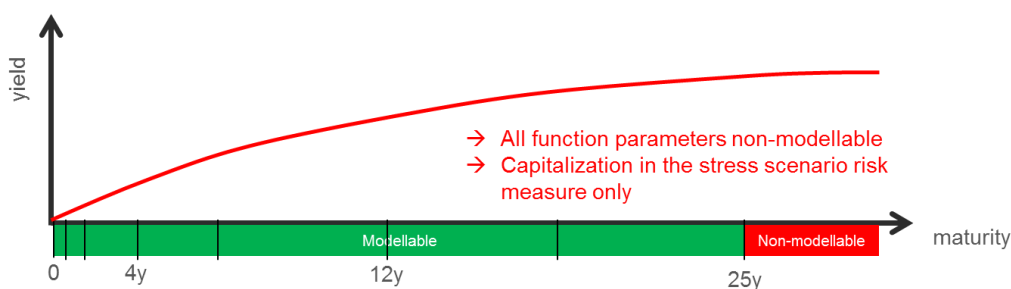
Consider the following examples:

- Principal components derived by a PCA from time series for the different grid points of an interest rate curve. Here, the modellability assessment shall be conducted for the interest rate buckets according to row i in Table 1;

- The parameters of an interest rate curve fitted to a point cloud of rate vs. maturity observations through some optimization algorithm (e.g. Nelson Siegel approach). Here, the modellability assessment shall be conducted for the interest rate buckets according to row i in Table 1;

- SABR parameters derived from prices of swaptions covering different maturities, tenors and strikes. Here, the modellability assessment shall be conducted for the buckets according to rows ii, iii and iv in Table 1.

When the entire curve, surface or cube is classified as modellable (i.e. all the buckets that contain points of the curve or surface are classified as modellable), the function parameters are considered
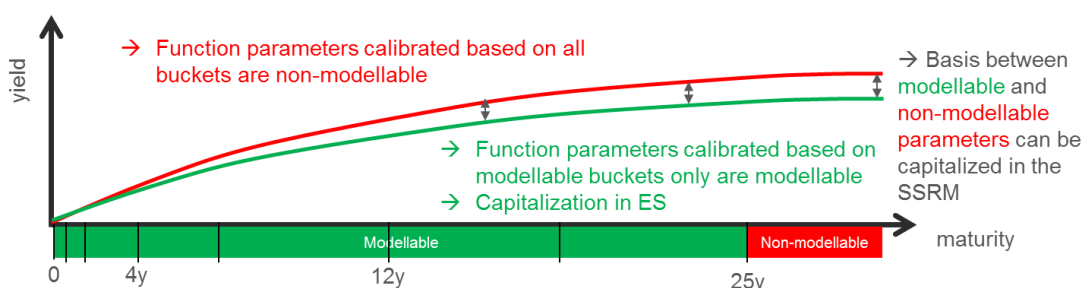
modellable. Nevertheless, the consequences for the modellability of the parameters representing a curve, surface or cube in case some buckets are assessed as modellable and some as non-modellable need to be specified.

In this regard, the following approaches are considered: the function parameters shall be assessed as modellable only if all the buckets of the curve, surface or cube are modellable. In any other case the function parameters are considered non-modellable.

Although it is a clear and easy rule, it has the drawback that a full curve, surface or cube could be pushed to the stress scenario risk measure just because one bucket (maybe not even a relevant bucket for the institution, e.g. at the far end of the curve) is non-modellable. In order to mitigate the potential overly punitive effect of the proposed approach, two alternatives are introduced for consultation:

1. Institutions can use data from only modellable buckets to determine the function parameters and include those parameters in the calculation of the expected shortfall. Optionally, the institution may additionally use data from all - modellable and non-modellable - buckets to determine a second set of parameters and include the difference between the two parameter sets in the calculation of the stress scenario risk measure.

The institution hence would have the choice to follow a simple but potentially strict approach or a more complex approach which allows an inclusion of the function parameters in the expected shortfall in more cases. Option 1 comes with the drawback that – in order to capitalize the curve, surface or cube in the expected shortfall – the function parameters would be based only on the reduced, modellable set of buckets instead of using all data available. Furthermore, it would force institutions to rebuild the whole data history of the function parameters every quarter based on the currently modellable/non-

modellable buckets, which can be especially problematic and burdensome in case of unstable modellability results for the buckets.

2. Institutions can define as risk factors in its internal risk-measurement model the output values of the function representing the curve, surface or cube. Then, where risk factors belong to a modellable bucket, they can be considered modellable; on the other hand, all the risk factors that belong to non-modellable buckets must be considered non-modellable, and consequently for those risk factors the own funds requirements for market risk must be computed using the stress scenario risk measure.

The CP aims at getting institutions' and stakeholders' views on the practicability of the different alternatives.

4.   Draft Regulatory Technical Standards on Criteria for assessing assessing the modellability of risk factors under the Internal Model Approach (IMA) under Article 325be(3) of proposed amended Regulation (EU) No 575/2013 (Capital Requirements Regulation 2 - CRR2)

In between the text of the draft RTS that follows, further explanations on specific aspects of the proposed text are occasionally provided, which either offer examples or provide the rationale behind a provision, or set out specific questions for the consultation process. Where this is the case, this explanatory text appears in a framed text box.

COMMISSION DELEGATED REGULATION (EU) No …/..

of XXX

[…]

supplementing Regulation (EU) No 575/2013 of the European Parliament and of the Council with regard to regulatory technical standards to further specify the criteria for assessing the modelability of risk factors under the Internal Models Approach (IMA) under Article 325be(3)

(Text with EEA relevance)

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union,

Having regard to Regulation (EU) No 575/2013 of 26 June 2013 of the European Parliament and of the Council on prudential requirements for credit institutions and investment firms and amending Regulation (EU) No 648/2012[3], and in particular of Article 325be(3) thereof,

Whereas:

(1)   In accordance with Article 325be(1) of Regulation (EU) No 575/2013, institutions shall assess the modellability of each and every risk factor included (or in the process of being included) in their internal model, i.e. under the scope of Chapter 1b, Title IV, Part Three of Regulation (EU) No 575/2013. Accordingly, modellable risk factors may be included in the expected shortfall risk measure under Article 325bb of Regulation (EU) No 575/2013, while non-modellable risk factors should be included in the stress scenario risk measure under Article 325bk of that Regulation. The criteria that should be satisfied in order for the risk factors to be assessed as modellable should be specified in regulatory technical standards, ensuring a uniform application of the assessment and taking into account the relevant international framework defined by the Basel Committee on Banking Supervision (BCBS) in "Minimum capital requirements for market risk"[4].

(2)   The assessment of the modellability of a risk factor should be based on the identification, in the 12-month observation period ending at the reporting reference date that immediately precedes the assessment, of a sufficient number of verifiable prices that are representative of that risk factor. However, where an institution uses data for verifiable prices from an external

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[3] OJ L 150, 7.6.2019, p. 1.

[4] January 2019 (rev. February 2019)

source and those data are available with a delay, the period used for the assessment may be allowed to differ from that 12-month observation period. In order to ensure consistency of the institution's overall assessment of modellability and promote harmonised practices across the Union, shifted periods should not be allowed to differ by more than one month from that 12-month observation period and institutions should use those shifted periods in a consistent way across risk factors, specifying their usage in a detailed documentation.

(3)   For the purposes of assessing the modellability of risk factors, institutions should also be allowed to use information based on prices collected from a third-party vendor provided that those prices are verifiable according to this Regulation. The third-party vendor should be, in any case and regardless of the type of information provided to the institution, subject to an audit by a third-party undertaking regarding the validity of its information. In order to ensure compliance of the information provided by third-party vendors with this Regulation, competent authorities should be able, where assurances with respect to the validity the information provided by a third-party vendor cannot be provided, to disallow the use of that information. In order to ensure a harmonised application across the Union, competent authorities should notify the European Banking Authority of any such decision.

(4)   A key step in the assessment of modellability of risk factors consists in assessing the representativeness of identified verifiable prices for those risk factors. A verifiable price is representative for a risk factor of an institution where the institution is able to extract the value of the risk factor from the value of the verifiable price. However, a number of common extraction methodologies need additional input data in order to be able to provide the value of the risk factor. Those additional input data should be based on objective information, which should also be documented. This should prevent institutions from demonstrating representativeness on the basis of biased or unsound extraction methodologies. Due to their lack of verifiability and representativeness, collateral reconciliations or valuations should, in line with international standards, not be considered eligible sources of verifiable prices.

(5)   Where a risk factor is a point of a curve, a surface or any other higher dimensional objects such as cubes, in order to count verifiable prices for the assessment of modellability, institutions should be allowed to choose among different bucketing approaches the one that is more appropriate for the given curve, surface or cube. In line with international standards, this Regulation should recognise the fact that, given the shared characteristics of risk factors belonging to a given bucket, the verifiable prices representative for one risk factor in a bucket should also be representative for any of the risk factors in the same bucket. Hence, in order to assess the modellability of risk factors belonging to a curve, surface or cube, it should be sufficient to assess the modellability of each bucket of that curve, surface or cube, using all the verifiable prices that are allocated to that bucket. In addition, these regulatory technical standards should also address the case where an institution uses a parametric function to represent a curve, surface or cube and defines the function parameters as the risk factors in its risk-measurement model. In that case, considering that verifiable prices may not exist that are directly representative of those function parameters, these standards should specify how the modellability assessment should be performed.

(6)   This Regulation is based on the draft regulatory technical standards submitted by the European Banking Authority (EBA) to the Commission.

(7)   EBA has conducted open public consultations on the draft regulatory technical standards on which this Regulation is based, analysed the potential related costs and benefits and

requested the opinion of the Banking Stakeholder Group established in accordance with Article 37 of Regulation (EU) No 1093/2010[5],

HAS ADOPTED THIS REGULATION:

Article 1

Criteria for the modellability of risk factors

1. A risk factor subject to the assessment in accordance with Article 325be(1) of Regulation (EU) No 575/2013 shall be considered modellable for the purpose of Article 325be where, over an observation period of 12-months ending at the preceding reporting reference date as referred to in Article 2(1)(b) of Commission Implementing Regulation (EU) No 680/2014, the institution has identified either of the following:

    (a) A minimum of 24 verifiable prices with distinct observation dates which are representative for the risk factor and for which there shall be no 90-days period with less than four of those verifiable prices;

    (b) A minumum of 100 verifiable prices with distinct observation dates which are representative for the risk factor.

2. Where a risk factor subject to the assessment in accordance with Article 325be(1) of Regulation (EU) No 575/2013 is a point of a curve, a surface or a cube, the institution shall assess the modellability of that risk factor in accordance with Article 4.

3. Where an institution, in its internal risk-measurement model, uses a mathematical function ('parametric function') to represent a curve, a surface or a cube, and defines the function parameters as the risk factors in its internal risk-measurement model, the institution shall assess the modelability of those risk parameters in accordance with Article 5.

4. To account for possible delays in data availability, an institution may replace the 12-month period referred to in paragraph 1 by a 12-month period that is ending no earlier than one month before the preceding reporting reference date as referred to in Article 2(1)(b) of Commission Implementing Regulation (EU) No 680/2014, where all of the following conditions are met:

    (a) the institution applies the shifted 12-month period consistently across all risk factors of the same type as that risk factor;
    (b) the institution applies the shifted 12-month period consistently across time;
    (c) the institution documents the use of a 12-month period in accordance with this paragraph.

    For the purpose of point (a), all risk factors of a curve, a surface or a cube, shall be considered of the same type.

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[5] Regulation (EU) No 1093/2010 of the European Parliament and of the Council of 24 November 2010 establishing a European Supervisory Authority (European Banking Authority), amending Decision No 716/2009/EC and repealing Commission Decision 2009/78/EC (OJ L 331, 15.12.2020, p. 12).

Article 2

Verifiable prices

1. For the purposes of Article 1, a price shall be considered verifiable where it is obtained from any of the following:

   (a) an actual transaction to which the institution was one of the parties and which was entered into at arm's length;

   (b) an actual transaction which was entered into by third parties at arm's length;

   (c) a committed quote provided at arm's length by the institution itself or a third party.

   For the purposes of point (c), a quote shall be considered committed only where the provider of the quote is legally obliged to buy and sell the corresponding financial instrument at that price if requested.

Explanatory text for consultation purposes

In paragraph 31.12 FAQ 1 of the BCBS document "Minimum capital requirements for market risk"[6], a committed quote is defined as '*[…] a price from an arm's length provider at which the provider of the quote must buy or sell the financial instrument*'.

On the one hand, it could be considered that the provider of a quote must be willing to both buy and sell. On the other hand, it could be considered as sufficient that the provider is only willing to either buy or sell. Although this would lead to a decreased number of quotes eligible to be considered in the modellability assessment, the requirement of willingness to buy and sell is, in any case, an additional safeguard ensuring that only sound prices are counted as verifiable prices.

Alternatively, if it is considered sufficient that a provider is only willing to either buy or sell, the existence in the market of a committed quote to buy from a provider and of a committed quote to sell from another provider could be considered as a verifiable price provided that the bid-offer spread between those two quotes is not unreasonably large.

Questions

Q1. Do you agree that a committed quote, to be considered verifiable, should be required to have both a firm bid <u>and</u> offer price? If you think that solely a bid <u>or</u> offer price should be sufficient please provide a convincing rationale.

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[6] https://www.bis.org/bcbs/publ/d457_faq.pdf

Q2. Please provide an estimation of the impact of requiring solely a firm bid <u>or</u> offer price compared to requiring both. Please provide this impact e.g. in terms of number of non-modellable risk factors, stress scenario risk measure charge or number of eligible committed quotes for different risk factors/ risk factor categories.

2. For the purposes of Article 1, a price shall not be considered verifiable where it is obtained from any of the following:

   (a) an actual transaction or a committed quote between two entities of the same group;

   (b) an actual transaction or a committed quote of a negligible volume as compared to usual sizes of transactions or quotes, reflective of normal market conditions;

   (c) a committed quote with an unreasonably large bid-offer spread as compared to usual bid-offer spreads, reflective of normal market conditions;

Explanatory text for consultation purposes

In paragraph 31.12 FAQ 2 of the BCBS document "Minimum capital requirements for market risk", it is outlined that only "*Orderly transactions and eligible committed quotes with a non-negligible volume, as compared to usual transaction sizes for the bank, reflective of normal market conditions can be generally accepted as valid [as real price observations]*".

Similarly, the EBA believes that the bid-offer spread of a quote should not be unreasonably large compared to usual bid-offer spreads, reflective of normal market conditions, for the price to be considered as verifiable.

Questions

Q3. How would you define and check for a "non-negligible volume of a transaction or quote, as compared to usual transaction sizes for the bank, reflective of normal market conditions" for the purpose of assessing the validity of a price observation?

Q4. How would you define and check for an "unreasonably large bid-offer spread as compared to usual bid-offer spreads, reflective of normal market conditions" for the purpose of assessing the validity of a price observation obtained from a committed quote? In your response, please provide a detailed reasoning.

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3. Transactions shall not be conducted and quotes shall not be committed with the sole purpose of identifying a sufficient number of verifiable prices that allows to meet the criteria specified in Article 1.

4. The observation date of a verifiable price shall correspond to the day of execution for transactions and to the day on which the quote was committed for quotes. The observation date of verifiable prices shall be recorded based on a consistent single time zone across all data sources.

5. For the purpose of this Regulation, a third-party vendor shall be defined as an undertaking that provides data on transactions or committed quotes to institutions for the purpose of Article 1. The definition of third-party vendor may include, but is not limited to, data reporting service providers as defined in Article 4(1)(63) of Directive 2014/65/EU and multilateral systems as defined in Article 4(1)(19) of Directive 2014/65/EU.

6. A transaction or a committed quote shall be used for the purpose of points (b) and (c) of paragraph 1 only where all the following conditions are met:

   (a) the transaction or committed quote has been processed through, or collected by, a third-party vendor;

   (b) the third-party vendor or the institution has agreed to provide evidence of the transaction or committed quote and evidence of the verifiability of its price to the institution's competent authorities upon request;

   (c) the third-party vendor has provided to the institution the observation date and a minimum set of information about the transaction or commited quote on the basis of which the institution is able to map the verifiable price to its risk factors for which it is representative in accordance with Article 3;

   (d) the institution has verified that the third-party vendor is subject, at least annually, to an independent audit by a third-party undertaking, within the meaning of Article 325bi(1)(h) of Regulation (EU) No 575/2013, regarding the validity of its price information, governance and processes, and has access to audit results and reports. Upon request, the institution shall provide audit results and reports to its competent authorities.

Explanatory text for consultation purposes

Institutions may use data from third-party vendors as input to the modellability assessment. Whereas in paragraph 31.14 of the BCBS document "Minimum capital requirements for market risk" third-party vendors are required to be subject to an audit only in case the vendors solely communicate limited information to the institution (i.e. number of observed verifiable prices and observation dates together with a minimum set of identifier information to map the price to the institutions' risk factors, instead of comprehensive transaction/quote details including the price), the EBA considers it as an additional safeguard to require all sources of external data to be subject to the same requirements including an audit.

Question

Q5. Do you see any problems with requiring that institutions are allowed to use data from external data providers as input to the modellability assessment <u>only</u> where the external data providers are regularly subject to an independent audit (independent of whether the price is shared with the institution or not)? If so, please describe them thoroughly (i.e. for which data providers and the reasons for it).

7. Where a third-party vendor does not provide the institution with the information to verify that a price is verifiable in accordance with paragraphs 1 and 2, the institution shall be able to demonstrate to its competent authority that the third-party vendor is contractually obliged to verify itself that a price is verifiable in accordance with paragraphs 1 and 2.

Explanatory text for consultation purposes

Legal or technical impediments may, in practice, limit the ability of third-party vendors to provide institutions with all the necessary information for institutions to be able to assess themselves the verifiability of prices. In that case, institutions could be allowed to rely on the assessment of verifiability performed by third-party providers.

In this consultative paper, the EBA is proposing, in order to mitigate potential risks or legal issues stemming from the outsourcing to third-party vendors of such assessment, to require that, at a minimum, the contract between the institution and the third-party vendor should specifically mention that the third-party vendor assesses the verifiability of prices according to this Regulation and is able to provide verifiable prices that meet all the requirements of this Regulation. However, the EBA is also investigating what additional requirements or safeguards would allow framing this flexibility more clearly in the legal text.

Question

Q6. Do you have any proposals on additional specifications that could be included in the legal text in order to ensure that verifiable prices provided by third-party vendors meet the requirements of this Regulation?

8. Competent authorities may decide to prevent institutions from using information on verifiable prices from a third-party vendor for the purpose of this Regulation where institutions cannot demonstrate that the third-party vendor meets the requirements under this Regulation to the satisfaction of the competent authorities, or where other competent authorities have prevented institutions from using information from a third-party vendor. Competent authorities shall notify the EBA where they have made use of this provision.

Article 3

Representativeness of verifiable prices for risk factors

1. A verifiable price shall be considered representative of a risk factor as of its observation date where both the following conditions are met:

   (a) the institution has demonstrated that there is a close relationship between the risk factor and the verifiable price;

   (b) the institution has specified a conceptually sound methodology to extract the value of the risk factor from the verifiable price. Any input data or risk factor used in that methodology other than that verifiable price shall be based on objective data.

2. Any verifiable price may be counted for the purpose of Article 1 for all of the risk factors for which it is representative in accordance with paragraph 1.

3. Where an institution uses a systematic credit or equity risk factor to capture market-wide movements for given attributes of a pool of issuers, such as the country, region or sector of those issuers, verifiable prices of market indices or instruments of individual issuers shall be considered representative for that systematic risk factor, only where they share the same attributes as that systematic risk factor.

Article 4

Modellability of risk factors belonging to curves, surfaces and cubes

1. Where a risk factor subject to the assessment in accordance with Article 325be(1) of Regulation (EU) No 575/2013 is a point of a curve, a surface or a cube, the institution shall determine the modellability of that risk factor in accordance with this article.

2. For each curve, surface or cube, the institution shall choose one of the two bucketing approaches set out in Article 6.

3. A bucket set out in accordance with Article 6 shall be considered modellable where, over an observation period of 12-months ending at the preceding reporting reference date as referred to in Article 2(1)(b) of Commission Implementing Regulation (EU) No 680/2014, the institution has identified, for that bucket, either of the following:

   (a) A minimum of 24 verifiable prices with distinct observation dates which are allocated to that bucket and for which there shall be no 90-days period with less than four of those verifiable prices;

   (b) A minimum of 100 verifiable prices with distinct observation dates which are allocated to that bucket.

4. A verifiable price shall be allocated to a bucket where it is representative in accordance with Article 3 for a risk factor that belongs to that bucket.

5. For the purpose of paragraph 4, the institution may consider as a risk factor any point of the curve belonging to the bucket, regardless of whether such point is a risk factor included in the risk-measurement model.

6. Any risk factor belonging to a modellable bucket shall be considered modellable for the purposes of Article 1.

Article 5

Modellability of risk factors belonging to parametric curves, surfaces and cubes

1. Where an institution, in its internal risk-measurement model, uses a mathematical function ('parametric function') to represent a curve, a surface or a cube, and defines the function parameters as the risk factors in its internal risk-measurement model, the institution shall assess the modelability of those function parameters in accordance with this article.

2. For each parametric curve, surface or cube, the institution shall:

   (a) identify the set of points in the curve, surface or cube that were used to calibrate the function parameters;

   (b) choose one of the two bucketing approaches set out in Article 6 and apply the bucketing approach as if the risk factors in the risk-measurement model were the data points identified in point (a);

   (c) assess, in accordance with paragraph 3 of Article 4, the modellability of the buckets resulting from the application of the bucketing approach in point (b), as if the risk factors in the risk-measurement model were the data points identified in point (a).

3. The institution shall assess the modellability of the function parameters as follows:

   (a) where all the buckets of the curve, surface, or cube are modellable in accordance with paragraph 2, all those function parameters shall be considered modellable;

   (b) where one or more than one bucket of the curve, surface, or cube is not modellable in accordance with paragraph 2, none of those function parameters shall be considered modellable;

   (c) by way of derogation from point (b), where one or more than one bucket of the curve, surface, or cube is not modellable in accordance with paragraph 2, an insitution may apply one of the following approaches:
      i. **[OPTION 1]**
         1. The institution shall use data inputs from only modellable buckets to determine a first set of parameters of the function representing the curve, surface or cube and consider those parameters as modellable risk factors; and,
         2. The institution may additionally use data inputs from all modellable and non-modellable buckets to determine a second set of parameters of the function representing the curve, surface or cube and, for each parameter, consider the

difference between the parameter in the second set of parameters and the parameter in the first set of parameters, as a non-modellable risk factor.

ii.   **[OPTION 2]** The institution shall:
1. redefine as risk factors for that curve, surface or cube in its internal risk-measurement model the data points of the curve, surface or cube represented by the mathematical function;
2. consider those risk factors modellable, where they belong to a modellable bucket;
3. consider those risk factors non-modellable, where they belong to a non-modellable bucket.

Explanatory text for consultation purposes

In cases where institutions use a mathematical function to represent curves, surfaces or cubes and choose the function parameters, which define the shape of the whole curve, surface or cube, as its risk factors, the consequence on the modellability of the parameters (and hence on their inclusion in expected shortfall or SSRM) have to be specified, where one or more buckets of this curve, surface or cube are non-modellable whilst others are modellable.

Different options are outlined above.

The EBA would like to better understand the advantages and disadvantages of the different possible approaches. Based on a more thorough review after consultation, the EBA will reassess which of these options to keep.

Questions

Q7. How relevant are the provisions outlined above for your institution? How many and which curves, surfaces or cubes are (planned to be) represented by a mathematical function with function parameters chosen as risk factors in your (future) internal model?

Q8. Do you have a preference for any of the options outlined above? For which reasons? Please motivate your response.

Q9. Do you consider any of the options outlined above as impossible or impractical? For which reasons? Please motivate your response.

Q10. Do you have alternative proposals to define the consequence on the modellability of the parameters where some buckets of a curve, surface or cube are modellable whilst others are non-modellable?

Article 6

Bucketing approaches for risk factors belonging to curves, surfaces or cubes

1. For risk factors belonging to a curve, surface or cube, institutions may choose to use, for each given curve, surface or cube, either the bucketing approach set out in paragraph 2 or the bucketing approach set out in paragraph 3. Institutions shall use only one bucketing approach per curve, surface or cube.

2. For the purpose of paragraph 1, institutions may define the buckets of a curve, surface or cube themselves, where all the following conditions are met:

   (a) the buckets cover the whole curve, surface or cube;
   (b) the buckets are non-overlapping;
   (c) each bucket includes exactly one risk factor that is part of the calculation of the theoretical changes in the trading desk portfolios' values of the institution for the purposes of assessing the compliance with the P&L attribution requirements in accordance with Article 325bg of Regulation (EU) No 575/2013.

3. For the purpose of paragraph 1, institutions may use the following set of standard, pre-defined buckets:

   (a) the 9 buckets defined in row i. of Table 1 for risk factors with one maturity dimension $'t'$, expressed in years, which have been assigned to the following broad risk factor categories:
      i. Interest rate, except those risk factors assigned to the broad risk factor subcategory Volatility;
      ii. Foreign Exchange, except those risk factors assigned to the broad risk factor subcategory Volatility;
      iii. Commodity, except those risk factors assigned to the broad risk factor subcategories Energy volatility and carbon emissions volatility, Precious metal volatility and non-ferrous metal volatility and Other commodity volatilities;

   (b) the 6 buckets defined in row ii. of Table 1 for each maturity dimension $'t'$ of risk factors with more than one maturity dimension, expressed in years, which have been assigned to the following broad risk factor categories:
      i. Interest rate, except those risk factors assigned to the broad risk factor subcategory Volatility;
      ii. Foreign Exchange, except those risk factors assigned to the broad risk factor subcategory Volatility;
      iii. Commodity, except those risk factors assigned to the broad risk factor subcategories Energy volatility and carbon emissions volatility, Precious metal volatility and non-ferrous metal volatility and Other commodity volatilities;

   (c) the 5 buckets defined in row iii. of Table 1 for each maturity dimension $'t'$ for risk factors with one or several maturity dimensions, expressed in years, which have been assigned to the following broad risk factor categories:
      i. Credit spread, except those risk factors assigned to the broad risk factor subcategory Volatility;
      ii. Equity, except those risk factors assigned to the broad risk factor subcategories Volatility (Large capitalisation) and Volatility (Small capitalisation);

(d) the 5 buckets defined in row iv. of Table 1 for any risk factors with one or several moneyness dimensions, as expressed using the delta ('δ') convention. For option markets where alternative definitions of moneyness are standard, institutions shall convert the buckets defined in row iv. of Table 1 to the market-standard convention using their own documented and independently reviewed pricing models.

(e) the 5 buckets defined in row iii. and the 5 buckets defined in row iv. of Table 1 for risk factors assigned to the following broad risk factor categories:
   i. Foreign Exchange, exclusively those risk factors assigned to the broad risk factor subcategory Volatility;
   ii. Credit spread, exclusively those risk factors assigned to the broad risk factor subcategory Volatility;
   iii. Equity, exclusively those risk factors assigned to the broad risk factor subcategories Volatility (Large capitalisation) and Volatility (Small capitalisation);
   iv. Commodity, exclusively those risk factors assigned to the broad risk factor subcategories Energy volatility and carbon emissions volatility, Precious metal volatility and non-ferrous metal volatility and Other commodity volatilities;

(f) the 6 buckets defined in row ii., the 5 buckets defined in row iii. and the 5 buckets defined in row iv. of Table 1 for risk factors assigned to the broad risk factor category interest rate and to the broad risk factor subcategory Volatility with an maturity, expiry and moneyness dimension.

Table 1

Bucket no.	1	2	3	4	5	6	7	8	9
i.	$0 \leq t < 0.75$	$0.75 \leq t < 1.5$	$1.5 \leq t < 4$	$4 \leq t < 7$	$7 \leq t < 12$	$12 \leq t < 18$	$18 \leq t < 25$	$25 \leq t < 35$	$35 \leq t$
ii.	$0 \leq t < 0.75$	$0.75 \leq t < 4$	$4 \leq t < 10$	$10 \leq t < 18$	$18 \leq t < 30$	$30 \leq t$			
iii.	$0 \leq t < 1.5$	$1.5 \leq t < 3.5$	$3.5 \leq t < 7.5$	$7.5 \leq t < 15$	$15 \leq t$				
iv.	$0 \leq \delta < 0.05$	$0.05 \leq \delta < 0.3$	$0.3 \leq \delta < 0.7$	$0.7 \leq \delta < 0.95$	$0.95 \leq \delta \leq 1$				

A given standard bucket may be subdivided in smaller buckets.

4. For the assessment of modellability of risk factors of the broad risk factor category Credit spread belonging to a certain maturity bucket, institutions are allowed to reallocate the verifiable prices of a bucket to the adjacent bucket related to shorter maturities only if all the following conditions are met:

(a) the institution does not have exposure to any risk factor belonging to the bucket related to the longer maturities and hence does not use any of these risk factors within its risk-management model;

(b) any verifiable price is only counted in a single maturity bucket;

(c) any verifiable price is only reallocated once.

Explanatory text for consultation purposes

As debt instruments mature, verifiable prices for those products that have been identified within the prior 12 months are usually still counted in the maturity bucket to which they were initially allocated. Where institutions no longer need to model a credit spread risk factor belonging to a given maturity bucket, banks can be allowed to reallocate the verifiable prices of this bucket to the adjacent (shorter) maturity bucket.

For instance, if a bond with an original maturity of 4 years, had a verifiable price on its issuance date 8 months ago, banks can opt to allocate the verifiable price to the bucket [1.5; 3.5] instead of the bucket [3.5; 7.5] to which it would normally be allocated.

On the one hand, this addresses problems with issuances becoming non-modellable simply because they crossed into a new maturity bucket even when they maintain an adequate trading volume.

On the other hand this provision adds complexity to the framework and makes the outcome of the modellability assessment dependent on the portfolio of the institution. Furthermore, to model the risk of an issuance, data for the risk factors associated to its current maturity is needed. If the current bucket of the issuance is non-modellable, it means a bank does not have this data and the bucket might be non-modellable rightfully.

The EBA would like to better understand potential issues associated with this provision.

Question

Q11. Do you intend to apply paragraph 4? If so, for which risk factors will it be relevant? Do you expect any implementation issues related to it? Please explain expected issues thoroughly.

Article 7

Documentation

1. The following shall be documented and clearly described in the internal policies of institutions:

   (a) the set and definitions of risk factors in their internal risk-measurement model subject to the modellability assessment;

   (b) the sources of verifiable price information used to assess the modellability of risk factors;

   (c) the criteria for a price to be considered verifiable in accordance with Article 2. The policies shall specifically outline how the institution assesses whether the volume of a transaction or committed quote is non-negligible in accordance with paragraph 2(b) of Article 2 and

whether the bid-offer spread of a quote is reasonable in accordance with paragraph 2(c) of Article 2;

(d) the mapping process and the criteria used to determine the representativeness of verifiable prices to risk factors in accordance with Article 3. The policies shall specifically outline the methodology specified for the extraction of the value of the risk factor and any additional input the methodology potentially requires;

(e) the modellability assessment for parametric curves, surfaces or cubes in accordance with Article 5;

(f) the use of the bucketing approaches in accordance with Article 6, also specifiying if and how the institution applies the provision in paragraph 4 of Article 6.

(g) the use of the 12-month period in accordance with Article 1(4).

2. For each risk factor, institutions shall keep a tracked record of at least one year of the results of its modellability assessment. For risk factors for which one year of results is not yet available, institutions shall keep the maximum available track record of results.

Explanatory text for consultation purposes

This Regulation aims at ensuring a uniform application of the modellability assessment across institutions within EU, while taking into account the relevant international framework defined by BCBS.

Questions

Q12. Do you agree with the outlined methodology for the assessment of modellability of risk factors? If not, please explain why.

Q13. Do you expect any problems for the modellability assessment arising from the upcoming benchmark rate transition that could be addressed via this regulation? If so, please provide a thorough description and potential solutions if any.

Q14. How do you intend to integrate the risk factor modellability assessment (i.e. RFET) into the processes of your institution? Do you expect those data to be used for the purpose of the RFET only or do you think those data would increase the data availability used e.g. for the calibration of your internal model (under para 31.26 of 2019 Basel rules)? What percentage of data used for the RFET do you think will be used also for the calibration of your internal model?

Article 8
Entry into force

This Regulation shall enter into force on the twentieth day following that of its publication in the *Official Journal of the European Union*.

This Regulation shall be binding in its entirety and directly applicable in all Member States.

Done at Brussels,

For the Commission
The President

[For the Commission
On behalf of the President

[Position]

5. Accompanying documents

5.1 Draft cost-benefit analysis / impact assessment

Article 325be of the CRR2 requires the EBA to develop draft RTS to specify the criteria for assessing the modellability of risk factors for positions attributed to trading desks that have be granted or are in the process of being granted the permission to use internal models for calculating own funds requirements for market risk.

As per Article 10(1) of Regulation (EU) No 1093/2010 (EBA Regulation), any regulatory technical standards developed by the EBA shall be accompanied by an Impact Assessment (IA), which analyses 'the potential related costs and benefits'.

This section presents the cost-benefit analysis of the provisions included in the RTS described in this CP. The analysis provides an overview of identified problems, the proposed options to address those problems and the costs and benefits of those options.

A. Problem identification

In January 2019, the Basel Committee on Banking Supervision (BCBS) finalised the standards on "Minimum capital requirement for market risk". The revised internal model approach includes three components for measuring capital requirements: (i) an expected shortfall (ES) metric, which determines capital requirements for those market risk factors (i.e. market variables such as interest rates or equity prices that affect the value of financial instruments) for which a sufficient amount of observable market data is available and therefore are deemed suitable for modelling ("modellable" risk factors); (ii) a non-modellable risk factor (NMRF) requirement for market risk factors with limited observable market data which are deemed not suitable for modelling; and (iii) a default risk capital (DRC) requirement, to determine the capital requirements associated with default risk for credit and equity positions.

The revised framework recognises that there is significant uncertainty in modelling risks for which there are limited observable historical market data, and prevents banks from modelling those risks within their ES model. Risk factors (e.g. FX rates or equity prices) that do not have sufficient observable market data are deemed to be non-modellable (i.e. NMRFs). NMRFs are excluded from the ES calculation; instead, the capital requirement for each NMRF is determined by means of a stress test.

Under the Basel standards, for a risk factor to be classified as modellable by a bank, a necessary condition is that it "passes" the risk factor eligibility test (RFET). This test requires identification of a sufficient number of real prices that are representative of the risk factor. In addition, banks must apply certain principles to determine whether a risk factor that "passed" the RFET can be modelled within the ES model or should be subject to capital requirements as an NMRF.

The CRR2 which implements the FRTB into the EU, requests the EBA to specify the criteria for modellability of risk factors. The lack of a common specification, would result in an inconsistent implementation of the internal model approach for the calculation of the own funds requirements for market risk across banks.

B. Policy objectives

The specific objective of the RTS are to establish harmonised criteria for assessing the modellability of risk factors. Generally, the RTS aim to create a level playing field, promote convergence of institutions' practices and enhance comparability of own funds requirements across the EU. Overall, the RTS are expected to promote the effective and efficient functioning of the EU banking sector.

C. Baseline scenario

The baseline scenario aims to describe the regulatory environment and regulatory developments, as well the institutions' practices.

In terms of regulatory environment, the baseline assumes the entry into force of the CRR2, which does not provide any criteria for assessing the modellability of risk factors. Institutions could rely on the RFET test and principles proposed in the FRTB standards in assessing modellability of risk factors.

In terms of institutions' practices, the baseline scenario assumes that no common criteria exists regarding the assessment of modellability of risk factors, given that under the current CRR framework, institutions are allowed to model all risks inherent in their trading portfolio and are thus not required to distinguish between modellable and non-modellable risk factors.

D. Options considered, Cost-Benefit Analysis and Preferred Options

Bid-ask spread

FRTB FAQ defines a committed quote as a price from an arm's length provider at which the provider of the quote must buy or sell the financial instrument. Two different interpretations are considered.

Option 1a: For a committed quote to be considered as verifiable price, it shall have either a firm bid or offer price.

Option 1b: For a committed quote to be considered as verifiable price, it shall have both a firm bid and offer price.

Under Option 1a it is sufficient if the provider is only willing to either buy or sell. Option 1b requires that the provider is willing to both buy <u>and</u> sell a financial instrument, ensuring that only sound prices, for which a transaction can be conducted from either the buy- or sell-side, are counted as

verifiable prices. However, this may reduce the number of quotes that can be counted as verifiable prices.

Option 1b is retained.

Delays in data availability

FRTB specifies that, when an institution uses data for real price observations from an external source, and those observations are provided with a time lag, the period used for the RFET may differ from the period used to calibrate the current ES model. The difference in periods used for the RFET and calibration of the ES model should not be greater than one month, meaning that for each risk factor, a one-year time period finishing up to one month before the RFET assessment can be used.

In the present RTS, to account for delays in data availability, it has been included the possibility for institutions to replace the 12-months period referred to in Article 1 paragraph 1 by a 12-months period that is ending no earlier than one month before the preceding reporting date as referred to in Article 2(1)(b) of Commission Implementing Regulation (EU) No 680/2014. However, it has been also specified that institutions shall use a consistent 12-month period across risk factor types and across time. In addition to that, they shall set out the used period per risk factor type in their policies (option 2a). Alternatively, institutions could be allowed of using a time-shift in the one-year period which is of the same length of the time delay in data availability (option 2b). Given that the latter option implies a burden which is disproportionate for the beneficial effects that it can provide, option 2a is retained.

Mapping of verifiable prices to risk factors, when the characteristics of a position or a risk factor change

The FRTB standards set out that a real price is representative for a risk factor of a bank where the bank is able to extract the value of the risk factor from the value of the real price. The bank must have policies and procedures that describe its mapping of real price observations to risk factors. However, the Basel text does not specify how exactly the counting of verifiable prices shall work for the past 12 months, i.e. which verifiable prices are exactly representative for a risk factor. This leaves room for different interpretations in the case of changes in the characteristics of a position (e.g. decreased maturity) or in the case of changes in the characteristics of a risk factor (e.g. a risk factor representing a credit index which rolls regularly or a risk factor representing implied ATM-volatility where the ATM level changed over the preceding 12 months).

Consider a verifiable price of a 5Y5Y Swaption traded almost 12 months ago at 1% strike (the ATM level at that time), with today's ATM level being at 2%. Under a first interpretation (Option 3a), the price observation is representative for today's ATM implied volatility with a 5y maturity, while under an alternative interpretation (Option 3b), the price observation is representative for today's ATM-100bp implied volatility with a 4y maturity.

Similarly, consider the risk factor representing the iTraxx. Since a new iTraxx series is determined every 6 months, the risk factor is set up to always be based on the respective most up-to-date series. Under Option 2a the price observation for series 29 stemming from almost 12 months ago is representative for a risk factor which was based on series 29 at that time and is based on series 30 now. On the other hand, under Option 3b this price observation is not representative for a risk factor which was based on series 29 at that time and is based on series 30 now.

Option 3a is retained, i.e. a verifiable price is representative of a risk factor where the institution is capable to extract the value of the risk factor from the verifiable price as of its observation date.

Mapping of verifiable prices to buckets for credit spread risk factors

Where a risk factor is a grid point of a curve or a surface, in order to count verifiable prices for the modellability assessment, institutions may use a so-called "bucketing approach". In that respect, institutions shall count all verifiable prices allocated to a bucket to assess whether the modellability assessment is "passed" for any risk factors that belong to the bucket. A verifiable price must be allocated to a bucket where it is representative for any possible risk factor that belongs to the bucket. As debt instrument mature, real price observations that have been identified within the prior 12 months are usually still counted in the maturity bucket to which they were initially allocated. This can result in issuance becoming non-modellable, simply because they cross into a new maturity bucket, even if they maintain an adequate trading volume. Two options are considered:

Option 4a: Allow to reallocate the verifiable price of a given maturity bucket to the adjacent (shorter) maturity bucket (given that certain conditions are met).

Option 4b: Do not allow to reallocate the verifiable price of a given maturity bucket to the adjacent (shorter) maturity bucket.

Option 4a is in line with international standards, which allow institutions that no longer need to model a credit spread risk factor belonging to a given maturity bucket, to reallocate the verifiable prices of this bucket to the adjacent (shorter) maturity bucket. For example, if a bond with an original maturity of four years, had a real price observation on its issuance date eight months ago, banks can opt to allocate the real price observation to the bucket associated with a maturity between 1.5 and 3.5 years instead of to the bucket associated with a maturity between 3.5 and 7.5 years to which it would normally be allocated. However, it can add complexity to the framework and make the outcome of the modellability test dependent on the portfolio of the bank. On the other hand, Option 4b, does not allow such reallocation on the basis that institutions need to have data for the risk factors associated to the current maturity of an issuance in order to model its risk. If the current bucket of the issuance is non-modellable it means an institution does not have this data and the bucket might be rightfully classified as non-modellable.

Option 4a is retained.

Modellability assessment of parametric curves, surfaces and cubes

Where an institution uses a mathematical function to represent a curve, surface or cube and defines the function parameters as the risk factors in its risk measurement model, the assessment of modellability shall still be performed based on the buckets underlying the curve, surface or cube (like in the case where an institution defines grid points of the curve, surface or cube as its risk factors). The function parameters shall be assessed as modellable only if all the buckets of the curve, surface or cube are modellable. When one or more buckets are classified as non-modellable, the criteria under which these parameters can be considered as modellable shall be specified.

Option 5a: The function parameters shall be assessed as modellable only if they are solely derived from data assigned to modellable buckets.

Option 5b: The institution shall define as the risk factors the points in the parametric function. These points are deemed modellable only where they belong to modellable buckets.

Under Option 5a, in case there are buckets which are non-modellable, institutions could either calibrate the function parameters using all buckets and hence consider them as NMRF or use data only from modellable buckets to determine the function parameters and consider those parameters as modellable. Optionally, the institution may additionally use data from all modellable and non-modellable buckets to determine a second set of parameters and include the difference between the two parameter sets in the calculation of the stress scenario risk measure. While this option will allow institutions to include the function parameters in the expected shortfall in more cases, it has the drawback that the function parameters would be based only on the reduced set of modellable buckets instead of using all data available. Furthermore, it would force institutions to rebuild the whole data history of the function parameters every quarter based on the currently modellable/non-modellable buckets, which can be especially problematic and burdensome in case of unstable modellability results for the buckets.

Option 5b, may allow banks to consider modellable the part of the curve, surface or cube that is relevant for them, and classify as non-modellable the part which maybe not relevant e.g. at the far end of the curve). However, it would force institutions to model the curve, surface or cube based on grid points instead of function parameters.

All Options are retained for consultation.

5.2 Overview of questions for consultation

Q1. Do you agree that a committed quote, to be considered verifiable, should be required to have both a firm bid and offer price? If you think that solely a bid or offer price should be sufficient please provide a convincing rationale.

Q2. Please provide an estimation of the impact of requiring solely a firm bid or offer price compared to requiring both. Please provide this impact e.g. in terms of number of non-modellable risk factors, stress scenario risk measure charge or number of eligible committed quotes for different risk factors/ risk factor categories.

Q3. How would you define and check for a "non-negligible volume of a transaction or quote, as compared to usual transaction sizes for the bank, reflective of normal market conditions" for the purpose of assessing the validity of a price observation?

Q4. How would you define and check for an "unreasonably large bid-offer spread as compared to usual bid-offer spreads, reflective of normal market conditions" for the purpose of assessing the validity of a price observation obtained from a committed quote? In your response, please provide a detailed reasoning.

Q5. Do you see any problems with requiring that institutions are allowed to use data from external data providers as input to the modellability assessment only where the external data providers are regularly subject to an independent audit (independent of whether the price is shared with the institution or not)? If so, please describe them thoroughly (i.e. for which data providers and the reasons for it).

Q6. Do you have any proposals on additional specifications that could be included in the legal text in order to ensure that verifiable prices provided by third-party vendors meet the requirements of this Regulation?

Q7. How relevant are the provisions outlined above for your institution? How many and which curves, surfaces or cubes are (planned to be) represented by a mathematical function with function parameters chosen as risk factors in your (future) internal model?

Q8. Do you have a preference for any of the options outlined above? For which reasons? Please motivate your response.

Q9. Do you consider any of the options outlined above as impossible or impractical? For which reasons? Please motivate your response.

Q10. Do you have alternative proposals to define the consequence on the modellability of the parameters where some buckets of a curve, surface or cube are modellable whilst others are non-modellable?

Q11. Do you intend to apply paragraph 4? If so, for which risk factors will it be relevant? Do you expect any implementation issues related to it? Please explain expected issues thoroughly.

Q12. Do you agree with the outlined methodology for the assessment of modellability of risk factors? If not, please explain why.

Q13. Do you expect any problems for the modellability assessment arising from the upcoming benchmark rate transition that could be addressed via this regulation? If so, please provide a thorough description and potential solutions if any.

Q14. How do you intend to integrate the risk factor modellability assessment (i.e. RFET) into the processes of your institution? Do you expect those data to be used for the purpose of the RFET only or do you think those data would increase the data availability used e.g. for the calibration of your internal model (under para 31.26 of 2019 Basel rules)? What percentage of data used for the RFET do you think will be used also for the calibration of your internal model?