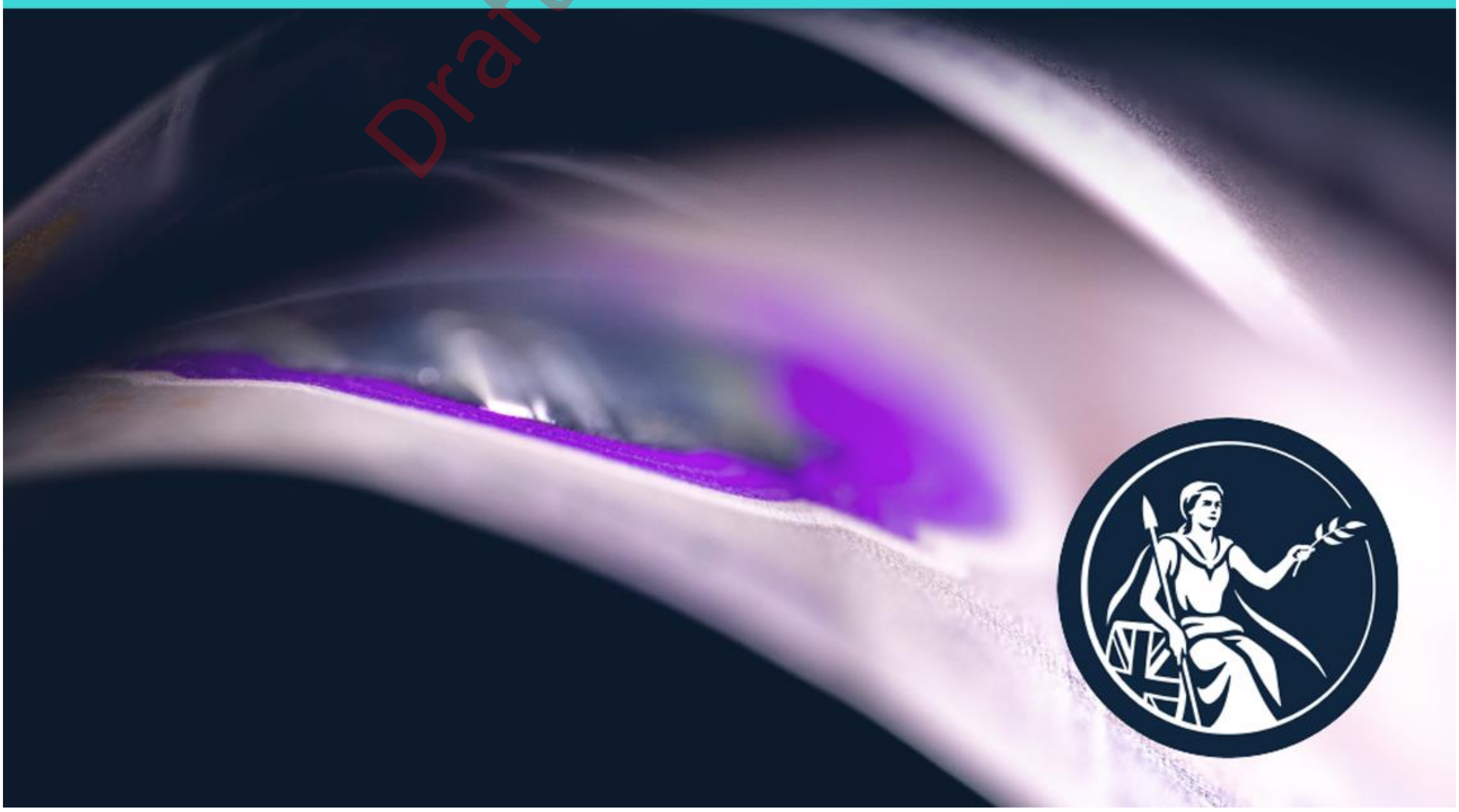
Bank of England

Prudential Regulation Authority

Appendix 16: Draft amendments to SS13/13 – Market Risk

Consultation Paper | CP16/22

November 2022



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In this appendix, new text is underlined and deleted text is struck through.

1 Introduction

1.1 This supervisory statement is aimed at CRR firms and CRR consolidation entities ~~firms to which CRD IV applies~~.[1]

1.2 It sets out the Prudential Regulation Authority's (PRA's) expectations of firms in relation to market risk and should be considered in addition to requirements set out in the Trading Book (CRR), Market Risk: General Provisions (CRR), Market Risk: Simplified Standardised Approach (CRR), Market Risk: Advanced Standardised Approach (CRR), and Market Risk: Internal Model Approach (CRR) Parts ~~CRD IV Articles 325–377, the Market Risk Part~~ of the PRA Rulebook and the high-level expectations outlined in 'The PRA's approach to banking supervision'.[2]

1.3 This statement details the PRA's expectations with regard to the following:

- Material deficiencies in risk capture by an institution's internal approach.
- ~~Standardised~~ Simplified standardised approach for options.
- ~~Netting a convertible with its underlying instrument.~~
- Offsetting derivative instruments.
- Corrections to modified duration for debt instruments subject to prepayment risk.
- Exclusion of back-testing exceptions when determining multiplication factor addends.
- Derivation of notional positions for simplified standardised approaches.
- Qualifying debt instruments.
- Expectations relating to internal models.
- ~~Value-at-Risk (VaR) and stressed VaR (sVaR)calculation.~~
- Requirement to have an internal ~~incremental~~ default risk charge (DRC ~~IRC~~) model.
- Annual Senior Management Function (SMF) ~~SIF~~ attestation of market risk internal models.

2 Material deficiencies in risk capture by an institution's internal approach

2.1 This chapter sets out the PRA's expectations regarding ~~requirements for~~ the calculation of additional own funds for the purposes of Article 325az(6) of the Market Risk: Internal Model Approach (CRR) Part of the PRA Rulebook ~~implementing CRD Article 101~~, which applies where a firm has permission to calculate own funds requirements for one or more categories of market risk under Market Risk: Internal Model Approach (CRR) Part ~~CRR Part 3 Title IV Chapter 5~~. It requires firms to identify any risks which are not adequately captured by

1 On 23 February 2017, this SS was updated – see appendix for full details.

2 www.bankofengland.co.uk/pra/Pages/supervision/approach/default.aspx.

those models and to hold additional own funds against ~~those~~ material risks. The methodology for the identification of those risks and the calculation of those additional own funds for ~~VaR and sVaR~~ internal model approach (IMA) models is referred to as the '~~RNIV~~ RNIM (risks not in models) framework'.

2.2 Firms are responsible for identifying these additional risks, and this should be seen as an opportunity for risk managers and management to better understand the shortcomings of the firm's models. Firms are expected to validate the appropriateness of the ~~RNIV~~ RNIM framework.

Scope of the Risks not in ~~VaR (RNIV)~~ Models (RNIM) framework

2.3 The ~~RNIV~~ RNIM framework is intended to ensure that own funds are held to meet all risks which are not captured, or not captured adequately, by the firm's ~~VaR and sVaR~~ models for expected shortfall (ES), non-modellable risk factors (NMRFs) and the default risk charge (DRC). These include, but are not limited to: (1) missing risks such as cross-risks and higher-order risks, resulting from the re-pricing methods used in those models; and (2) missing risk factors such as basis risk factors and calibration parameters for which historical changes may significantly underestimate the risks~~, missing and/or illiquid risk factors such as cross-risks, basis risks, higher-order risks, and calibration parameters~~. The ~~RNIV~~ RNIM framework is also intended to cover event risks that could adversely affect the relevant business.

Identification and measurement framework

2.4 The PRA expects firms to systematically identify and measure all non-captured or poorly captured risks for the purpose of calculating additional own funds against those risks that the firm assesses are material. Firms should have a formal process in place through which senior management are made aware of limitations and assumptions of firms' IMA models and the impact that those limitations and assumptions can have on the reliability of IMA model output.

2.4A In complying with these expectations, the PRA expects that all firms should be able to make readily available a single, comprehensive inventory of limitations and assumptions that may affect the output of IMA models to senior management, the PRA, and other stakeholders. This should include all limitations and assumptions identified during the validation of the individual models that make up the IMA framework, as well as overarching limitations and assumptions which affect the calculation of IMA risk measures under both the current and stress period calibration. The inventory should include, but is not limited to, assumptions and limitations associated with the following:

- risk factors used by the business in the pricing of transactions included in the scope of the IMA, whose variability is not captured in IMA models;
- any fixed parameters or constants determined by expert judgement which are used in IMA models;
- calibration of models, including the selection of calibration instruments and the use of proxy data;
- use of re-pricing methods in models which are different to those used by the business (eg use of simplified pricing approximations based on risk sensitivities, pricing grids, etc.); and
- the methods by which historical risk factor movements are applied to current market data when deriving modelled scenarios.

2.4B This analysis should be updated at least quarterly, or more frequently at the request of the PRA. The measurement of these risks should capture the losses that could arise due to the risk factor(s) of all products that are within the scope of the relevant internal model permission, but are not adequately captured by the relevant internal models.

Identification of risk factors

2.5 The PRA expects firms to, on a quarterly basis, identify and assess individual risk factors covered by the ~~RNIV~~ RNIM framework. The PRA will review the results of this exercise and may require that firms identify additional risk factors as being eligible for measurement.

Measurement of risk factors

2.6 Where sufficient data are available, and where it is appropriate to do so, the PRA expects firms to calculate ~~a VaR and sVaR metric as the RNIV~~ an RNIM measure for each material risk factor within scope of the framework in accordance with Article 325bk of the Market Risk: Internal Model Approach (CRR) Part. The stressed period for the ~~RNIV~~ RNIM measure ~~sVaR~~ should be consistent with that used for ~~sVAR~~ non-modellable risk factors in the same risk factor category. ~~No offsetting or diversification may be recognised across risk factors included in the RNIV framework.~~

2.6A The PRA expects that offsetting and diversification should not be recognised across risk factors included in the RNIM framework. Subject to being granted a waiver by the PRA, a firm may be permitted to recognise a degree of offsetting or diversification across specific RNIMs, where the firm is able to empirically justify that such recognition is prudent and appropriate.

2.7 If it is not appropriate to calculate an RNIM ~~VaR and sVaR~~ metric for a material risk factor in accordance with Article 325bk of the Market Risk: Internal Model Approach (CRR) Part, a firm should instead measure the size of the risk based on a stress test. The confidence level and capital horizon of the stress test should be commensurate with the liquidity of the risk factor, and should be at least as conservative as comparable risk factors under the internal model approach. The ~~RNIV~~ RNIM measure should be at least equal to the losses arising from the stress test. Where quantitative models are used, these should be reviewed by a team independent from the model developer with a degree of rigour commensurate with materiality of the RNIM.

2.7A The PRA expects that ~~RNIV~~ RNIM own funds requirements should be calculated at quarter-end as the average across the preceding three month period of an ~~RNIV~~ RNIM measure calculated at least monthly. ~~For each RNIV measure calculated from VaR and sVaR metrics , the multipliers used for VaR and sVaR should be applied to the aforementioned average to determine the RNIV own funds requirement.~~

2.7B The PRA expects that firms should calculate the ~~RNIV~~ RNIM measure at least monthly for at least 90% of ~~RNIV~~ RNIM requirements. The PRA expects firms to document the calculation frequency and materiality (relative to total ~~RNIV~~ RNIM own funds requirements) of each ~~RNIV~~ RNIM.

2.7C The PRA expects firms to consider whether it is necessary for the ~~RNIV~~ RNIM measure to be calculated more frequently than monthly calculation for more material or more variable ~~RNIV~~ RNIM positions. Where a firm identifies ~~RNIVs~~ RNIMs that should be calculated more frequently than monthly, the PRA expects that the ~~RNIV~~ RNIM position or risk sensitivity should be updated with that increased frequency. The PRA does not expect a recalibration of the ~~RNIV~~ RNIM methodology more frequently than monthly.

~~**Reporting of RNIV**~~

[This sub-section has been deleted]

~~2.8~~ [Deleted] ~~Firms that are required to compute RNIV should complete FSA005 — in addition to the MRK IM COREP reporting template — for the relevant rows. When submitting FSA005, firms are advised to complete the fields as follows:~~

- ~~populate the table under element 63, filling in both fields in each row;~~
- ~~element 64 should be the total of all values entered in 63 column B; and~~
- ~~in order for the form to validate, the value entered in 64 should also be entered in 61 and 62.~~

~~2.9~~ [Deleted] ~~Firms that are required to compute RNIV should complete the MKR IM COREP reporting template in addition to FSA005, and include the own funds required in their COREP reporting. The components of RNIV should be included within C24.00 as follows:~~

- ~~RNIV from VaR should be added to [C24.00, {c030}, r010] and [C24.00, {c040}, r010];~~
- ~~RNIV from sVaR should be added to [C24.00, {c050}, r010] and [C24.00, {c060}, r010]; and~~
- ~~RNIV from stress tests should be added to [C24.00, {c050}, r010] and [C24.00, {c060}, r010].~~

Extensions and changes to the ~~RNIV~~ RNIM framework

2.10 The PRA expects firms to notify all model extensions and changes to the ~~RNIV~~ RNIM framework and submit the pro-forma available on the Capital Requirements Regulation permissions webpage.~~,~~[3] ~~on Bank's website should be submitted~~

2.11 ~~The PRA considers material changes to the RNIV framework to be when the extension or change implies either: 1) a capital impact of 5% or more of the total market risk capital requirements, including RNIV capital, or 2) a capital impact of 10% or more of the total RNIV component in line 64 of FSA005 in accordance with paragraph 2.8~~. The PRA expects to be pre- notified for material extensions or changes to the ~~RNIV~~ RNIM framework and to be notified following the occurrence of any other non-material extensions or changes.

Interaction with back-testing, profit and loss attribution, and total market risk own funds requirements

2.12 ~~See Chapter 9 for the process around extensions and changes to IMA models under CRR.~~ The PRA considers that for the purposes of back-testing, firms should not include RNIMs in the Value at Risk (VaR) measure calculated for back-testing.

2.13 The PRA considers that for the purposes of determining the theoretical changes in portfolio value for the profit and loss attribution requirement in accordance with Article 325bg of the Market Risk: Internal Model Approach (CRR) Part, firms may recognise changes relating to material RNIMs that additional own funds are held against.

2.14 The PRA expects that the own funds add-ons for RNIMs should be added to own funds requirement calculated in accordance with Article 325ba(3) of the Market Risk: Internal Model Approach (CRR) Part of the PRA Rulebook. The PRA expects that firms should continue to hold additional own funds against material RNIMs that temporarily fail desk-level back-testing or P&L attribution and are capitalised under the advanced standardised approach. Subject to PRA approval, a firm may be permitted to cease holding additional own funds for material RNIMs relating to desks that are temporarily capitalised under the advanced standardised approach, where the firm is able to demonstrate that the advanced standardised approach explicitly and adequately capitalises for that specific RNIM.

3 Standardised approach for options

3.1 Firms that need to use own estimates of delta for the purposes of the simplified standardised approach for options, should provide the PRA with confirmation that they meet the minimum standards set out below for each type of option for which they calculate delta. Firms should only provide this confirmation if they meet the

3 https://www.bankofengland.co.uk/prudential-regulation/Authorisations/capital-requirements-regulation-permissions.

minimum standards. Where a firm meets the minimum standards, they will be permitted to use own estimates of delta for the relevant option. Firms should read the requirements for the granting of the permissions set out in Articles 329, 352, and 358 of the Market Risk: Simplified Standardised Approach (CRR) Part, as appropriate, before applying for any of these permissions.

...

Minimum standards

3.3 The level of sophistication of the pricing models, which are used to calculate own estimates of delta for use in the simplified standardised approach for options, should be proportionate to the complexity and risk of each option and the overall risk of the firm's options trading business. In general, it is considered that the risk of sold options will be higher than the risk of the same options when bought.

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3A Sensitivity Models for Interest Rate Risk

3A.1 Firms intending to use sensitivity models to calculate the positions on derivative instruments covered in Articles 328 to 330 of the Market Risk: Simplified Standardised Approach (CRR) Part ~~the CRR~~ are expected to demonstrate that they meet the requirements for granting of the relevant permission by providing the PRA with confirmation that they meet the minimum standards set out in paragraphs 3A.3 to 3A.9 below. Where a firm meets the minimum standards, it will be permitted to use sensitivity models to calculate the positions referred to in those Articles and may use them for any bond which is amortised over its residual life rather than via one final repayment of the principal. Firms should read ~~CRR~~ Article 331 of the Market Risk: Simplified Standardised Approach (CRR) Part before applying for this permission.

...

3A.5 The sensitivities should be assessed with reference to independent movement in sample rates across the yield curve, with at least one sensitivity point in each of the maturity bands and appropriate to produce accurate valuation changes based on the assumed interest rate changes as set out in Table 2 in Article 339 of the Market Risk: Simplified Standardised Approach (CRR) Part ~~the CRR~~.

...

3B Calculation of the overall net foreign exchange position

3B.1 Firms intending to exclude from the calculation of net open currency positions any positions which are taken in order to hedge against the adverse effect of the exchange rate on its ratios in accordance with Article 92(1) of the Required Level of Own Funds (CRR) Part are expected to demonstrate that they meet the requirements for granting of the relevant permission by providing the PRA with confirmation that they meet the minimum standards set out in paragraphs 3B.3-3B.9 below. Firms should read ~~CRR~~ Article 325a1 of the Market Risk: General Provisions (CRR) Part~~352~~ before applying for this permission.

...

4 ~~Netting a convertible with its underlying instrument~~

[This section has been deleted]

~~4.1~~ [Deleted] ~~For the purposes of CRR Article 327(2), the netting of a convertible bond and an offsetting position in the instrument underlying it is permitted. The convertible bond should be:~~

- ~~treated as a position in the equity into which it converts; and~~
- ~~the firm's equity own funds requirement should be adjusted by making:~~
  - ~~(1) an addition equal to the current value of any loss which the firm would make if it did convert to equity; or~~
  - ~~(2) a deduction equal to the current value of any profit which the firm would make if it did convert to equity (subject to a maximum deduction equal to the own funds requirements on the notional position underlying the convertible).~~

…

5A Corrections to modified duration for debt instruments under ~~CRR~~ Article 340 of the Market Risk: Simplified Standardised Approach (CRR) Part

5A.1 The PRA expects firms making corrections to the calculation of modified duration for debt instruments, which are subject to prepayment risk under the second subparagraph of Article 340(3) of the Market Risk: Simplified Standardised Approach (CRR) Part, to apply one of the following:

(a) The formula set out in paragraph 5A.2

(b) The formula set out in paragraph 5A.3.

5A.2 For the purposes of paragraph 5A.1(a), firms should apply the following formula to correct the Modified Duration and compute a Corrected Modified Duration (CMD):

$$CMD = MD \times \Phi \times \Omega$$

where:

$MD =$ modified duration as in Article 340(3) of the Market Risk: Simplified Standardised Approach (CRR) Part

$\Phi = \frac{B}{P}$

$\Omega = 1 + \Delta + \frac{1}{2} \times \Gamma \times dB + \Psi$

$P =$ price of the bond with embedded optionality

$B =$ theoretical price of the vanilla bond

$\Delta =$ delta of the embedded option

$\Gamma =$ gamma of the embedded option

$\Psi =$ where not considered in the calculation of Δ and Γ, and where material, an additional factor for transaction costs and behavioural variables consistent with an Internal Rate of Return ("IRR") shift of 100 basis points ("b.p.").

dB = change in value of the underlying

5A.3 For the purposes of paragraph 5A.1(b), firms should apply the following formula to re-compute directly a Corrected Modified Duration ('CMD') by re-pricing the instrument after a shift of 100 b.p. in the IRR:

$$CMD = \frac{P_{-\Delta r} - P_{+\Delta r}}{2 \times P_0 \times \Delta \mathrm{r}} + \Psi$$

where:

P_0 = the current market price of the product;

$P_{-\Delta r}$ = theoretical price of the product after a negative IRR shock equal to Δr

$P_{+\Delta r}$ = theoretical price of the produce after a positive IRR shock equal to Δr

Δr = a hypothetical IRR change of 50 b.p.

Ψ = where not considered in the calculation of $P_{-\Delta r}$ and $P_{+\Delta r}$, and where material, an additional factor for transaction costs and behavioural variables consistent with an IRR shift of 100 b.p.

5A.4 The computation of the additional factor Ψ need only be considered if material, and should not lead to a shorter CMD than if it had not been considered in the calculation.

5A.5 For the purposes of assessing the additional factor Ψ in accordance with paragraph 5A.3, firms should take into account each of the following:

(a) that transaction costs reduce the value of the option, making the option unlikely to be executed below the threshold established by the transaction costs; and

(b) that there are behavioural factors suggesting that some clients, in particular retail clients, may not always exercise an option, even when it is in the money, in certain circumstances including the following:

(i) where the remaining principal is close to the initial amount lent, leading some 'aggressive' borrowers to leave or refinance at an early stage; and

(ii) in the case of borrowers with the largest loan size who have the largest gain from prepayment as the cost attached to prepayment is a fixed amount.

5A.6 The assessment of the additional factor Ψ should be based on historical data, obtained from a firm's own experience or from external sources. Data on the behavioural factors referred to in 5A.5(b) may be obtained from the assessment of other balance sheet elements subject to prepayment risk, such as those observed for retail clients in the non-trading book.

5A.7 Institutions should calibrate the additional factor Ψ by assessing significant divergences between the real behaviour historically observed for a type of client and the theoretical behaviour that would have been envisaged for counterparties acting in a purely rational way.

5A.8 The calibration of the additional factor Ψ , due to behavioural factors referred to in paragraph 5A.7, should be made where a relevant amount of these instruments with prepayment risk are held in the trading book and especially where the counterparties are retail clients. Additional factors should not be considered for the embedded options where the institution has the right to call for an early termination of the instrument.

…

7 Derivation of notional positions for simplified standardised approaches

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7.5 Other futures, forwards, and swaps where a treatment is not specified in Article 328 of the Market Risk: Simplified Standardised Approach (CRR) Part should be treated as positions in zero specific risk securities, each of which:

…

8 Qualifying debt instruments

8.1 ~~CRR~~ Article 336(4)(a) of the Market Risk: Simplified Standardised Approach (CRR) Part states that positions listed on a stock exchange in a third country, where the exchange is recognised by the competent authorities, qualify for the specific risk own funds requirements in the second row of the table in ~~CRR~~ Article 336 of the Market Risk: Simplified Standardised Approach (CRR) Part.

…

9 Expectations relating to internal models

9.1 ~~CRR~~ Article 325az of the Market Risk: Internal Model Approach (CRR) Part ~~CRR Article 363~~ states that permission for an institution to use internal models to calculate capital is subject to competent authorities verifying compliance with:

- ~~the general requirements~~ requirements on risk measurement;
- ~~requirements particular to specific risk modelling~~ qualitative requirements; and
- requirements on internal validation ~~for an internal model for incremental default and migration risk~~.

9.2 The standards that the PRA expects to be met to consider that an institution is compliant with these requirements are set out below.

High-level standards

9.3 A firm should be able to demonstrate that it meets the risk management standards set out in ~~CRR~~ Article 325bi of the Market Risk: Internal Model Approach (CRR) Part ~~CRR Article 368~~ on a legal entity and business line basis where appropriate. This is particularly important for a subsidiary undertaking in a group subject to matrix management, where the business lines cut across legal entity boundaries.

Categories of position

9.4 An expected shortfall (ES) ~~VaR~~ model permission will ~~generally~~ set out the broad classes of position within each risk category within its scope. It may also specify how individual products within one of those broad classes may be brought into or taken out of scope of the ES ~~VaR~~ model permission. These broad classes of permission are as follows:

(1) Linear products, which comprise securities with linear pay-offs (such as bonds and equities), and derivative products which have linear pay-offs in the underlying risk factor (such as interest rate swaps, forward-rate agreements, and total return swaps).

(2) European, American and Bermudan put and call options (including caps, floors, and swaptions) and investments with these features.

(3) Asian options, digital options, single barrier options, double barrier options, look back options, forward starting options, compound options and investments with these features.

(4) All other option based products (such as basket options, quantos, outperformance options, timing options, and correlation-based products) and investments with these features.

~~Data standards~~
[This sub-section has been deleted]

~~9.5~~ [Deleted] ~~The PRA expects a firm to ensure that the data series used by its VaR model is reliable. Where a reliable data series is not available, proxies or any other reasonable value-at-risk measurement may be used when the firm can demonstrate that the requirements of CRR Article 367(2)(e) are met. A firm should be able to demonstrate that the technique is appropriate and does not materially understate the modelled risks.~~

~~9.6~~ [Deleted] ~~Data may be deemed insufficient if, for example, it contains missing data points, or data points which contain stale data. With regard to less-liquid risk factors or positions, the PRA expects the firm make a conservative assessment of those risks, using a combination of prudent valuation techniques and alternative VaR estimation techniques to ensure there is a sufficient cushion against risk over the close out period, which takes account of the illiquidity of the risk factor or position.~~

~~9.7~~ [Deleted] ~~A firm is expected to update data sets to ensure standards of reliability are maintained in accordance with the frequency set out in its VaR model permission, or more frequently if volatility in market prices or rates necessitates more frequent updating. This is in order to ensure a prudent calculation of the VaR measure.~~

Aggregating Expected Shortfall (ES) ~~VaR~~ measures
~~9.8~~ [Deleted] ~~In determining whether it is appropriate for an institution to use empirical correlations within risk categories and across risk categories within a model, the PRA expects certain features to be observed in assessing whether such an approach is sound and implemented with integrity. In general, the PRA expects a firm to determine the aggregate VaR measure by adding the relevant VaR measure for each category, unless the firm's permission provides for a different method of aggregating VaR measures which is empirically sound.~~

9.9 The PRA does not expect a firm to use the square root of the sum of the squares approach when aggregating measures across or within risk categories unless the assumption of zero correlation between these categories is empirically justified. If correlations between risk categories are not empirically justified, the ES ~~VaR~~ measures for each category should be added in order to determine its aggregate ES ~~VaR~~ measure. However, to the extent that a firm's ES ~~VaR~~ model permission provides for a different way of aggregating ES ~~VaR~~ measures:

(i) that method applies instead; and

(ii) if the correlations between risk categories used for that purpose cease to be empirically justified then the firm must notify the appropriate regulator at once.

Testing prior to model validation
9.10 A firm is expected to provide evidence of its ability to comply with the requirements for an ES ~~a VaR~~ model permission. In general, it will be required to demonstrate this by having a back- testing programme in place and should provide three months of back-testing history.

9.11 A period of initial monitoring or live testing is required before an ES ~~a VaR~~ model can be recognised. This will be agreed on a firm by firm basis.

9.12 In assessing the firm's ES ~~VaR~~ model and risk management, the results of internal model validation procedures used by the firm to assess the ES ~~VaR~~ model will be taken into account.

Back-testing

9.13 For clarity, the back-testing requirements of ~~CRR~~ Article 325bf of the Market Risk: Internal Model Approach (CRR) Part ~~366~~ should be implemented as follows:

- If the day on which a loss is made is day n, the value-at-risk measure for that day will be calculated on day n-1, or overnight between day n-1 and day n. Profit and loss figures are produced on day n+1, and back-testing also takes place on day n+1. The firm's supervisor should be notified of any legal entity-level overshootings by close of business on day n+2.

- Any overshooting initially counts for the purpose of the calculation of the plus factor even if subsequently the PRA agrees to exclude it. Thus, where the firm experiences an overshooting and already has four or more overshootings for the previous 250 business days, changes to the multiplication factor arising from changes to the plus factor become effective at day n+3.

9.14 A longer time period improves the power of back-testing. However a longer time period may not be desirable if the ES ~~VaR~~ model or market conditions have changed to the extent that historical data are no longer relevant.

9.15 The PRA will review, as part of a firm's ES ~~VaR~~ model permission application, the processes and documentation relating to the derivation of profit and loss used for back-testing. A firm's documentation should clearly set out the basis for cleaning profit and loss. To the extent that certain profit and loss elements are not updated every day (for example certain reserve calculations) the documentation should clearly set out how such elements are included in the profit and loss series.

Planned extensions and changes to the Internal Model Approach model

9.16 In accordance with ~~CRR~~ Article 325az(7) of the Market Risk: Internal Model Approach (CRR) Part ~~363(3)~~, the PRA expects a firm to provide to - and discuss with - the PRA details of any significant planned changes to the Internal Model Approach model before those changes are implemented. These must include detailed information about the nature of the change, including an estimate of the impact on capital requirements. ~~The PRA expects firms to submit the pro-forma for all internal model extensions or changes when submitting an application for approval, a pre-notification or post-notification in accordance to Delegated Regulation (EU) 529/2014 as amended by Delegated Regulation (EU) 2015/942~~. For the avoidance of doubt, the assessments of materiality that determine whether a model change is an application, pre-notification or post-notification should be carried out without incorporating capital requirements from the RNIM ~~RNIV~~ framework. See Chapter 2 for the process around extensions and changes to the RNIM ~~RNIV~~ framework. The pro-forma can be found on the Bank's website at **www.bankofengland.co.uk/pra/Pages/authorisations/crr/applying.aspx**.

~~Ten-day VaR and sVaR calculation~~

[This sub-section has been deleted]

~~9.17~~ [Deleted] ~~The use of overlapping intervals of ten-day holding periods for the purposes of CRR Article 365 introduces an autocorrelation into the data that would not exist should truly independent ten-day periods be used. This may give rise to an underestimation of the volatility and the VaR at the 99% confidence level. To obtain clarity on the materiality of the bias, firms should measure the bias arising from the use of overlapping intervals for ten-day VaR and sVaR when compared to using independent intervals as a part of its periodic model validation.~~

~~9.18~~ [Deleted] ~~A firm that scales its one-day VaR and sVaR measures to ten-days should ensure that the up-scaled VaR and sVaR measures do not underestimate risk when compared to the corresponding full ten-day VaR and sVaR measures. The firm should perform this analysis as a part of its periodic model validation.~~

Accuracy of approximate revaluation approaches

9.19 Related to the expectations in paragraph 2.4A, firms ~~Firms~~ should perform periodic monitoring to demonstrate the accuracy of any approximate revaluation approaches used within its model (eg for firms using sensitivities, revaluation ladders, or spot/vol-matrices), with a particular emphasis on ES ~~sVaR~~ suitability. This should include a review of any ladders/matrices to ensure that they are extended to accommodate wider shocks associated with the firm's selected 1-year stress ~~sVaR~~ period for ES calculation. The frequency of the monitoring should be commensurate to the accuracy of the firm's approximate revaluation approach and the materiality of the risks covered.

Trading locations

9.20 ~~In accordance with Delegated Regulation (EU) 529/2014 as amended by Delegated Regulation (EU) 2015/942, firms~~ Firms must seek pre-approval from the PRA if they wish to extend the use of their Internal Models Approach (IMA) to a trading desk located in another jurisdiction or time zone that is not listed as a trading location in the existing permission. ~~For clarity the PRA takes the view that a 'trading desk' in this context may be defined as a group of traders or trading accounts that has a well-documented business strategy, a revenue target and clear trading limits.~~ The PRA takes the view that sub-desks that are set up for internal operation purposes only (such as for the booking and transmission of trades to another trading desk with IMA approval) should not be 'trading desks' for this purpose.

Absolute and relative shifts

[This sub-section has moved from paragraphs 10.5 and 10.6]

9.21 The PRA expects firms to be able to justify on an ongoing basis the rationale for the choice of risk factor shift methodologies (eg absolute or relative shifts). In particular, the consistency of the assumed risk factor dynamics with those observed in practice should be evidenced for ES ~~both VaR and sVaR~~ as a part of the firm's periodic model validation.

9.22 The following information is expected to be submitted quarterly:

- analysis to support the equivalence of the firm's current approach to an ES ~~a VaR~~ maximising approach on an ongoing basis;
- the rationale behind the selection of key major risk factors used to find the period of significant financial stress (where relevant); and
- summary of ongoing internal monitoring of stressed period selection with respect to current portfolio.~~; and~~
- ~~the firm's 10-day 99% standalone VaR and sVaR by asset class.~~

10 ~~Stressed VaR calculation~~

[This section has been deleted]

~~10.1~~ [Deleted] ~~CRR Article 365 requires firms that use an internal model for calculating their own funds requirement to calculate at least weekly a sVaR of their current portfolio. When the PRA considers a firm's application to use a sVaR internal model, the PRA would expect the following features to be present prior to permission being granted as indicative that the conditions for granting permission have been met.~~

~~Quantile estimator~~

[This sub-section has been deleted]

~~10.2~~ [Deleted] ~~The firm should calculate the sVaR measure to be greater than or equal to the average of the second and third worst loss in a twelve-month time series comprising of 250 observations. The PRA expects as a minimum that a corresponding linear weighting scheme should be applied if the firm use a larger number of observations.~~

~~Meaning of 'period of significant financial stress relevant to the institution's portfolio'~~

[This sub-section has been deleted]

~~10.3~~ [Deleted] ~~Subject to paragraph 10.3A, the firm should ensure that the sVaR period chosen is equivalent to the period that would maximise VaR given the firm's portfolio. There is an expectation that a stressed period should be identified at each legal entity level at which capital is reported. Therefore, group- level sVaR measures should be based on a period that maximises the group-level VaR, whereas entity-level sVaR should be based on a period that maximises VaR for that entity~~

10.3A [Deleted] ~~The PRA expects that, to identify their sVaR period, firms should consider an observation period that starts at least from Monday 1 January 2007. The PRA expects that the observation period generally does not need to include the most recent 12 months of historical data immediately preceding the point of calculation, in order to minimise overlaps with VaR. However, firms may include the most recent 12 months in their observation period, where it leads to a more appropriately prudent outcome. Where a firm believes that the observation period for determining the sVaR stress period should exclude more than the most recent 12 months (for example, where the firm uses more than the most recent 12 months to calculate VaR), the firm should contact the PRA setting out, and providing justification for, its rationale.~~

~~Antithetic data~~

[This sub-section has been deleted]

~~10.4~~ [Deleted] ~~The PRA expects firms to consider whether the use of antithetic data in the calculation of the sVaR measure is appropriate to the firm's portfolio. A justification for using or not using antithetic data should be provided to the PRA.~~

~~Absolute and relative shifts~~

[This sub-section has moved to Chapter 9]

~~10.5 The PRA expects firms to be able to justify on an ongoing basis the rationale for the choice of risk factor shift methodologies (eg absolute or relative shifts). In particular, the consistency of the assumed risk factor dynamics with those observed in practice should be evidenced for both VaR and sVaR as a part of the firm's periodic model validation.~~

~~10.6 The following information is expected to be submitted quarterly:~~

- ~~analysis to support the equivalence of the firm's current approach to a VaR-maximising approach on an ongoing basis;~~
- ~~the rationale behind the selection of key major risk factors used to find the period of significant financial stress (where relevant);~~
- ~~summary of ongoing internal monitoring of stressed period selection with respect to current portfolio; and~~
- ~~the firm's 10-day 99% standalone VaR and sVaR by asset class.~~

11 ~~Requirement to have an internal IRC model~~

[This section has been deleted]

~~11.1~~ [Deleted] ~~CRR Article 372 requires firms that use an internal model for calculating own funds requirements for specific risk of traded debt instruments to also have an internal incremental default and migration risk (IRC) model in place. This model should capture the default and migration risk of its trading book positions that are incremental to the risks captured by its VaR model.~~

~~11.2~~ [Deleted] ~~When the PRA considers a firm's application to use an IRC internal model, the PRA expects that the following matters would be included as demonstrating compliance with the standards set in CRR Article 372.~~

~~Basis risks for migration~~
[This sub-section has been deleted]

~~11.3~~ [Deleted] ~~The PRA expects the IRC model to capitalise pre-default basis risk. In this respect, the model should reflect that in periods of stress the basis could widen substantially. Firms should disclose to the PRA their material basis risks that are incremental to those already captured in existing market risk capital measures (VaR-based and others). This must take actual close-out periods during periods of illiquidity into account.~~

~~Price/spread change model~~
[This sub-section has been deleted]

~~11.4~~ [Deleted] ~~The price/spread change model used to capture the profit and loss impact of migration should calibrate spread changes to long-term averages of differences between spreads for relevant ratings. These should either be conditioned on actual rating events, or using the entire history of spreads regardless of migration. Point-in-time estimates are not considered acceptable, unless they can be shown to be as conservative as using long-term averages.~~

~~Dependence of the recovery rate on the economic cycle~~
[This sub-section has been deleted]

~~11.5~~ [Deleted] ~~To achieve a soundness standard comparable to those under the IRB approach, LGD estimates should reflect the economic cycle. The PRA therefore expects firms to incorporate dependence of the recovery rate on the economic cycle into the IRC model. Should the firm use a conservative parameterisation to comply with the IRB standard of the use of downturn estimates, evidence of this will be required to be submitted in quarterly reporting to the PRA, bearing in mind that for trading portfolios, which contain long and short positions, downturn estimates would not in all cases be a conservative choice.~~

12 Annual SMF ~~SIF~~ attestation of market risk internal models

12.1 The PRA expects an appropriate individual in a SMF ~~Significant Influence Function (SIF)~~ role to provide to the PRA on an annual basis written attestation that the firm's internal approaches for which it has received a permission comply with the requirements in the Market Risk: Internal Model Approach (CRR) Part of the PRA Rulebook ~~Part 3 Title IV of the CRR~~, and any applicable market risk supervisory statements.

12.2 Firms should agree the appropriate SMF ~~SIF~~ for providing this attestation with the PRA, noting that the PRA would not expect to agree more than 2 SMFs ~~SIFs~~ to cover all the firm's market risk internal models as described in the Market Risk: Internal Model Approach (CRR) Part ~~Part 3 Title IV of the CRR~~.

12.3 Where a firm is unable to provide an attestation under paragraph 12.1 or at any time has ceased to comply with the requirements in the Market Risk: Internal Model Approach (CRR) Part ~~Part 3 Title IV of the CRR~~, then the firm is expected to notify the PRA of that fact pursuant to Fundamental Rule 7 of the PRA Rulebook for CRR firms and to do one of the following:

- present the PRA with a credible plan for a timely return to compliance; or
- demonstrate to the satisfaction of the PRA that the effect of non-compliance is immaterial.