Bank of England PRA

Appendix 5: Draft amendments for SS13/13 – Market risk

Consultation paper | CP9/26

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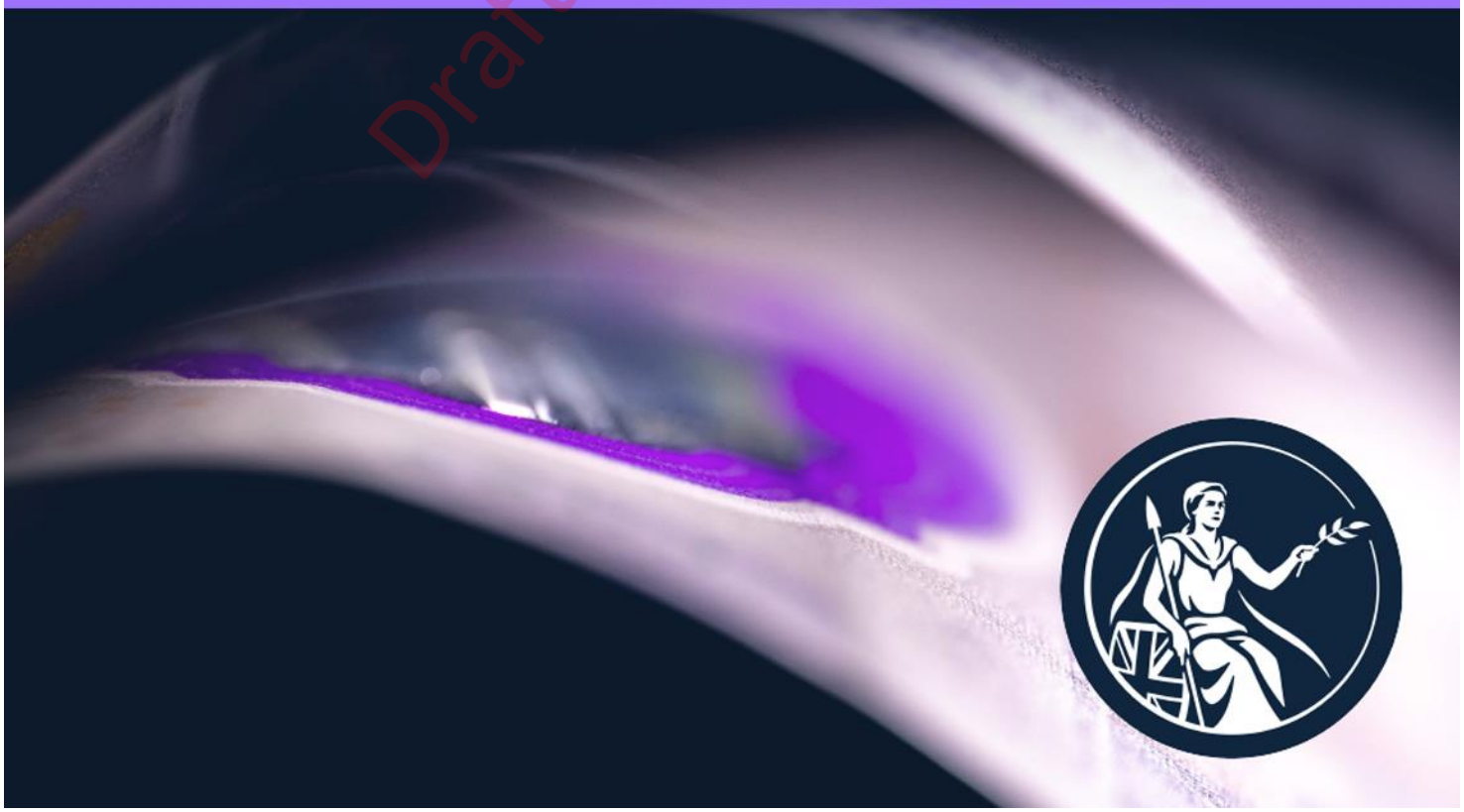

Contents

1: Introduction

In this document, additions are shown as underlined text, and deletions are shown as struck-through text.

1.1 This supervisory statement is aimed at Capital Requirements Regulation (CRR) firms and CRR consolidation entities.

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 of the PRA Rulebook and the high-level expectations outlined in 'The PRA's approach to banking supervision'.[1]

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.
- Simplified standardised approach for options.
- 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.
- Requirement to have an internal default risk charge (DRC) model.
- Annual Senior Management Function (SMF) attestation of market risk internal models.
- Alternative definitions of sensitivities in the advanced standardised approach.
- Determination of the value of a CIU and its underlying investments for the purpose of Articles 104(2)(f), 104(2)(h), and 325j(1)(a), as well as for determining the definition of an 'ineligible position' under the Market Risk: Internal Model Approach (CRR) Part 1.3.

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

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

2.1 This chapter sets out the PRA's expectations regarding the calculation of additional own funds for the purposes of Article 325az(4) of the Market Risk: Internal Model Approach (CRR) Part of the PRA Rulebook, 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. It requires firms to identify any risks which are not adequately captured by those models and to hold additional own funds against material risks. The methodology for the identification of those risks and the calculation of those additional own funds for internal model approach (IMA) models is referred to as the '(risks not in models) RNIM 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 RNIM framework.

Scope of the Risks not in Models (RNIM) framework

2.3 The 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 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. The 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 in place a formal process 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 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 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 RNIM measure should be consistent with that used for non-modellable risk factors in the same risk factor category.

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-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 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 RNIM own funds requirements should be calculated at quarter-end as the average across the preceding three month period of an RNIM measure calculated at least monthly.

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

2.7C The PRA expects firms to consider whether it is necessary for the RNIM measure to be calculated more frequently than monthly calculation for more material or more variable RNIM

positions. Where a firm identifies RNIMs that should be calculated more frequently than monthly, the PRA expects that the RNIM position or risk sensitivity should be updated with that increased frequency. The PRA does not expect a recalibration of the RNIM methodology more frequently than monthly.

Reporting of RNIV

[This sub-section has been deleted]

2.8 [Deleted]

2.9 [Deleted]

Extensions and changes to the RNIM framework

2.10 The PRA expects firms to notify all model extensions and changes to the RNIM framework and submit the pro-forma available on the Capital Requirements Regulation permissions webpage.[2]

2.11 The PRA expects to be pre- notified for material extensions or changes to the RNIM framework and to be notified following the occurrence of any other non-material extensions or changes.

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

2.12 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. 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.

[2] https://www.bankofengland.co.uk/prudential-regulation/Authorisations/capital-requirements-regulation-permissions

3: Simplified 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 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.

3.2 If a firm has a permission under any of these Articles but ceases to be able to provide assurance with regard to a particular option type which is currently within its permissions, a capital add-on may be applied and a rectification plan agreed. If a firm is unable to comply with the rectification plan within the mandated time-frame, further supervisory measures may be taken. This may include variation of permissions so that they are no longer allowed to trade those particular types of option for which they do not meet the minimum standards.

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.

3.4 Delta should be recalculated at least daily. Firms should also recalculate delta promptly following significant movements in the market parameters used as inputs to calculate delta.

3.5 The pricing model used to calculate delta should be:

- based on appropriate assumptions which have been assessed and challenged by suitably qualified parties independent of the development process;
- independently tested, including validation of the mathematics, assumptions, and software implementation; and
- developed or approved independently of the trading desk.

3.6 A firm should use generally accepted industry standard pricing models for the calculation of own deltas where these are available, such as for relatively simple options.

3.7 The IT systems used to calculate delta should be sufficient to ensure that delta can be calculated accurately and reliably.

3.8 Firms should have adequate systems and controls in place when using pricing models to calculate deltas. This should include the following documented policies and procedures:

- clearly defined responsibilities of the various areas involved in the calculation;
- frequency of independent testing of the accuracy of the model used to calculate delta; and
- guidelines for the use of unobservable inputs, where relevant.

3.9 A firm should ensure its risk management functions are aware of weaknesses of the model used to calculate deltas. Where weaknesses are identified, the firm should ensure that estimates of delta result in prudent capital requirements being held. The outcome should be prudent across the whole portfolio of options and underlying positions at a given time.

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 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 Article 331 of the Market Risk: Simplified Standardised Approach (CRR) Part before applying for this permission.

3A.2 If a firm has permission under any of these Articles but ceases to be able to provide assurance with regard to a particular position which is currently within its permissions, a capital add-on may be applied and a rectification plan agreed. If a firm is unable to comply with the rectification plan within the mandated time-frame, further supervisory measures may be taken.

Minimum standards

3A.3 Firms should indicate the instruments for which net sensitivity positions are used and the currencies in which those positions are denominated. In addition, for the product scope requested firms should:

- confirm that the interest rate risk is managed on a discounted cash-flow basis; and
- briefly indicate any growth plans for the exposures.

3A.4 Firms should confirm that all models generate positions which have the same sensitivity to interest rate changes as the underlying cash flows.

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.

3A.6 The sophistication of all pricing models used should:

- be proportionate to the complexity and risk of the instruments and the nature of the business;
- be based on appropriate assumptions that have been assessed and challenged by suitably qualified parties independent of the development process;
- have been independently tested, including validation of the mathematics, assumptions, and software implementation; and
- have been developed or approved independently of the trading desk.

3A.7 The frequency of independent testing of the accuracy of the pricing model and guidelines for the use of unobservable inputs, where relevant, should be documented. The responsibilities of the various areas involved in the calculation should be clearly defined and documented.

3A.8 Risk management functions should be aware of weaknesses in the model used to calculate sensitivities to interest rate changes, and where weaknesses are identified a prudent amount of additional capital should be held against the relevant exposures.

3A.9 Firms should confirm that sensitivities to interest rate changes can be recalculated promptly following significant movements in inputs used to calculate sensitivities. IT systems used to calculate sensitivities to interest rate changes should be sufficient to ensure that sensitivity positions can be calculated accurately and reliably.

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 deliberately taken or maintained in order to hedge against the adverse effect of the exchange rate on their 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 permission under Article 325(9) of the Market Risk: General Provisions (CRR) Part (the 'Structural FX Permission') and provide the PRA with confirmation that they meet the minimum standards set out in paragraphs 3B.4-3B.13 below. Firms should read Article 325a1 of the Market Risk: General Provisions (CRR) Part before applying for this permission.

3B.2 If a firm has a permission under any of these Articles but ceases to be able to provide assurance of a particular position which is currently within its permissions, a capital add-on may be applied and a rectification plan agreed. If a firm is unable to comply with the rectification plan within the mandated time frame, further supervisory measures may be taken. This may include a variation of permissions so that the firm is no longer allowed to exclude those hedging positions from the calculation of net open currency positions for which it does not meet the minimum standards.

Level of application

3B.2A Chapter 2 of the Market Risk: General Provisions (CRR) Part of the PRA Rulebook sets out the level of application of the requirements in that part. In relation to the calculation of own funds requirements for foreign exchange risk, unless otherwise stated, a firm will need to assess the applicability of criteria at the relevant level of application. For example, when considering the exclusion of a position at a particular level of application under Article 325(9A), or under a permission given in accordance with Article 325(9), a firm should only exclude those positions which meet the criteria at that level of application.

3B.2B The PRA expects firms which make use of a Structural FX Permission (or firms seeking to make use of a Structural FX Permission) to consider the effects on their capital ratios at both consolidated and solo levels of risk positions it uses to hedge against the adverse effect of foreign exchange rates on any of its capital ratios. The PRA will generally only consider applications to exclude a position at the level(s) of consolidation for which the position acts as a hedge against the adverse effect of foreign exchange rates on a firm's capital ratios. For example, where a position acts as a hedge for a firm's consolidated ratios but not its solo-level ratios, the PRA will generally only permit the firm to exclude the FX position from the calculation of the net FX position at consolidated level. Where a position acts as a hedge at both levels of consolidation, the firm should only exclude at a particular level of consolidation that portion of the position which acts as a hedge of its capital ratios at that level of consolidation.

Minimum standards

3B.3 [Deleted]

3B.4 A firm should confirm that mismatches resulting in an open structural FX position (other than those open structural FX positions it deliberately takes or maintains to protect its capital ratios) are avoided as far as possible, and that positions are accounted for so that capital ratios are protected.

3B.5 Firms should confirm that they minimise any residual risks arising from structural FX positions, and consider such residual risks in their Pillar 2 assessment.

3B.6 Firms should confirm that policies and procedures are clearly articulated and are made available to the board and to regulators on an annual basis. The structural FX hedging strategy should be clearly articulated to investors and included in Pillar 3 disclosures.

3B.7 [Deleted]

3B.8 Firms should confirm that traders' remuneration structures do not in any way incentivise the structural FX positions becoming a profit centre.

3B.9 Oversight of the structural FX positions should be carried out by the appropriate committees of the boards of both the foreign entity and the group on at least a quarterly basis.

3B.10 Firms have to calculate their foreign exchange risk positions for market risk capital requirements in accordance with the methodologies referenced in Article 325(1) of the Market Risk: General Provisions (CRR) Part of the PRA Rulebook. However, firms may use an alternative measure for the net FX position when calculated only for the purposes of the SFX permission, as long as they can demonstrate to the PRA's satisfaction that their proposed alternative is a more appropriate measure for hedging capital adequacy ratios against adverse movements in FX rates, and that the proposed alternative does not omit any sources of FX risk that are of a non-trading or structural nature.

3B.11. The PRA expects firms to calculate their maximum risk position which may be excluded from the calculation of own funds requirements for foreign exchange risk, per currency i, using the formula outlined below. Firms may use more complex approaches to determine the maximum risk position, as long as they can demonstrate to the PRA that the alternative approach is an appropriate method of calculation.

$$\textit{Maximum risk position in foreign currency } i$$

$$= \textit{Sum of the foreign currency } i \textit{ RWAs}$$

$$\times \textit{current capital ratio of the entity hedging the risk}$$

3B.12. As set out in the formula above, the maximum risk position should be calculated based on the current capital ratio, at the relevant level of application of the entity.

3B.13. Firms should at a minimum include their credit risk risk-weighted assets (RWAs) as part of their foreign currency RWAs for the purposes of determining their maximum position per currency i in accordance with paragraph 3B.11 above. For the purposes of this calculation, 'credit risk' RWAs are those RWAs referred to in Article 92(3)(a) of the Required Level of Own Funds (CRR) Part of the PRA Rulebook. If firms wish to also include RWAs other than 'credit risk' RWAs, they should submit the methodology for including them and their respective sensitivity to movements in FX to be reviewed and agreed by the PRA.

4: Netting a convertible with its underlying instrument

[This section has been deleted]

4.1 [Deleted]

5: Offsetting derivative instruments

5.1 CRR Article 331(2) states conditions that should be met before firms not using interest rate pre-processing models can fully offset interest rate risk on derivative instruments. One of the conditions is that the reference rate (for floating rate positions) or coupon (for fixed rate positions) should be 'closely matched'. The PRA would normally consider a difference of less than 15 basis points as indicative of the reference rate or coupon being 'closely matched' for the purposes of this Article.

5A: Corrections to modified duration for debt instruments under 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

$\Delta r =$ a hypothetical IRR change of 50 b.p.

$\Psi =$ 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.

6: Exclusion of overshootings when determining multiplication factor addends

6.1 The PRA's starting assumption will be that all overshootings should be taken into account for the purpose of the calculation of addends. If a firm believes that an overshooting should not count for that purpose, then it should contact the PRA in order to obtain its agreement to exclude that particular overshooting. The PRA will then decide whether to agree to such an exclusion.

6.2 One example of when a firm's overshooting might properly be disregarded is when it has arisen as a result of a risk that is not captured in its VaR model, but against which capital resources are already held.

7: Derivation of notional positions for simplified standardised approaches

Futures and forwards on a basket or index of debt securities

7.1 These should be converted into forwards on single debt securities as follows:

(1) futures or forwards on a single currency basket or index of debt securities should be treated as either:

(ac) a series of forwards, one for each of the constituent debt securities in the basket or index, of an amount which is a proportionate part of the total underlying the contract according to the weighting of the relevant debt security in the basket; or

(bd) a single forward on a notional debt security; and

(2) futures or forwards on multiple currency baskets or indices of debt securities should be treated as either:

(a) a series of forwards (using the method described in 1(a)); or

(b) a series of forwards, each one on a notional debt security to represent one of the currencies in the basket or index, of an amount which is a proportionate part of the total underlying the contract according to the weighting of the relevant currency in the basket.

7.2 Notional debt securities derived through this treatment should be assigned a specific risk position risk adjustment and a general market risk position risk adjustment equal to the highest that would apply to the debt securities in the basket or index.

7.3 The debt security with the highest specific risk position risk adjustment within the basket might not be the same as the one with the highest general market risk position risk adjustment. A firm should select the highest percentages even where they relate to different debt securities in the basket or index, and regardless of the proportion of those debt securities in the basket or index.

Bonds where the coupons and principal are paid in different currencies

7.4 Where a debt security pays coupons in one currency, but will be redeemed in a different currency, it should be treated as:

(1i) a debt security denominated in the coupon's currency; and

(2ii) a foreign currency forward to capture the fact that the debt security's principal will be repaid in a different currency from that in which it pays coupons, specifically:

(a) a notional forward sale of the coupon currency and purchase of the redemption currency, in the case of a long position in the debt security; or

(b) a notional forward purchase of the coupon currency and sale of the redemption currency, in the case of a short position in the debt security.

Interest rate risk on other futures, forwards and swaps

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:

(1~~i~~) has a zero coupon;

(2~~ii~~) has a maturity equal to that of the relevant contract; and

(3~~iii~~) is long or short according to the following table:

Instrument		Notional positions	
Foreign currency forward or future	A long position denominated in the currency purchased	and	A short position denominated in the currency sold.
Gold forward	A long position if the forward or future involves an actual (or notional) sale of gold	or	A short position if the forward or future involves an actual (or notional) purchase of gold.
Equity forward	A long position if the contract involves an actual(or notional) sale of the underlying equity	or	A short position if the contract or future involves an actual (or notional) purchase of the underlying equity.

Deferred start interest rate swaps or foreign currency swaps

7.6 Interest rate swaps or foreign currency swaps with a deferred start should be treated as two notional positions (one long, one short). The paying leg should be treated as a short position in a zero specific risk security with a coupon equal to the fixed rate of the swap. The receiving leg should be treated as a long position in a zero specific risk security, which also has a coupon equal to the fixed rate of the swap.

7.7 The maturities of the notional positions are shown in the following table:

	Paying leg	Receiving leg
Receiving fixed and paying floating	The maturity equals the start date of the swap.	The maturity equals the maturity of the swap.
Paying fixed and receiving floating	The maturity equals the maturity of the swap.	The maturity equals the start date of the swap.

Swaps where only one leg is an interest rate leg

7.8 For the purposes of interest rate risk, a firm should treat a swap (such as an equity swap) with only one interest rate leg as a notional position in a zero-specific-risk security:

(1a) with a coupon equal to that on the interest rate leg;

(2b) with a maturity equal to the date that the interest rate will be reset; and

(3c) which is a long position if the firm is receiving interest payments and short if making interest payments.

Foreign exchange forwards, futures and CFDs

7.9 A firm should treat a foreign currency forward, future, or Contracts for Difference (CFDs) as two notional currency positions as follows:

(1a) a long notional position in the currency which the firm has contracted to buy; and

(2b) a short notional position in the currency which the firm has contracted to sell.

7.10 The notional positions should have a value equal to either:

(1c) the contracted amount of each currency to be exchanged in the case of a forward, future, or CFD held in the non-trading book; or

(2d) the present value of the amount of each currency to be exchanged in the case of a forward, future, or CFD held in the trading book.

Foreign currency swaps

7.11 A firm should treat a foreign currency swap as:

(1e) a long notional position in the currency in which the firm has contracted to receive interest and principal; and

(2f) a short notional position in the currency in which the firm has contracted to pay interest and principal.

7.12 The notional positions should have a value equal to either:

(1g) the nominal amount of each currency underlying the swap if it is held in the non-trading book; or

(2h) the present value amount of all cash flows in the relevant currency in the case of a swap held in the trading book.

Futures, forwards, and CFDs on a single commodity

7.13 Where a forward, future or CFD settles according to:

(1) the difference between the price set on trade date and that prevailing at contract expiry, then the notional position should:

(a) equal the total quantity underlying the contract; and

(b) have a maturity equal to the expiry date of the contract; and

(i) the difference between the price set on trade date and the average of prices prevailing over a certain period up to contract expiry, then a notional position should be derived for each of the reference dates used in the averaging period to calculate the average price, which:

(a) equals a fractional share of the total quantity underlying the contract; and

(b) has a maturity equal to the relevant reference date.

Buying or selling a single commodity at an average of spot prices prevailing in the future

7.14 Commitments to buy or sell at the average spot price of the commodity prevailing over some period between trade date and maturity should be treated as a combination of:

(1) a position equal to the full amount underlying the contract with a maturity equal to the maturity date of the contract, which should be:

(a) long, where the firm will buy at the average price; or

(b) short, where the firm will sell at the average price; and

(2) a series of notional positions, one for each of the reference dates where the contract price remains unfixed, each of which should:

(a) be long if the position under (1) is short, or short if the position under (1) is long;

(b) equal to a fractional share of the total quantity underlying the contract; and

(c) have a maturity date of the relevant reference date.

8: Qualifying debt instruments

This chapter has been deleted.

9: Expectations relating to internal models

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

- requirements on risk measurement;
- qualitative requirements; and
- requirements on internal validation.

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 Article 325bi of the Market Risk: Internal Model Approach (CRR) Part 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 [Deleted]

Data standards

[This sub-section has been deleted]

9.5 [Deleted]

9.6 [Deleted]

9.7 [Deleted]

Risk Factor Modelling

9.7A As part of validating the close relationship between a risk factor and a verifiable price, the PRA expects a firm seeking to map a verifiable price to more than one risk factor in accordance with Article 325be(7) of the Market Risk: Internal Model Approach (CRR) Part to have performed a quantitative assessment demonstrating that the verifiable price has a material dependence on each of the risk factors.

9.7B A firm should include all of its modellable risk factors in the set of modellable risk factors referred to in Paragraph 4 of Article 325bc of the Market Risk: Internal Model Approach (CRR) Part. The firm may choose to exclude some of those risk factors from the subset of modellable risk factors referred to in paragraph 2 of the same Article (e.g. where those risk factors did not exist in the historical period of stress). Where a firm maps those excluded risk factors to another risk factor that is included for complying with the requirement in Article 325bh(12) of the Market Risk: Internal Model Approach (CRR) Part, the PRA expects a firm

to ensure such mapping approach remains prudent and include evidence to demonstrate this in its documentation.

9.7C Article 325bc(3) of the Market Risk: Internal Model Approach (CRR) Part requires firms to calculate partial expected shortfall measures based on the same subset of modellable risk factors that the firm uses to calculate the corresponding measures referred to in Paragraph 2 of that Article. The PRA expects a firm to use the same modelling approach when calculating the two partial expected shortfall measures, with very limited exceptions. To the extent that a firm deviates from applying the same modelling approach, it should clearly document the basis for the deviation.

Aggregating Expected Shortfall (ES) measures

9.8 [Deleted]

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 measures for each category should be added in order to determine its aggregate ES measure. However, to the extent that a firm's ES model permission provides for a different way of aggregating ES 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 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 model can be recognised. This will be agreed on a firm by firm basis.

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

Back-testing

9.13 For clarity, the back-testing requirements of Article 325bf of the Market Risk: Internal Model Approach (CRR) Part 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 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 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.

Date of application of consequences of model tests

9.15A The Market Risk: Internal Model Approach (CRR) Part requires firms to undertake a number of tests on a quarterly basis, and sets out that the results of these tests should be assessed as at the quarterly reporting reference date. The PRA expects firms to reflect any consequences from these tests in the quarter immediately following the quarterly reporting reference date. For example, the consequence of failing the profit and loss attribution test (PLAT) as at 31 March should be reflected in the quarter beginning 1 April and ending 30 June.

Planned extensions and changes to the Internal Model Approach model

9.16 In accordance with Article 325azx of the Market Risk: Internal Model Approach (CRR) Part, 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. 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 framework. See Chapter 2 for the process around extensions and changes to the RNIM 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]

9.18 [Deleted]

Accuracy of approximate revaluation approaches

9.19 Related to the expectations in paragraph 2.4A, 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 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 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.

Internal default risk model

9.19A As part of the internal default risk model requirement as set out in Article 325bp of the Market Risk: Internal Model Approach (CRR) Part, firms are required to model default risk using two types of systematic risk factors. Firms' internal default risk model shall also reflect/incorporate the economic cycle appropriately. In order to meet both these requirements without compromising the risk sensitivity of the model, the PRA considers that firms may reflect the economic cycle differently than through the chosen systematic factors, provided it can be shown that this is equivalent to a 2-factor model where the economic cycle is absorbed into the chosen systematic risk factors (eg region and sector).

Trading locations

9.20 [Deleted]

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 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 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.

10: Stressed VaR calculation

[This section has been deleted]

10.1 [Deleted]

Quantile estimator
[This sub-section has been deleted]

10.2 [Deleted]

Meaning of 'period of significant financial stress relevant to the institution's portfolio'
[This sub-section has been deleted]

10.3 [Deleted]

10.3A [Deleted]

Antithetic data
[This sub-section has been deleted]

10.4 [Deleted]

Absolute and relative shifts
[This sub-section has moved to chapter 9]

10.5 [Moved to Chapter 9]

10.6 [Moved to Chapter 9]

11: Requirement to have an internal IRC model

[This section has been deleted]

11.1 [Deleted]

11.2 [Deleted]

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

11.3 [Deleted]

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

11.4 [Deleted]

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

11.5 [Deleted]

12: Annual SMF attestation of market risk internal models

12.1 The PRA expects an appropriate individual in a SMF 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, and any applicable market risk supervisory statements.

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

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, 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.

13: Alternative definitions of sensitivities in the advanced standardised approach

13.1 In assessing a firm's application for permission to use alternative definitions of sensitivities for calculating the own funds requirements of a trading book position under Article 325t(5) of the Market Risk: Advanced Standardised Approach (CRR) Part, the PRA expects firms to:

- provide justification that the resulting sensitivities are appropriate for calculating the own funds requirements of a trading book position; and

- document the circumstances or scenarios under which the results of the alternative definitions of sensitivities might materially differ from those in the PRA rulebook. Firms should have an appropriate process to ensure that if and when those scenarios occur, the resulting sensitivity-based method calculation does not understate risk (when compared to the use of the standard definitions). Firms should periodically update this analysis.

14: Determination of the value of a CIU and its underlying investments for the purpose of Articles 104(2)(f), 104(2)(h), ~~and~~ 325j(1)(a) and the Market Risk: Internal Model Approach (CRR) Part

14.1 Firms are required to determine the 'value' of a CIU and its underlying investments to apply the thresholds in Articles 104(2)(f), 104(2)(h), and 325j(1)(a), as well as for determining the definition of an 'ineligible position' under the Market Risk: Internal Model Approach (CRR) Part 1.3. For many standard CIUs, the PRA considers Net Asset Value (NAV) would be an appropriate measure for the CIU and the respective valuations included in the NAV would be appropriate for its underlying investments. However, the PRA expects this determination of value to consider whether there are features of the CIU, such as leverage, derivatives that are used for purposes other than hedging, or synthetic positions, that would mean that the NAV or the related valuation of the underlying investments would not be an appropriate measure to reflect the proportion of the overall market risk of the CIU that a collection of underlying investments contribute. In cases where such features exist, firms should instead apply an alternative approach to determine the CIU and its underlying investments' value for the purpose of applying the thresholds in Articles 104(2)(f), 104(2)(h), and 325j(1)(a), as well as for determining the definition of an 'ineligible position' under the Market Risk: Internal Model Approach (CRR) Part 1.3. Firms should be able to demonstrate to supervisors, upon request, that the alternative approach appropriately reflects the CIU and underlying investments' value, taking into account its market risk profile.