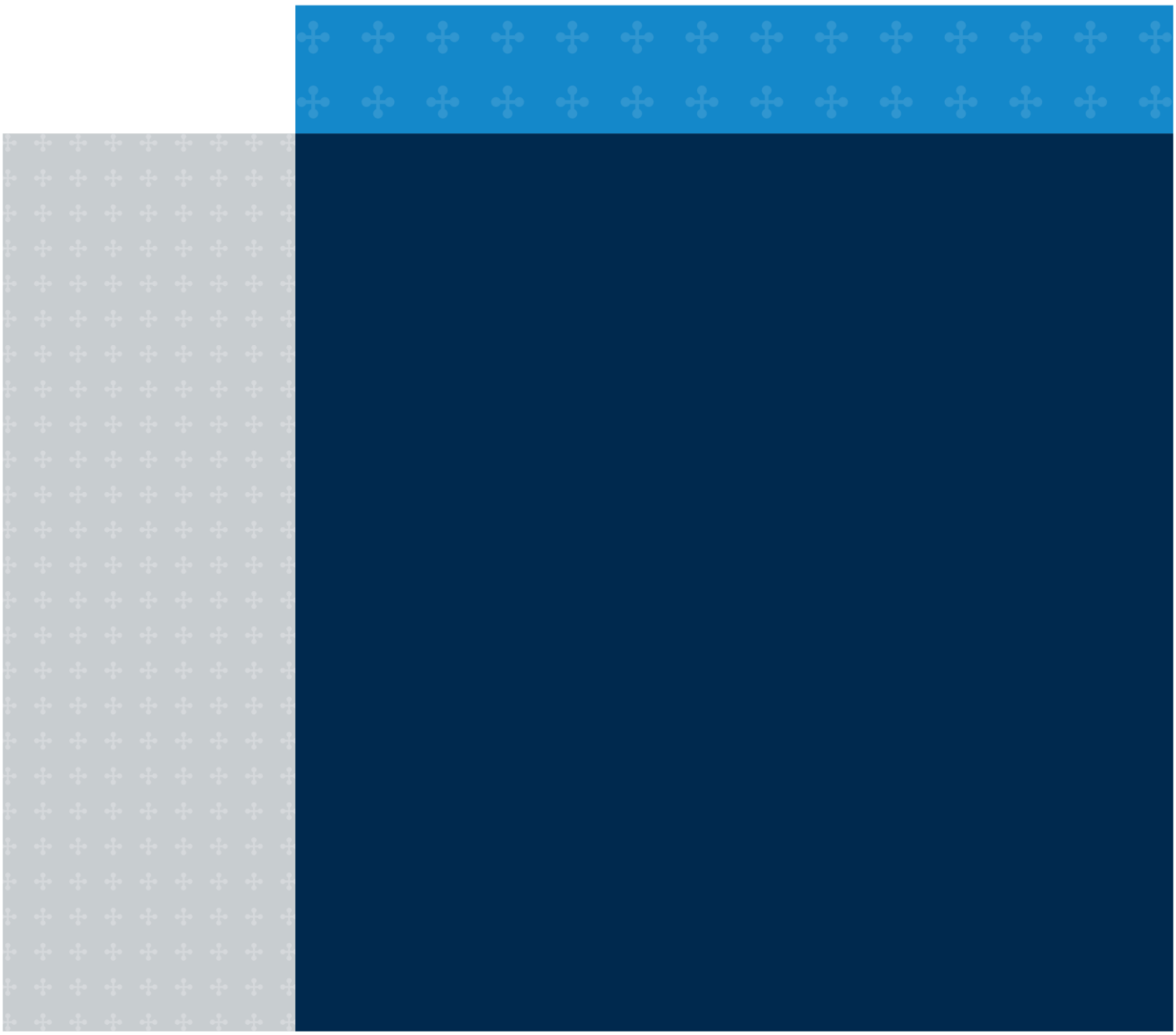
BANK OF ENGLAND
PRUDENTIAL REGULATION AUTHORITY

Publication

Policy Statement | PS22/20

Counterparty credit risk: Treatment of model limitations in banks' internal models

October 2020



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Counterparty credit risk: Treatment of model limitations in banks' internal models

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Prudential Regulation Authority | 20 Moorgate | London EC2R 6DA

Contents

1 Overview

1.1 This Prudential Regulation Authority (PRA) Policy Statement (PS) provides feedback to responses to Consultation Paper (CP) 17/19 'Counterparty credit risk: Treatment of model limitations in banks' internal models'.[1] It also contains final policy in the form of the updated Supervisory Statement (SS) 12/13 'Counterparty credit risk' (Appendix).

1.2 This PS is relevant to UK banks, building societies and PRA-designated UK investment firms that are subject to the Capital Requirements Regulation (575/2013) (CRR). It is not relevant to UK branches of firms in other European Economic Area (EEA) countries and non-EEA countries, nor to insurance firms.

Background

1.3 In CP17/19 the PRA consulted on the treatment of model limitations and assumptions under Part Three, Title II, Chapter 6, Section 6 (the internal model for counterparty credit risk) of the CRR. The changes covered two broad areas:

Monitoring of model limitations and assumptions

1.4 This section sets out proposed expectations that firms using the Internal Models Method (IMM) should use a centralised inventory to track all limitations and assumptions which may have an impact on the output of the IMM model. This would be used to support the CRR requirement for all firms using the IMM to have in place a formal process through which senior management should be aware of the limitations and assumptions of the model, and the impact those limitations and assumptions can have on the reliability of the model output.

1.5 The PRA noted that most firms already have some form of inventory which they use to track model limitations. However there is variability in the scope and breadth of these inventories. Some firms track limitations per underlying model, rather than centrally across all models which contribute to the IMM output, which can make it difficult to see the key model risks driving uncertainty in the overall exposure. By setting expectations across all IMM firms, the PRA intends to harmonise standards and move towards a consistent high standard of model risk management across the IMM framework.

A minimum exposure level in the presence of excess collateral

1.6 This section sets out proposed expectations for how firms should mitigate the impact of model limitations in the particular case of exposures covered by excess collateral posted to meet a regulatory obligation calculated in accordance with Chapter I, Section 4 of Commission Delegated Regulation (EU) 2016/2251 (Uncleared Margin Requirements) through use of an exposure floor, applied to the Effective Expected Positive Exposure (*EEPE*) as per equation [1] below:

$$[1]\ EEPE = \max\left[EEPE_{modelled}\ ,\ EEPE_0\left(0.05 + 0.95e^{-IM/1.9EEPE_0}\right)\right]$$

where $EEPE_{modelled}$ is the *EEPE* estimated by the model recognising all collateral; $EEPE_0$ is the *EEPE* recognising only collateral sufficient to offset the current market value; and *IM* is the volatility-adjusted value of excess collateral available over and above the amount required to offset the current market value.

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1 July 2019 (page 2 of 2): https://www.bankofengland.co.uk/prudential-regulation/publication/2019/counterparty-credit-risk-treatment-of-model-limitations-in-banks-internal-models.

1.7 Exposures covered by excess collateral (initial margin) are particularly susceptible to model risk, because the relative materiality of any model limitation's potential impact increases as the net exposure decreases. The risk models used to forecast exposure under IMM are very similar to the models used to calibrate uncleared margin requirements. Intuitively, therefore, it is not surprising that, when the uncleared margin requirement is set to cover the forecast exposure at a high confidence level, the only significant genuine residual risk comes from risk factors not included in either model.

1.8 The PRA recognised that initial margin is a genuine economic risk mitigant and is supportive of firms recognising this within IMM exposure models. However, there are inherent difficulties and complexities in accurately modelling risk in the presence of excess collateral. The PRA's intention in developing a floor for some over-collateralised exposures is to provide all firms with a simple way to address the concern of excessive model risk arising from the recognition of initial margin received under uncleared margin requirements. This approach attempts to strike the balance between simplicity and conservatism and timeliness, against more complex approaches that firms could attempt to develop. In this way the PRA aims to assist firms that wish to apply for permission to recognise uncleared margin requirements initial margin within IMM.

Summary of responses

1.9 The PRA received three responses to the CP. The responses were broadly supportive of the principle of a centralised inventory for monitoring model limitations and assumptions, and were broadly opposed to the principle of a floor for over-collateralised exposures. The PRA's feedback to these responses, and final policy decisions, are set out in Chapter 2.

Changes to draft policy

1.10 Following consideration of the responses, the PRA has made a minor change to the draft policy to clarify that where quantitative models are used to estimate the materiality of model limitations and assumptions, the level of independent challenge to these models that the PRA expects should be commensurate with materiality. Further details on this change are set out in Chapter 2.

1.11 The PRA has also included guidance in SS12/13, which has already been published in a statement on Monday 30 March 2020, relating to the treatment of unsettled margin in the IMM.[2] This has been included as a clarification of a pre-existing expectation which will aid firms in their implementation of the IMM. Minor changes have been made to the original wording to clarify the intended scope of the guidance.

1.12 The PRA has also taken the opportunity to add a new example, relating to the aforementioned guidance on the treatment of unsettled margin, to the list of typical limitations which it would expect to see included in the inventory of model limitations and assumptions.

1.13 The PRA considers that the changes will not have a significant impact on firms, and will not have a significantly different impact on mutuals than for other firms. As a result, the cost benefit analysis has not been updated in respect of these changes.

1.14 The PRA has also taken the opportunity to make amendments to the format of the SS to bring it into line with other statements.

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2 See www.bankofengland.co.uk/prudential-regulation/publication/2020/exposure-value-for-internal-models-method-counterparty-credit-risk.

Implementation

1.15 The changes to SS12/13 will be effective on publication of this PS, on Wednesday 14 October 2020. If firms have concerns about their ability to comply with these expectations, they should get in touch with their usual supervisory contacts.

1.16 The policy set out in this PS has been designed in the context of the UK's withdrawal from the European Union and entry into the transition period, during which time the UK remains subject to European law. The PRA will keep the policy under review to assess whether any changes would be required due to changes in the UK regulatory framework at the end of the transition period, including those arising once any new arrangements with the European Union take effect.

1.17 The PRA has assessed that the policy would not need to be amended under the EU (Withdrawal) Act 2018 (EUWA). Please see PS5/19 'The Bank of England's amendments to financial services legislation under the European Union (Withdrawal) Act 2018' for further details.[3]

3 April 2019: https://www.bankofengland.co.uk/paper/2019/the-boes-amendments-to-financial-services-legislation-under-the-eu-withdrawal-act-2018.

2 Feedback to responses

2.1 The PRA has considered the responses received to the CP. This chapter sets out the PRA's feedback to those responses, and its final decisions.

2.2 The feedback set out in this chapter has been grouped by the subject of the responses in two sections:

- monitoring of model limitations and assumptions; and
- a minimum exposure level in the presence of excess collateral.

Monitoring of model limitations and assumptions

2.3 Respondents were broadly supportive of the proposal that firms should maintain a single, central inventory of limitations and assumptions which may affect the output of IMM models.

Proportionality

2.4 One respondent expressed concern that the requirement to include all model limitations and assumptions in the inventory would be unduly onerous, and proposed that the inventory should only include limitations and assumptions that drive a 'meaningful change in the model output'.

2.5 The PRA has decided not to change the expectation that all limitations and assumptions should be included in the inventory. The determination that a limitation or assumption does not drive a 'meaningful change in the model output' must itself require some level of analysis, and the PRA considers that there is value in maintaining a list of all such analysis. The PRA re-emphasises that the frequency and sophistication of that analysis is expected to vary significantly with the likely materiality of the limitation or assumption, and fully expects the analysis of some limitations or assumptions to be little more than a qualitative comment. As such the PRA does not consider this requirement to be disproportionate or unduly onerous.

Independent challenge

2.6 Respondents also commented that the requirement to challenge the quantification of the impact of assumptions, relative to other plausible assumptions, could be disproportionate relative to the estimated impact and would not allow estimates of impact to vary in frequency and methodological rigour based on materiality.

2.7 The PRA agrees that where models are used to quantify the impact of IMM model assumptions relative to other plausible assumptions, it is important that the level of independent challenge to those models should be proportionate relative to the estimated impact. In practical terms, for some firms this may mean that these models are not subject to a full model validation process. The SS has been updated to make this clearer.

Implementation time

2.8 Respondents noted that the creation of a single central inventory will require significant investment in systems, time and effort, and requested that the industry be given 18-24 months to take action.

2.9 The PRA recognises that it will take some firms time to develop the systems and perform the analysis needed to come into compliance with these expectations, depending on their initial state. As always, firms approved to use the IMM should send the PRA an annual attestation of their compliance with both the requirements in CRR and the expectations set out in SS12/13, and where

they are found to be non-compliant, include a credible plan to come into compliance. The PRA considers most firms should be able to comply with the new expectations set out in this PS within 12 months, but will engage with individual firms on an appropriate timeline for coming into compliance.

A minimum exposure level in the presence of excess collateral

2.10 Respondents were largely opposed to the proposal that model risks due to excess collateral posted to meet uncleared margin requirements could be mitigated by an exposure floor.

Level playing field

2.11 The criticism was raised that a floor could create an 'unlevelled playing field' between different jurisdictions. There was a concern that the expectation of a floor could cause businesses in the UK to operate at a competitive disadvantage internationally.

2.12 The PRA does not consider the impact of requiring firms to address model shortfalls by permitting only partial recognition of excess collateral is likely to be material in the context of firms' overall capital requirements. The PRA also considered that it strikes an appropriate balance between simplicity, timeliness for model approval, and risk sensitivity, while remaining an important supervisory tool for mitigating model risk in exposures covered by uncleared margin requirements.

2.13 Furthermore, the PRA considers that the most likely effect of the proposal will be a reduction in capital requirements for affected firms, by facilitating the approval of applications to recognise uncleared initial margin within the exposure model. This will improve the competitiveness of businesses in the UK, compared with the current situation.

Use test

2.14 Respondents also expressed concern that the proposed floor could distort the natural sensitivity of the Effective Expected Positive Exposure (EEPE) to its underlying risk factors, with possible perverse effects. This may undermine the connection between the EEPE used for regulatory capital requirements and the measure of exposure used to set credit limits, which may continue to use an (unfloored) EEPE with full recognition of all collateral.

2.15 The PRA is sensitive to the concern that EEPE should maintain, to the extent possible, its sensitivity to underlying risk factors. The proposed floor, which mirrors the functional form for recognising excess collateral in the Standardised Approach to Counterparty Credit Risk (SA-CCR) would preserve these sensitivities to a large extent. It remains the case, for example, that additional collateral will always reduce the modelled exposure, even if subject to the floor. However it is of course inherently impossible to reduce the recognition of collateral in the exposure calculation without any impact on the sensitivities of that exposure.

2.16 The PRA agrees that harmonisation is desirable between the exposure measure used for regulatory capital and the exposure measure used to monitor credit risk appetite. This preference is codified in the 'use test' set out in CRR Article 289, which requires that the output of the IMM model be taken into account in the processes of credit approval and CCR management. It is not unusual however for there to be different model parameterisations or model overlays between the 'regulatory' and 'internal' exposure calculations.

2.17 The PRA does not consider that a floor, which permits only partial recognition of excess collateral against a limited number of exposures, will in itself undermine the use test, noting that the concern motivating this proposal (excessive model risk in exposures covered by initial margin) applies equally well to exposures estimated for internal risk management purposes. As a result the

PRA would be concerned if a firm were monitoring credit risk on such exposures primarily through an EEPE metric.

Universality of application

2.18 One respondent opined that the floor should be considered only as a supervisory backstop tool to address material model deficiencies identified by the PRA.

2.19 The PRA is concerned that one effect of increasing collateralisation is an increase in the relative materiality of all model limitations and assumptions. At the levels of over-collateralisation at which the proposed floor would become the binding constraint, the PRA does not consider it is practical to quantitatively assess all model limitations and their potential impact on the model output. The PRA expects that a simple floor is generally the most effective way to address the increased model risk, while still permitting the recognition of justifiable economic risk reduction that comes from increasing levels of collateralisation.

Excess conservatism

2.20 Respondents highlighted a number of ways in which they felt the existing IMM framework already embeds a level of conservatism which might be regarded as sufficient to compensate for the inherent model risk found in exposures subject to uncleared margin requirements, raising the possibility of 'double counting'. In particular:

- the supervisory haircuts used to adjust the value of non-cash collateral or collateral in a different currency to the underlying exposure embed a degree of conservatism;

- the alpha factor (set to a minimum value of 1.4) is applied to all IMM exposures and may be regarded as existing partially for the purpose of compensating for model risk; and

- the Basel 3.1 package includes a proposal for an output floor to be applied to the output of all internal models.

2.21 The PRA does not consider any sources of potential conservatism found elsewhere within the IMM framework can be used to justify ignoring the model risk generated by the modelling of exposures subject to uncleared margin requirements.

2.22 The supervisory haircuts applied to the value of collateral are in place to recognise the volatility of the collateral value over the margin period of risk, which is not directly related to the issue of model limitations having an outsized impact on the modelled exposure net of collateral. The alpha multiplier may be increased as mitigant against model risk, but at its default value of 1.4, should not be regarded as a mitigant against deficiencies in the IMM models (a point supported by the fact that an alpha multiplier of 1.4 is also applied to non-IMM exposures under SA-CCR). The Basel output floor, which is not part of the current regulatory framework, may serve as a mitigant against excessive model risk across the whole suite of regulatory capital models. However it should not be regarded as a substitute for the requirement for firms to ensure adequate risk capture within their Pillar 1 capital models.

2.23 One respondent suggested that the PRA should consider the ability of firms to apply for an alpha factor of less than 1.4 to offset any double counting of model risk. Firms are entitled to apply for permission to use their own estimate of alpha in accordance with CRR Article 284(9) and the PRA will consider any application to do so. As set out above however, the PRA does not consider the motivation for the alpha multiplier to overlap with the concerns motivating the exposure floor. Full recognition of excess collateral received under uncleared margin requirements within the internal

capital calculation used to estimate alpha would therefore be a cause for concern, in the same way that it would be a cause for concern within the regulatory exposure calculation.

Level of the floor

2.24 The model used to determine initial margin amounts for margin posted to meet uncleared margin requirements is calibrated to the 99th percentile of the risk distribution forecast over a 10-day margin period of risk. Citing this point, one respondent suggested that the floor should be recalibrated in order to asymptotically approach 1% (rather than 5%) of the exposure recognising no excess collateral, as a function of increasing initial margin.

2.25 The PRA has elected to preserve the form of the floor as per the original proposal. The floor is a mitigant against limitations in the IMM exposure model and there is no strong rationale to adjust its calibration based on the calibration of the model used to determine the initial margin amount. The 5% asymptotic floor is chosen for consistency with the equivalent function in SA-CCR.

Form of the floor

2.26 A respondent suggested that, for simplicity as well as in order to avoid double counting of conservative elements in the framework, it might be more appropriate to use a simple floor rather than the exponential function proposed.

2.27 The PRA considers that the exponential function in the proposal is preferable to a floor set at a fixed percentage of the exposure recognising no excess collateral. A simple fixed floor would distort considerably the natural sensitivities of the exposure value to its underlying risk factors (a concern highlighted in paragraph 2.14 by the same respondent). The complexity of the proposed floor is not unreasonable for a firm with the sophistication to implement a model for incorporating risk-sensitive initial margin within an IMM exposure simulation.

Pillar 2

2.28 A respondent noted that there are other supervisory tools, in particular the setting of Pillar 2 capital requirements, which could be used to address the concerns which the floor seeks to mitigate.

2.29 The PRA has considered the use of Pillar 2 to address the risk of undercapitalisation in over-collateralised exposures. However the PRA's approach to setting Pillar 2A capital requirements, as set out in its Statement of Policy 'The PRA's methodologies for setting Pillar 2 capital', is that deficiencies or issues in the quantification of capital requirements under advanced models should be addressed as part of the model approval and review process and any additional capital requirements reflected in Pillar 1.[4]

4 February 2020: https://www.bankofengland.co.uk/prudential-regulation/publication/2015/the-pras-methodologies-for-setting-pillar-2-capital.

Appendix

1 SS12/13 'Counterparty credit risk', available at: www.bankofengland.co.uk/prudential-regulation/publication/2013/counterparty-credit-risk-ss.