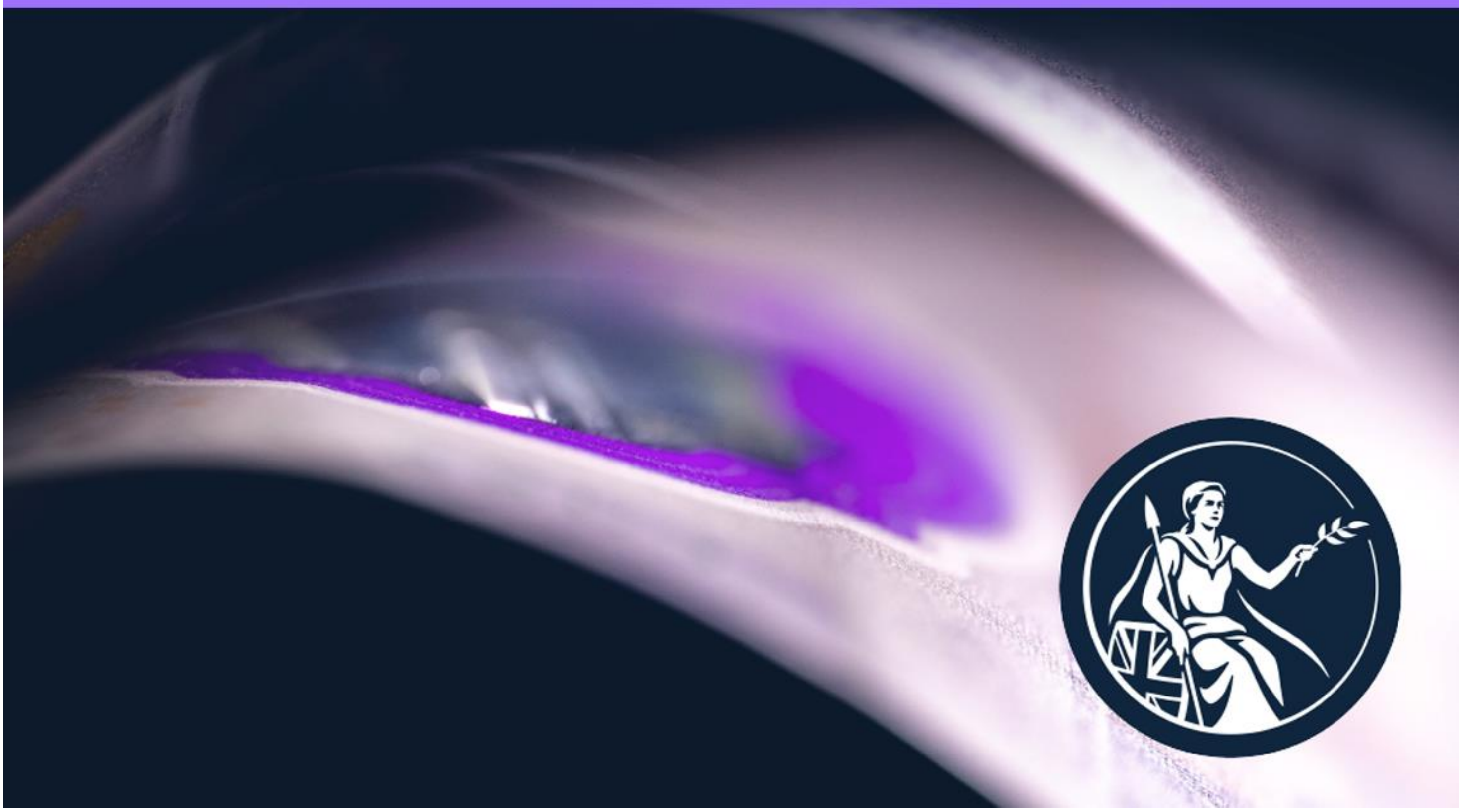
Bank of England PRA

Solvency II: Internal models – modelling of the matching adjustment

Supervisory Statement | SS8/18

June 2024 (updating July 2018)



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1: Introduction

1.1 This supervisory statement (SS) sets out the Prudential Regulation Authority's (PRA) expectations of firms regarding the application of the matching adjustment (MA) within the calculation of the Solvency Capital Requirement (SCR).

1.2 The SS is addressed to UK Solvency II firms and to the Society of Lloyd's and its managing agents. It is most relevant to firms with or seeking MA permission and which use a full or partial internal model to determine the SCR, together with UK Solvency II firms making an assessment as to the appropriateness of the standard formula for their risk profile.

1.3 This statement should be read in conjunction with the following Parts of the PRA Rulebook:

- Matching Adjustment;
- Solvency Capital Requirement – General Provisions (Chapter 3);
- Solvency Capital Requirement – Internal Models (Chapters 10 to 16); and
- Investments (Chapters 2 and 3).

1.4 It should also be read in conjunction with the document 'The PRA's approach to insurance supervision'[1], SS7/18[2] and SS1/20.[3]

1.5 The PRA has considered the relevant sections of The Insurance and Reinsurance Undertakings (Prudential Requirements) Regulations 2023 (referred to here as the 'IRPR regulations'), the PRA Rulebook and the Commission Delegated Regulation (EU) 2015/35 when setting the expectations noted in this SS. Throughout this SS, any reference to any provision of direct EU legislation is a reference to it as it forms part of assimilated law.

1.6 The European Insurance and Occupational Pensions Authority (EIOPA) publication entitled 'The underlying assumptions in the standard formula for the Solvency Capital Requirement calculation'[4] will also be relevant for firms using this SS in the context of an assessment of standard formula appropriateness.

1.7 The MA allows firms to adjust the relevant risk-free interest rate term structure for the purposes of calculating the best estimate of a portfolio of MA-eligible insurance or reinsurance obligations. In order to calculate the MA for a portfolio, firms must determine

1 July 2023: www.bankofengland.co.uk/prudential-regulation/supervision.
2 'Solvency II : Matching adjustment', June 2024: www.bankofengland.co.uk/prudential-regulation/publication/2018/solvency-2-matching-adjustment-ss.
3 'Solvency II: Prudent Person Principle', June 2024: www.bankofengland.co.uk/prudential-regulation/publication/2020/solvency-ii-prudent-person-principle-ss.
4 25 July 2014.

the fundamental spread (FS) to be used in the calculation. To apply an MA, firms must have permission from the PRA, as per Matching Adjustment 2.1. Firms with MA permission are permitted to apply an MA for the purposes of determining both technical provisions (TPs) and the SCR. Firms should have confidence that the level of MA benefit assumed in each of these calculations is fit for purpose. This SS covers the application of an MA as part of the SCR calculation. In general, the references to stressed MA and stressed FS in this SS are intended to apply to the entire MA portfolio on the stressed balance sheet unless otherwise stated.

1.8 The PRA recognises that many firms hold a relatively wide range of assets in their MA portfolios. These assets will differ in terms of liquidity and complexity; many of them may not be traded assets. The PRA's expectations set out in this statement primarily apply to the risks arising in respect of corporate bond assets within firms' MA portfolios. However, many of the expectations apply irrespective of the assets held and the PRA would therefore expect firms to consider the expectations set out in the SS to be more widely applicable unless specifically stated otherwise. In a number of places (eg paragraphs 4.10, 4.15, 4.20, 4.22, 5.17 and 5.18) the SS sets out specific expectations in relation to less liquid assets. In future, the PRA may issue further, more bespoke, expectations for the SCR treatment of other assets within an MA portfolio, such as illiquid assets.

1.9 The chapters that follow set out the PRA's expectations in relation to the modelling of the MA within the SCR calculation. The PRA considers that meeting these expectations will be in line with its general approach to the supervision of firms.

- Chapter 2 of the SS clarifies the PRA's overarching expectations as to how the MA should be captured in the SCR and the extent to which firms' modelling approaches for the MA should be constrained by the approach used in the calculation of TPs.
- Chapter 3 then discusses a framework for the modelling of the MA within internal models.
- Chapters 4 to 6 expand on the steps within this framework.

2: Allowing for an MA within the SCR calculation

2.1 Chapter 4 of the Matching Adjustment Part of the PRA Rulebook, which restates the relevant provisions of the IRPR regulations, sets out (at rule 4.6) that the matching adjustment must not include the fundamental spread reflecting the risks retained by the firm.

2.2 For the purposes of determining TPs, the FS calibrations used in the MA calculation are, in most cases, provided by the PRA in technical information produced in accordance with Matching Adjustment 4.10 to 4.15. Where a firm has TPs in a particular currency for which the PRA does not publish technical information, it is the firm's responsibility to propose technical information that complies with Solvency II requirements, and to justify this approach to its supervisor.[5] Firms are required to adjust this technical information (where possible and appropriate) to allow the FS to capture differences in credit quality by rating notch (Matching Adjustment 6). Firms are required to apply additions to the FS for assets with highly predictable (HP) cash flows (as per Matching Adjustment 4.16) and can apply any further additions to the FS that they consider necessary to ensure it covers all risks retained by the firm (as per Matching Adjustment 4.17). No similar technical information is provided in order to calculate the SCR and the PRA expects firms to consider if and how any adjustments to the technical information, and additions to the FS, used to calculate TPs need to be updated in stress conditions.

2.3 A firm's SCR should capture all material and quantifiable risks[6] to which it is exposed. The calculation of the SCR should therefore allow for any changes to the FS and MA following a stress event. In doing this, firms should determine the risks to which the MA portfolio is exposed, how these risks could affect the FS and MA and assess how this impact is captured within the SCR calculation. Changes to the FS in stress conditions should include any changes to additions made to the FS used to calculate the TPs, including those made as part of the attestation process. For assets with HP cash flows, the SCR should specifically allow for changes to the expected cash flow pattern on these assets as well as any changes to any FS additions made in line with Matching Adjustment 8.

2.4 The PRA has identified at least three high-level reasons why the FS could change following a stress:

5 Paragraph 3.6 of statement of policy – The PRA's approach to the publication of Solvency II technical information (December 2023, updating August 2022): **www.bankofengland.co.uk/prudential-regulation/publication/2020/the-pras-approach-to-publication-of-sii-technical-information**.

6 Solvency Capital Requirement – General Provisions 3.3(1) and Solvency Capital Requirement – Internal Models 11.6.

(i) changes in investment portfolio quality due to the occurrence of a stress;
(ii) assumption changes to reflect an updated forward-looking view of the FS following the stress, including any changes to additions made to the FS (as per Matching Adjustment 4.16 for assets with HP cash flows, or as per Matching Adjustment 4.17 for other reasons) for the purpose of calculating the TPs; and
(iii) assumed management actions, including rebalancing of the MA portfolio, that are required to maintain MA compliance following a stress. The extent of the actions required will be driven by the extent of any mismatch between the asset and liability cash flows following a stress event within the MA portfolio.

2.5 For the purposes of assessing how the assumptions underlying the FS calibration could change post-stress (paragraph 2.4(ii) above), it is important that firms' internal models are not inappropriately constrained by the assumptions and parameters used to calculate TPs. The PRA would therefore not expect firms to adopt a purely 'mechanistic approach' to determine the FS following a stress that directly follows the assumptions and methodology used to determine the FS for the purpose of calculating TPs. The PRA considers that a 'mechanistic approach' based on the re-application of the approach used to calculate TPs is unlikely to result in an SCR that takes into account all quantifiable risks to which a firm is exposed, including the risk of losses that are not allowed for within the TP calculation, resulting in an FS that may not capture all retained risks in stressed conditions. This is particularly the case for assets with HP cash flows where firms should consider changes to both the stressed cash flow projection and the level of uncertainty around this projection.

2.6 Firms should ensure that their chosen method to determine the FS under stress takes account of all quantifiable risks to which they are exposed. Firms should particularly consider those risks that have been retained within their MA portfolio(s) and ensure that their modelling approach results in an SCR that covers those risks at the 99.5% confidence level.

2.6A For some assets, particularly those with HP cash flows, the best estimate cash flows could change under stress for reasons other than default. It may not be possible to derive a full probability distribution. However, firms should consider the consequential impacts on the MA benefit and any rebalancing needed to maintain a matched position.

3: A framework for determining the MA used in the SCR calculation

3.1 The PRA has developed a five-step framework that sets out how the MA could be considered in the context of the SCR calculation. The steps in the framework are:

Step 1: re-value the MA portfolio assets under a one-year stress;

Step 2: calculate updated FS values, reflecting the stressed modelled economic environment;

Step 3: verify whether the MA eligibility conditions are still met (allowing also for any changes in asset and liability cash flows/values);

Step 4: if step 3 has failed, then the cost of re-establishing an MA compliant position should be estimated; and

Step 5: re-calculate the MA. Note that based on the analysis in the previous steps this may need to be based on a re-balanced MA asset portfolio.

3.2 The PRA considers that this framework will help a firm to exhibit and validate that its approach covers all material and quantifiable risks to which it is exposed. Therefore, it would be good practice for a firm to reconcile its approach with the steps in the framework in its internal model documentation.

3.3 The chapters that follow contain the PRA's more detailed expectations as to how the MA should be reflected within the SCR calculation. These have been linked, where appropriate, to the relevant steps in the PRA's framework for ease of reference. However, the PRA considers that a firm should be able to meet these expectations regardless of the modelling approach it has used.

4: Impact of a one-year stress on the MA

4.1 The SCR is defined as corresponding to 'the Value-at-Risk of [the firm's] basic own funds subject to a confidence level of 99.5% over a one-year period'.[7] The modelled change in basic own funds will capture any change in the MA.

4.2 When considering how a stress event can impact the MA, the PRA expects firms to capture any changes in the:

- value and cash flow profile (before and after risk adjustment) of assets held in the MA portfolio as a result of the stress event; and
- cash flow profile of the MA liabilities as a result of the stress event.

4.3 These changes can result from either actual portfolio losses due to the stress event or from changes in valuation assumptions triggered by new data or other information emerging over the one-year period. Furthermore, new risks may emerge in stress conditions and existing risks could become more prevalent.

4.4 Steps 1 and 2 of the PRA's five-step framework address the first of the points in paragraph 4.2 above. The second point is relevant to Steps 3, 4 and 5 and is discussed in Chapter 5.

Asset side stress to MA portfolio assets

4.5 The PRA expects firms to determine the change in the MA asset portfolio over one year. This will include changes in asset values and, for some assets including those with HP cash flows, any changes to the cash flow profile. This is intended to capture only those assets that were already in the MA portfolio pre-stress and not any assets subsequently injected in order to rebalance the portfolio post-stress.

4.6 Any firm that does not explicitly model a change in the value of the assets and, where applicable, a change in asset cash flows is unlikely to be able to demonstrate that it can continue to meet the MA eligibility conditions in stress conditions. In particular, this includes assessing whether the appropriate level of cash flow matching has been achieved and whether the value of assets in the MA portfolio covers the best estimate value of the MA liabilities.

4.7 The methodology used to calculate the asset values under stress should also determine the credit quality (eg credit rating) of a firm's assets under the modelled stresses at a suitable level of granularity, considering whether it should reflect differences in credit quality by rating notch. This is a key input into the MA in stress calculation.

7 Solvency Capital Requirement – General Provisions 3.4.

4.8 Many of the considerations in modelling asset-side credit risk are common to the modelling of the stressed FS. The remaining paragraphs in this chapter refer only to the FS. However, the PRA encourages firms to consider their wider applicability.

Risks retained in stress

4.9 In determining the level of stressed MA, the PRA expects firms to take appropriate account of the risks they retain in stress conditions including:

- downgrade and default risk (discussed below under ‘Modelling considerations in respect of downgrade and default risk’);
- basis risk;
- concentration risk; and
- any additional risks associated with assets with HP cash flows (discussed below under ‘Modelling considerations for assets with HP cash flows’).

4.10 The PRA expects the range of risks is likely to be broader for assets other than corporate bonds such as direct lending, reflecting their more bespoke nature.

Basis risk

4.11 Possible sources of basis risk that the PRA expects firms to allow for (unless immaterial) in respect of their MA portfolios include:

- the use of historical data to inform a firm’s calibrations or assumptions, where the dataset(s) used may not be reflective of the actual holdings and/or risk profile of the MA portfolio. A firm should consider whether any basis risk arises from the distribution of the firm’s asset holdings by rating notch compared to that assumed in the data and judgements used to calibrate its model. Also, even if historical data does perfectly reflect a firm’s asset holdings, the past may not be a good guide to the future and so an element of basis risk should be assumed to be present;[8]
- when firms choose to implement hedging strategies that are imperfect hedges; and
- if the risk profile of some of a firm’s assets differs materially from the assumptions used by the PRA or the firm to calibrate the FS for the purposes of calculating the TPs.

4.12 Where firms allow for basis risk when determining the stressed values of their asset holdings, they should consider how this affects the calculation of the FS in stress conditions and whether basis risk has been appropriately reflected in the stressed FS.

8 It may also be the case that calibrating statistics based on historical data does not fully capture the statistical qualities of the forward-looking distribution.

Concentration risk

4.13 Concentration risk can arise from a firm being disproportionately exposed to, for example, a given issuer or sector.

4.14 In assessing the extent to which a firm is exposed to concentration risks in its MA portfolio, the PRA expects a firm to use a number of different approaches including potentially:

- analysing the composition of its current MA portfolio(s) and the associated investment mandates and policies to identify potential areas of concentration, for example, large single name exposures, sector exposures, exposures to sub-investment grade assets or simply concentration arising from having relatively few different asset holdings comprising the total portfolio;
- including quantitative measurements where possible (eg using the Herfindahl index[9]); and
- conducting stress and/or scenario testing to assess to what degree concentration risk in the MA portfolio could crystallise in a severe credit event, for example increased concentration of exposure to sub-investment grade assets.

4.15 Concentration risk on non-corporate bond assets is likely to be more complex and could arise from a wider range of sources. Where a firm has material exposure to assets other than corporate bonds in its MA portfolio, any analysis of concentration risk exposure should reflect the nature of these assets and the types of concentration risks to which they give rise.

4.16 If a firm considers it does not have material exposure to concentration risk, it should be able to justify this conclusion through analysis of its own portfolio and should show how any potential concentration risks are mitigated (eg through exposure limits in the investment mandates).

4.17 If, through its own analysis, a firm considers its exposure to concentration risk to be material, it should make an allowance in the model calibration for the additional variability in losses that might be incurred in an economic stress. If this allowance is based on an approximation, the firm should be able to show that this approximation is reasonable given the risk exposure it is intended to capture.

9 The Herfindahl index is a simple measure of concentration risk, defined as the sum of the squares of the ‘market shares’ of each asset, where the ‘market share’ is the ratio of an asset’s value to the total asset value in the MA portfolio.

General modelling considerations when determining the FS calibration post-stress

4.18 The PRA does not have a preference or expectation as to the methodological approach used by firms to model the stressed FS, as long as the chosen approach meets the internal model requirements.

4.19 The PRA expects firms to justify the granularity of the underlying modelling performed to determine the stressed FS (eg by asset class, credit quality, sector, term).

4.20 As a starting point, the PRA expects firms to consider modelling the FS at the same level of granularity as is used for the purposes of calculating TPs. However, a different level of granularity can also be justified. This is likely to be particularly pertinent where the firm's MA portfolio includes a material proportion of assets other than corporate bonds or where using the same level of granularity would cause the model to become unduly complex.

4.21 A firm should strike a balance between modelling to a level of granularity that reflects its risk profile and ensuring sufficient credible evidence, supported by expert judgement, to develop calibrations reliably at this level of granularity.

4.21A The PRA expects a firm to justify any differences in the granularity at which credit quality is reflected in its internal model compared to that used for the purposes of calculating TPs. This should include consideration of the following factors:

- the composition of the MA portfolio by rating notch relative to the indices used to calibrate the transition and spread stresses (basis risk). For example, the PRA would expect a firm with a bias or concentration towards the lowest or highest notch in each CQS to make an appropriate allowance for this in its SCR calculation and, all else being equal (including the distribution of assets by CQS), for it to impact the quantification of the firm's SCR;
- the pattern of variation in spread and transition stresses by rating notch;
- the consistency between the granularity at which spreads and transitions are modelled;
- the availability and credibility of relevant data;
- the materiality of the impact of the adjustment to the FS to allow for variation in credit quality by rating notch for the purposes of calculating the TPs (Matching Adjustment 6);
- the consistency with the granularity at which the firm uses the model in accordance with Solvency Capital Requirement - Internal Models 10.3;

- the rebalancing assumptions made within the internal model and the granularity of risk modelling required to support those assumptions; and
- the type of modelling approach used. For example, a model that quantifies the SCR by determining the total stressed FS might reverse out any impacts from notching in the TPs and hence the firm may require a more granular modelling approach to address this.

4.21B A firm may consider that its risk profile requires it to increase the granularity at which credit quality is reflected in its internal model, for example to model the FS by rating notch, but that developing its model may not be straightforward and may take some time. In this circumstance, the PRA expects the firm to consider other possible remedies until it has completed the necessary development, including potentially increasing the capital requirement calculated by the internal model, in order to ensure that the SCR complies with the core calibration standards at all times.[10]

4.22 In the case of firms that have material exposure to less liquid assets (eg illiquid, direct investments) within the MA portfolio, the PRA expects a separate approach to be developed to model the FS for these assets. While an approach similar to that used for corporate bonds may be possible, the level of adaptation from the core corporate bond methodology and calibration should depend on the similarity of the assets in question to corporate bonds. In some cases a more bespoke methodology may be necessary. Where firms do not distinguish between asset classes in their modelling, then the appropriateness of the model for each asset class should be clearly justified.

4.23 The PRA is open to firms applying proportionate modelling approaches (likely to contain limitations and approximations) where they have only small exposures to certain asset classes, but the PRA does not expect firms to make material investment decisions using a model that does not appropriately reflect the risk profile of such investments.

4.24 Firms may seek to use their models to determine the change in FS in stress conditions or the total FS in stress conditions. While the PRA does not have a preference for either metric, firms are expected to acknowledge, when determining their preferred approach, that these metrics imply two markedly different modelling philosophies that will have a direct impact on the extent to which the SCR behaves in a cyclical manner. The PRA expects a firm to understand and justify the approach it has chosen and its limitations. Where a firm has identified scenarios where the approach operates in a way it considers inappropriate (eg produces counter-intuitive results relative to the change in risk profile), the firm should identify the actions it could potentially take in response, for example increasing the capital requirement calculated by the internal model, in order to ensure that the SCR complies with the core calibration standards at all times.

10 Solvency Capital Requirement – General Provisions 3.3 and 3.4.

4.25 When firms use historical data they should consider whether the data is:

- of sufficient length and quality to contribute towards a credible calibration for the risk in question;
- likely to contain a sufficiently extreme event or events to be useful for calibration purposes; and
- useful in determining how potential future credit events may manifest themselves.

4.26 In particular, firms should analyse whether actual migration and default rates over the future holding period of their assets could be more onerous than those observed in historical stress events, and make adjustments accordingly. The PRA also expects firms to set out clearly any judgements made around potential future crisis events that may differ in nature, magnitude and duration to crises seen previously.

Modelling considerations when determining an updated forward-looking view of the FS post-stress

4.27 Firms may model stressed FS by modifying the approach and inputs used to produce the FS for determining the TPs. The following paragraphs are of particular relevance for firms using this approach.

4.28 Chapter 4 of the Matching Adjustment Part of the PRA rulebook (restating as rules the relevant provisions of the IRPR regulations) sets out how the MA and FS should be calculated for the purpose of determining TPs. While the PRA considers that the MA calculation method should not change in stress conditions, firms should consider if the assumptions used to calculate the MA and FS for the TP calculation, including any additions to the FS (either for assets with HP cash flows as per Matching Adjustment 4.16 or for other reasons as per Matching Adjustment 4.17), remain appropriate in stress conditions.

4.29 Firms should ensure that the MA on sub-investment grade assets, including on assets that downgrade to sub-investment grade as a result of the stress, remains appropriate post-stress, taking account of the increased risks associated with such assets and the need to comply with the Prudent Person Principle (PPP) at all times. As a continuation of (or for consistency with) existing modelling approaches, some firms may choose to assume that the MA on sub-investment grade assets does not exceed that on assets of investment grade quality of the same duration and asset class. Some firms may instead choose to cap the MA on sub-investment grade assets in a different way in order to reflect the additional risks and PPP implications of sub-investment grade exposures. The PRA considers that such approaches could potentially be a way for firms to demonstrate compliance with the internal model calibration standards. Regardless of the approach taken, firms should ensure that the resulting stresses applied to sub-investment grade assets are appropriately calibrated having regard to:

- the availability of data;
- the extent to which these assets are assumed to default in stress conditions, including the assumptions and judgements about recoveries and the associated workout processes;
- the greater breadth of risks associated with sub-investment grade assets; and
- the potential concentration of risks both pre-stress and post-stress, recognising that over-exposure to speculative investments is unlikely to be compatible with the prudent management of the portfolio as required by the PPP. This presents a risk of forced sales of such assets in stress scenarios in order to ensure continued compliance with risk management requirements, including a firm's own risk limits and investment mandates.

4.30 The PRA expects firms to maintain a floor (ie a minimum level of FS at the appropriate point of the calculation) based on long-term average spreads as part of their modelling of the stressed FS. As a minimum, the PRA expects firms to reapply the methodology and calibration of the floor as set out in Matching Adjustment 4.11 to 4.15. If any changes are made to the floor, the PRA expects these changes to be justified. They should not result in a calibration below that which would have been obtained by re-applying the methodology and calibration used to calculate the TPs.

4.31 For all approaches, firms may also wish to apply other limits to the stressed FS. Often these will be grounded in historical experience or expressed as a percentage of total spread widening. While such limits can be helpful, they should not be an essential feature of firms' models or overshadow the importance of any more detailed modelling work undertaken.

4.32 Notwithstanding the above points, the PRA expects the methods used to determine the stressed FS calibrations to be grounded in the requirement that the stressed FS reflects the risks retained by the firm in stress conditions. However, within their internal models, firms may need to develop approaches that use different models and/or assumptions to those used to calibrate the FS for the purposes of determining the TPs calculation, in order for the SCR to take account of all quantifiable risks to which the firm is exposed. Firms are nonetheless expected to ensure that as a starting point they use, where available, the FS information published by the PRA, adjusted as required to allow the FS to vary by rating notch[11], for the purpose of calculating TPs.

4.33 Specifically for corporate bonds, a firm is expected to ensure that if it is using an approach to model the stressed FS that cannot closely replicate the FS used to calculate the TPs (in basis points or £ millions), consideration should be given to:

11 Matching Adjustment 6.

- how the FS or MA used to determine the TPs would compare to a proxy calculation based on the firm's own assumptions, and what the key reasons are for any difference; and
- how the firm has chosen to express the stressed FS (ie as the total FS or as the change in FS) and whether the difference between its assumptions at the 50th percentile compared to the assumptions used to calculate the TPs could give rise to the SCR being potentially under- or over-stated.

Modelling considerations in respect of downgrade and default risk

4.34 The matrix format of historical transition data potentially makes it difficult to model and/or compare transition data over time. When using transition data, the PRA expects a firm to:

- consider different approaches to comparing transition matrices and assessing their relative strength. The PRA's preferred approach is for firms to consider the whole matrix rather than just a single cell or small selection of cells. However, a firm could also use an approach that considers only a selection of cells provided it has a procedure to translate the output of this alternative approach into a whole matrix;
- compare its modelled 1-in-200 year transition matrix and matrices at other extreme percentiles against key historical transition events, notably the 1930s Great Depression (and 1932 and 1933 experience in particular). This should include considering how the matrices themselves compare as well as relevant outputs; and
- justify any shortfall between its 1-in-200 year transitions scenario and the actual transitions experience implied by these events (and the impact of this on the level of capital held). The firm should explain how it has validated that the level of stress it is applying is capturing all quantifiable risks to which it is exposed in this context.

4.35 In relation to transitions data for corporate bond assets, withdrawn ratings are a specific feature of the data that should be allowed for. A rating is withdrawn where an entity or financial instrument is no longer rated by the ratings agency concerned. Reasons for withdrawals of rating can be varied and are not necessarily indicative of impending downgrade or default. Firms should be able to justify the reasonableness of the approach used to allocate withdrawn ratings across the transition matrix as well as provide sensitivity analysis that quantifies the impact of using different allocations.

4.35A The PRA expects firms to consider the implications of any difference in granularity between the available historical transition data and the set of assumptions required for modelling, particularly if attempting to model transitions for notched ratings. Even if there is no difference, firms should consider whether low volumes of historical data for some categories of transitions could result in adjustments being required to the data when constructing estimates of future transition probabilities.

4.36 In order to ensure that the stressed FS calibration fully captures the risks retained on a forward-looking basis, a firm should consider whether its chosen methodology would allow the stressed experience (for one or more of the metrics modelled) to revert to more normal levels over a given period rather than instantaneously. This can be achieved through an explicit incorporation of a reversionary period (a ‘glide path’) within the model but other approaches are also possible.

4.37 In calibrating a glide path, the PRA expects consideration to be given to historical data and events as well as the theoretical justification.

4.38 Where a glide path is being modelled in respect of more than one element of the model (eg transitions and spreads) then the length and severity of the stressed period for different elements would not automatically be considered independent. The relationship between different glide paths should therefore be considered and any inconsistency should be justified.

4.39 Allowing stressed experience to revert to ‘normal’ over an extended period should not be seen as a correction for limitations elsewhere in the model.

Modelling considerations for assets with HP cash flows

4.40 The PRA considers that a distinction can usefully be drawn between assets with HP cash flows with economic variability and those with event-driven variability. Firms should consider how the cash flows and FS addition will change under stress for both types of assets.

4.41 For assets with economic variability, the cash flow profile under stress should be consistent with the modelled economic conditions. Where any optionality is ‘in the money’ the projection should reflect the increased likelihood of take-up by a rational counterparty. Firms should also consider the level of uncertainty around the stressed cash flows and the implications this has for any FS addition.

4.42 A lack of reliable data may make it challenging to model the stressed cash flows of assets that are exposed to event-driven variability. The PRA considers that a possible approach is to allow for the increased uncertainty via a change to the FS addition or a cap on the MA. In deciding on an approach, firms should carefully consider:

- the potential for the cash flow profile to change materially;
- any liquidity or reinvestment costs; and
- correlations with the wider economic environment.

5: Maintaining compliance with the MA eligibility conditions in stress conditions

5.1 In order to take credit for an MA benefit in stress conditions, a firm needs to check that its MA portfolio continues to meet the MA eligibility conditions.[12]

5.2 In particular the PRA expects the firm to evidence that the MA portfolio continues to be adequately matched and that the asset eligibility criteria continue to be met.

5.3 When undertaking this assessment, the firm should ensure that it has allowed for the impact of a stress event on both the assets and liabilities within the MA portfolio. For example, a longevity stress could result in an increase in the liability value, and an increase in longer-dated liability cash flows. The firm should also ensure that the assumptions used in this assessment are consistent with those used to stress the assets and liabilities in the MA portfolio in the given stress scenario.

5.4 Following a stress event, the firm may conclude that the result of the assessment referred to above is that the MA eligibility conditions and/or any internal policies relating to the management of the MA portfolio would no longer be met. Steps 3 and 4 of the five-step framework cover checking and maintaining continued compliance with the MA eligibility conditions. The remainder of this chapter sets out the PRA's expectations regarding any potential actions that could be assumed to restore compliance with the MA eligibility conditions and internal policies. The PRA expects a firm's assumed actions to be limited to those necessary to restore compliance. They should not include, for example, steps to optimise an already compliant portfolio in a stressed environment.

Re-establishing MA compliance post-stress via rebalancing

5.5 An assumption that a firm can rebalance an MA portfolio post-stress within the SCR calculation constitutes a future management action within the internal model. A firm is therefore expected to show how its proposed approach to rebalancing meets the requirements set out in Article 236 of the Commission Delegated Regulation (EU) 2015/35. In particular, the firm should clearly set out how the impact of rebalancing is allowed for within the calculation of the SCR.

5.6 In determining the conditions in which MA portfolios require rebalancing, firms should consider all risks that could affect the cash flow profile of the MA portfolio and ensure that the full cost and impact of any rebalancing is captured in the SCR.

12 See Chapter 2 of the Matching Adjustment Part, and regulation 4 of the IRPR regulations.

5.7 Where a firm has reinsured all or part of the business in its MA portfolio, it should consider the extent of any rebalancing that may be required in the event of reinsurer default, and the reasonableness and achievability of this.

5.8 Firms should be able to demonstrate how the actions they propose to take to re-establish matching reflect: (i) the source of the stress (eg credit default or migration, longevity); (ii) the nature of the stress; and (iii) the severity of the stress. Firms should demonstrate that their proposed actions are realistic in the given stress event and show how they have taken account of how the type of stress could affect their ability to take such actions. Different management actions will likely be required in different scenarios, ie the same management actions need not be appropriate across the probability distribution forecast.

5.9 Following a stress, the PRA expects a firm to:

- re-establish cash flow matching in Component A of the MA portfolio[13] as measured using the tests the firm has implemented to assess the adequacy of matching in its MA portfolio. The PRA would also expect the firm to have regard to the level of matching measured using appropriate thresholds (eg using the published indicative thresholds for the PRA's five tests as set out in Appendix 1 of SS7/18); and
- consider whether additional assets are needed in Component B[14] to ensure that the value of assets equals the value of best estimate liabilities within the MA portfolio and determine any costs of re-establishing MA compliance.

5.10 Any rebalancing action should be consistent with the firm's wider risk management framework and the PPP.[15] In particular, the firm should consider whether its investment policies (as drafted) may prevent proposed rebalancing actions from being completed in practice.

5.11 Rebalancing actions assumed in SCR calculations should take account of any such restrictions and should either operate within the current policies (as drafted) or should clearly set out changes required to the policies together with justification as to why they are achievable. In the latter case, such justification should include discussion of the governance that would be enacted to make potential changes to the investment policies if necessary and the timescales that would be needed to do this. Any planned changes to investment policies would need to be compatible with the firm's wider risk management framework and the PPP. On rebalancing, the PRA considers one or both of the following

13 Component A of the MA portfolio refers to the assets where cash flows replicate the expected liability cash flows after being adjusted for the component of the FS that corresponds to the probability of default (taking account of differences in credit quality by rating notch if possible and appropriate to do so).

14 Component B of the MA portfolio refers to the additional assets that, when added to component A, result in the value of components A and B combined being equal to the best estimate of the liabilities within an MA portfolio (when discounted at the risk-free rate plus MA).

15 Investments 2 and 3.

options to be viable provided the option is demonstrably feasible in the stress scenario in question:

- demonstrating that the required eligible assets are held outside the MA portfolio and can be injected post-stress; and/or
- assuming the required assets have to be purchased from the market and demonstrating that sufficient funds will be available to achieve this.

5.12 Firms should consider the impact of the stress event on the value of any assets to be injected into the MA portfolio, and any assets that are to be sold for the purposes of purchasing eligible assets.

5.13 In a situation where the MA portfolio has become mismatched, or is no longer complying with the MA eligibility conditions, a firm has a two-month window in which to take actions to restore compliance with the eligibility conditions before its MA must be reduced as per Matching Adjustment 13.5. It is also possible that in some circumstances the MA could be reduced by more than the amounts set out in Matching Adjustment 13.5 or that the firm's permission to apply the MA could be revoked by the PRA.[16] Firms should consider how this impacts their investment and rebalancing strategies and their ability to withstand any reduction in MA, including possible reduction of the MA to zero, for any assumed period of non-compliance.

5.14 In the event of a breach of the MA eligibility conditions, firms are not necessarily precluded from modelling further rebalancing actions, beyond those required to restore MA compliance. However, these actions will need to be able to be taken within the SCR timeframe and be in accordance with firms' own investment strategies and risk limits. Firms will also need to demonstrate how any such actions comply with the relevant Solvency II requirements and that they are feasible given limited and uncertain timeframes and the potential scarcity of suitable assets and/or competition from other investors. The PRA expects a firm to ensure that the calibration and ranking of the 1-in-200 year stress considers both the quantum of the stress and the window for any rebalancing actions beyond those needed to restore MA compliance. The PRA considers that these factors are likely to set a high bar to firms being able to justify a material benefit from any such additional rebalancing actions.

Injection of eligible assets from elsewhere in the business

5.15 Where a firm assumes that any rebalancing can be done by injecting eligible assets from outside the MA portfolio, the PRA expects the firm to be able to demonstrate that:

- assets held outside the MA portfolio meet the MA eligibility criteria and have the same features as those already in the MA portfolio;
- the appropriate amounts of eligible assets are available outside the MA portfolio;

16 Paragraphs 8.1B and 8.1C of SS7/18.

- the eligible assets outside the MA portfolio are of the appropriate duration and credit quality (in order to meet the cash flow matching requirements);
- the assets outside the MA portfolio are not encumbered or required for other purposes (eg to meet margin calls on derivatives held outside the MA portfolio);
- the MA portfolio remains in line with any exposure limits in respect of assets with HP cash flows;
- it has performed a detailed assessment of investment concentration and correlation to ensure that there is not a risk of it assuming it has assets available to inject into the MA portfolio to replace any defaulted assets when in reality the degree of common exposures means that a number of the assets outside the MA portfolio would also have defaulted; and
- it has considered the degree to which its MA portfolio may hold concentrated exposures following actions taken to rebalance the portfolio post-stress, particularly in respect of exposures to sub-investment grade assets, and has reflected this in the SCR.

Asset purchases: availability considerations

5.16 Where a firm assumes that rebalancing involves purchasing new assets, the PRA expects the following points to be considered and appropriately allowed for in the SCR:

- the availability and liquidity of the assets being sought;
- the likely level of competition for the assets in question. After a systemic market event, it is feasible that there could be a flight to quality in the market and firms should allow for this and the impact it could have on price;
- potential new or increased risks that the assets sought could introduce to the MA portfolio (eg increased concentration of exposures); and
- whether the firm can reasonably expect to do the trading needed in the timeframe it has assumed to restore compliance with the MA eligibility conditions.

5.17 The PRA expects firms to give careful consideration to the types of assets that could be purchased in stressed conditions, in particular whether less liquid assets or certain assets with HP cash flows could be purchased. In the PRA's view, completing such transactions is likely to be particularly difficult in stress conditions and within the required timescales.

Asset purchases: funding considerations

5.18 Where a firm assumes that rebalancing to remedy a breach involves purchasing new assets, the PRA also expects the following points to be taken into account as to how the purchases will be funded:

- where a firm assumes it can use assets outside the MA portfolio to fund such purchases, the expected liquidity of these assets should be assessed in order to determine the feasibility of undertaking this action in practice;
- the PRA would not usually expect firms to assume the replacement assets are purchased using the proceeds from defaulted assets or the sale of assets downgraded below investment grade. This is due to the difficulty in objectively determining prices, including prices for assets in default, in a stressed environment;
- where a firm assumes it can sell downgraded assets, it should demonstrate the feasibility of this action, paying particular attention to the reasons for downgrade and justification for any assumptions made in respect of liquidity of the downgraded assets under stressed market conditions;
- the PRA would be unlikely to consider it realistic for purchases to be funded by an assumed sale of less liquid assets; and
- the PRA would expect demonstration of the ability of the firm to sell the assets in question regardless of whether these assets sit in the MA portfolio (ie that they are not otherwise required or encumbered).

5.19 An allowance should be made for expected transaction costs, incurred through any trading activity, in a stressed environment. This allowance should take account of the likelihood that such costs will be higher in stress conditions than in normal conditions. This is particularly pertinent where large trading volumes are envisaged – the PRA expects firms to hold capital to allow for transaction costs.

5.20 The PRA also expects firms to undertake sensitivity tests to reflect the risk that it is not possible to purchase the assets intended to be purchased post-stress. In particular the PRA considers that it is a useful comparator for firms to show the impact on the stressed MA and the SCR if only gilts were available in order to indicate the extent to which reliance is being placed on obtaining assets that attract a higher MA benefit.

Assessment of whether MA compliance has been re-established

5.21 Firms should clearly demonstrate that sufficient MA-eligible assets are held to cover the MA liabilities in conditions as at the valuation date, and are readily available (or may be obtained) to cover the MA liabilities in stress conditions. One possible method to demonstrate this is a 'matching rectangle'[17] assessment. If a firm chooses this approach (or a similar approach that achieves the same outcome), the assessment should be completed in both current conditions and a suitable number of stress scenarios across the probability distribution forecast. Any such assessment should consider the balance sheet gross of the transitional measure on technical provisions (TMTP).

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17 An actuarial technique for summarising which assets are apportioned to which liabilities.

6: Validation of the amount of MA assumed in the SCR calculation

6.1 As per Step 5 of the PRA five-step framework, a firm is expected to perform a recalculation of the MA in stressed conditions. This calculation should apply the same calculation method as that used to determine the MA for the purposes of calculating the TPs, including ensuring that the level of cash flow matching is in line with the firm's matching tolerances.

6.2 Firms are also expected to validate the MA benefit assumed in the SCR calculation and the assumptions on which this MA benefit is based. There are a range of methodological approaches that firms could use to do this.

6.3 When validating the amount of MA assumed in the SCR calculation, the PRA expects firms to explicitly and separately cover:

- the assumed impact of the stress event on the level of MA benefit; and
- the impact of any management actions taken to restore MA compliance, including the impact of these actions on the MA benefit.

6.4 For the purpose of ensuring the MA is appropriately reflected in a firm’s internal model, the PRA expects the firm to set out an approach that allows for the full range of risks and risk interactions to which the MA portfolio is exposed. Specifically for the MA portfolio, the PRA expects the firm to consider explicitly the impact of underwriting risk stresses that the MA portfolio could suffer (eg a longevity stress and the associated requirement to find additional long-dated cash flows to match the additional long-dated liability cash flows arising after an adverse change in longevity assumptions).

6.5 Where a firm does not have an internal model covering all risks to which the MA portfolio is exposed, the PRA expects these risks and associated risk interactions to be considered in the own risk and solvency assessment (ORSA). Over time, the firm should aim to incorporate all material risks and risk interactions to which the MA portfolio is exposed in its full or partial internal model, with consideration given as to any temporary measures that may be required.

6.6 Modelling management actions (to restore MA compliance) within the internal model is complex, especially for firms that determine their SCR using stochastic methods. Such actions can also change the ranking of scenarios and therefore the ultimate SCR. Firms should consider the effect of the management actions in a suitable number of scenarios across the probability distribution forecast to ensure an appropriate scenario ranking is achieved.

6.7 If a firm is using a variance-covariance approach to determine the SCR, the PRA expects the firm to consider whether any further adjustments are required to restore MA compliance in the SCR scenario. This can potentially be incorporated as an end-piece adjustment (eg via a non-linearity adjustment).

6.8 The PRA expects firms to validate the level of MA benefit assumed in the SCR calculation using a methodology that differs from the primary methodology used to calibrate the stressed MA. In particular, where a calibration method is highly reliant on expert judgement, the validation approach should aim to make use of historical data (if possible) to demonstrate the appropriateness of the output, and vice-versa. For the avoidance of doubt, the PRA does not expect firms to run two parallel models for the MA but the validation approaches used should be sufficiently independent from the core modelling methodology so as to give adequate comfort as to the appropriateness of the overall stressed MA and its underlying drivers.

6.9 Where a firm’s model to determine the stressed FS is a modification of the approach used by the PRA to determine the FS for the purposes of calculating the TPs, the PRA expects the model to be capable of replicating the FS provided by the PRA in the same economic conditions. This should act as a check on whether the model is fit for purpose.

6.10 While the PRA recognises the importance of industry benchmarking surveys as a validation tool, care needs to be taken to ensure that comparable metrics are being assessed and that the surveys used take adequate account of potential differences between firms including the:

- approach to rebalancing; and
- concentrations of exposure.

6.11 Also, while simple metrics such as the MA in stress conditions as a percentage of the spread widening have an intuitive appeal, the MA is a portfolio-level calculation and care needs to be taken to ensure that this is appropriately reflected in any conclusions based on benchmarking studies. A firm should not place material reliance on such an assessment for the purposes of validating the modelled MA in stress conditions unless it is sure that the comparison is on a truly like-for-like basis.

Annex – SS8/18 updates

This annex details the changes that have been made to this SS following its initial publication in July 2018:

2024

June 2024

This SS has been updated alongside the publication of Policy Statement (PS) 10/24 - Review of Solvency II: Reform of the Matching Adjustment.[18] Details of the PRA's feedback to responses received are available in the PS. The SS has been updated to incorporate the proposals set out in Appendix 4 to Consultation Paper (CP) 19/23 except for the following:

- paragraph 4.29 has been updated to confirm that the paragraph is intended to apply to assets rated sub-investment grade both pre- and post-stress;
- references to legislation and PRA rules in paragraphs 1.5, 1.7 and 5.1 (including associated footnotes of some of these) have been updated where necessary; and
- some minor typographical corrections (including minor rewordings for greater clarity) have been made throughout the SS.

This policy is effective from 30 June 2024.

18 www.bankofengland.co.uk/prudential-regulation/publication/2024/june/review-of-solvency-ii-reform-of-the-matching-adjustment-policy-statement.