

Group Model Risk Policy

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Version Control Table

Name	Changes made	Approved by	Version number	Approval Date	Effective Date
Martin Roberts	Initial Version	Roselyne Renel	1.0		
Jinu Chandrasekhar	<ol style="list-style-type: none"> Document contact, owner and approver Policy and Governance team to replace Model Strategy and Management and Model Risk Oversight Changes to approval authority Change to model risk definition 	Ian Anderson	1.1		
Jinu Chandrasekhar	<ol style="list-style-type: none"> Changes to Roles and Responsibilities New sub-section for 'Effective Date / Transition Period' and 'Retired Policies' Introduction of a Risk-Based Approach to Model Validation New requirement on Model Development Planning New Model Risk Ratings Metrics New Annual Status Assessment process Grandfathering of Policy Requirements Change to Model Approval Changes to Model Change Management 	Ian Anderson	1.2		
Mark Green	<ol style="list-style-type: none"> Model definition moved from GMRS to GMRP Model User introduced as stakeholder Introduction of materiality zero bucket Model Scope expansion to Algorithmic Trading and Climate Risk Model Scope catch all as directed by MRC or CRO 	Jason Forrester	1.3		



	6. Definition of Analytic Tools, Single-Use Tools and Qualitative Frameworks 7. Alignment of responsibilities for model monitoring and PMA processes to the applicable Process Owners. 8. More clarification on UAT/UVT specification and mandatory signoff of UAT results by GMV				
Mark Green	1. Clarification on Model Scope by referencing to RTF 2. Clarification on governance of tools not assessed as models 3. Optional tollgate meetings 4. Clarification on UAT/UVT review and sign off 5. Clarification on timeline for completion of ASA 6. Simplification of Minor Model Change sign-off. 7. Clarification of Country governance requirements	Jason Forrester	1.4		
Mark Green	1. Model Developer added as a 1LOD role as a delegate of the Model Owner 2. Clarification of responsibilities of Model Owner versus Model Developer 3. Internal revalidation to complete within 6 months of initiation to align with GMRS 4. Dispensation process on exceptional basis with MRC approval beyond 12 months 5. Clarification of dispensation process versus policy breach	Jason Forrester	1.5		



	6. Capturing permanent minor deviations from Policy / Standards for specific models in MFS 7. Timing of compliance of policy changes				
Mark Green	1. Clearer model definition removing “critical” and “direct impact” 2. Rebranded “qualitative framework” as “non-model estimate” 3. ASA to include list of major model changes since last review 4. Carve out of revalidation requirements for models with zero usage 5. Introduction of provisional approval process	Jason Forrester	1.6		
Mark Green	<i>Updates arising from SS 1/23:</i> 1. Model definition to include qualitative output and scope extended to Recommendation Systems 2. SS1/23 regulatory reference and definition of DQM 3. Tiering methodology materiality criteria aligned with SS 1/23 and requirement for verifying annually 4. Model Development data quality management procedures & model operating boundary 5. Effectiveness of Validation 6. Enhanced UAT/UVT requirements 7. Expanded ASA tasks (verifying tiering method and list of dispensations) 8. Monitoring alignment with SS 1/23 review and challenge	Jason Forrester	2.0	16 May 2024	1 June 2024



	<div>9. Generalised overlays section to Mitigants (in-model adjustments, PMAs, MA, Restrictions)</div> <div>10. Escalation process clarification</div> <div>11. Model Sponsor endorsement of dispensations, PMA for material models</div> <div>12. Model sponsor awareness of performance and policy breaches</div> <div>Other Updates:</div> <div>13. Issue management align to GMRS</div> <div>14. Lower revalidation frequency for low-risk models</div>				
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1. PURPOSE AND SCOPE

1.1 Objectives

This Policy sets out the requirements and responsibilities for the identification, measurement, mitigation, and monitoring of Model Risk within Standard Chartered Bank (the “Group”).

This Policy is mapped to the Model Risk Framework.

1.2 Applicability

Model Risk is defined as the *“potential loss that may occur as a consequence of decisions or the risk of mis-estimation that could be principally based on the output of models due to errors in the development, implementation, or use of such models”*. An important source of model risk is the inherent uncertainty in all model outputs, and may arise from uncertainty in parameter estimates, limited statistics, or uncertainty in model choices.

1.2.1 Model Definition

Models are defined as tools that use assumptions and underlying theories to generate predictions or estimates, which meet the following criteria:

- i. Consists of three components: an information input component which delivers assumptions and data to the model, a processing component which transforms the inputs into quantitative estimates, and an output component which translates the estimates into useful business information which may be quantitative or qualitative in nature
- ii. Uses assumptions, underlying theories or techniques which are statistical, economics based, financial or mathematical
- iii. Involves inherent uncertainty in relation to the model inputs, and/or processing unit and/or model outputs
- iv. Generates a quantitative or qualitative output which is, or is planned to be, used as an input to a business decision making process, and not derived simply for information purposes.
- v. Is used more than once (i.e., not one-time ad-hoc analysis)

The definition of a model also includes quantitative approaches whose inputs are partially or wholly qualitative or based on expert judgement, provided that the output is quantitative in nature.

1.2.2 Scope of Applicability

This Policy applies to models used in the Group as defined in the scope of the Model Risk Type Framework (“RTF”). This includes, but is not limited to, models used:

- i. To meet the Group’s regulatory obligations for prudential capital and liquidity management. This includes models used for Pillar 1, Pillar 2 and trading book valuations. Regulatory prescribed factors and calculations are not classified as models, unless directed by the Model Risk Committee (“MRC”).
- ii. To meet the Group’s financial reporting obligations under IFRS9.
- iii. To meet the Group’s regulatory obligations for Bank of England stress testing.
- iv. For internal risk measurement and management of Credit Risk, Traded Risk, Liquidity & Capital Risk, Climate Risk, Financial Crime Risk, and risks around Algorithmic Trading.
- v. To recommend products and services to consumers



- vi. Not already covered under (i)-(v) as directed by the MRC or the Group Chief Risk Officer (“CRO”).

This scope may be expanded by the MRC to include additional model family types or specific tools within existing family model types where required.

The Policy is supported by and must be read in conjunction with the Group Model Risk Standards and the applicable Group Model Family Standards which describe how the Policy requirements are to be met.

Any instances where the determination of a tool as a model under this Policy is unclear must be escalated to Model Risk Policy and Governance following the process detailed in the Group Model Risk Standards.

The Policy has been designed in alignment with:

- Capital Requirements Regulations (EU) No. 575/2013 and related European Banking Authority (“EBA”) Regulatory Technical Standards and Guidance.
- The Prudential Regulation Authority (“PRA”) Supervisory Statement 3/18 “Model risk management principles for stress testing”.
- The Prudential Regulation Authority (“PRA”) Supervisory Statement 1/23 “Model risk management principles for banks”.
- Federal Reserve Supervisory Regulation 11/7 “Supervisory Guidance on Model Risk Management” for application to Standard Chartered Bank Limited, New York branch.

1.2.3 Deterministic Quantitative Methods (“DQM”)

DQM are defined as tools which meet the model definition in section 1.2.1, with the exclusion of requirement (ii), i.e., there is no use of mathematical/financial/economic theories or techniques to perform the processing (and hence no uncertainty arising from the choice of a given specific technique). DQM are often referred to as Non-Models (‘NM’) and the terms are used interchangeably.

NM generally fall into two types, (a) Non-Model Estimations (‘NME’), where the processing component is purely qualitative in nature (purely based on expert judgment) rather than quantitative, and (b) Non-Model Calculators (‘NMC’) where the processing component is purely deterministic, e.g., calculator arithmetic, logic trees etc. We use the term DQM to cover both purely deterministic calculations and those that are deterministic but with some expert judgement applied to the processing. The key differentiator between a DQM and a model is that DQM do not make use of any statistical, economic, financial or mathematical theories.

While DQM do not meet the formal definition of a model, they are still an integral part of a business decision process and are subject to governance requirements as specified in the “Group Deterministic Quantitative Methods Standard” (“GDQMS”). The scope of applicability for DQMs is as per models defined in section 1.2.2 above, with further details provided in the Group DQM Standard.

1.2.4 Analytic Tools

An analytic tool is defined as a tool that meets the model definition in section 1.2.1, with the exclusion of requirement (iv). The output produced by the tool is not, and not planned to be, used as an input to a business decision process. For the purpose of this Policy, an analytic tool is not classified as a model.

1.2.5 Single Use Tools

A single use tool is defined as a tool that meets the model definition in section 1.2.1, with the exclusion of requirement (v), such that it is not used repeatedly. For the purpose of this Policy, a single use tool is not classified as a model.



1.3 Roles & Responsibilities

The following roles are critical for the implementation of the Policy:

Role	Description / Summary of Role
Model Sponsor (Business/Product/Function Head)	<ul style="list-style-type: none"> Accountable executive responsible for the model risk arising from models for which they are the assigned Model Sponsor Responsible for ensuring the First Line of Defence duties have been carried out as required in the Enterprise Risk Management Framework Responsible for assignment of Model Owner and providing oversight for Model Owner activities Responsible for ensuring model issue remediation is suitably prioritized Responsible for endorsing dispensation requests Responsible for endorsing overlays applied to material models Responsible for endorsing model approval requests Awareness of model limitations, weaknesses, breaches in model performance and continued usage of model overlays or other mitigants
Model Users (Primary or Secondary Model Users)	<ul style="list-style-type: none"> Primary Users are those Model Users within the Model Sponsor Business, Product or Function unit for whom the model was primarily developed Secondary Users are those Model Users outside of the Model Sponsor Business, Product or Function unit for whom the model was developed but are additional beneficiaries of the model output used as part of their business processes <p>Primary and Secondary Users are both jointly responsible for:</p> <ul style="list-style-type: none"> Responsible for providing feedback as part of the model development process in relation to user testing Responsible, in conjunction with Process Owners, for the identification and confirmation of models and DQM used within their Business, Product, or Function units Responsible for understanding the approval status of models used including any model limitations, restrictions of model use, and for providing input to the Model Owner as part of the model approval process
Model Owner ¹ (Function supporting Model Sponsor on model development,	<ul style="list-style-type: none"> Accountable executive for the model development process for specified models Represent the Model Users and ensure all the model use cases are considered within the model life cycle activities

¹ For practicality, there may be certain activities that are shared across Model Owner and Model Developer roles, and in some cases (e.g., smaller model families) the Model Owner may also be the Model Developer. In all cases the accountability for the model lies with the Model Owner.



Role	Description / Summary of Role
implementation, maintenance and monitoring)	<ul style="list-style-type: none"> • Responsible for the overall model design process including engagement with Model Users to solicit feedback on the proposed model solution • Responsible for providing annual project plan covering known major projects and quarterly updates to address any plan changes • Responsible for coordinating the submission of the model for validation, and submission of the approval package for consideration • Responsible for coordinating with Process Owners and Model Users in relation to model approval, implementation and decommission • Responsible for proposing Model Risk Ratings for new models taking into consideration input from Model Developers • Responsible for working with Model Developers to assess residual model risk, and with Process Owners in relation to any required model overlay and model monitoring processes • Responsible for working with Process Owners and Model Users to ensure models perform as expected and are only used for their approved use cases • Responsible for end-to-end remediation of model issues for which they are accountable
Model Developer ¹ (Individuals supporting Model Owner in model development activities)	<ul style="list-style-type: none"> • Individuals responsible for the development of models acting as a delegate or agent of the Model Owner • Responsible for documenting and testing the model in accordance with Policy requirements • Responsible for engaging with Model Users, as directed by the Model Owner, as part of the development process • Responsible for addressing model related queries raised by Model Validation as part of the validation process • Responsible for providing input to the Model Owner when assessing the Model Risk Ratings for new models • Responsible for highlighting key sources of residual model risk for consideration by the Model Owner
Process Owners ² (Business/Function managers responsible for the end-to-end processes)	<ul style="list-style-type: none"> • Responsible, in conjunction with Model Users, for the identification and confirmation of models and DQM used within their Business, Product, or Function processes • Responsible for coordinating with Model Owners and Model Users in relation to model implementation and decommission

² Process Owners, as defined in the ERMF, are Business/Function managers responsible for the end-to-end business/function processes as identified within the Group's Process Universe.



Role	Description / Summary of Role
	<ul style="list-style-type: none"> Responsible for working with Model Owners in relation to model overlay processes and model monitoring processes Responsible for working with Model Owners in relation to Model User testing requirements
DQM Owner (Owners of DQM)	<ul style="list-style-type: none"> Responsible for identification of DQM they own Responsible for ensuring DQM they own are registered in the Group DQM Inventory Responsible for tiering DQM in accordance with requirements in the Group DQM Standard and applicable Model Family Standards Responsible for ensuring appropriate governance and management controls are applied to the DQM in accordance with the DQM tiering.
Model Validation (Group Model Validation ('GMV') function unless otherwise authorized)	<ul style="list-style-type: none"> Responsible for providing effective review and challenge in the form of an independent model validation, to assess model performance in line with design objectives and business uses Ensure sufficient resources and competent staff to validate models
Model Approver (MRC or delegate)	<ul style="list-style-type: none"> Responsible for review and challenge of the model, based on evidence provided by the Model Owner, and Model Validator, and for approving the model for use Responsible for ensuring the model risk presented by the model is acceptable to the Group
Model Risk Policy and Governance ³ ('MRPG')	<ul style="list-style-type: none"> Responsible for ongoing assessment of the model risk management framework in accordance with the specific requirements set out under the Policy and associated Standards Responsible for preparing model risk oversight reporting to MRC and for other senior management including executive-level and board-level risk committees Responsible for the governance and execution of the annual status assessment for models Responsible for preparing Group's model risk assessments and Group's model risk profile reporting for MRC and for other senior management including executive-level and board-level risk committees Responsible for assisting and advising countries in relation to local model risk governance requirements
Model Risk Committee ('MRC')	<ul style="list-style-type: none"> Authorised to delegate responsibility to Delegated Model Approvers Review and recommend the Group's model risk appetite

³ Model Risk Management ("MRM") – comprising Group Model Validation ("GMV") and Model Risk Policy and Governance ("MRPG") teams – forms the second line of defence function.



The Model Owner may appoint additional roles such as model manager to manage the model risk life cycle. Such additional roles must only be maintained to provide operational support and must not dilute Model Owner's accountability for being part of the First Line of Defence.

1.4 Effective Date / Transition Period

After this Policy becomes effective, all derived Standards (Group Model Risk Standards and applicable Model Family Standards) must be assessed against the new requirements and all required updates made and approved within 4 months of the effective date.

Certain model risk management activities will take time to be fully embedded after this Policy becomes effective. The following table details the perceived major impacts arising from this Policy change and associated grace periods (where applicable) for compliance.

GMRP & GMRS Changes	Grace Period for Implementation
Expanded model definition with qualitative output	Zero (applies from effective date)
Application of materiality criteria from SS 1/23	Zero (applies from effective date)
Effectiveness of Validation	Zero (applies from effective date)
Extension of ASA process (list of dispensations, continued application of model overlays, assessment of tiering methodology of DQM)	Zero (applies from effective date) for inclusion of dispensations on a forward-looking basis. Aligned with DQM framework implementation for assessing tiering methodology.
Development Data Quality Standards	Updates to Model Family Standards to be documented and approved within four months ⁴ of the effective date of the GMRS, in accordance with the "SS 1/23 Roadmap to Compliance ("RTC")"
Changes to Performance Monitoring Process	
Changes to Mitigants Process (Adjustments, Overlays, Restrictions)	
Changes to UAT/UVT process requirements and System Process requirements (suitability) (Input feeds, Calculation accuracy, Output suitability)	
Inclusion Scope of Recommendation Systems	Timeline for compliance defined in the SS 1/23 RTC
Implementation of DQM Framework	Timeline for compliance defined in the SS 1/23 RTC
Developer Requirements	To be applied on a forward-looking basis for new models & applicable at the time of revalidation
Validation Requirements	To be applied on a forward-looking basis for new models & applicable at the time of revalidation

2. MANDATORY POLICY STATEMENTS

2.1 Model Development Planning

- a. The Model Owner is responsible for providing an annual project plan to GMV and MRPG covering known major projects, and to ensure that any required updates to the plan are notified in advance on a quarterly basis to allow for accurate planning of validation resources. The plan must take into consideration any specific requirements of the Model Sponsor.

⁴ Exceptions to this will be managed via the formal governance mechanism on RTC.



- b. GMV is responsible for developing an annual validation plan based on the model development plan provided.

2.2 Model Identification & Ownership

- a. All models must have a Model Sponsor. Where a model is designed to manage a Principal Risk Type (“PRT”) as defined in the Enterprise Risk Management Framework, the Model Sponsor can be the corresponding Risk Framework Owner (“RFO”) or their delegate. In other instances, the Model Sponsor can be the Process Universe Owner⁵ or their delegate. The delegate must be the owner of the process (Process Owner) in which the model is primarily used. The Model RFO reserves the right to assign model sponsorship in cases where the determination is unclear.
- b. The Model Sponsor must assign a Model Owner for each model.
- c. Process Owners in conjunction with Model Users must ensure that all in-scope models used in their processes are identified and recorded in the Group Model Inventory.

2.3 Third-Party Models

- a. Where the Group is contracting with a third-party, the contract and selection must be based on the third-party’s ability to meet the requirements stated in this Policy and associated Standards, and on the Group’s ability to incorporate and integrate the third-party model or model risk service into SCB’s model risk management.
- b. The relevant Model Sponsor (or delegate) is responsible for approving the proposed role of the third-party, including the ability to meet requirements in this Policy and associated Group Model Risk Standards.
- c. The Model Sponsor must assign an Internal Model Owner for every third-party model.
- d. Where a third-party performs the independent model validation of a model for SCB, GMV must authorise the appointment of the third party, review the independent model validation and supporting documentation to ensure that it meets requirements in this Policy and associated Group Model Risk Standards.
- e. GMV must assign an internal model validator for all third-party models.

2.4 Group Model Inventory

- a. Each model must be recorded in the Group Model Inventory.
- b. Model Owners must ensure, and attest, that their model inventory records are accurate, complete and current.
- c. GMV must ensure that that their model inventory records are accurate, complete and current.
- d. MRPG must perform an inventory review on a semi-annual basis.
- e. Model Sponsors must attest to which models are under their purview at least annually, in accordance with requirements detailed in the Group Model Risk Standards.

2.5 Model Risk Ratings

- a. Model Owners, taking into consideration of inputs from Model Developers, are responsible for assigning each new model a materiality rating between 0, 1, 2, 3 and 4, where models rated 4 are the most material and 0 is reserved for models with zero-usage. The materiality rating must consider both quantitative and qualitative criteria. This includes: reliance placed on the model (importance in informing business decisions), model purpose (financial, reputational, regulatory), coverage

⁵ Process Universe Owners, as defined in the ERMF, are Global Business/Function Heads responsible for identifying processes within their respective business/function and ensuring processes have named Process Owners.



(users, clients, products, portfolios); and materiality when considered as part of a larger model network. Models rated 3 or 4 are deemed “material models”.

- b. Model Owners, taking into consideration of inputs from Model Developers, are responsible for assigning each new model an uncertainty rating between A, B, C and D, where models rated D are the most uncertain. The model uncertainty rating must consider uncertainty arising from model development, implementation, and use. The rating must be assigned taking into consideration any model risk mitigants applied as part of the design process but not those applied post model output as part of an overlay.
- c. Model materiality ratings and uncertainty ratings are combined to construct a model risk rating (MRR) between RR1, RR2, RR3, and RR4, where models rated RR4 have the highest risk. The model risk rating is the primary risk driver used to determine the required level of model risk management activities, such as development and validation intensity, frequency of revalidation and ongoing monitoring requirements. The construction of the MRR matrix is specified in Group Model Risk Standards.
- d. When models have different use cases, the Group Model Family Standards must, where possible, specify different risk ratings (materiality and uncertainty) in line with those use cases.
- e. Model materiality ratings and uncertainty ratings must be reviewed and challenged by GMV as part of the validation process, with final ratings determined by GMV.
- f. The suitability of the methodology used to determine the model risk ratings within a given model family must be re-verified annually as part of the Annual Status Assessment process (refer to section 2.12.3), along with the individual model risk ratings applied to specific models. Where known changes to the materiality rating or uncertainty rating values occur outside of this process these should be updated in a timely manner.

2.6 Model Initiation

- a. The Model Owner is responsible for ensuring that Business requirements and modelling objectives for new models and major changes to existing models are documented in a Terms of Reference (“ToR”).
- b. The ToR must be signed off by the Model Sponsor (or delegate) and by the Model Owner and the model must be indicated as ‘In-Flight’ in the Group Model Inventory.

2.7 Model Development

- a. The Model Owner is responsible for ensuring that the model solution is conceptually sound and is designed to meet the business requirements and, together with the Model Developer, must engage with the Model Sponsor and Model Users as part of the development process.
- b. The Model Owner is responsible for ensuring that data quality management procedures are specified in the applicable Model Family Standards in accordance with requirements in Group Model Risk Standards.
- c. The Model Developer must assess model development data in accordance with the applicable Model Family Standard data quality management procedures. This includes assessing data for quality and relevance, and justifying any adjustments, proxies or the use of expert judgement.
- d. The Model Developer must carry out appropriate testing and analysis to identify and assess sources of model risk, including modelling limitations, associated with the solution and, where feasible, mitigate those risks through modelling choices, model adjustments and compensating controls.
- e. The Model Owner is responsible for assessing and proposing the monitoring arrangements for tracking the key sources of residual model risk, as highlighted by the Model Developer, once the model is live. In cases where a monitoring technique itself constitutes a model, then that technique must be categorised as a model under this Policy.



- f. The Model Developer must document the model development in a Technical Development Document (“TDD”) in accordance with requirements in Group Model Risk Standards.

2.8 Tollgate Process

- a. Tollgate meetings are optional and provide a mechanism for Model Owners and Model Developers to meet with Model Validation, and other stakeholders, to enable early identification of potential modelling issues at key stages of the development process.
- b. As part of the ToR, the Model Owner is responsible for ensuring the proposed nature of any tollgate meetings to be held including the proposed timing of such meetings is documented.
- c. Each tollgate meeting held must be documented on the standard Tollgate Template (TT) and uploaded to the Group Model Inventory.

2.9 Independent Model Validation

- a. The purpose of the independent model validation is to provide effective review and challenge to assess model performance in line with design objectives and business uses. The validation must cover all model components (inputs, processing and reporting outputs). In addition, the Model Validator may identify, assess and opine on any other model risk issues that they consider relevant to the business requirements and model approval decisions.
- b. Individuals performing model validation must be independent of the model development process.
- c. Each model must be independently validated by a member of GMV, or another SCB employee or third party that is authorised by GMV.
- d. Models must be validated before use and then on an ongoing basis. The Model Owner must ensure that the model undergoes independent model validation.
- e. Models are tiered based on model risk rating, and those with a rating of RR4, RR3 or RR2 are subject to more intense development and validation requirements than those with a rating of RR1. The requirements for development and validation are specified in Group Model Risk Standards and respective Group Model Family Standards.
- f. Ongoing revalidation will be performed for in use models at a frequency based on the model risk rating as follows; with a trigger of every 2 years, 3 years, 5 years, 6 years, since the date of last validation completion, for models rated RR4, RR3, RR2, RR1 respectively. Where there are regulatory requirements for more frequent revalidation, this will override the revalidation frequency. Similarly, where poor model performance results are observed, as part of model monitoring, this could also trigger earlier revalidation requirements. Ongoing validation must commence within 30 days of the revalidation trigger date and complete within 6 months. For models with zero usage and due for revalidation, the existing model approval will lapse and a revalidation and/or re-approval is required before the model can be used again.
- g. Model issue severity must be classified as either; Material Weakness, Identified Concern or Immaterial.
- h. A Model must be graded as either; Acceptable, Conditionally Acceptable or Unacceptable based on the nature of any outstanding model issues raised in connection with the applicable Standards.
- i. The Model Validator must document the model validation in a Technical Validation Report (“TVR”).
- j. The ongoing effectiveness of the validation process will be assessed on a periodic basis in accordance with requirements specified in the Group Model Risk Standards.

2.10 Model Approval

- a. The Model Owner is responsible for ensuring that a model is approved prior to the point of go-live and thereafter whenever any major model change is made to the implemented model. Changes to



parameters and calibration may be allowed without approval if clearly articulated as part of thresholds and limits defined in the corresponding Group Model Family Standards.

- b. The primary purpose of model approval is to provide additional review and challenge of the model, based on evidence provided by the Model Owner, the Model Developer, and the Model Validator, and to confirm that the model is fit-for-purpose, with a level of model risk acceptable to the Group.
- c. The Model Owner is responsible for ensuring that the model approval request for new models and major model changes is documented, based on information provided by the Model Developer and Model Validator, and is endorsed⁶ by the Model Sponsor. Endorsement is not required for ongoing revalidation of existing models.
- d. The MRC is responsible for approving models for use. However, the MRC may choose to delegate model approval authority to Delegated Model Approvers (“DMA”), via sub-committees or a select group of individuals from the second line. DMA must have the technical competence to review and challenge the use of models within their approval scope prior to providing their sign-off.
- e. Where the DMA is an individual from the second line, the approval hierarchy must be specified in each Group Model Family Standards, which must also ensure that the individual acting as DMA is independent of the first line.
- f. DMA authority must be clearly articulated in terms of materiality considerations. For example, whether the DMA has the power to approve models of all materiality ratings (1,2,3,4) or a subset (1,2).
- g. The Model Approver must ensure that an approval of a model and any restrictions on approved model usage are documented.
- h. The Model RFO reserves the right to overrule the approval authority of Delegated Model Approvers and refer any potential approvals to MRC for adjudication.
- i. In exceptional circumstances models may be approved via provisional approval prior to completion of the independent model validation and/or for purposes which they were not designed for. The Model Approver is authorized to make this decision subject to setting and documenting appropriate restrictions on model use, and application of compensating controls in the provisional approval.
- j. A model must not be used for external purposes, for example regulatory, statutory or accounting purposes, prior to receiving the necessary approvals from the relevant external parties. The Model Owner must ensure that external approval is sought only after the completion of independent model validation and approval of the model by the Model Approver.
- k. The Process Owner and associated Model Users must not use a model or modelled output unless the model or modelled output has been approved for use in the applicable process. The Process Owner and Model Users may start using a model within their process once it is confirmed as ready for go-live by the Model Owner.
- l. The escalation process for model related matters will follow the model approval hierarchy from Delegated Model Approvers as the starting point to MRC as the final escalation point, in line with requirements in Group Model Risk Standards.

2.11 Model Implementation and Go-Live

- a. Each model must be implemented in a secure production environment with appropriate change controls and ongoing support.
- b. The Model Owner, working together with the applicable Process Owners, must ensure that production implementation requirements are specified for all new models. This includes defining any requirements for User Acceptance Testing and User Verification Testing, to ensure that the implemented version of the model reflects the approved version of the model documented in the TDD, taking into consideration the perceived level of model risk posed by the model release.

⁶ Approval requests made without Model Sponsor endorsement will be considered on a case-by-case basis.



- c. User Acceptance Testing must occur before go-live and its results must be shared with the Model Owner (or delegate) for signoff and GMV for subsequent review, challenge, and signoff. User Verification Testing, where applicable, occurs after go-live and any unexpected model behaviour must be communicated to the Model Owner and GMV for consideration.
- d. Production implementation must result in the generation of information to facilitate subsequent monitoring, ongoing independent model validations and model redevelopment from the point of go-live.
- e. The Model Owner and applicable Process Owners are responsible for identifying Model Users across all impacted processes and providing them with appropriate initial and ongoing user training.
- f. Each Model Owner and Process Owner must ensure that the required model use processes and controls are implemented to support the use of the model in their impacted process.
- g. Model Users are responsible for understanding the approval status of models used, including model limitations and any restrictions on model use.

2.12 Model Usage

2.12.1 Ongoing Monitoring

- a. Model monitoring requirements are expected to be aligned with the current level of perceived model risk (as captured via the model risk rating) taking into consideration future expectations.
- b. Model monitoring requirements must be specified as a part of Model Family Standards, including the function responsible for performing the monitoring process, the Process Owner⁷ for model monitoring, and the frequency and nature of the monitoring to be performed.
- c. Model monitoring results must be signed off by the Process Owner (or delegate) responsible for model monitoring, and shared with the Model Sponsor, Model Owner and Group Model Validation for review and challenge in accordance with requirements specified in the Group Model Risk Standards and applicable Model Family Standards.
- d. The Process Owner for model monitoring is responsible for ensuring that model monitoring has been carried out in line with the requirements specified in the applicable Group Model Family Standards.
- e. Breaches in model monitoring thresholds will follow the process described in the applicable Model Family Standards, including whether model recalibration or redevelopment is required, and triggers for root-cause analysis. Breaches must be escalated to the Model Sponsor for awareness.
- f. The Model Owner (or delegate) is responsible for ensuring that the applicable Model Family Standards defines model performance tests in accordance with requirements in the Group Model Risk Standards to ensure transparency of the ongoing performance of in-scope models.

2.12.2 Model Risk Mitigants

- a. Model risk mitigants may be used to address known modelling deficiencies or model performance issues.
- b. Model risk mitigants may include model adjustments applied at the model design stage, model overlays applied post model output, or restrictions on model usage.
- c. Model overlays are categorized as either Post-Model Adjustments (“PMA”) or Management Adjustments.

⁷ The Process Owner for the model monitoring process and PMA process is typically the Model Owner, but this may not always be the case and must be specified in the applicable Model Family Standard. Where not specified, the Process Owner will be assigned to the Model Owner.



- d. PMA are used to address observed deficiencies by adjusting the model output either directly or indirectly (e.g., adjusting parameters). Management adjustments are used to address un-traced issues by applying management decisions without a direct modelling component.
- e. Each Group Model Family Standard must specify (i) the Overlay Process Owner⁸, accountable for ensuring the use of model overlays has been carried out in line with the approved Model Family Standards, and roles responsible for, (ii) the design and calculation, (iii) review and challenge, and (iv) approval of, application or removal, of model overlays.
- f. All PMA are subject to independent review and challenge. The outcome of a PMA review will be graded Acceptable or Unacceptable.
- g. Where a PMA is applied as a mitigant for a model used in Pillar 1 or Pillar 2 calculations the independent review must be performed by GMV with sign-off from the Model Approver prior to implementation. In cases where the PMA itself constitutes a model then the technique must be categorised as a model under this Policy.
- h. Management Adjustments are subject to similar documentation, review, challenge, and approval requirements as PMAs, as specified in the Group Model Risk Standards. Given the expert judgement nature of Management Overlays, the review, challenge, and approval must be conducted by suitably qualified subject matter experts, with roles specified in the applicable Group Model Family Standard.
- i. Model overlays applied to material models, with materiality 3 or 4, must be endorsed by the Model Sponsor.
- j. The application of model usage restrictions should be considered by the Model Approver where material weaknesses⁹ are identified as part of the model validation process, or where errors are identified as part of the ongoing model performance monitoring process.

2.12.3 Annual Status Assessment

- a. Annual Status Assessment (ASA) is an annual process governed and coordinated by MRPG to assess the health of models within a given model family by verifying:
 - i. tiering methodology applied to in scope models and DQM remains suitable
 - ii. materiality ratings, uncertainty ratings and model risk ratings of models are appropriate
 - iii. that issue severity categorization remains appropriate
 - iv. that models continue to be fit for their approved usage and reside in a suitable production environment
- b. ASA involves participation from MRPG, GMV, Model Owners and Model Developers, with flexibility for involvement from other first or second line functions, where deemed necessary.
- c. The intensity of review for a given model will be aligned with the model risk rating.
- d. Actions arising from the ASA process may include changes in tiering methodology, or ratings, or issue severity which could lead to changes in revalidation schedule (e.g., due to a change in ratings) and/or further model development (e.g., when an issue has grown in materiality and the model is no longer fit for usage). Each action must have an owner who is accountable for ensuring completion in accordance with specified timelines.
- e. The ASA process is performed per model family on an annual basis with due date for completion within one year of the previous ASA completion date. The ASA must contain a list of material model changes since the time of the previous ASA, and a list of current dispensations and/or provisional approvals as relate to the in-scope model population.

⁸ The Model Owner is assumed to be the Process Owner for the Overlay process unless otherwise documented in the Model Family Standard.

⁹ Models with material weakness issues identified and approved for use must have compensating controls in place.



- f. Extensions to the ASA timelines may be approved by the Global Head, Model Risk Management.

2.12.4 Model Change Management and Decommission

- a. Model changes must be specified as either major or minor in nature. Each Model Family Standards must define criteria for determining whether a given change is major or minor in line with principles specified in the Group Model Risk Standards.
- b. Any regulatory requirements relating to model change (e.g., pre-notification, pre-approval or post-notification) must be documented as part of the relevant Model Family Standards.
- c. The Model Owner is responsible for classifying model changes as either major or minor in line with the principles specified in the Group Model Risk Standards and applicable Model Family Standards.
- d. The Model Owner must ensure that each major change proceeds through the model life cycle.
- e. Each minor change must be signed-off internally by the Model Owner or suitable delegate, as specified in the applicable Model Family Standards. Minor changes must be documented in the applicable TDD and notified to GMV, and where the model risk rating is RR2, RR3 or RR4, additional confirmation is required from GMV.
- f. Where the nature of the model is such that frequent changes to parameterization or calibration are required, the Model Approver may allow for such changes to be carried out without triggering a major change provided the arrangements are clearly documented in the development documentation and approved as part of the Model Approval.
- g. Once a model reaches the end of its useful life the model must be decommissioned. The Model Owner must document, and ensure implementation of, a decommission plan to ensure controlled decommission, as detailed in the Group Model Risk Standards.
- h. The Model Decommission Plan must be signed off by the Model Sponsor, Model Owner and the Global Head, Model Risk, Policy and Governance, or respective delegates.

2.13 Model Issue Management

- a. Model issues are prioritized as High, Medium or Low by combining the model issue severity rating (Material Weakness, Identified Concern, Immaterial), assigned by Group Model Validation, together with the model materiality rating (1, 2, 3, 4).
- b. The issue prioritization rating determines the governance requirements for issue remediation as detailed in the Group Model Risk Standards.

2.14 Deterministic Quantitative Methods

- a. Governance and management control requirements applicable to Deterministic Quantitative Methods ("DQM") are detailed in the Group DQM Standard.
- b. DQM are tiered based on a consideration of materiality and complexity, the combination of which will determine the required level of governance and management controls to be applied in accordance with Group DQM Standard.
- c. DQM that are material and complex in nature will be assessed to determine if any aspects of the model life cycle should be applied. Where such DQM are required to undergo revalidation by GMV this will be performed on a 4-year cycle.

2.15 Model Risk Training & Reporting

2.15.1 Model Risk Training

- a. The Model RFO / Delegate is responsible for developing, maintaining and conducting periodic model risk training for senior management understanding and oversight, including members of



senior executive-level and board-level risk committees, and for independent non-executive directors.

2.15.2 Model Risk Profile

- a. The Group's model risk profile must be periodically assessed using a combination of quantitative and qualitative measures that collectively describe the model risk in the model portfolio and changes in the profile.
- b. MRPG is responsible for preparing the Group's model risk profile reporting for MRC and for other senior management including executive-level and board-level risk committees.

2.15.3 Model Risk Management Effectiveness

- a. In accordance with the specific requirements set out under the Policy and associated Standards, MRPG is responsible for ongoing assessment of the model risk management framework.
- b. MRPG is responsible for preparing model risk reporting to MRC and for other senior management including executive-level and board-level risk committees.

2.15.4 Model Risk Events

- a. The identification and reporting of model risk events are governed by the Group Operational Risk Standards.

2.16 Country Model Risk Requirements

For Countries that have formally adopted the Model RTF via the creation of Country specific RTF addenda the Country Model RFO is responsible for ensuring that:

- a. Model Usage is correctly identified within the Country, captured in the Country Model Inventory and attested to on a semi-annual basis.
- b. A suitable local governance process is established to accommodate models requiring local regulatory approval, to provide model risk oversight and for any other specific local regulatory requirements at the Country or Legal Entity level.
- c. Ensure fundamental model risk training is provided for respective country stakeholders.

These requirements must be adopted within 6 months of Country adoption of the Model RTF.

3. RESPONSIBLE ROLES FOR IMPLEMENTING THE MANDATORY POLICY STATEMENTS

Refer to the table in 1.3.

4. POLICY RELATED AUTHORITIES

4.1 Dispensations

Dispensation requests must be submitted using the Model Risk Policy Dispensation Form, and approved by Global Head, Model Risk Management (or delegate). Dispensation requests with a remediation period of greater than 12 months must be referred to the MRC for approval.

All dispensation requests and approvals must be documented, with reasons for the exception, including expiration or review date, and where applicable include an action plan and timetable for compliance, and must be endorsed by the Model Sponsor.

Policy dispensations will only be approved on an exceptional basis taking into consideration the rationale for non-compliance.

Policy dispensations will be tracked and reported at the MRC by MRPG.



4.2 Policy Breaches

Preventative measures must be implemented to avoid Policy breaches. Where this is not possible, Policy breaches, without a valid dispensation in place, must be managed via the Group Operational and Technology Risk Type Framework, raising an appropriate level risk and/or issue and associated treatment plan to get back to Policy compliance within an acceptable period. The treatment plan and remediation timeline are subject to approval by the Global Head, Model Risk Management (or delegate). The Model Owner (or delegate) is responsible for ensuring that any Policy breaches are escalated to the Model Sponsor for awareness.

Policy breaches will be tracked and reported at the MRC by MRPG.

4.3 Minor Deviations from Policy

There may be occasions where the requirements imposed by Policy and/or Group Model Risk Standards are not suitable or meaningful for certain models. Where a permanent minor deviation from Policy and/or Group Model Risk Standards is required due to such modelling specifics, this must be documented in the applicable Model Family Standards and presented for consideration and approval by Global Head, Model Risk Management and recorded in relevant systems.

5. CONNECTED PROCESSES AND ACTIVITIES

All processes and activities are regarded as connected, where in-scope models are:

- Initiated
- Developed
- Validated
- Implemented
- Used (model operated and/or model output used)

The applicable processes must be captured in the Group Model inventory.

6. POLICY EFFECTIVENESS REVIEW

Model RFO will monitor effectiveness of this Policy through:

- Effectiveness reviews on the Model Risk Type Framework and this Policy in accordance with requirements defined in the Enterprise Risk Management Framework;
- Review of the output of oversight activities conducted by MRPG Function;
- Effectiveness review of the key related policies;
- Review of control monitoring results, residual risk assessments and any applicable risk acceptances or root cause reviews for the processes connected to this Policy;
- Evidence of gaps or inefficiencies gathered from stakeholders through use of the processes connected to this Policy; and
- Review of relevant management information such as the Model Risk profile presented to MRC.

7. INTERCONNECTED POLICIES & STANDARDS

Policy Name	Risk Type & Risk sub-type	Policy Owner	Area of connection
Group Information and Cyber Security Policy	Information and Cyber Security Risk	Global Head, ICS Policy and Risk	Relevant model related information must be classified in line with



Policy Name	Risk Type & Risk sub-type	Policy Owner	Area of connection
			the policy and the appropriate controls installed.
Group Data Conduct Policy	Compliance – Data Management Risk	Global Head, Data Conduct, CFCC	Data must be clearly defined and understood before it is utilised in model development. Any data quality issues identified must be escalated in line with the DM Policy.
Group Third Party Risk Management Policy	Operational and Technology Risk – Third Party Risk Mismanagement	Executive Director, Third Party Risk Management	All third-party models must comply with the TPRM policy. The requirements set out in section 2.3 are over and above those in the TPRM policy.
End-User Computing Standard	Operational and Technology Risk – Technology Risk	Global Head, TTO Risk Management	End User Computing applications used to implement models must be recorded in the EUC Register, with an EUC Owner identified. The EUC Owner must ensure that relevant controls, in line with the EUC Policy, are installed.
Group Technology Policy	Operational and Technology Risk – Technology Risk	CRO Functions, Technology & Innovation	Technology solutions used to deploy models must comply with the Group IT Policy.

8. STANDARDS MAPPED TO THIS POLICY

This Policy is supported by and is read in conjunction with Group Model Risk Standards. The standards describe how the Policy requirements are to be met and how the model life cycle to be operated.

- Model Risk Policy and Governance function, together with Global Head, Model Risk Management, are responsible for developing and maintaining the Group Model Risk Standards (GMRS). Group standards provide an overarching structure to the standards, covering a high-level guidance to the operational requirements as per Policy.
- Model Risk Policy and Governance function, together with Global Head, Model Risk Management, are responsible for developing and maintaining the Group Deterministic Quantitative Methods Standards (Group DQM Standards). DQM standards define the governance requirements to be applied to in scope DQM.



- Model Owners and Group Model Validation functions are responsible for the development and maintenance of the Group Model Family Standards. Model Family Standards must be an extension of the Group Model Risk Standards and sets out the specific standards required for each model family. Model Family Standards must contain all the operational requirements for each of the model life cycle stages, along with adequate detailing on the corresponding controls established.
- Model Family Standards are co-owned by the first LOD (Model Owner) and second LOD (Group Model Validation), with sections pertaining to model validation requirements solely owned by the Group Model Validation function.
- Development and validation standards specific to each model family type must be defined in the respective Model Family Standards in accordance with the Group Model Risk Policy and Group Model Risk Standards.
- Model Family Standards may only serve to extend requirements set forth in the Group Model Risk Standards and not contradict them.
- Wherever deviations to the Group Model Risk Standards are proposed in a Model Family Standard, this must be presented for consideration to the Global Head, Model Risk Management as part of the standard approval process for the applicable Model Family Standard.

Risk Type	Title	Standard Owner	Standard Approver
Model Risk	Group Model Risk Standards	Global Head, Model Risk Management	Global Head, Enterprise Risk Management
Model Risk	Group Deterministic Quantitative Methods Standards	Global Head, Model Risk Management	Global Head, Enterprise Risk Management
Model Risk	Group Model Family Standards – Market Risk	Global Head, Market Risk Analytics Global Head, Traded Risk Group Model Validation	Global Head, Model Risk Management
Model Risk	Group Model Family Standards – Counterparty Credit Risk Models	Global Head, Counterparty Credit Risk Models Global Head, Traded Risk Group Model Validation	Global Head, Model Risk Management
Model Risk	Group Model Family Standards – Credit Risk IRB & Scorecards	Global Head, CIC Models & IFRS9 ECL Global Head, Retail Risk Analytics Global Head, Banking Book Group Model Validation	Global Head, Model Risk Management
Model Risk	Group Model Family Standards – Credit Risk IFRS9	Global Head, CIC Models & IFRS9 ECL Global Head, Retail Risk Analytics Global Head, Banking Book Group Model Validation	Global Head, Model Risk Management



Risk Type	Title	Standard Owner	Standard Approver
Model Risk	Group Model Family Standards – Economic Models	Head, Scenario Design Global Head, CIC Models & IFRS9 ECL Global Head, Banking Book Group Model Validation	Global Head, Model Risk Management
Model Risk	Group Model Family Standards – Operational Risk	Senior Operational Risk Officer Global Head, Banking Book Group Model Validation	Global Head, Model Risk Management
Model Risk	Group Model Family Standards – EWST Financial Projection	Head, CPBB Stress Testing Global Head, Stress Testing & Analytics Global Head, Banking Book Group Model Validation	Global Head, Model Risk Management
Model Risk	Group Model Family Standards – Financial Crime Compliance	Head, FCC, Group & Business Risk Assessment Head, FCC, Monitoring & Surveillance Infrastructure Head Fraud Risk Strategy & Head Asia FR Ops, CPBB Global Head, Non Financial Risk Group Model Validation	Global Head, Model Risk Management
Model Risk	Group Model Family Standards – Capital	Head, Treasury Stress Testing Head Capital Management, Treasury Capital Global Head, Banking Book Group Model Validation	Global Head, Model Risk Management
Model Risk	Group Model Family Standards – Liquidity & IRRBB Model Families	Head, IRRBB, Treasury Liquidity Regional Head, Treasury Risk, GCNA Head, Liquidity Stress Testing, Treasury Liquidity Head, FTP & Liquidity Asia, Treasury Global Head, Group Model Validation	Global Head, Model Risk Management
Model Risk	Group Model Family Standards – Pension Risk	Head, Pension Risk, Group Pensions	Global Head, Model Risk Management



Risk Type	Title	Standard Owner	Standard Approver
		Global Head, Non-Financial Risk Group Model Validation	
Model Risk	Group Model Family Standards – Financial Markets	Global Head, FM Modelling & Analytic Group Global Head, Traded Risk Group Model Validation	Global Head, Model Risk Management
Model Risk	Group Model Family Standards – Algorithmic Trading Models	Senior Business Manager, Electronic Trading, FM COO Macro Global Head, Traded Risk Group Model Validation	Global Head, Model Risk Management
Model Risk	Group Model Family Standards – Climate Risk	Head, Climate Risk Management Global Head, Banking Book Group Model Validation	Global Head, Model Risk Management
Model Risk	Group (Sub) Model Family Standards – SIMM	Head Portfolio Risk Models Global Head, Valuation Model Validation	Global Head, Model Risk Management
Model Risk	Group (Sub) Model Family Standards – FM Vendor Models	Global Co-Head, Financing and Securities Services Global Head, Traded Risk Group Model Validation	Global Head, Model Risk Management
Model Risk	Group Model Family Standards – Recommendation Systems	Head, Analytics and AI, CPBB Segmentation Analytics Global Head, Banking Book Group Model Validation	Global Head, Model Risk Management