Performance Monitoring

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Confidential
Performance Monitoring

Elements of a comprehensive model performance monitoring program in CCAR
- Key elements: Assessment of model behavior and identification of model limitations and uncertainties
- Establishment of thresholds
- Definition of frequency
- Escalation upon breach of thresholds
- Review and oversight by MRM
- Performed during development and as part of ongoing monitoring

Example 1: Assessment of model behavior
- Test design and purpose: Suite of tests in the form of assertions of specific behaviors
  - Types of tests: monotonicity of price, interpolation/extrapolation smoothness, calibration, benchmarking, numerical convergence, and model consistency
  - Applied to both feeder models (e.g., pricing models) and core CCAR models
  - Under BAU market conditions and under stress scenarios
- Thresholds: established by developers, subject to approval by MRM; produces binary output (pass/fail)
- Frequency: daily, using changing market data and randomly generated securities from a defined testing space
- Escalation: Notification to developers/MRM of failures; continuous failures result in un-approval of the model
Example 2: Identification of model limitations and uncertainties

- Testing of feeder pricing model performance under CCAR-like stress scenarios is an important component of a comprehensive testing program
- Test design and purpose:
  - Quantify the impact of a limitation/uncertainty using sensitivity analysis, benchmarking, etc.
  - Alternative model assumptions/risk factors/dynamics, input/parameter uncertainty, numerical convergence
- Frequency:
  - Identified and assessed during model development and validation
  - Reassessed weekly under BAU market conditions
  - Reassessed annually under stress scenarios
- Escalation: results subject to review by MRM; depending on materiality MRM may require the following actions:
  - Application of model overlays
  - Changes to the model
  - Restrictions on model usage
Benchmarking

- Where should benchmark methodologies be utilized?
  - Material estimation approaches (i.e., ones with significant contribution to capital ratios and signification limitations or uncertainties)

- What makes a good benchmark model?
  - Provides a different perspective
    - An approach which is sufficiently different may be preferred over a more complex approach that is too similar to the primary
  - Targets specific limitations/uncertainties of the primary model, where appropriate

- How should benchmark models be used?
  - Support the primary model projections; or point to weaknesses
  - Motivate changes to the primary model
  - Inform overlays
  - Review by governance committees and MRM