



SS 3/18 MODEL RISK MANAGEMENT PRINCIPLES

*For
Stress Testing Models*

*"This Prudential Regulation Authority (PRA) supervisory statement (SS) sets out the PRA's expectation as to the model risk management practices firms should adopt when using stress test models. It supports firms' development and implementation of policies and procedures to **identify, manage and control the risks** inherent in the use of stress test models."*

—The Prudential Regulation Authority on
Supervisory Statement 3/18

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For Stress Testing

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SS3/18 MODEL RISK MANAGEMENT PRINCIPLES

Executive Summary

The PRA's recent Supervisory Statement 3 /18 concerning model risk management principles creates yet another compliance and documentation burden on the person(s) responsible for model risk management. Nonetheless, given the pervasiveness of models and the critical decision processes that are based on model outputs, this guidance is useful and should be applied to all departments in the bank (not just stress testing). Whilst no one can successfully argue against the merits of more effective model risk management, the practical constraint is resources.

In terms of getting started, having clear, accurate, unabridged insight into every model used within a critical business process is paramount. In day to day operations, this means having a "model inventory". CIMCON Software provides a model inventory-as-a-service that can eliminate those aforementioned resource constraints. All of your sensitive models and the intellectual property therein remain under your bank's control, within your network. However, the key metadata necessary to effectively mitigate model risk is collected and managed in a secure, hosted service requiring no IT resources. Although each bank's policy and procedures are unique, it is anticipated that use of this service can help avoid the potential added cost of complying with SS3 /18. In addition, it can actually reduce costs incurred with any existing, "as is" model risk management framework.

Objective

The purpose of this white paper is to provide a detailed, one-to-one mapping of each of the PRA principles pertaining to model risk management with the corresponding capability in CIMCON's model inventory-as-a-service. It illustrates where the resource constraints affecting model risk management in UK banks can be cost-effectively removed. This will enable the reader to assess the benefits of using a hosted system to establish and then automate the on-going maintenance of an accurate model inventory and processes to implement more effective controls.

Prudential Regulatory Authority – SS3/18 Background

Supervisory Statement 3/18 Issued

The PRA's Supervisory Statement (SS 3/18) became effective on 1 June 2018 and sets out the PRA's expectation as to the model risk management practices banks should adopt for stress testing. Its goal is to support UK banks' development and implementation of policies and procedures to identify, manage and control the risks inherent in the use of stress test models. The Supervisory Statement is relevant to PRA-authorized banks, building societies, and PRA-designated investment firms but not credit unions. Currently, there is no proposal to extend the principles to insurance and reinsurance firms. That being said, CIMCON believes the benefits of effective model risk management extend well beyond stress testing models and well beyond banks. All companies, in all industries that utilise models in critical business and decision-making processes, can benefit from following some, if not all of the PRA's principles which are summarised below:



- Principle 1** Banks have an established definition of a model and maintain a model inventory.
- Principle 2** Banks have implemented an effective governance framework, policies, procedures and controls to manage their model risk.
- Principle 3** Banks have implemented a robust model development and implementation process and ensure appropriate use of models.
- Principle 4** Banks undertake appropriate model validation and independent review activities to ensure sound model performance and greater understanding of model uncertainties.

The assessment of the model risk management practices of participating firms will form part of a bank's qualitative review of the annual concurrent stress testing. For firms not participating in the bank's annual concurrent stress testing, the PRA will review their stress test model risk management practices as part of the supervisory review and evaluation process (SREP). All firms applying these principles are expected to complete a self-assessment of their stress test model risk management practices against the principles as part of their internal capital adequacy assessment process (ICAAP) and report the findings in the ICAAP documents from Tuesday, 1 January 2019 onwards.



Mapping of Principle Details to CIMCON Capabilities

Principle 1 - Banks have an established definition of a model and maintain a model inventory.

P1.1 Definition of a model

Many banks and financial services firms already have a definition established as part of existing standards or policy. Software technology should be configured to enable the implementation of that policy.

- If policy, standards and/or procedures do not exist, CIMCON can provide a standard template that reflects industry best practice that recognizes the four calculation methods/systems/frameworks outlined in the supervisory statement.

It should be noted that the statement also recommends these principles are applied to other “calculation mechanisms” that are not classified as models. In general, these would typically be applications or files under end user control (EUCs) that are used within a critical business process. More often than not, such EUCs do not have effective controls and thus should be included within your model risk management efforts. There is no downside, no technical limitations to taking such a prudent approach.

P1.2 Model inventory

A model inventory (which may include additional high-risk EUCs that aren't models) is the heart of any strategy to mitigate these risks. Having clear, accurate, unabridged insight into every model used within a critical business process and/or other regulatory reporting process is of paramount importance.

The Supervisory Statement reads, 'A designated internal party should be responsible for maintaining the bank-wide inventory of all models'. For some banks, this will require a review of who is currently charged with manually maintaining the register(s) of models. Frequently, bank's will have more than one model inventory and if so, the accuracy of the inventory is in doubt. In addition, inventories that are maintained manually, or stored in numerous places, do not lend themselves to providing bank-wide oversight in line with the principles set forth by the PRA.

*Start where you are. Use what you have.
Do what you can.*

- Arthur Ashe

CIMCON Capabilities:

CIMCON offers a hosted, inventory-as-a-service solution for managing the risk metadata associated with all models in inventory. Specific capabilities in EUC Inventory Cloud™ that enable compliance with this first PRA principle include:

- Information on model owners and users
- Lifecycle status e.g. "under development", "in production", "retired"
- Appending of supporting documentation including but not limited to intended use case, data dependencies, etc.

CIMCON hosts this secure system so that no bank IT resources are needed to operate it. Universally accessible via a browser, model owners are systematically prompted to input and maintain the quality of the model risk data. Model risk management resource requirements are de minimis as all reports are continuously updated.

In summary, the inventory service provides a single, bank-wide view of *all* critical models (of *any* file type), complete with developer and owner attestations along with risk and complexity assessments. And as mentioned, the models never leave the bank's firewall(s).

Principle 2 - Banks have implemented an effective governance framework, policies, procedures and controls to manage their model risk

P2.1 Board of directors and senior management responsibility:

A Model Risk Management policy can exist within the firm's overall governance, risk and compliance framework. However, this latest statement from the PRA is likely to require a review of those existing policies and standards. Specific requirements such as identifying a designated internal party to be responsible for maintaining the bank-wide inventory of all models will usually require a dedicated MRM Committee.

Senior management and Board level input is needed to ensure that model risk is effectively managed in line with PRA expectations. Model validation teams will also be required in order to perform validation and testing to provide assurance to the MRM Committee that models are safe and error-free.

CIMCON can also provide analytic tools that automate the process of analysing end-user developed models to identify possible errors and dependencies on other models and/or datasets within the bank. CIMCON consultants can assist with the development of a model risk governance framework. This includes but is not limited to assisting with the establishment of MRM committee, policy, and model validation requirements.



P2.1 Board of directors and senior management responsibility

CIMCON's preferred approach is to utilise existing policy/standards and configure the model inventory service to enable a sustainable implementation of the existing policy.

If policy, standards and/or procedures do not exist or need updating, CIMCON consultants can provide standardised templates that reflect industry best practice covering the four calculation methods/systems/frameworks outlined in the guidance.

P2.3 Model developers, owners, users and control functions

The roles and responsibilities of developers, owners and users should be defined in your MRM Policy.

The control activities/functions should also be defined in that policy, but be advised that “*management review*” is not always an effective control. Management review can be strengthened via approval workflows where the review process is fully documented in an audit trail. In addition, change management technology can be used to automatically enforce specific controls such as restricting who has access to a model.

P2.4 Role of Internal Audit (IA)

The standard reports available within CIMCON's hosted model inventory system can provide objective evidence that clearly demonstrates what controls are in place and to what degree the controls are affecting operations.

CIMCON also provides analytical tools that can be used by Internal Audit teams to facilitate their evaluation of models, their control sets, and the overall governance environment.

P2.5 Use of external resources

CIMCON's model inventory solution can be configured to allow for the input of model risk metadata by authorised external resources.

In addition, external resources can utilise CIMCON's model analysis tools to provide insight and documentation that is 100% consistent with the methods that are used internally within the bank. In other words, both internal and external resources can use the same tools.

Principle 3 – Banks have implemented a robust model development and implementation process and ensure appropriate use of models

P3.1 Model purpose and design

Model purpose, design, choice of parameters, mathematical theory, and underlying assumptions of a model can be documented within the model itself or in Microsoft Word and references to those documents can be made permanent through the model inventory system.

- CIMCON consultants can assist with developing reusable documentation templates.
- For spreadsheet-based models, CIMCON provides capabilities to automate the sensitivity testing iterations.

P3.2 Use of data

Any documentation regarding data used to develop the model can be permanently referenced to the model inventory record.

P3.3 Testing

Any documentation of logic testing activity can be permanently referenced to the model inventory record.

P3.4 Documentation

Any model documentation can be permanently referenced to the model inventory record.

P3.5 Use of judgement

Any documentation of judgments/overlays can be permanently referenced to the model inventory record.

P3.6 Supporting systems

CIMCON's model inventory service is not dependent on the type of information system(s) the model is built in. Whether it be SAS, Excel, Python, R, MatLab or even a bespoke process consisting of multiple models, the model inventory information can be collected, summarised and reported on.

P3.7 Business involvement

N/A to CIMCON

P3.8 Model uncertainty

N/A to CIMCON



P3.9 Monitoring

Depending on model complexity and materiality, periodic reviews can be every quarter or six months or every year.

- CIMCON's model inventory system can be configured to send notifications to the model owners to update the risk information and confirm that tasks outlined in the guidance have been performed. This self-assessment then becomes part of the permanent record of that model.

Principle 4 – Banks undertake appropriate model validation and independent review activities to ensure sound model performance and greater understanding of model uncertainties

P4.1 Scope of validation and review

Confirmation that model validation has actually been completed and by whom can be captured and become part of the permanent inventory records.

P4.2 Independence

Details on the person(s) performing the validation can be captured and become part of the permanent inventory record.

P4.3 Competence and influence

N/A to CIMCON

P4.4 Treatment of model issues and/or deficiencies

Any documentation pertaining to model deficiencies and/or errors identified during the validation process can be linked to the inventory record.

- CIMCON provides tools for error detection and analysis for spreadsheet-based models.
- CIMCON's Change Management technology can be used to systematically apply controls if access or other editing rights need limitation.

P4.5 Frequency of model validation

Periodic reviews can be automated to ensure they take place and non-conformance reports are available to highlight those models that were not reviewed/validated in the appropriate time frame.

Conclusion

An accurate, up-to-date model inventory is the fundamental foundation of a good model risk governance framework. Without this, the effectiveness of any model related controls are seriously compromised and the critical decision making based on those models is more prone to error. As per the PRA guidance, stress testing model inventories are now recommended and the self-attestation is required in ICAAP.

The practical challenge is that maintaining accurate model inventories are resource intensive. It creates a burden for the person responsible for the inventory and for each model owner as well. Inventory requires a lot of time, not only to establish but especially in the on-going maintenance and refresh of the risk metadata.

CIMCON's model inventory-as-a-service is a hosted software solution that automates many of the burdensome tasks associated with maintaining model inventories and implementing effective controls. With a typical on-boarding process estimated at 30 minutes, the benefits of systematically managing this component of model risk far exceed the costs.

For more information about using software to facilitate more cost-effective compliance with the PRA's Model Risk Management Principles, please email us at sales@cimcon.com.



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