



# Model Risk Management

*Presented by:*

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Certified Public Accountants

Consultants

Wealth Management

Technology




# Agenda

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- Overview
- Model Risk
- Development, Implementation, and Use
- Validation
- Governance Framework



# Overview



# Systems Utilized in Bank Decision-Making

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- Underwriting credits
- Measuring risk
- Capital adequacy
- Reserve adequacy
- Interest rate risk
- BSA/AML monitoring



# Models Come With Costs

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- Development, Implementation, Use
- Validation
- Financial loss of relying on inaccurate output



# Customize Implementation Based on Your...

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- Risk exposure
- Business activities
- Complexity of model
- Extent of use on the model



# Model Risk



# What's a Model?

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- A quantitative method, system or approach
- Applies statistical, economic, financial or mathematical theories, techniques and assumptions
- Process input data into quantitative estimates
- Consists of input of data and assumptions, processing and reporting





# Model Risk

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- Use of any model presents model risk
- Model risk can lead to:
  - Financial loss
  - Poor business and strategic decision making
  - Damage to the bank's reputation



# Primary Reasons for Model Risk

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- Fundamental errors in product design may produce inaccurate outputs
- Model may be used incorrectly or inappropriately



# Model Risk Should Be Managed

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- Effective Challenge
  - Critical analysis by objective informed parties
- Materiality
  - More you rely on to make critical decisions



# Other Tools to Manage Model Risk

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- Establish limits on model use
- Monitor model performance
- Adjust & revise over time
- Supplement with other analysis or information



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# Model Development, Implementation, & Use



# Development

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- Most smaller institutions do not develop their own models.
- Due diligence is performed when assessing which model to purchase for use.
- Ensure model has the appropriate functionality for your banks needs.
- Visit another bank that already has it implemented and ask that they provide an overview of the system, including their likes and dislikes.



# Implementation

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- Document the flow of information into the model.
- Map fields from input data (core and other systems) into the fields of the model.
- Implement a reporting mechanism



# Use – Be Wary

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- Challenge from users may be weak
  - “it doesn’t affect me”
  - Its outcomes has bad effects
  - Change is required – change is difficult and costly
- Users only focus on aspects of the model
- Users less likely to challenge an outcome that results in an advantage for them





# Model is “Conservative”

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- Sensitivity analysis and stress testing
  - Unexpected large changes in outputs when small changes in inputs are made – model is unstable
- Back testing
  - Set acceptable levels of deviation



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# Validation



# Validation

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- Validation should be completed by individuals who are not part of development and use.
- Staff handling validation should have the requisite knowledge, skills and expertise.
- Staff conducting validation work should have explicit authority to challenge developers and users and to elevate their findings, including issues and deficiencies.



# Validate Input

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- Validate the input data.
- Validation should include appropriate amount of sampling.
- Test all types of input to ensure that they were interfaced correctly.
- Keep details of testing performed to provide to the regulatory to support the validation process.



# Validate Output

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- Validate the output.
- Validation should include appropriate amount of sampling.
- Test all types of output you are reporting on.
- Keep details of testing performed to provide to the regulatory to support the validation process.



# Model Review

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- Banks should conduct a periodic review—at least annually but more frequently if warranted—of each model to determine whether it is working as intended and if the existing validation activities are sufficient.
- This process can be incorporated into the internal audit function.
- Material changes to the model should be subject to validation.



# Governance Framework



# A Strong Governance Framework

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- Provides explicit support and structure to risk management functions through:
  - Policies defining relevant risk management activities,
  - Procedures that implement those policies,
  - Allocation of resources, and
  - Mechanisms for evaluating whether policies and procedures are being carried out as specified.





# Senior Management Role

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- Bank-wide approach to model risk management begins with the board of directors and is delegated to senior management.
- Senior management duties include:
  - Establishing adequate policies and procedures and ensuring compliance
  - Assigning competent staff
  - Overseeing model development and implementation



# Senior Management Role *(cont'd)*

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- Senior management duties include:
  - Evaluating model results
  - Ensuring effective challenge
  - Reviewing validation and internal audit findings
  - Taking prompt remedial action when necessary
  - Establishing committees to assist in this process



# Establish Roles and Responsibilities

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- Business unit leaders ultimately responsible.
- Model owners should ensure models are properly developed, implemented and used.
- Managing independent validation and review process.
- A bank's internal audit function should assess the overall effectiveness of the model risk management framework.



# What Should Be In Your Model Inventory?

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- All active models, retired models, and models in development
- All business uses of the models
- Computational tools deemed to be non-models
- Key information for models

# Key information

Model ID, name and version	Date of initial implementation /approval
Inherent risk tier	Date of last validation type and outcome
Model status (active, retired, in development)	Table of outstanding validation findings with associated status due dates remediation action owner
Business area /LOB/ department	Date and outcome of last annual review
Brief description of model and its use	Information about any exceptions
Name of vendor	Implementation platform
List of key stakeholders – model developer model owner, model users, oversight committee, model validator	Name of attester/last attestation date



# Questions?

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# Presenter Contact Info

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