



Model Risk Management

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Certified Public Accountants

Consultants

Wealth Management

Technology



Model Risk Management

- Agenda
 - Overview
 - Model Risk
 - Model Implementation
 - Model Use
 - Governance Framework



Overview

- Banks utilize many systems in decision making
 - Underwriting credits
 - Measuring risk
 - Capital adequacy
 - Reserve adequacy
 - Interest rate risk
 - BSA/AML monitoring



Overview

- Models come with costs:
 - Implementation
 - Validation
 - Input/assumption review
 - Maintenance
 - Financial loss of relying on inaccurate output



Overview

- Implementation of model risk management should be customized based on the specific model and:
 - Risk exposure
 - Business activities
 - Complexity of model
 - Extent of use on the model



Overview

- A model is a:
 - Quantitative method, system, or approach
 - Applies statistical, economic, financial, or mathematical theories, techniques, and assumptions
 - Processes input data into quantitative estimates
- A model consists of input of data and assumptions, processing and reporting



Model Risk

- 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



Model Risk

- Primary reason for model risk:
 - Fundamental errors in product design
 - Mathematical calculation errors
 - Inaccurate inputs
 - Inaccurate assumptions
 - Utilized incorrectly



Model Implementation

- 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



Model Implementation

- We will utilize Asset Liability Management (ALM) and Bank Secrecy Act (BSA) software models as examples throughout this part of the presentation
- 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 to alert the bank if there was an error with the import



Model Implementation

- Validation should be completed by individuals who are not part of development and use
- Staff doing 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



Model Implementation

- 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 regulators to support the validation process



Model Implementation

- Validate the output
- Validation should include appropriate amount of sampling
- Test all types of output to ensure that the system is alerting you of the activity you expected
- Keep details of testing performed to provide to the regulators to support the validation process



Model Implementation

- The bank cannot begin to rely on the model until all significant issues noted during the validation are resolved
- Appropriate changes are to be made and re-testing is necessary until satisfactory results are obtained
- Re-testing may be required multiple times during the validation process
- Validation should be ongoing after a model goes into use to identify any new limitations/exceptions



Model Implementation

- 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 when they occur



Model Use

- Utilize in production once validation is completed
- Users of the model need to scrutinize the output during the course clearing alerts generated
- Run statistical information on the alerts to justify the parameters set and any recommended changes
- Models to be regularly adjusted to take into account new data/techniques/trends
- Assess the parameters periodically to keep them from becoming stale



Model Use

- Back testing of data necessary in some models, specifically interest rate risk models
- This type of model utilizes assumptions
- Take model from previous period and compare to actual
- Bank to identify the scenario which tracks closest to actual
- Any large variances should be appropriately supported



Governance Framework

- A strong governance framework 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



Governance Framework

- 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



Governance Framework

- Senior management duties (continued):
 - 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



Governance Framework

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



Questions

Questions??



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Salvatore Zerilli, CPA, CAMS is a principal in Mercadien, P.C., CPAs and a managing director of The Mercadien Group. A seasoned public accounting professional, Sal specializes in performing risk management services for banks, credit unions, and United States branches of foreign banking institutions. These services are inclusive of outsourced internal audit services, regulatory compliance reviews, enterprise risk management and consulting services. Specific areas of expertise include the Bank Secrecy Act (BSA)/USA PATRIOT Act, allowance for loan and lease losses, asset/liability management, liquidity management, information technology, and regulatory compliance, among others.

The government instituted the USA PATRIOT Act in 2001 which placed further regulatory guidelines on the banking industry. Soon thereafter, Mr. Zerilli became a Certified Anti-Money Laundering Specialist (CAMS) by successfully completing a rigorous examination designed by financial services industry leaders and an independent testing firm. The examination provides an objective measure of a professional's knowledge of industry best practices, anti-money laundering standards, and other areas that are crucial in the field. Sal works with financial institutions to ensure that they have properly implemented compliance programs that meet the scrutiny of federal and state regulators. Well-versed in the various software applications for BSA compliance, Sal is a sought-after expert in this area.

Armed with more than a decade of banking industry experience and a Bachelor of Science in Accounting from the University of Albany (magna cum laude), Sal formerly served as an auditor for Ernst & Young in the company's financial services industry, performing external audits of community and commercial banks. He then served in positions for various New York City banks including vice president and controller. Mr. Zerilli's duties included supervising the financial accounting, deposit and loan operations, information technology, and human resources departments. He then served as a director in an accounting and consulting firm where he was responsible for overseeing the outsourced internal audit engagement for financial institutions. This experience in the industry gives Sal insight and hands-on knowledge relating to the internal operations of a bank.

Sal is a member of the New York State Society of Certified Public Accountants and the American Institute of Certified Public Accountants. He is also an active member of the Financial Managers Society (New York/New Jersey and Philadelphia Chapters) as well as an active member of the Association of Certified Anti-Money Laundering Specialists. Sal resides in Old Bridge with his wife and two children.