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Model Risk Management for Insurers

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INSURANCE COMPANIES USE COMPLEX MODELS TO SUPPORT ALMOST ALL CRITICAL BUSINESS DECISIONS.

However, models can only estimate future results, and thus they will never produce answers that are 100 percent accurate. The reliability of results can also be affected by human error, including design flaws, incorrect calculations, out-of-date parameters, misunderstood or poorly communicated assumptions



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and results, poor data and the inappropriate application of a model.

Financial models introduce risks at all insurance organizations and should be addressed as part of a comprehensive risk management program to protect an organization's financial strength and reputation. Much of the activity underway to man-

age model risk in the United States is in response to the joint guidance from the Office of the Comptroller of the Currency (OCC) and the Federal Reserve Board: Supervisory Guidance on Model Risk Management (SR 11-7/ OCC 2011-12).¹ Banks, insurers that own banks and insurers designated systemically important financial institutions (SIFIs) will be held to the standards in that guidance. These standards are also establishing leading practices for a model risk management capability for the broader insurance industry.

Additional information on model risk management and validation that directly applies to insurers comes from Solvency II in Europe, the 2012 North American CRO Council article on applying model validation principles to risk and capital models² and the SOA research project "Model Validation for Insurance Enterprise Risk and Capital Models."³ Together, these sources of guidance provide a good starting point for insurers, but they focus only on capital models and do not address

a comprehensive model risk management capability.

This article discusses specific challenges in model risk management, and practical solutions to those challenges, which are critical to building a model risk management capability. Through our experience working with insurers to build a model risk management capability, we have identified four areas in need of special attention.

1. Model definition
2. Governance and policy
3. Model validation
4. Model documentation

Addressing the challenges within these areas early on can help prevent more complex problems from arising later in a model's life cycle.

MODEL DEFINITION

In building and maintaining an inventory of models that will be subject to a model risk management policy, the following considerations can help streamline model risk management activities once the policy is in place.

Coverage

- Challenge: The definition of "model" may inadvertently exclude analysis tools that introduce risk to the organization.
- Our point of view: The Federal Reserve Board's Supervisory Guidance on Model Risk Management states that a model is "a quantitative method, system, or approach that applies statistical, economic, financial, or mathematic theories, techniques, and assumptions to process input data into quantitative estimates."⁴ Most insurers have found the need to tailor that definition to their organizations. One example of relevance for insurers is that traditional reserve valuation models are often excluded from the model risk policy. This occurs for valuation models where there is limited or no judgment and the systems are well-controlled.

Materiality

- Challenge: The materiality of certain models may change over time.
- Our point of view: A model not deemed material today might have less rigorous oversight throughout its life cycle, even as it exposes the company to more risk tomorrow. Insurers may need to identify models whose materiality is likely to change over time. These models may need triggers in place to regularly examine their materiality and determine anew the appropriate level of oversight.

GOVERNANCE AND POLICY

Developing a policy and establishing governance help to ensure that all other activities of model risk management are followed appropriately and consistently. Considerations for these initial activities include the following items:

Centralized or decentralized structure

- Challenge: Many insurers are unsure of how to organize their model risk management activities.
- Our point of view: Either a centralized or decentralized structure may be appropriate. What matters is the clear definition of roles and responsibilities at each of the three lines of defense—model owners, model governance and validation, and internal audit. Regardless of structure, the organization needs clear and consistent visibility into its model risks and the ability to look at the aggregate model risk for the entire enterprise. While both structures are used, organizations with more mature model risk management programs have moved to a centralized structure. One additional point is that if the business units within a company are diverse, enterprise standards may need to be translated into guidelines and procedures at the business unit, product and model levels.

UNIQUE SKILL SETS

- Challenge: Much of the modeling performed at insurance companies requires a specialized set of

technical skills, and validation of models requires a different mindset.

- Our point of view: Given the evolving regulatory environment, many insurance companies are looking to increase staffing to meet finance, risk and actuarial needs. They find it difficult to meet those demands and, at the same time, allocate qualified resources to model risk management activities. Subject-matter specialists who have the background to effectively govern model risk management are needed. When choosing members of the model governance committee and defining their roles, their objectivity, independence and skill sets must be considered. Finally, just hiring technically qualified professionals will not automatically result in the appropriate validation skill set. Organizations that wish to have an internal validation unit need to provide adequate training to junior resources to develop their own validation expertise. For validation activities, some organizations use a third party to access qualified, cost-effective resources.

MODEL VALIDATION

Management expectations

- Challenge: Senior management and the board of directors may not be aware of the scope and expectations related to the validation of a model.
- Our point of view: Risk management must establish realistic expectations among leaders and decision-makers about what model validation means, both what it is and is not, and should revisit the definition often. Models by their nature are not without forecasting error, and to test all of the calculations is extremely costly and time prohibitive. However, there is a clear benefit to validation: a model that has gone through the procedures should have a lower risk of misinterpretation and inaccurate results than a model that has not.

Independence

- Challenge: A truly independent review of the model may be difficult to achieve.

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- Our point of view: Independent validation is the gold standard when it comes to models. Banks often have large teams of qualified professionals within independent reporting lines who perform validations. Insurance companies have not yet adopted this approach, but they do need some form of independent validation, which may vary by model depending on the risk rating established by the organization. For example, for certain models, it might be acceptable to have a qualified professional who was not involved in the development perform the validation, even if the ultimate reporting line is the same as the developer's, as long as the validator is providing a qualified and effective challenge.

Scope

- Challenge: Model validation may not address all areas of potential risk.
- Our point of view: The term “model validation” carries different meanings—from individual cell testing to a high-level evaluation of conceptual soundness. Insurers need to address all sources of risk, either in the validation process or in other model risk management activities. Overall risk mitigation must include detailed recalculations to validate the math used and address a model's appropriateness for its intended use, its consistency with industry practice and the quality of input data. The specific procedures for validation should be clearly articulated in the model risk management policy and provide enough guidance for a diverse set of models.

Ownership

- Challenge: It may be easy to over rely on the validation conclusions of third parties.
- Our point of view: Given the resource constraints of many insurers, in particular scarce actuarial skill sets, third parties are often called on to perform model validation. It is important for companies to engage with the third party, take full ownership of the conclusions of the model validation work and

interpret the third party's procedures accordingly. By owning the conclusions of model validation, the risk management function of an organization can more effectively perform its duties as the second line of defense.

Sustainability

- Challenge: The validity of the model changes over time.
- Our point of view: Tactics must be in place so that a validated model stays valid, particularly models that remain in use for long periods. Establishing clear processes and controls for incorporating changes, monitoring results and reviewing model use will help increase the longevity of the validation. Many companies have established formal change management policies that model owners and developers must follow.

New uses

- Challenge: Models may be used incorrectly.
- Our point of view: When a new analysis and model are needed, practitioners typically look for a starting point from the existing model inventory. Having been validated once, an existing model may appear valid for any purpose. However, validations are performed for a specific use of the model, and applying an existing model for a new purpose may not be appropriate. Anyone considering a new use for an existing model should understand the intended use for the model and its limitations—and the need to revalidate the model for the new use.

MODEL DOCUMENTATION

One of the most critical activities of model risk management is developing comprehensive and robust documentation. Comprehensive documentation provides evidence of the diligence used to create the model, captures the findings of the validation, and clarifies the intended use and limitations of the model. To help see that thorough, consistent documentation is created for all models, the challenges below should be addressed.

“One of the most critical activities of model risk management is developing comprehensive and robust documentation.”

Standards

- Challenge: The documentation for a model is often little more than a user guide.
- Our point of view: By defining the standards for documentation and making model owners and builders aware of those standards, critical information will be captured at the earliest stages of model development. Common items include the current approach and methodology, and the limitations and uncertainties for the user of the model’s results to be aware of. An often overlooked element is the rationale for developing the model and the assumptions and trade-offs made in its creation. The documentation should also outline a consistent approach for monitoring the model’s performance.

Templates

- Challenge: The quality of model documentation is often inconsistent from model to model.
- Our point of view: Establishing templates early in the development of model risk management capability can provide consistency and clarity in the documentation across all models. The templates must include sufficient detail to make sure each model owner interprets the requirements the same way, and model owners should be required to provide examples to clarify complicated topics.

Third-party models

- Challenge: Many actuarial models are licensed from a third-party software developer, and much of the initial model development and history may not be known to the organization.
- Our point of view: Insurers should request that third-party developers be able to provide information needed to comply with the model risk management policy and standards. Also, companies should avoid relying on third-party documentation for open-source models where there have been modifications, and look for the same level of documentation for those changes as an in-house model. An insurer is responsible for potential risks, even

from a third-party model, and therefore should make it clear how the requirements for those models differ from those for in-house models.

CONCLUSION

Setting up a model risk management capability is a complex undertaking that can be broken down into parts. A solid start includes establishing a framework, setting a governance cadence and selecting an initial set of models to go through a validation.

Model risk management will call on resources beyond the business units that own the models, including resources from enterprise risk management and internal audit. A program management office may need to be established to keep the implementation moving forward as other issues take priority for the people involved.

Ultimately, model risk management should add value to the enterprise as well as reduce risk. Visibility into the source of data, confidence in the reliability and applicability of the model, and ongoing model improvements all support more effective decision-making for the organization, ultimately protecting its financial position and reputation. ■

ENDNOTES

1. *Supervisory Guidance on Model Risk Management*, SR 11-7, Board of Governors of the Federal Reserve System, 4 April 2011, <http://www.federalreserve.gov/bankinforeg/srletters/sr1107.htm>
2. *Model Validation Principles Applied to Risk and Capital Models in the Insurance Industry*, North American CRO Council, 2012, http://cro council.org/images/CRO_Council_-_Model_Validation_Principles.pdf
3. *Model Validation for Insurance Enterprise Risk and Capital Model*, <https://www.soa.org/Files/Research/Projects/research-2014-model-valid-ins.pdf>
4. *Supervisory Guidance on Model Risk Management*, SR 11-7, Board of Governors of the Federal Reserve System, 4 April 2011, <http://www.federalreserve.gov/bankinforeg/srletters/sr1107.ht>