

# DeRisk

*CRISIL's insights and analyses of regulations, macroeconomic factors, guidance and trends affecting the insurance industry*

*October 2019*

Panel discussion on

## Implementing Model Risk Management practices at insurers

Global Research  
& Analytics

**CRISIL**  
An S&P Global Company

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## **Panelists**



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## Key findings

CRISIL GR&A hosted a roundtable with top model risk management (MRM) practice leaders in the insurance industry in New York. We welcomed more than 30 attendees. A panel was formed by Nikolai Kukharkin (Head of Model Risk at TIAA), Phil Elam (Head of Model Risk at Prudential Financial), Mark Kust (Model Risk Expert at VCP), Rodanthy Tzani (Head of Model Risk at New York life) and Eric Tam (Managing Director for Model Risk at AIG). The panel was moderated by Alberto Ramirez, Practice Leader (Insurance), CRISIL.

## Adoption of MRM by insurers

While the US banking industry embraced MRM programs since the early 2000s and more rigorously from 2011 (after the issuance of SR 11-7, a Supervisory Letter (SR) guidance on MRM from the US Federal Reserve and the Office of the Comptroller of the Currency [OCC]), the insurance industry started adopting MRM programs only around 2016. Since then models have been classified based on model components, with many pieces nested within the models.

### ...the Fed expanded the MRM focus to all models

The 2008 financial crisis increased the focus on risk models – from pricing to anti-money laundering (AML) risk models – which account to 30% of models. Initially insurers were focused on actuarial models, but the Fed expanded the MRM focus to all models.

Insurers define models or model components in different ways. Depending on the definition, they can get an inventory of 300 to 3,000 models. Model components reduce model complexity, but might increase the effort to establish inherent risk and dependencies while performing model validation. A thorough review is necessary to determine which models should be considered and which ones should be excluded from the model inventory, based on the nature of their use, such as end-user computing tools (EUCTs). It is also important to determine the linkages or interdependencies of models.

Even though insurers have their own model inventories, it is important to re-evaluate the completeness of their inventories, as a few models might have been left out unintentionally. Model inventories are never complete and there are no guidelines for insurers on this currently.

Over the past three years, industry practices regarding models have changed. There have been adjustments in the validation cycle from one year to the next, and the number of models have reduced. Moreover, many model changes are occurring due to regulations (principle-based reserving), and the trend is likely to continue. As of now, US insurers have 60% actuarial models, 20% financial models, and the rest risk models from corporate.

## Roles and responsibilities

The increased importance of model risk has transformed traditional roles and responsibilities for insurers, such as changes in the roles of actuaries and the way insurers have modified traditional controls. While the adoption of MRM programs have not been difficult for some insurers (given that many actuarial models already comply with the requirements), there has been a complete change in the mindset for others. For example, given that data science, artificial intelligence (AI) and machine learning (ML) models are becoming more important for industries driven by decision making under uncertainty, it is more difficult to adopt the MRM framework for these types of disciplines.

Insurers have been reacting in adopting MRM practices because there are not many clearly defined requirements to do so. However, the importance of having an MRM framework is growing quickly, along with the value of having personnel that are fluent in model risk and the way their roles and responsibilities are defined.

Challenges in adopting the new MRM paradigm are particularly interesting between the actuarial and non-actuarial functions. Actuaries follow a stringent and rigorous modeling process (e.g., documentation), but now they have to figure out how to redeploy their practices under a different approach (MRM).



## There is a shortage of around 1,000 actuaries in the US

Considering the different model changes expected from statutory requirements and Generally Accepted Accounting Principles (GAAP) in the coming years, there is a shortage of around 1,000 actuaries (Fellows of the Society of Actuaries) in the US. Moreover, the availability of actuaries with a background in MRM is limited.

## Best practices adopted by insurers

The degree of maturation of MRM practices varies in the insurance industry, some insurers have MRM program under development and others in a desired state. Those few in desired state, have MRM practices in line with those in the banking industry, while others have practices that are developing and still have a gap with their “desired state”. This developing stage is particularly for non-actuarial models in each model inventory, accounting for around 40% of total models.

Various models, such as those from predictive modelling, are more established, while those from AI and ML are still evolving. For established models, performance testing and benchmarking are key best practices. Other important practices include stress-testing, identification and mitigation of risk factors. For some models, industry practices are still evolving.

## Insurers took a different approach to adopt the MRM framework

Insurers took a different approach to adopt the MRM framework, as they rely heavily on actuarial standards. It has been difficult for insurers to integrate actuarial and non-actuarial functions under the same MRM umbrella. For example, while actuaries start by replicating the models, non-actuaries begin with testing and stress-testing the models.

Actuaries, too, are making an effort in adopting MRM practices. In fact, the fourth exposure draft of the Actuarial Standard of Practice (ASOP No.

38) on modeling has concluded recently. However, non-actuaries are not adopting the prescriptive practices that actuaries have followed for many years, especially for reserving, asset adequacy, and other statutory models. Non-actuaries could benefit by collaborating with actuarial functions, in terms of the level of detail and documentation they provide.

Assessing model performance is important to establish successful MRM practices. Backtesting is a key practice that enables model oversight. Model changes fueled by evolving regulations and accounting guidance will continue to trigger the need for MRM experts. A high level of expert judgment is required in assessing or transforming models to adapt to new regulations or accounting guidance – and it is very challenging to validate expert judgment. The role of a risk manager is to be aware of new regulations and set up new processes or guidelines, as well as identifying new risks arising from regulation.

## Model governance and workflow management initiatives

MRM teams have different competing priorities, depending on complexity, risk and materiality of models. MRM creates workflow management challenges for teams, as their time is consumed in coordination/communication with different stakeholders (model owners, developers, users and regulators), while additional time is required for documenting and addressing model remediation or changes. The first step of successful model governance is a good inventory. Second, a good model risk rating system factors in all the risk factors before model validation.

Establishing a risk tiering mechanism is crucial to differentiate models. Prioritization should be implemented on the basis of a combination of model materiality, risk, and complexity. Commitment at the corporate level to perform relevant risk tiering, based on prioritization, is also required. Some insurers have taken more time than others to undergo a full lifecycle of model validation for all models – and this is where ongoing monitoring process can help.

## ...legal and ethical risks, particularly around ML models

A good governance mechanism is required to handle various types of models, including those around AI and ML. Although the mechanics could be different for each model, actuaries and non-actuaries should look under the hood to identify and mitigate model risk. They should also follow diverse validation practices under the same governance framework. Other non-quantitative aspects, such as legal and ethical risks, particularly around ML models, are required due to emerging regulations. The key difference between these and other models is the reduced transparency needed to perform a model validation, as these models have high opacity and in general are black boxes.

## Other important aspects

### End-user computing tools

These do not fit under the definition of a 'model', but are model components whose level of model-risk validation is prescribed differently at the governance level. These tools do not follow the definition of a model by the insurer, but are important enough to scrutinize periodically through model validation. These tools are typically the first line of defense, as they look at the 'code' very closely; for example, applications based on the R or Python programming languages. As the second line of defense is a focus on the evidence and process, stability of EUCTs tools is an important component in model validation.

### Liquidity risk

Liquidity risk is driven more by model risk than by investment risk, given the emerging regulations in this area. More complex models, such as liquidity-risk models, will have to reflect the correct fit for purpose, including alternative asset investment classes, such as infrastructure, solar energy, wind energy and private equity.

### Residual risk

This is typically identified through a risk-assessment process. After building the model inventory and creating a holistic governance mechanism, there is a residual risk that comes from model interdependencies, inherent risk, model aggregation and other non-observable risk sources. Having controls in place to provide a conservative yet appropriate level of residual risk estimation is crucial to ensure that the MRM program is robust. Some considerations include the frequency and severity of events related to inherent and residual risk. Modelling 'capital at risk' is quite subjective.

### Expert judgment

Many quantitative models contain considerable qualitative and expert-judgement inputs. These cannot be validated with the usual procedures. It is important to elaborate a good internal model risk management practice to identify and mitigate model risk from these inputs.

## Vision of MRM at insurers in the next 2-3 years

- Collaboration of actuaries with non-actuarial business units to transfer knowledge of best modeling practices and take a stronger leadership role
- Use of more innovative techniques for modeling, especially the use of non-traditional data that can enable insurers to enhance products
- More industrialization-standardization, efficiency, and agility in the MRM function, including the way different stakeholders are involved in the process
- A pronouncement by either the regulator (National Association of Insurance Commissioners in the US) or actuarial societies that can trigger the adoption of MRM practices more widely
- Increased availability of tools and accelerators that can enable a simpler MRM function

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