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Session 26: The Role of a Model Risk Management Framework in P&C Insurers

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The Role of a Model Risk Management framework in a P&C Insurer

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What do we mean by *models*?

Definition: A model is an abstraction or an approximation of a complex reality. It is a quantitative method, system, or approach that applies statistical, economic, financial, or mathematical theories and techniques, with assumptions and expert judgment, to process input data into quantitative estimates or qualitative indicators. It consists of an information input component, a processing component and a reporting component.

Models can be grouped into two main categories:

Valuation models:
- Valuation of assets and liabilities for external disclosures (e.g., local statutory, IFRS)
- Pricing of new business or large transactions (M&A, reinsurance)
- Measurement of ex-ante business performance
- Illustration of insurance benefits

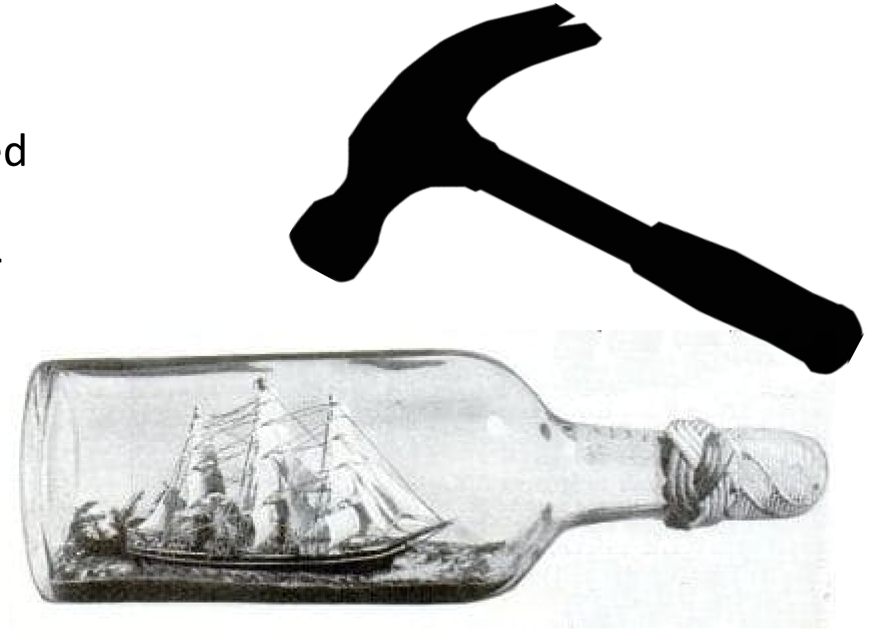
Risk measurement and selection models:
- Measuring capital requirement (for regulators, rating agencies or internal management)
- Supporting investment decisions (e.g., strategic asset allocation, risk assessment)
- Supporting business-mix decisions (e.g., risk-based return measure)

What do we mean by *model risk*?

Model risk is the risk that an adverse outcome (financial, strategic or reputation) may arise as a consequence of weaknesses or failures in the design, implementation or use of a model.

Model risk is mainly triggered by:

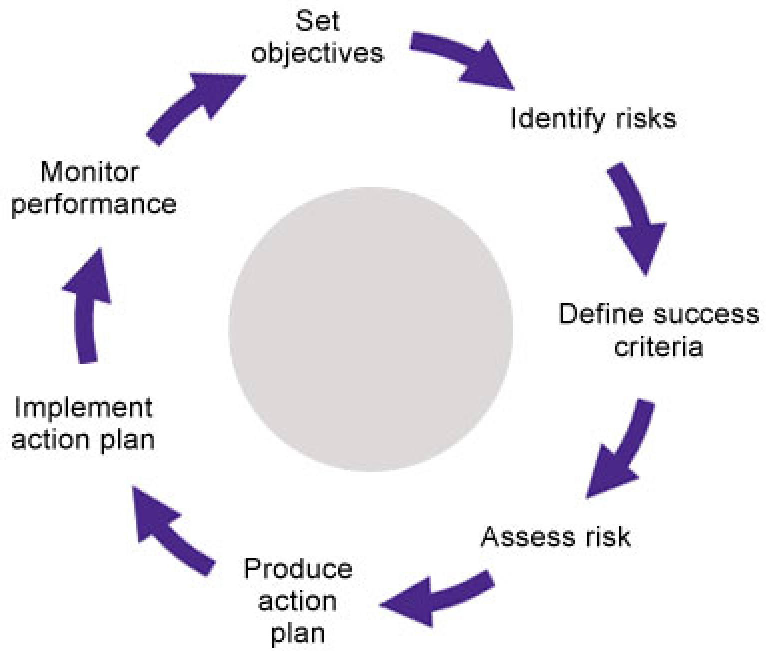
- Model accuracy being inadequate when viewed against the intended purpose and usage
- Making inadequate simplifications, approximations, assumptions or expert judgment, given the intended purpose and use of the model
- Incorrectly implementing model assumptions and specifications
- Using inappropriate, incorrect or incomplete input data
- Using models inappropriately or for unintended purposes



Companies manage, mitigate or limit model risks by:

- Establishing standards for reserving, pricing, valuation and capital models
- Requiring model owners to effectively limit or mitigate risks in their models
- Overseeing independent validation of critical models

Part of the general risk management cycle



- Model risk should be treated as any other risk an organization faces
- A robust model risk management framework can help focus attention on the most important model risks, while ensuring all models are subject to a minimum consistent level of governance
- Independent validation should be a part of the framework for models of strategic importance or those having potentially material financial impacts

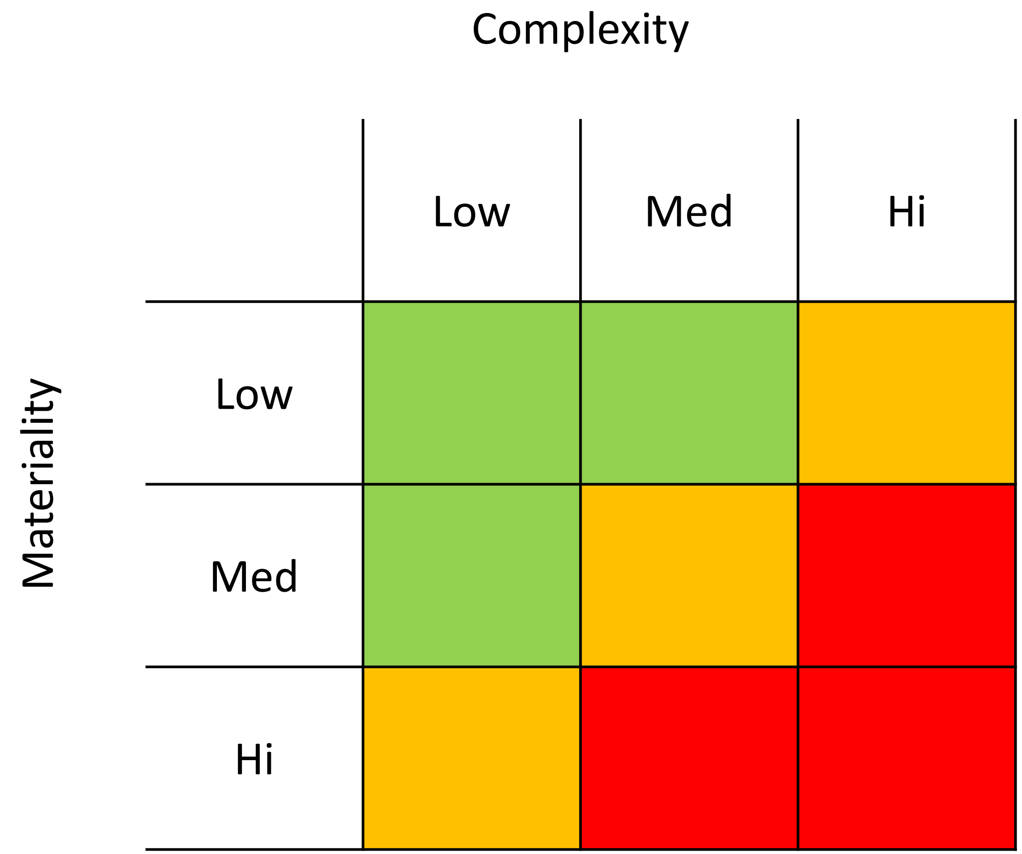
Where to begin?

Model inventory should include items such as:

- Model identifier
- Model owner
- Intended users
- Purpose
- Overview/description
- Key assumptions
- Data sources

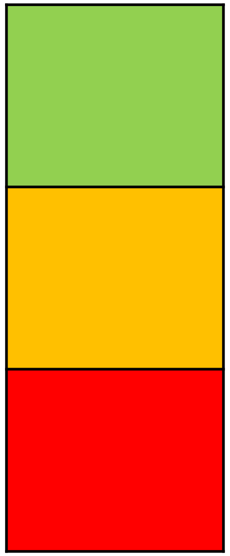
- Date created
- Date last updated
- Date of last review
- Materiality assessment (H/M/L)
- Complexity assessment (H/M/L)

Assessing model risk – simple approach



Risk Rating

Model Governance



Initial technical validation and testing; log of updates; document data sources;

PLUS key assumptions and parameters documented; changes logged and approved;

PLUS independent validation before implementation of model and updates; scheduled reviews;

Assessing model risk – more robust approach

Department **Model** **Assessor**	

Aspect	**Assessment**	**Avg Rating**
Data	low	1.0
Methodology & Calibration	low	1.0
Implementation	low	1.0
Model Use	low	1.0
Documentation	low	1.0
Governance, Process and Controls	low	1.0
Compliance	low	1.0

Aspect	**Subaspect**	**Quality to assess**	**Rating**
Methodology & Calibration	Methodology (theory, assumptions, expert judgment, methods & algorithms)	Robustness	1
		Consistency	1
		Granularity	1
		Appropriateness	1
	Calibration & Parametrization	Robustness	1
		Consistency	1
		Granularity	1
		Appropriateness	1
	Model Results	Stability	1

Total Score	**Model Risk**	**Mitigation Level (refer to guide)**
7-10	Low	I
11-14	Moderate	II
15-18	High	III
19-21	Very High	IV

Model validation

- **DO** ensure clarity around model owner, users, purpose
- **DO** verify the technical functionality of the model – logic, formulas, etc.
- **DO** verify controls for input/output data
- **DO** ensure appropriate governance over changes in structure, logic, assumptions, output, etc.

- **DO NOT** “fix things” or make changes to the model
- **DO NOT** focus on technology-related items (model efficiency, choice of platform, etc.)
- **DO NOT** re-do work (testing logic in ResQ, for example)
- **DO NOT** use model validation as a pretense for independent peer review (second-guessing loss reserve analyses, e.g.)

How do senior management and the board determine that models are being used for appropriate purposes?

Model Governance

- Especially important when pricing and underwriting models are distributed throughout entities, lines of business, geographies, etc.
- Need to ensure consistency of approaches, assumptions, methods, etc. where appropriate
  - Which models should be consistent?
- Someone with appropriate skills and experience to review and approve – and provide comfort to senior management and Board that there is a coherent and consistent view of risk being applied throughout insurer
- This is true for all models relied upon to make material decisions
  - Discuss
- Management will find it difficult to ensure that models are used appropriately without formal and rigorous governance

What To Do With a Model Validation Report?

Management and Board need actionable information. Frame model validation report in terms they care about and that can drive decisions

- For which decisions can we rely on a particular model?
- Do any models require additional resources, revisions, data, etc.?
- Any significant life cycle issues that need to be addressed?
- Any gaps that need to be remedied?
- Efficiency of modeling efforts
- Practicality and usefulness of models to insurer’s mission
- Are the downside risks of modeling more “expensive” than the benefits provided?
- Other?

Ensuring Linkage Between Models, Risk Appetite, and Strategy

- Capital Models
  - Capture metrics that management and Board care about
  - Resources and sophistication applied in areas linked to RA and Strategy
- Risk Accumulations and Aggregate Loss Distributions
  - Cat PMLs
  - Clash / Casualty Catastrophes
  - Common Loss Drivers (even across balance sheet)
- Pricing and Underwriting models
- Reserving models
- Investment Models