

SEAC/ACSW Annual Meeting

Model Validation

November 2016

What is a Model?

Model types and examples

- According to the FED/OCC Guidance on Model Risk Management, a financial model is, “*a quantitative method, system, or approach that applies statistical, economic, financial, or mathematical theories, techniques, and assumptions to process input data into quantitative estimates.*”
- Models are a fundamental part of an insurers ERM framework

Model Types	Examples
Actuarial	Reserves, CFT, ALM, DAC, LRT
Statistical models	Economic Scenario Generators
Risk and capital models	Economic Capital
Financial accounting models	Cost of projected hedges
Business models	Annual Plan

What is Model Risk?

... and why is it important?

In finance, **model risk** is the **risk** of loss resulting from using models to make decisions, initially and frequently in the context of valuing financial securities. – *Wikipedia*

A type of risk that occurs when a financial model used to measure a firm's market risks or value transactions does not perform the tasks or capture the risks it was designed to. – *Investopedia*

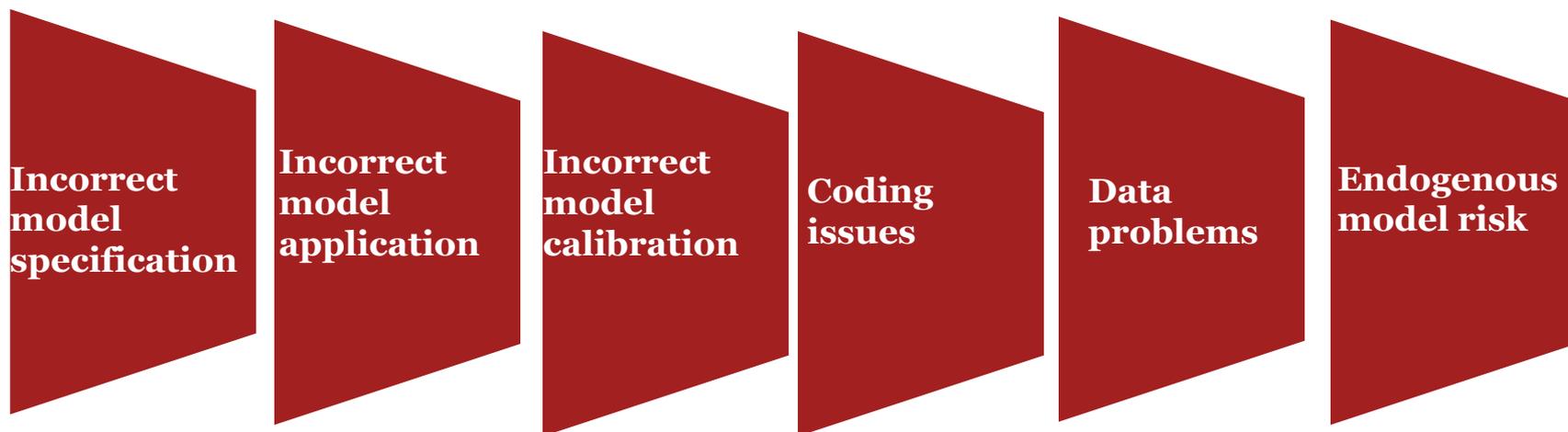
... the potential for adverse consequences from decisions based on incorrect or misused model outputs and reports. Model risk can lead to financial loss, poor business and strategic decision making, or damage to a bank's reputation. – *SR 11-7*

The risk of adverse consequences resulting from reliance on a model that does not adequately represent that which is being modeled or that is misused or misinterpreted. – *ASB Proposed Standard of Practice: Modeling*

Sources of Model Risk

Identify, assess, understand

Sources of Model Risk

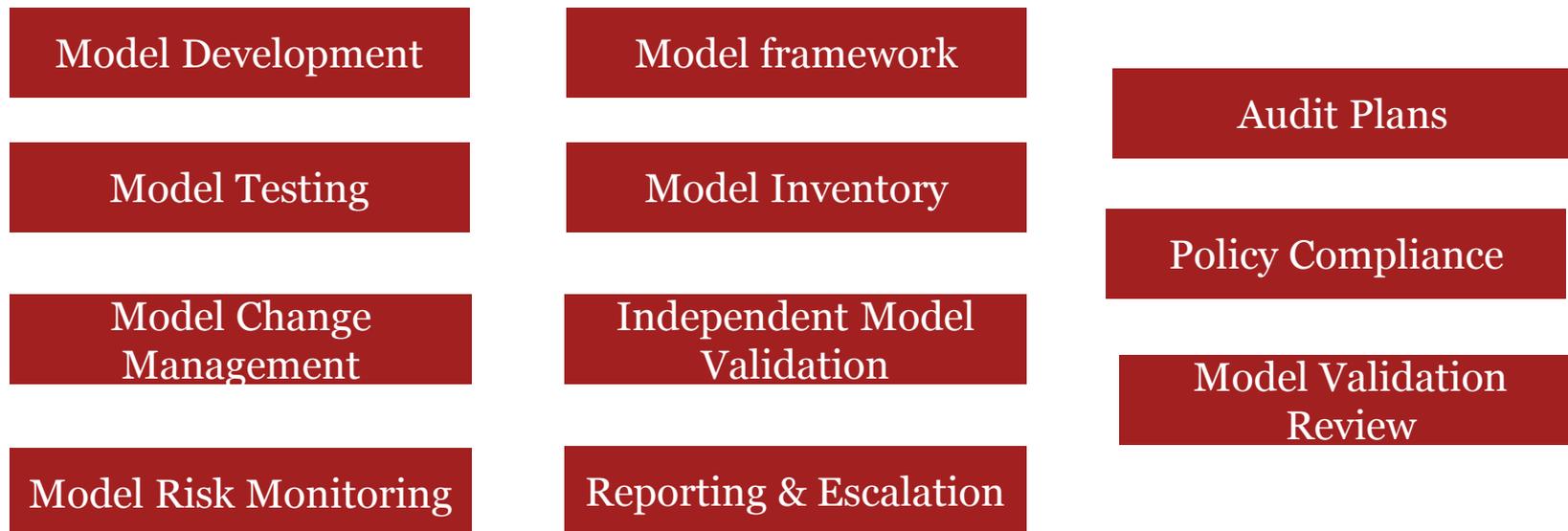


- Insurers are **placing increased reliance on strategically significant, highly complex models** that are not subject to internal control environments under SOX (e.g., pricing, risk, valuation/economic capital models).
- Every company's goal should be to **avoid** the following:



Model Risk Management Framework

The three lines of defense

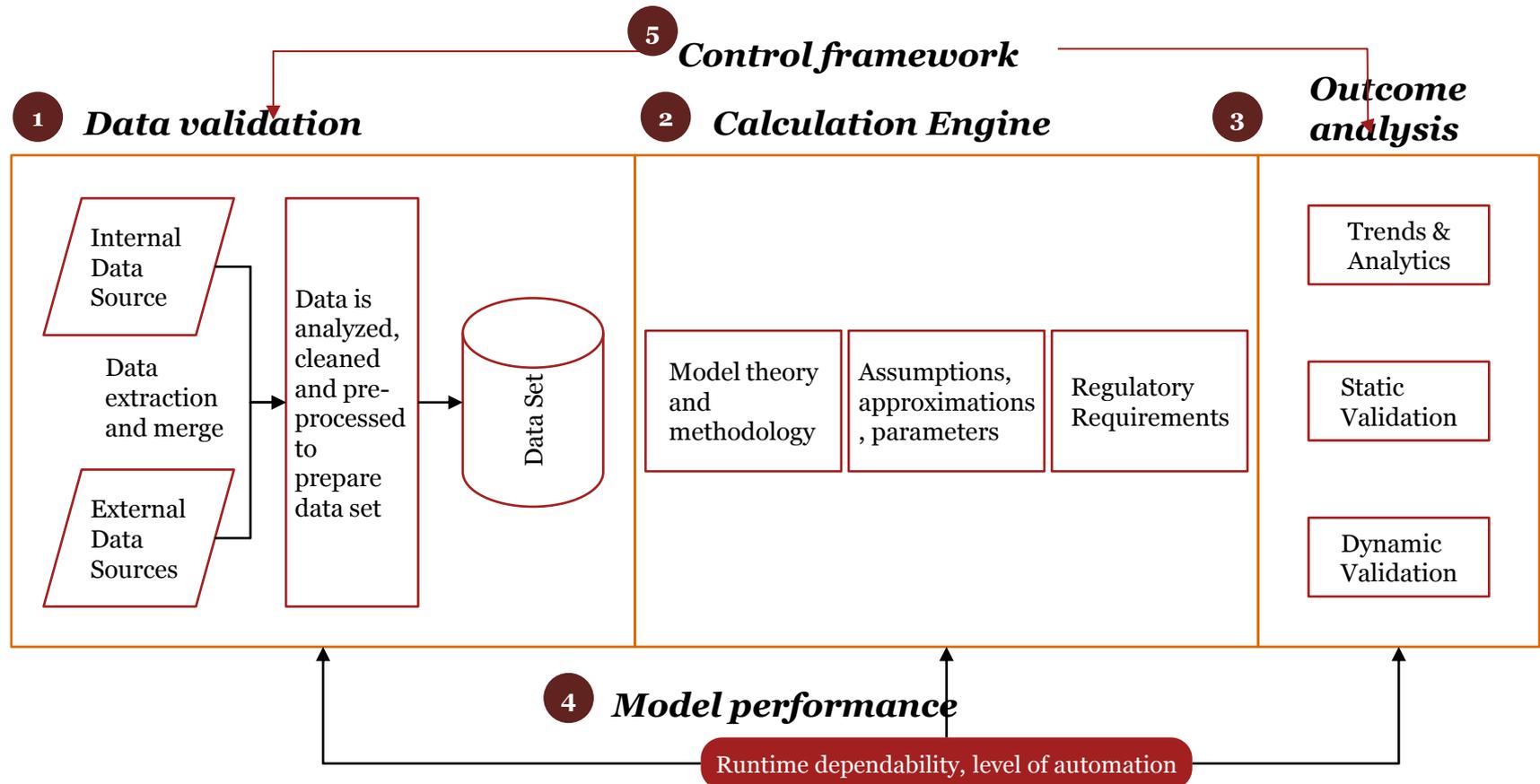


- **Effective oversight and control is required** as the demand for risk disclosures on models increases.
- **External stakeholders** expect insurers to have robust model risk practices as part of their ERM programs.
- **Strong ERM programs require confirmation of the validity of models** on which senior management rely when making strategic decisions, or on which business units rely to underwrite and price business.

Model Validation Framework

Actuarial model validation process overview

Independent Model Validation



Thank you...

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Observations from a Model Validator

ACSW Fall 2016 Meeting
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Model Definition

- On the surface, it doesn't appear to be too difficult a question, but the devil is in the details
 - Platform dependent?
 - Anything requiring judgment?
 - Anything requiring a forecast? Are assumptions models? (e.g., mortality, lapse, expense)
 - Heavily prescribed regulatory projections?
- Upstream / downstream models
 - Are results from upstream models assumed as inputs for the downstream model being validated? If so, are these “inputs” assumed to be OK for the validation exercise or are they themselves subject to review as part of the validation process for the downstream model?
- How do we consistently and systematically get comfortable with calculations that are not deemed to be a “model”?

Risk Culture

- Are model validators independent from the model owners / developers?
- Does the model owner look at the model documentation / validation as a one-and-done exercise (i.e., special project) or as a continuous process (i.e., part of their daytime job)?
- Do model owners admit model weaknesses prior to them being identified by the model validator?
- How good is the ongoing cooperation during a validation exercise? Is getting information difficult? What type of response do you get if you need timely information from a group not directly associated with the model (e.g., Admin, IT or Marketing)?
- How much time and effort do model owners appropriate for a validation exercise?
- Are the controls that are described in the documentation actually followed in practice? (e.g., change management, restrictions on accessibility)
- How are differences in opinion between the validators and the model owners typically resolved?
- Any real repercussions for the model owner of a model that could not be validated?

What does it really mean when a model cannot be validated?

- Reliance on models
 - Appointed actuary relies on model results in forming an opinion
 - Regulators / Shareholders / Auditors rely on model results in their respective decision-making processes
 - Strategic priorities of the organization (e.g., pricing a product that the company wants to sell)
- Sometimes it's difficult to simply stop using a model
 - Regulatory requirements have tight timeframes
 - No better alternative model exists
- Alternatives
 - Temporary or permanent “Risk acceptance” for models that cannot be validated?
 - Fast-track model fixes or development of viable alternative

Model Validation Results

- What type of measurement is used to assess model quality?
 - Pass / Fail vs some kind of quality score vs other
 - The final results-based assessments can be difficult if there are many model components (e.g., numerous assumptions, multi-generational product lines, simplifying approximations, many data fields spanning numerous records), as some aspects may be strong while others are weak
- How are the validation results of the different types of models summarized and/or ranked for senior management, given that there can be significant variations in materiality / importance across the models?
 - Purpose: Pricing vs Valuation (STAT vs GAAP vs Economic) vs Capital vs...
 - LOB: life vs annuity vs P&C vs Health vs ...
 - Exposure – how to define for different model purposes/LOB's such that they are comparable?
 - Model quality or some combination of model quality and exposure?
 - What if a model is used for multiple purposes or as upstream input for other models?
 - Can a model be validated for some purposes, but not for others?

Process

- Inventory system
- Different types of validation exercises
 - initial validation for existing vs new model
 - validation of a model that was deemed previously not to be able to be validated
 - cyclical vs off-cycle revalidation
- How frequently must a validated model undergo future validation exercises?
 - What type of model changes / updates trigger an off-cycle revalidation exercise?
- How to differentiate the importance of different types of model findings?
 - Model bugs vs poor predictor vs poor controls vs conflicts with regulatory guidance vs ...
- Data validation included?
- Organizational Structure
- Challenges for model validators
 - Can't be an expert in everything, but only have a short period of time to get up to speed with the model owner (who's likely an expert in the area)
 - Getting timely information / support during an ongoing validation exercise
 - Maintaining professionalism (you may be a good buddy of the model owner / developer)



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