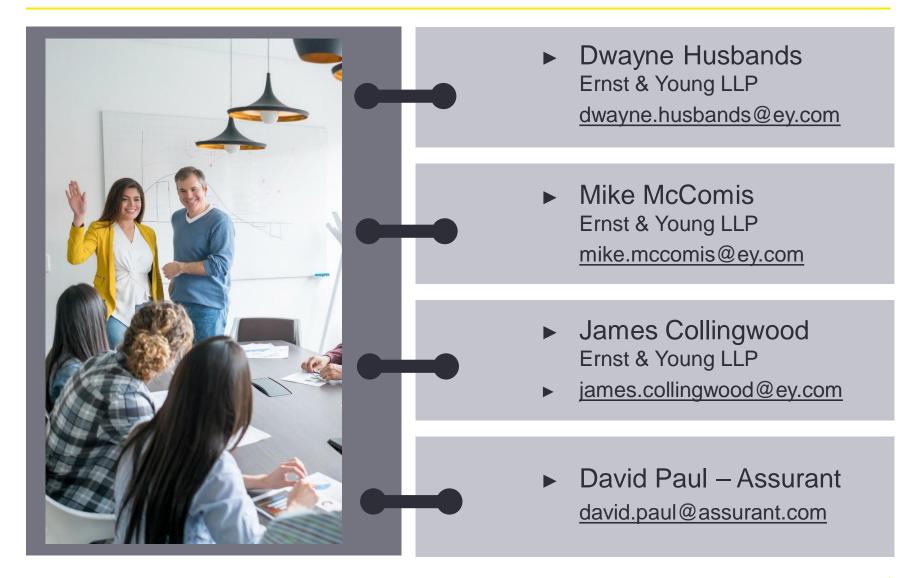


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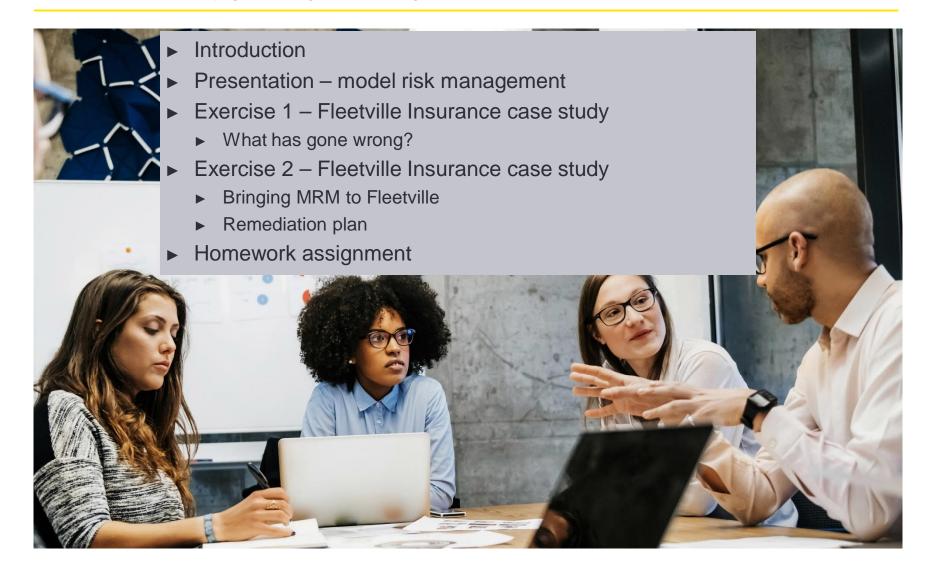
# Today's presenters





# Model governance

What could possibly go wrong - Part I agenda



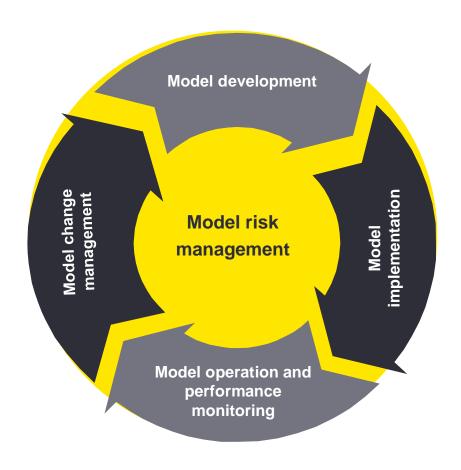




# Introduction

## Background

- Model risk management is not a new concept
  - Traditionally, insurers have performed tests and validations on their models to ensure calculation accuracy
  - The need now is for a more holistic and formal approach that considers and mitigates the risks that can arise throughout the life cycle of a model





# Introduction

## Why is MRM important?

Insurers are becoming increasingly reliant on models across Finance, Risk and Actuarial. The demand for and use of complex, principles-based models will continue to grow as expectations of stakeholders rise. As such, a robust MRM framework is important for a number of reasons, including:

Sound decision-making

- A robust MRM framework ensures models are conceptually sound to help inform business decisions
- ► This includes evaluating both judgmental and subjective model concepts that cannot be easily assessed

Confidence in results

► Senior management and the Board have an intolerance for model errors, especially those that can misinform shareholders and other stakeholders

Better understanding of models

▶ MRM leads to a better understanding and rationalization of models, which improves process efficiency and ensures models are fit for purpose

Regulatory guidance

- New MRM regulatory guidance has been released over recent years
- This includes ASOP 55, a model governance checklist and practices note from the Academy; MRM practices and principles from the North American CRO Council; and SR 11-7 (*Guidance on Model Risk Management*) from the Fed



# Introduction What is model risk?

# Model risk is the risk of adverse consequences from decisions based on the incorrect selection, implementation or use of a model.

- Occurs for several reasons:
  - Model may not be fit for purpose
  - Model may have fundamental errors and produce inaccurate outputs when viewed against its design objective and intended business uses
  - Model may be used incorrectly or inappropriately, or there may be a misunderstanding about its limitations and assumptions
- Model risk increases with:
  - Greater model complexity
  - Higher uncertainty about inputs and assumptions
  - Broader extent of use
  - Larger potential impact



# Introduction

## Adding value through MRM

# MRM activities add value to the enterprise by enhancing:

### **Accuracy**

- Systematic way of improving models and their accuracy, which reduces errors
- Model users and business managers are empowered to give recommendations for model development

### **Transparency**

 Increased transparency in the source of information for reporting and decisionmaking that depends on models

## **Alignment**

- Ability to make better decisions by better aligning models with intended use
- Achieving cost synergies via alignment of actuarial models across business units

## **Value**

## Scalability

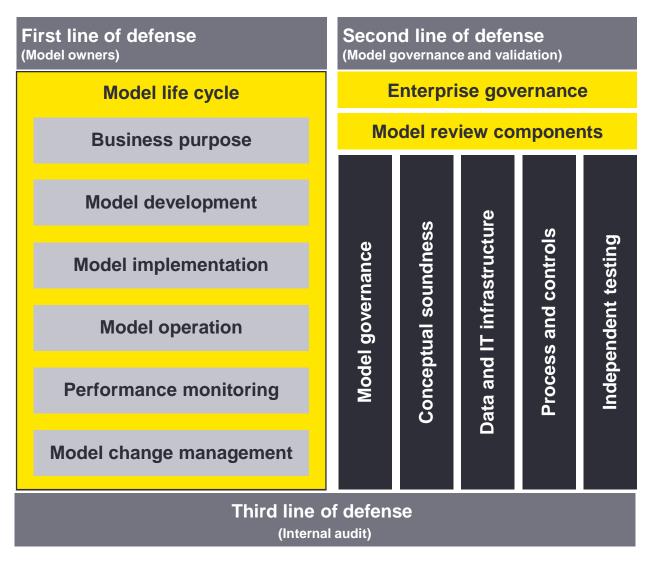
- ► Identifying options for areas in which to expand the use of models
- Models can be readily applied to new or recently acquired business

### MRM should be proportional with:

- ► The size, complexity, level of sophistication and nature of activities of the institution
- ► The scope and materiality of a specific model







# Roles and responsibilities

- First line owns model life cycle and related activities
- Second line establishes model risk management framework and standards, provides reviews and challenges and can perform independent model testing
- ► Third line performs independent testing and verification of first and second line activities



Responsibilities – first line of defense (model owners)

**Objective:** Manage the model risk of the organization by ensuring that models are developed, used and maintained consistent with enterprise policies. Focus on thoughtful and transparent model development, well-controlled and -tested model implementation, rigorous change management procedures and ongoing performance monitoring.

**Transparency** 

#### **Business purpose and model development**

- Clear purpose for the model
- Well documented rationale for key modeling decisions, including alternatives considered
- Use of developmental evidence and supporting analysis for key decisions

#### Model operation and performance monitoring

- Operates model in a manner consistent with intended use
- Regular reviews of model performance to confirm fit for purpose
- Monitoring includes confirmation of key assumptions and modeling choices

#### **Model implementation**

- Clearly defined and comprehensive testing of calculations prior to use in production environment
- Appropriate reviews and sign-offs by senior management

#### Model change management

- ► Formal controls over changes to models, including adequate testing to maintain validation integrity
- ► Formal governance process prior to change implementation
- Robust assumption management and review process



Responsibilities – second line of defense (model governance and validation)

**Objective:** Manage the model risk of the organization by establishing and implementing a model risk management policy. Key roles include maintaining and monitoring model inventory, performing independent model validation and providing effecting challenge throughout the model development process.

Effective challenge

#### **Enterprise governance**

- Establish model risk management policy and governance body
- ▶ Define models and maintain model inventory
- Determine prioritization approach and define requirements for model life cycle

#### **Model validation**

- ► Perform regular validation on models, depending on prioritization
- Procedures for second line usually focus on challenging judgment in model development process
- Detailed testing of calculations may be included

#### Set standards

- Determine documentation standards and templates to assist first line of defense implementation
- Determine standards for model validators, including expectations around specific tests and approaches

#### Understand model risk

- Develop a view of the key risk to the organization from models
- Determine potential impact for highest risk models and determine mitigation approaches



Responsibilities – third line of defense (internal audit)

**Objective:** To ensure that the first and second lines of defense are complying with the MRM policies within the organization.

Confirmation

#### First line review components

- Confirm model documentation requirements are being followed throughout model development life cycle – including development, implementation and performance monitoring
- Ensure all models included in reviewed processes are on model inventory
- Confirm testing performed during model development conforms with policy

#### **Second line review components**

- Review model validation reports and confirm compliance with policy and presence of effective challenge
- Confirm model governance committee charters, agendas and meeting minutes are compliant with firm expectations
- Confirm the execution of the model risk policy and validation schedules/calendar



# Model risk management framework Implementation

Key steps	First line	Second line	Third line
Establish MRM policy and governance structure  ▶ Defines what models and model risk are  ▶ Clearly defines roles and responsibilities of all three lines of defense  ▶ Creates a framework for model validation, including documentation standards and appropriate validation activities		•	$\bigcirc$
Create model inventory  ► Identifies models across the enterprise based on model definition  ► Captures critical model information, such as intended and actual use	•		
Perform model risk assessment  ► Assesses models, recognizing the different levels of inherent risk  ► Prioritizes models for validation			
Model documentation and testing  ► Typically requires significant investment, as documentation and testing procedures may not exist or be consistent with documentation standards			
Validate models  ► Incorporates end-to-end view of process (inputs, processing, outputs) and controls across key validation components (e.g., conceptual soundness)  ► Evidence of effective challenge is critical	•		
Prioritize and remediate findings  ▶ Process should be consistent with model change management framework			
Implement ongoing MRM procedures  ► Applies to models in all parts of life cycle (i.e., includes new and existing models)  ► Upkeep may be less onerous than initial effort, but still requires diligence			



Primary responsibility

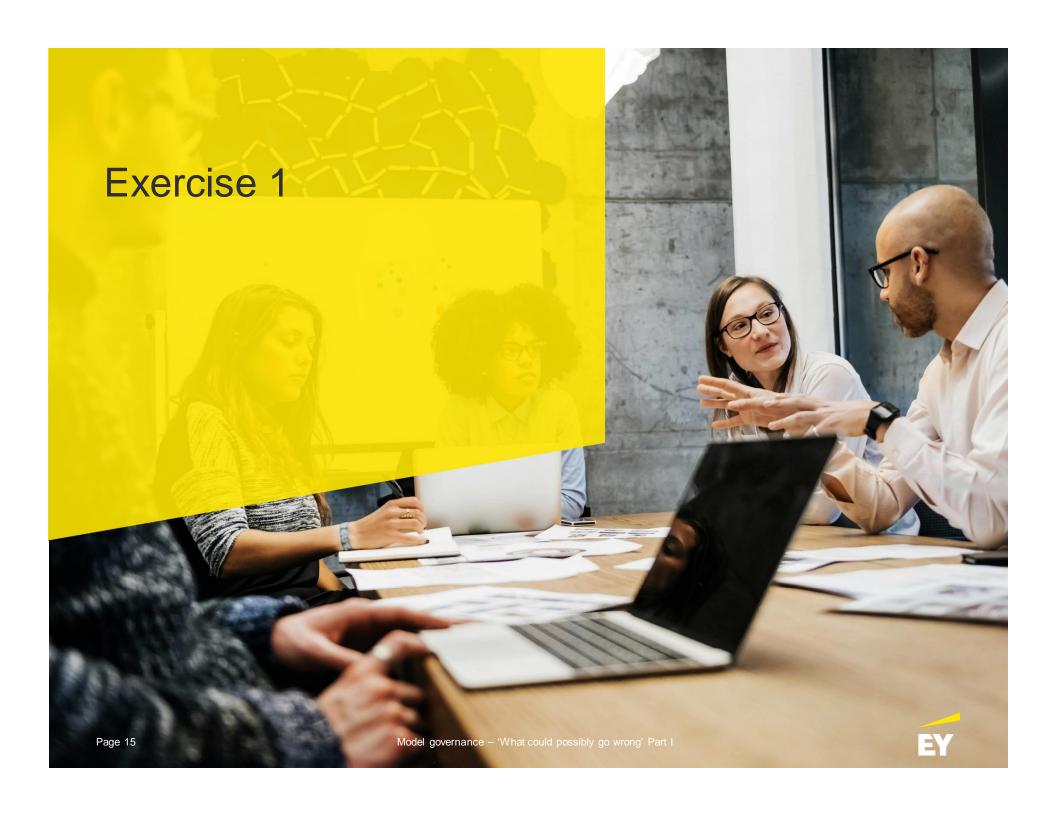


Secondary/potential responsibility



Review compliance





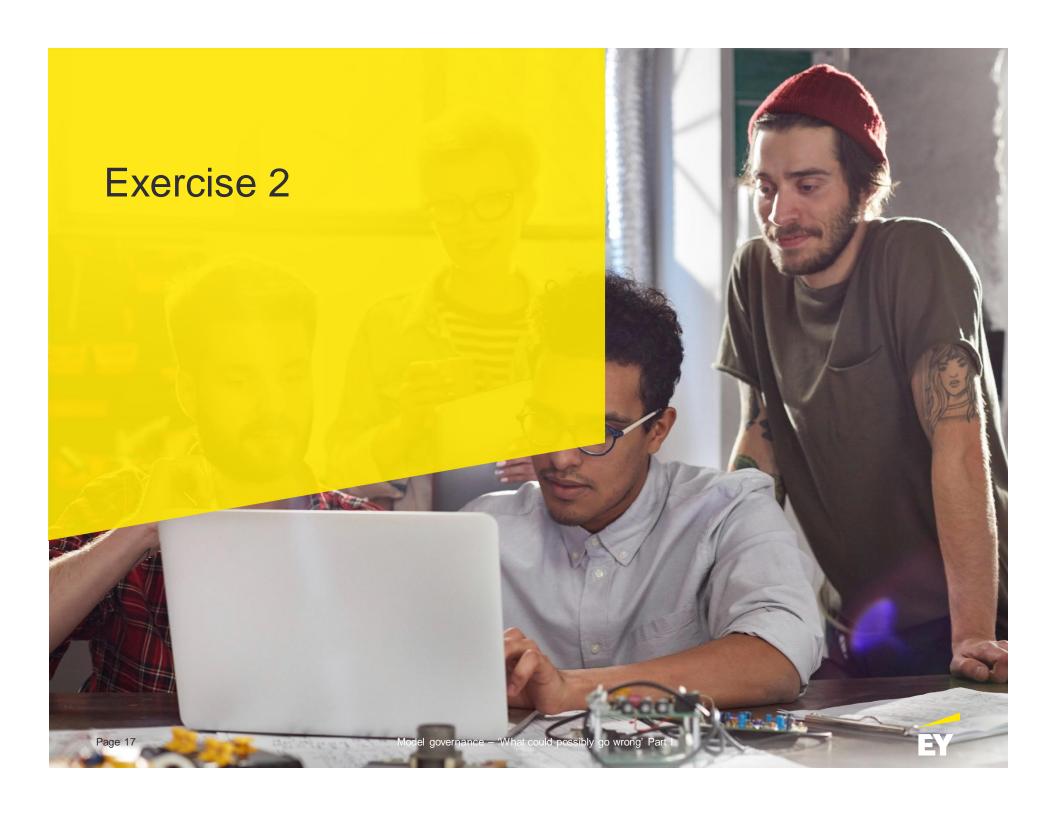
# Exercise 1

Fleetville Insurance case study

## **Instructions**

- All teams are to review the Fleetville Insurance case study exhibits (10 minutes)
- Discuss the case study within each team (5 minutes) and answer the following questions:
  - What difficulties is Fleetville encountering from an MRM perspective?
  - What mistakes do you feel have been made by Fleetville?
- Each team will designate a spokesperson to present their responses





# Exercise 2

Fleetville Insurance case study

## Instructions

- All teams are to prepare a MRM remediation plan outline for Fleetville (15 minutes), addressing the following questions:
  - What components of model risk management have been missing from Fleetville?
  - Do the organizational structure and roles and responsibilities need to be changed?
  - What actions need to be taken to enhance the models?
  - How should the remediation plan be sequenced? How long will it take?
- Each team should be prepared to discuss their remediation plan with entire group (10 minutes)



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