Model Risk Management: Understanding the Bank of England's Supervisory Statement

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Did you know?

ICAEW's Continuing Professional Development (CPD) Regulations have changed. Members are now required to do a minimum number of CPD hours per year.

This webinar could contribute to up to 1 hour of verifiable CPD, so long as you can demonstrate that the content is relevant to your role.

Today's presenters

Adrian Maconick
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Agenda

- Introductions and Welcome

- Model Risk Background

- Overview of SS1/23
  - What is a model ?
  - 5 Principles

- Implementation challenges

- ICAEW Modelling code & Twenty Principles

- Q&A

Basic Facts

- Objective : Set of principles defining how to manage model risk

- Scope : UK Banks, Building societies and PRA designated investment firms

- Published: May 2023

- Effective Date: 17 May 2024

SS1/23 What is a model?

- Quantitative methods vs Models

"A wide variety of quantitative calculation methods, systems, approaches, end-user computing (EUCs) applications and calculators (hereinafter collectively 'quantitative methods') are often used in firms' daily operations."

Models are a subset of quantitative methods.

".... a model is defined as a quantitative method that applies statistical, economic, financial, or mathematical theories, techniques, and assumptions to process input data into output. Input data can be quantitative and/or qualitative in nature or expert judgement-based and the output can be quantitative or qualitative."

However deterministic quantitative models (DQMs) may be in scope

60%-70% of models are spreadsheet or EUC based. The remainder are implemented in formal systems such as trading systems.

SS1/23 Context

- Models are often considered to be a source of competitive advantage.
- Model failure can be catastrophic

- 2008 Financial crisis was largely model failure

- Finance is a global industry:
  - Banks need to comply with all model related regulation e.g. SR11-7
  - Lots of scope for economies of scale
  - SS1/23 consistency with SR11-7

SS1/23 What is a model? - Examples

Area	Examples
Financial mathematics	Black & Scholes Valuations Regulatory capital calcs Example MR failures • London Whale • Insurance co interest calculation
Behavioural finance	Modelling redemptions e.g. Call centre contact predicts mortgage defaults
Calculators / Quantitative methods/ Deterministic .	Bookkeeping Transaction recording.

Comparison with SR11-7

- USA OCC guidance.

- SS1/23 is similar

- Consistency challenge for global banks

SS1/23 Overview

- Definition of a model and quantitative methods
- Five principles :
  - Principle 1 – Model identification and model risk classification
  - Principle 2 - Governance
  - Principle 3 - Model Development Implementation and use
  - Principle 4 – Independent model validation
  - Principle 5 – Model Risk Mitigants.

- Is it really 23 principles ??
- We will review main challenges facing banks.

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Principle 1 – Model identification and model risk classification

- Principle 1.1 – Model definition

"A model is a quantitative method, system, or approach that applies statistical, economic, financial, or mathematical theories, techniques, and assumptions to process input data into output. The definition of a model includes input data that are quantitative and / or qualitative in nature or expert judgement-based, and output that are quantitative or qualitative"

But see Deterministic Quantitative Methods (DQMs)

- Principle 1.2 – Model Inventory
  - IT supported apps ??
  - Shadow IT Spreadsheets and EUC

- Principle 1.3 Model Tiering – Risk Based

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Model Inventory Challenges

- Huge diversity of technologies
- Finding models
  - Bottom up – scanning
    - how do you know something is a model
  - Top down - departmental surveys
  - Handling duplicates
- Model Tiering – requires a very detailed understanding of the model
- Firm wide / global inventory

Principle 2 - Governance

- Board level involvement
- Principle 2.1 Board of directors' responsibilities
- Principle 2.2 SMF accountability **
- Principle 2.3 Policies and procedures **
- Principle 2.4 Roles and responsibilities
- Principle 2.5 Internal audit
- Principle 2.6 Use of externally developed models **

Principle 3 - Model Development Implementation and use

Robust model development process

- Principle 3.1 Model purpose and design
- Principle 3.2 Use of data **
- Principle 3.3 Model development testing
- Principle 3.4 Model adjustments and expert judgement **
- Principle 3.5 Documentation
- Principle 3.6 Supporting systems

Huge amount of work required.

Principle 4 – Independent model validation

- Principle 4.1 Independent validation function
- Principle 4.2 Independent review
- Principle 4.3 Process verification
- Principle 4.4 Model performance monitoring
- Principle 4.5 Periodic revalidation

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Principle 5 – Model Risk Mitigants

- Principle 5.1 Post model adjustments
- Principle 5.2 Restrictions on model use
- Principle 5.3 Exceptions and escalations

"All models are wrong, some are useful."   George Box

SS1/23 and linkage to the Financial Modelling Code and Twenty principles
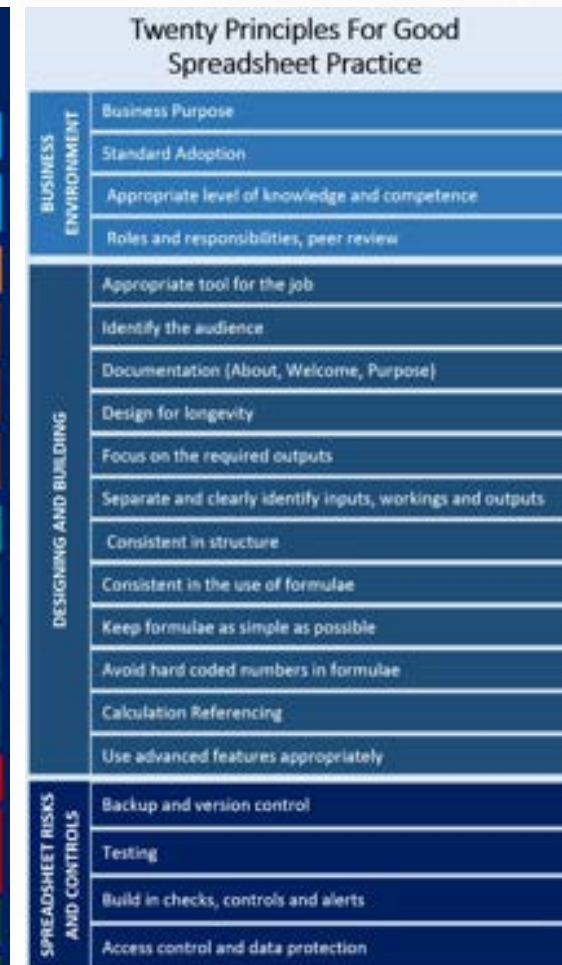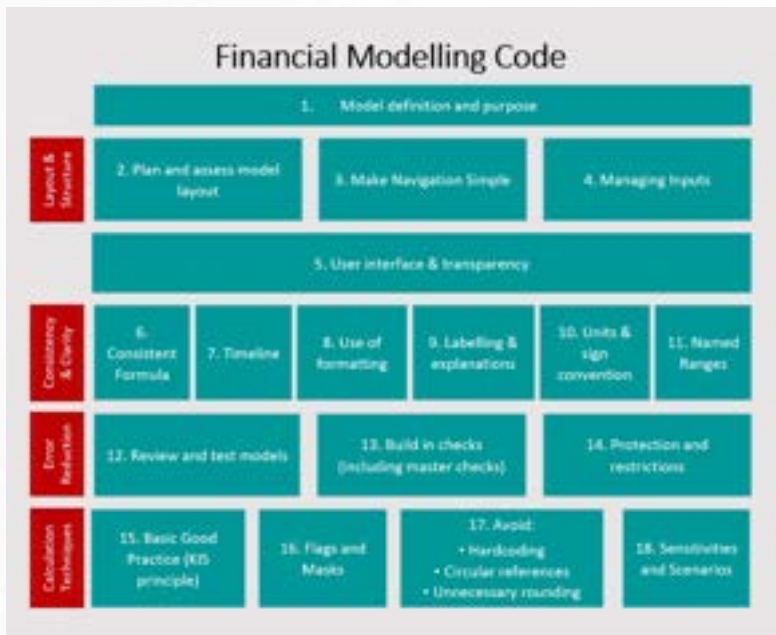
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1. Principle 1 – Model identification and model risk classification

| Principle 1.1 Model definition | Principle 1.2 Model inventory | Principle 1.3 Model tiering |

Financial Modelling Code

1. Model definition and purpose

Twenty Principles For Good Spreadsheet Practice

Business Purpose

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3.	Principle 3 – Model development, implementation, and use	
Principle 3.1 Model purpose and design		Principle 3.4 Model adjustments and expert judgement
Principle 3.2 The use of data		Principle 3.5 Model development documentation
Principle 3.3 Model development testing		Principle 3.6 Supporting systems

Financial Modelling Code

Layout & Structure	2. Plan and assess model layout	3. Make Navigation Simple	4. Managing Inputs		
	5. User interface & transparency				
Consistency & Clarity	6. Consistent Formula	7. Timeline	8. Use of formatting	9. Labelling & explanations	10. Units & sign convention	11. Named Ranges
Calculation Techniques	15. Basic Good Practice (KIS principle)	16. Flags and Masks	17. Avoid: • Hardcoding • Circular references • Unnecessary rounding		18. Sensitivities and Scenarios

Twenty Principles For Good Spreadsheet Practice

DESIGNING AND BUILDING

- Appropriate tool for the job
- Identify the audience
- Documentation (About, Welcome, Purpose)
- Design for longevity
- Focus on the required outputs
- Separate and clearly identify inputs, workings and outputs
- Consistent in structure
- Consistent in the use of formulae
- Keep formulae as simple as possible
- Avoid hard coded numbers in formulae
- Calculation Referencing
- Use advanced features appropriately

SS1/23 and linkage to the Financial Modelling Code and Twenty principles

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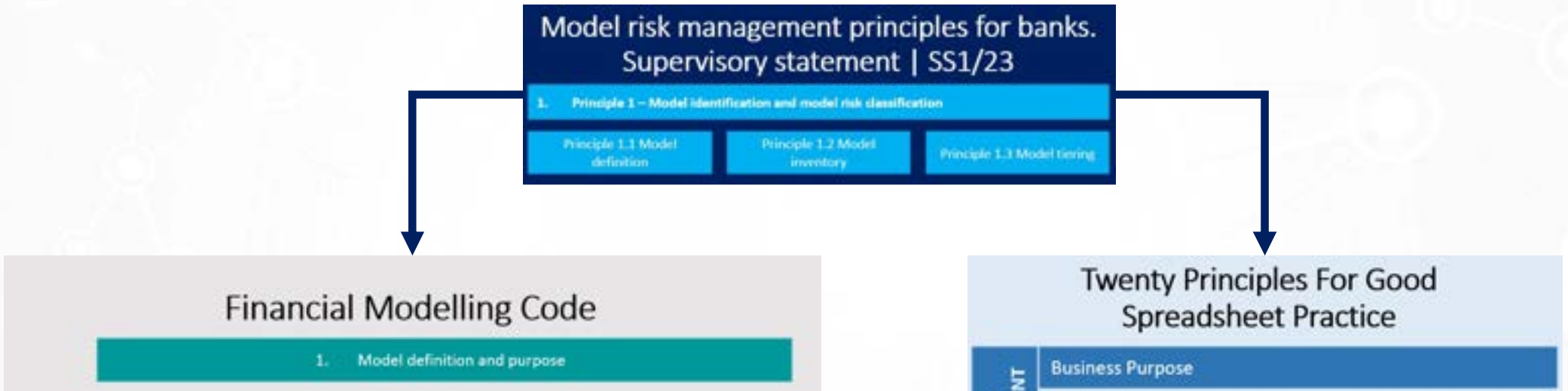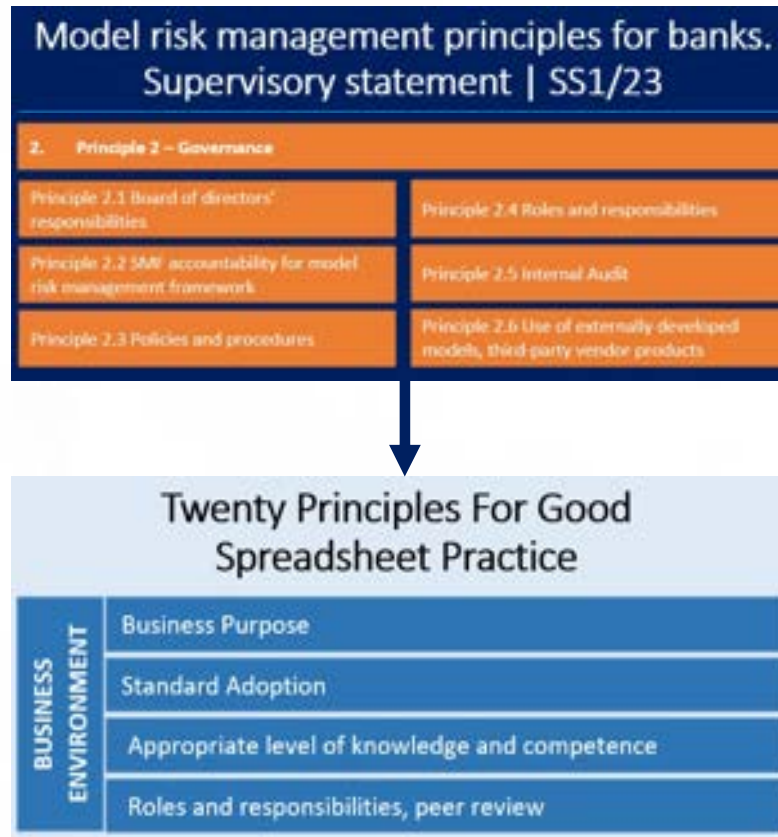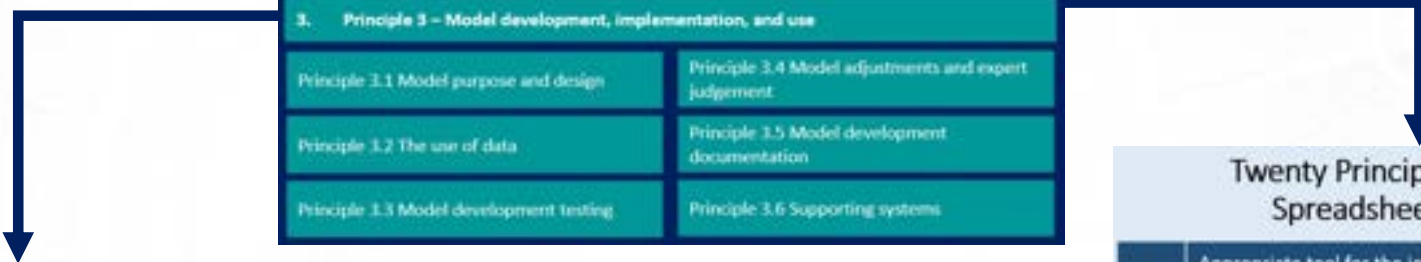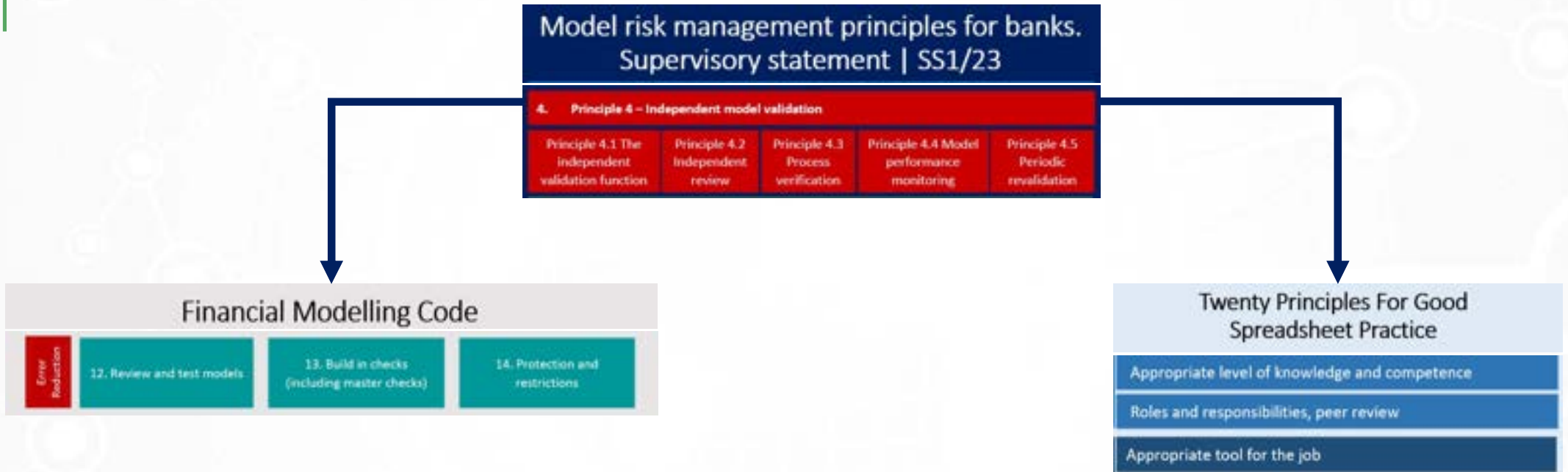| 4.	Principle 4 – Independent model validation			
Principle 4.1 The independent validation function	Principle 4.2 Independent review	Principle 4.3 Process verification	Principle 4.4 Model performance monitoring	Principle 4.5 Periodic revalidation

Financial Modelling Code

Error Reduction	12. Review and test models	13. Build in checks (including master checks)	14. Protection and restrictions

Twenty Principles For Good Spreadsheet Practice

Appropriate level of knowledge and competence

Roles and responsibilities, peer review

Appropriate tool for the job

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Q&A

Coming up

Excel Community

- 02 May: What's new in Excel, PowerPoint, Teams & Microsoft 365 from the last year (2023-24)

Financial Services Faculty

- 30 April: Introduction to PCAF – how to account for GHG emissions related to financial activities

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