# Supervisory Stress Test Modeling: Principles and Policies

1

**BEVERLY HIRTLE**
**FEDERAL RESERVE BANK OF NEW YORK**

**2015 STRESS TESTING MODELS SYMPOSIUM**
**JUNE 25, 2015**

# Disclaimer

2

The views in this presentation are those of the speaker and do not necessarily represent the views of the Federal Reserve Bank of New York or of the Federal Reserve System.

# Overview

- Model development governance

- My interpretation of the principles guiding design and implementation of the Federal Reserve's supervisory stress tests for CCAR and DFAST.

- Policies for supervisory model developers.

- Implications for the future.

# Governance

4

# Supervisory Model Development Governance

- <u>Model Oversight Group</u> (MOG):  oversees the development and implementation of supervisory stress test models and stress testing framework, and production of results
  - Supervisory Modeling Teams report to the MOG
  - MOG assisted by Model Coordination and Advisory Team (MCAT)
  - Not responsible for scenario design
- <u>Model Validation Unit</u> (MVU):  independent body responsible for validation of supervisory stress test models and controls
- MOG and MVU report to Director of Division of Supervision and Regulation at the Board of Governors

# Principles

# Principles: Broad Goals

- Set of principles that guide model selection and implementation, as well as design of the overall stress testing framework.

- The principles guide the nature of the supervisory stress test results – what characteristics we want the results to have.

- Broad goal: Supervisory stress test results should reflect likely outcomes under the supervisory scenarios.

***Supervisory stress test results should be:***

- ## Consistent and comparable:
  - Across institutions and models

- ## Robust and stable:
  - Changes in model projections over time should be driven by changes in fundamentals, not transitory variation in model performance or inputs

- ## Independent:
  - Eliminate reliance on firm-provided estimates, as much as possible and increasingly over time

# Principles – Part 2

***Supervisory stress test results should be:***

- Stress-focused:
  - Emphasis on projecting likely outcomes in stressed economic environments

- Simpler and more transparent:
  - Among a range of modeling choices, select the simpler and more transparent alternative

- (Reasonably) conservative:
  - When there is uncertainty or significant model risk, err on the side of picking conservative (but reasonable) results

- Forward-looking:
  - Do limit reliance on extrapolating past trends
  - Don't limit ourselves to events or outcomes that have occurred historically

# Policies

10

# Principles and Policies

- Over time, MOG has established a set of policies guiding model development.

- These policies are "actionable" implementation of the principles.

- "Dos" and "Don'ts" for the modeling teams.

- Principles are evergreen; policies are long-lasting, but could evolve over time.

- Most of these policies have been discussed in the DFAST and CCAR disclosures and instructions.

# Model Development Policies – Part 1

- **Industry-level models**
  - Models are calibrated using pooled data from many institutions
  - No firm-specific parameters
  - Differences across firms should be driven by differences in input data, not differences in model structure or parameters

- **Limited use of "fixed effects" (firm-specific dummy variables)**
  - Only in cases where granular input data are limited or unavailable and cross-firm differences are persistent and empirically important
  - Do not want to assume that the future will be like the past, especially under stress

# Model Development Policies – Part 2

- ## Limited use of vintage or time dummy variables

  - Vintage dummies control for (un-modeled) differences in performance over time of loans/positions originated in a given time period
  - Time dummies control for (un-modeled) differences in outcomes in a specific time period, for all loans/positions
  - Same thoughts as firm-specific fixed effects: not wanting to assume that the future will be like the past, especially under stress
  - In some models, use in estimation but "turn off" in projections

- ## No firm-specific adjustments or add-ons

  - Results are determined solely by industry-level models and firm-specific input data

# Model Development Policies – Part 3

(14)

- **Comparable data for all firms**
  - No use of data from some firms unless comparable data are collected from all firms with similar material exposures

  - Rely primarily on data collected on Y-14, Y-9C or other standardized regulatory reports

- **Missing or insufficient data**
  - When a BHC cannot provide data as required or if review determines that submitted data are not reliable (after attempts to correct):
    - Substitute conservative values for missing data items, OR
    - Apply conservative loss rate based on projections for other firms with reliable data

  - Similar treatment for immaterial portfolios, when data are not provided (conservative loss rate)

  - Premised on the idea that we do not know the true risk/performance characteristics of the underlying portfolio, so we need to make (reasonable) conservative assumptions

# Implications for the Future

15

# Evolution of Supervisory Modeling

- Move away from remaining "top down" models to models using more granular "bottom up" data
  - As longer history collected (e.g., on Y-14 reports)
  - As modeling technology evolves
  - Recent example: Interest income on subordinated debt (part of PPNR)

- Continued move away from use of firm-supplied estimates and assumptions, wherever possible
  - Again relies on better data and modeling technology
  - May not be possible in all cases
  - Recent example: balance sheet and RWA modeling

# Longer-Term Evolution

- ## Continued work to ensure appropriate sensitivity of models to scenarios, especially to historically unusual co-movements of variables
  - Potential areas of focus: liability/deposit volume modeling, intersection of interest rate-credit risk, fee income and other non-interest income/expenses

- ## Integration of loan balances, originations, defaults, prepayments, interest income projections
  - Use granular (loan-level) data more fully across the spectrum of projections

# The Next Presentations

- ## Anna Kovner (FRB New York): PPNR Modeling Team Leader
  - ○ "PPNR Model Approaches and Development"
  - ○ The evolution of PPNR modeling from "top down" to "bottom up"

- ## Mark Lueck (FRB Chicago): Wholesale Modeling Team Co-Leader
  - ○ "Coming Attractions in the FRS Corporate Model"
  - ○ R&D on enhanced modeling of default probability