BOARD OF GOVERNORS *of the* FEDERAL RESERVE SYSTEM

Stress Testing at the Federal Reserve

October 22, 2019

Public

Background: Stress Testing Overview

- The financial crisis highlighted the importance of forward-looking capital adequacy assessment, rather than a point-in-time assessment.
- First use of stress testing as a supervisory tool began with 2009 Supervisory Capital Assessment Program (SCAP).
- Dodd-Frank Act (DFA) enacted in 2010 requires both supervisory and company-run stress tests.

Background: Stress Testing Overview (Cont'd)

- The Economic Growth, Regulatory Relief, and Consumer Protection Act introduced in 2017 changed the scope of the DFA stress tests.
  - DFA supervisory stress testing applies to financial institutions with assets equal or greater than $100 billion.
  - Company-run stress testing applies to financial institutions with assets equal or greater than $250 billion.

Stress Testing and Capital Planning for Large Financial Institutions (FIs)

- The Comprehensive Capital Analysis and Review (CCAR) includes both a qualitative review of the capital planning process and a quantitative component—post-stress capital analysis.
  - The Federal Reserve can object to a FI's capital plan and capital distributions for qualitative reasons, quantitative reason, or both.

- Currently, firms must hold sufficient capital to pass stress tests in CCAR to avoid restrictions on capital distributions.
  - CCAR stress test assumes firms make baseline planned capital distributions in stress.

- Stress capital buffer (proposed April 2018) would directly integrate stress test into capital rules.
  - These changes are not reflected in the rest of this discussion.

Liquidity Stress Testing

- The Federal Reserve launched the Comprehensive Liquidity Assessment and Review (CLAR) Program in 2012.
  - Applies to LISCC firms and complements LCR and NSFR.
  - An annual horizontal assessment with quantitative and qualitative elements.
- CLAR assesses the adequacy of firms' liquidity positions:
  - Utilizes measures of funding concentrations beyond those captured in LCR.
  - Supervisors also assess the adequacy of firms' internal liquidity stress tests.
  - CLAR does not include a specific quantitative minimum.

Federal Reserve Data Collection for Capital Assessments and Stress Testing

- Applicable to FIs with total assets of $100 billion or more.
- Data are used to support supervisory stress test models, capital assessment and for continuous monitoring.

Report	Frequency	Data Collected
FR Y-14A	Annually or Semi-Annual	Quantitative projections of balance sheet, income, losses, and capital Qualitative information on methodologies used to develop internal projections of capital
FR Y-14Q	Quarterly	Granular data on FIs' various asset classes, including loans, securities and trading assets, and pre-provision net revenue (PPNR) for the reporting period
FR Y-14M	Monthly	Retail loan- and portfolio-level data

Supervisory Stress Tests: Key Principles

- **Independence** is necessary (though not sufficient) for credibility.
  - To the maximum extent possible, supervisory stress tests should provide an independent assessment of banks' capital adequacy.
    - The Federal Reserve uses models developed internally and independently.
    - These models rely on portfolio data provided by firms, but generally do not rely on models or estimates provided by firms.

- **Consistency and comparability** of results support cross-firm analysis and provides a valuable insight to supervisors and the market.
  - A standard set of scenarios, assumptions, and models promote comparability.

Supervisory Stress Tests: Key Principles (Cont'd)

- **Robustness and stability** of supervisory models promotes model projections that reflect changes in risk factors, scenarios, and model enhancements.
  - Changes in supervisory projections should not reflect transitory factors.

- The stress tests are designed to be **forward-looking.**
  - Though supervisory models are estimated with historical data, projections seek to limit reliance on past outcomes and avoid a simple extrapolation of past trends.

Supervisory Stress Tests: Key Principles (Cont'd)

- **Conservatism** reflects the use of assumptions or approaches that result in larger losses or revenue.
  - Uncertainty is inherent in supervisory modeling. Conservative approaches are used when there is not enough information to make a reasonable estimate for a portfolio or firm.

- **Focus on the ability to evaluate the impact of severe economic stress** results in the evaluation and selection of supervisory models based on their abilities to project outcomes in stressed economic environments.

Stress Scenario Design

- The Federal Reserve Board is required to conduct stress tests under three scenarios: baseline, adverse and severely adverse.
  - Company-run stress tests use the same macroeconomic scenarios.
- Approach for developing the macroeconomic scenarios
  - The **baseline scenario** reflects the most recently available consensus views of the macroeconomic outlook.
  - The **severely adverse scenario** reflects the conditions of post-war U.S. recessions with the unemployment rate as the primary basis for this scenario.
  - The **adverse scenario** is constructed by incorporating specific risks or by using a probabilistic approach.
    - Permits flexibility so that results provide most value to supervisors, given current economic conditions.

Stress Scenario Design (Cont'd)

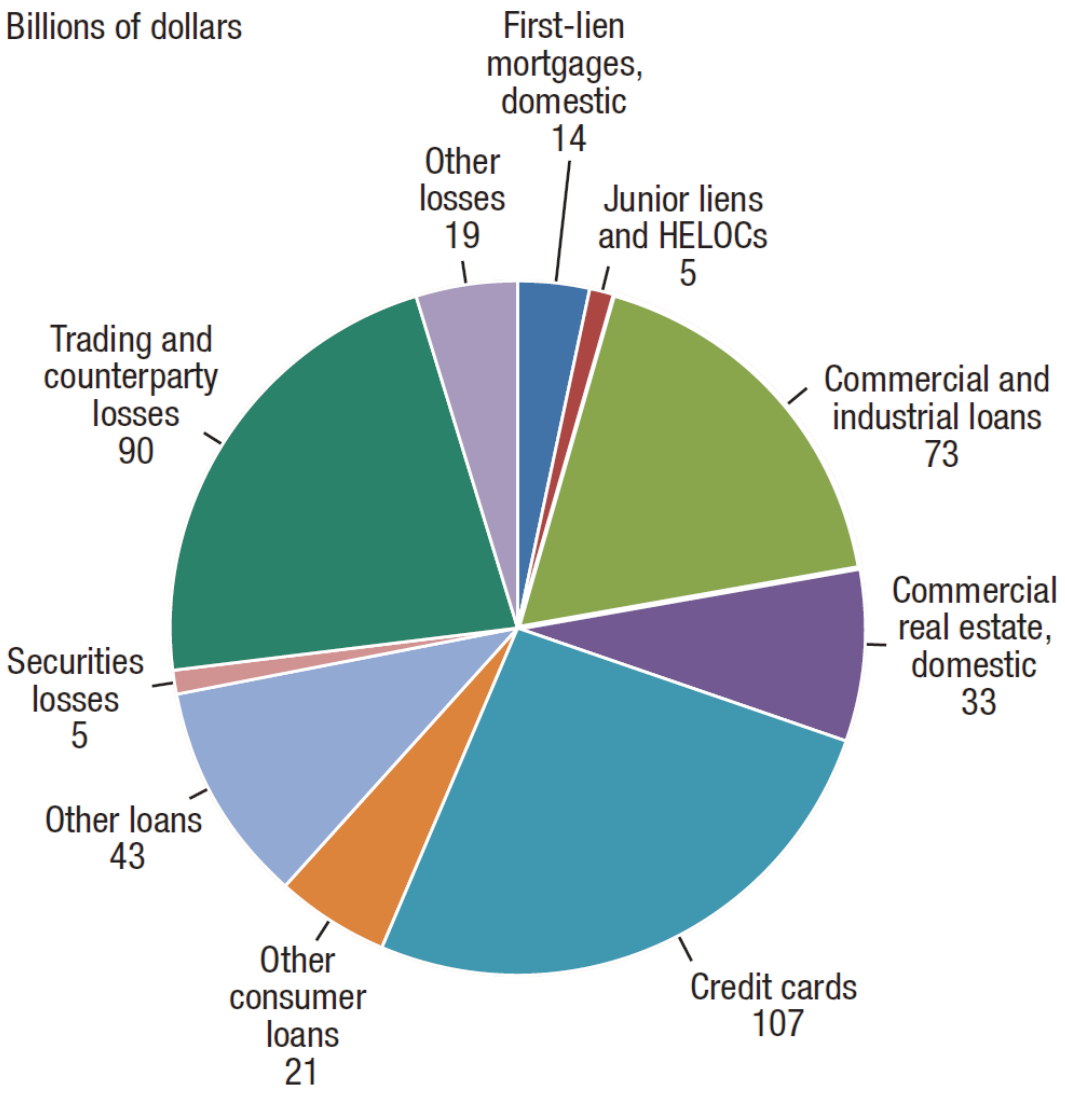
- The Federal Reserve has published a policy statement on the scenario design framework for stress testing, including quantitative guides for formulating the path of key variables in the scenarios.

- Flexibility of the macroeconomic scenarios ensures relevance.
  - Flexibility to modify and add scenarios and models allow the Federal Reserve to consider relevant risks each year and incorporate dynamic changes –in the economy, in bank portfolios, and the relationship between the two.

Stress Scenario Design (Cont'd)

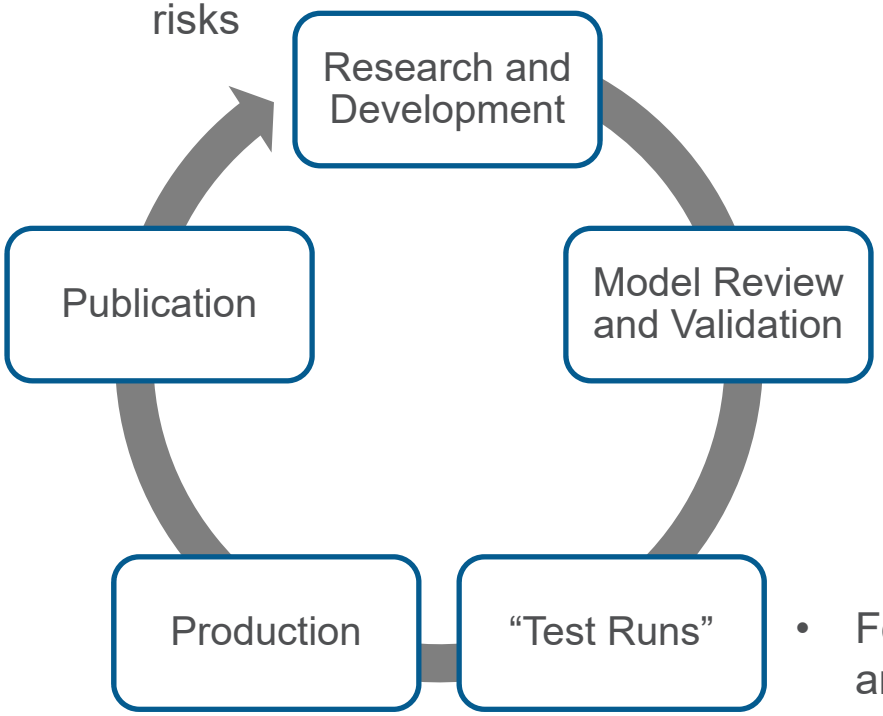
- Approach for developing the market shock components.
  - Market shock component is not included in the baseline.
  - To enhance consistency and comparability, the Board provided thousands of specific risk factor shocks.
  - The challenge of this level of comprehensiveness is in creating shocks that are coherent and internally consistent.
  - Based on a combination of historical episodes and hypothetical events

Aggregate DFAST 2019 Projected Losses
Severely Adverse Scenario



Cycle

- Develop and enhance models
- Conduct performance testing
- Explore new data sources and emerging risks



- Discuss stress test results with Governors and other internal stakeholders.
- Publish results and overview of methodology.

- Independent review of conceptual soundness and controls
- Must address key weaknesses before using model for production

- Implement approved models to produce supervisory estimates.
- Extensive vetting of outcomes for reasonableness, using multiple benchmarks

- Formal testing of all models and processes to identify weaknesses
- Conduct extensive vetting of assumptions, approaches, and outcomes.

Governance of the Supervisory Stress Test

- The process follows supervisory expectations for banks' model risk management (SR 11-7).

- Oversight is by a small group of senior staff from across the Federal Reserve System, the Model Oversight Group (MOG), which
  - directs model development and implementation; and
  - evaluates the reasonableness of assumptions and results and engages in extensive vetting of results with supervisory modeling teams, using a variety of benchmarks.

- A separate group conducts an independent review and validation of model soundness and controls, which
  - ensures, together with the MOG, that identified weaknesses are remedied prior to using the model; and
  - promotes internal transparency of model status and results.

New Methodology Disclosure

- Supervisory Stress Test Methodology disclosure published for the first time in March 2019.

- Disclosure includes:
  - Enhanced model descriptions, including key variables and important equations.
  - For two portfolios (corporate loan and credit cards):
    - Modeled loss rates by risk characteristics.
    - Portfolios of hypothetical loans and associated loss rates.
    - Summary statistics associated with the loans.

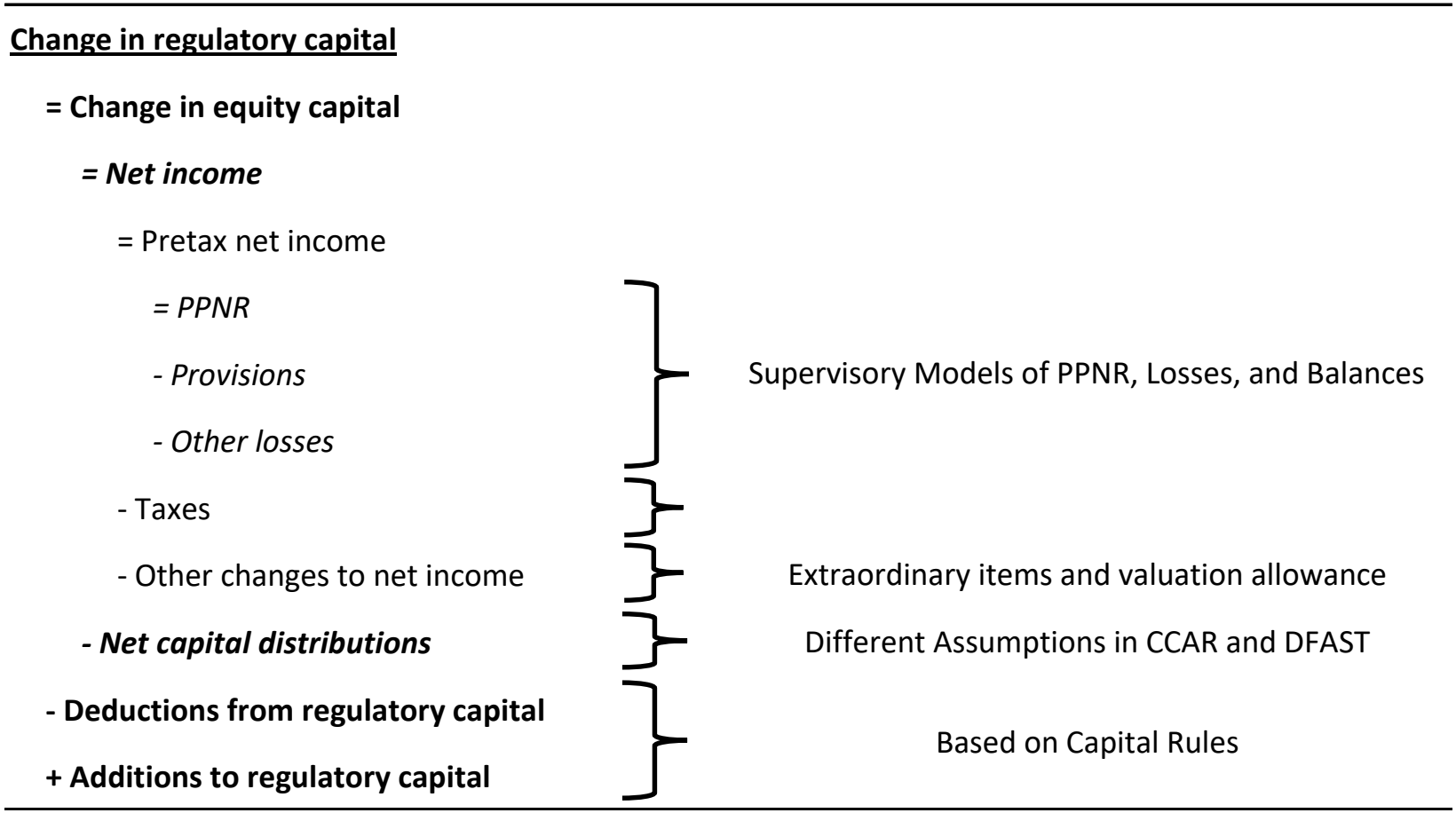
- Board intends to add modeled loss rate disclosures for additional portfolios at a rate of two per year.

Resources

- http://www.federalreserve.gov/bankinforeg/stress-tests-capital-planning.htm
- Supervisory and Company-Run Stress Test Requirements for Covered Companies, October 2012.
- Comprehensive Capital Analysis and Review 2019: Summary Instructions for LISCC and Large and Complex Firms, February 2019.
- 2019 Supervisory Scenarios for Annual Stress Tests Required under the Dodd-Frank Stress Testing Rules and the Capital Plan Rule, February 2019.
- Amendments to Policy Statement on the Scenario Design Framework for Stress Testing, Feb. 2019.
- Amendments to the Stress Testing Policy Statement, Feb. 2019
- Enhanced Disclosure of the Models Used in the Federal Reserve's Supervisory Stress Test, Feb. 2019
- Dodd-Frank Act Stress Test 2019: Supervisory Stress Test Methodology, March 2019.
- Dodd-Frank Act Stress Test 2019: Supervisory Stress Test Results, June 2019.
- Comprehensive Capital Analysis and Review 2019: Assessment Framework and Results, June 2019.
- Stress Testing: A Discussion and Review, July 9, 2019: https://www.federalreserve.gov/conferences/stress-testing-a-discussion-and-review.htm
- Database of public results: https://spweb.frb.gov/sites/StressTesting/DFAST/teams/CPU/STARRdocs/

Appendix: Stress Testing Large FIs: CCAR and DFA

	CCAR Post Stress Capital Analysis		DFA Stress Test	
Who conducts?	Federal Reserve	Company	Federal Reserve	Company
Which scenario should be used?	FR Baseline FR Adverse FR Severely adverse	FR Baseline FR Adverse FR Severely adverse Company Baseline Company Stress	Annual • FR Baseline • FR Adverse • FR Severely adverse No mid-cycle	Annual • FR Baseline • FR Adverse • FR Severely adverse Mid-cycle • Company Baseline • Company Stress
What capital actions are applied under each scenario?	Capital actions proposed under the company Baseline scenario are applied in all scenarios	Proposed capital actions under the company Baseline scenario are applied in all scenarios, except for the company Stress scenario, in which the company Stress capital actions are applied.	DFA capital actions for all scenarios. These capital actions are based on historical dividends, contracted payments, and generally no repurchases or issuances.	DFA capital actions for all scenarios. These capital actions are based on historical dividends, contracted payments, and generally no repurchases or issuances.
Minimum ratios	All applicable regulatory ratios must be maintained*	All applicable regulatory ratios must be maintained*	No minimum ratios	No minimum ratios

* Supplementary leverage ratio was incorporated in CCAR 2017.

Appendix: Calculating Post-stress Capital