Capital Stress Testing

Process Overview and
Supervisory Expectations

Session Objectives

1. Core elements of a sound capital planning framework
2. The “seven principles” approach to evaluating a bank’s capital planning process
3. Key supervisory expectations
4. Major challenges
5. Supervisory Assessment

Objective 1:
Capital Planning Framework

1. **Core elements of a sound capital planning framework**
2. The “seven principles” approach to evaluating a bank’s capital planning process
3. Key supervisory expectations
4. Major challenges
5. Supervisory Assessment

Core Elements of a Capital Plan

- A capital plan is defined as *"a written presentation of a company's capital planning strategies and capital adequacy process that includes certain mandatory elements."* These elements are:
  - Assessment of the expected uses and sources of capital over the planning horizon
  - Description of all planned capital actions over the planning horizon
  - Discussion of any expected changes to the BHC's business plan that are likely to have a material impact on its capital adequacy or liquidity
  - Detailed description of the process for assessing capital adequacy
  - BHC's capital policy

Core Elements of a Capital Plan

- An *assessment of the expected uses and sources of capital over the planning horizon* must contain the following elements:
  - Estimates of projected revenues, losses, reserves, and pro forma capital levels over the planning horizon under expected conditions and a range of stressed scenarios
  - Discussion of how the BHC will maintain all minimum regulatory capital ratios and a pro forma tier 1 common ratio above 5% under expected and stressed conditions
  - Discussion of stress test results and an explanation of how the capital plan takes these results into account
  - Description of all planned capital actions over the planning horizon

Core Elements of a Capital Plan

- The description of *all planned capital actions over the planning horizon* should include any:
  - Issuance of a debt or equity capital instrument
  - Capital distribution
  - Similar action that could impact a BHC's consolidated capital
- A capital distribution is defined as:
  - A redemption or repurchase of any debt or equity capital instrument
  - A payment of common or preferred stock dividends
  - A payment that may be temporarily or permanently suspended by the issuer on any regulatory capital instrument
  - Any similar transaction that is in substance a distribution of capital

Core Elements of a Capital Plan

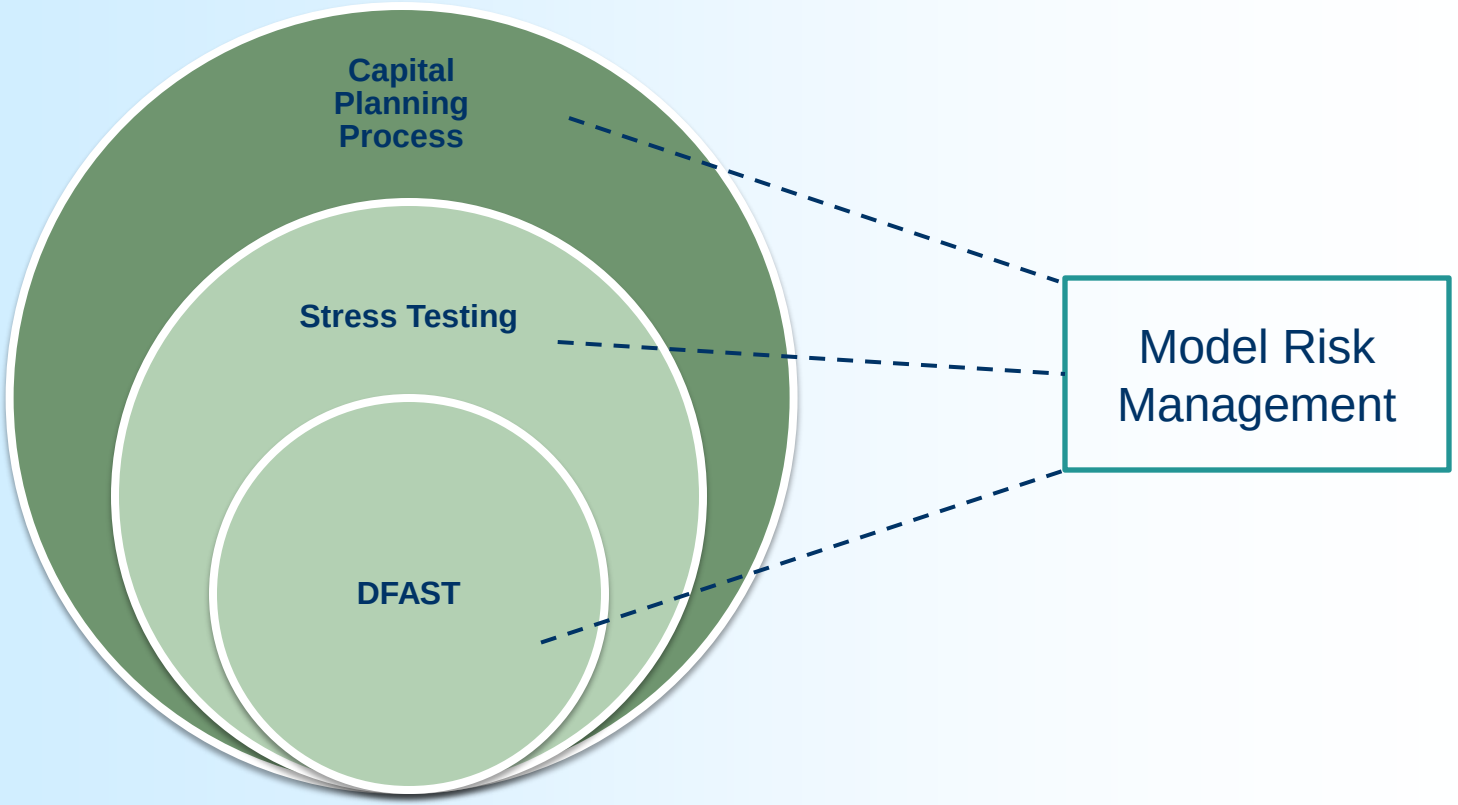
- A discussion of *any expected changes to the BHC's business plan that are likely to have a material impact on its capital adequacy and liquidity* could include:
  - a proposed merger or divestiture
  - changes in key business strategies
  - significant investments
- For material business changes, BHCs should consider both:
  - Impacts of expected changes, assuming they are realized
  - Potential adverse consequences if the planned changes are not realized
    - For example, if a merger plan falls through or a change in business strategy is not achieved

Core Elements of a Capital Plan

- A *detailed description of the BHC's process for assessing capital adequacy* should:
  - Reflect a full understanding of the BHC's risks
  - Ensure that the BHC holds sufficient capital against those risks
  - Discuss how the BHC will both:
    - Maintain capital above the minimum regulatory capital ratios under both expected and stress conditions, and
    - Serve as a source of strength to its depository institution subsidiaries
- *Even if current assessments suggest that a BHC's capital level is sufficient to withstand potential economic stress, a robust capital planning process helps ensure that this outcome will continue to hold in the future*

Capital Planning Framework

Capital Planning Process Overview



Capital Planning Framework: Stress Testing

- Stress testing is a forward-looking assessment of the potential impact of various adverse events and circumstances on a BHC
  - Conditions loss, revenue, and expense estimates on hypothetical stress scenarios
  - Assists BHCs identify and measure their material risks and vulnerabilities
  - Informs the board and senior management of the potential impact to capital levels
- Stress testing approaches should:
  - Be commensurate with BHC's size, complexity, business activities, risk profile
  - Evolve as industry research and innovation leads to new techniques and enhancements to existing approaches
- All BHCs should have the capacity to understand fully their risks and the potential impact of stressful events on their financial condition

Capital Planning Framework: Stress Testing

- Stress Testing Approaches and Applications
  - ***Scenario Analysis*** – assessing the impact of historical or hypothetical scenarios, including extreme ones
  - ***Sensitivity Analysis*** – assessing a BHC's exposures, activities, and risks when certain variables, parameters, and inputs are stressed or shocked
  - ***Enterprise-Wide Stress Testing*** – assessing the impact of specified scenarios on the BHC as a whole, particularly with regard to capital and liquidity
  - ***Reverse Stress Testing*** – assuming a known adverse outcome and then deducing the types of events that could lead to such an outcome

Objective 2 and 3: Seven Principles Approach

1. Core elements of a sound capital planning framework
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Seven Principles Approach

- Principle 1: Foundational Risk Management
- Principle 2: Loss Estimation Methodologies
- Principle 3: Resource Estimation Methodologies
- Principle 4: Impact on Capital Adequacy
- Principle 5: Capital Plan and Capital Policy
- Principle 6: Internal Controls
- Principle 7: Governance

Principle 1: Risk Management

The BHC has a sound risk-measurement and risk-management infrastructure that supports the identification, measurement, assessment, and control of all material risks arising form its exposures and business activities.

- BHCs should have a consistent, dynamic process to identify material risks
  - Should be systematic and repeatable and include a broad range of stakeholders
- Materiality thresholds should be established at multiple levels of BHC
- Immaterial risks should be aggregated to measure the combined impact
- Material risks should include:
  - Easily quantifiable risks (e.g., credit and market risks), and
  - Risks that are more difficult to quantify (e.g., reputational, legal, strategic)
- Risk identification systems should be sufficiently robust for effective measurement, monitoring, aggregation, and reporting

Principle 2: Loss Estimation

The BHC has effective processes for translating risk measures into estimates of potential losses over a range of stressful scenarios and environments and for aggregating those estimated losses across the BHC.

- BHCs should develop loss estimation methodologies for all material risk exposures
  - Estimates of losses should be supported by empirical evidence
  - Methodologies should generate credible estimates of loss that are consistent with assumed scenario conditions
- BHCs should refine loss estimation methodologies over time
- BHCs should develop consistent and repeatable processes to aggregate loss estimates on an enterprise-wide basis
- The BHC should recognize that loss projections are estimates and understand their uncertainties and sensitivities

Principle 2: Loss Estimation

The BHC has effective processes for translating risk measures into estimates of potential losses over a range of stressful scenarios and environments and for aggregating those estimated losses across the BHC.

- **Quantitative vs. Qualitative:** BHCs should have quantitative methods (models) to estimate losses where possible
  - However, qualitative approaches or management overlays may be appropriate in some circumstances
- **Use of External Data:** External data should reasonably approximate underlying risk characteristics of the BHC's own exposures
- **Granularity:** Portfolio/risk segmentation for loss estimation should be sufficiently granular to capture exposures that react differently to risk drivers under stressed conditions
- **Conservatism and Credibility:** BHCs should apply conservative assumptions throughout its stress testing process

Example: Qualitative Approach

As noted previously, BHCs are expected to have quantitative methods (models) to estimate losses where possible; however, qualitative approaches or management overlays may be appropriate in some circumstances. Detailed below is an example of a firm who utilizes a qualitative approach to compensate for deficient model output within their Home Equity portfolio:

- The firm's models project Home Equity Line of Credit (HELOC) balances to be in a ***runoff position for eight consecutive quarters*** as elevated interest rates and high unemployment forecasts decrease loan demand
  - HELOC new loan origination will quickly reduce and utilization of lines will start to decline once peak unemployment and home price deterioration occurs during quarter 5 of the forecasted period
  - As forecasted within the firm's models, runoff will accelerate within the portfolio during the 2nd half of the firm's scenario

Example: Qualitative Approach

- The firm's annual BHC Severely Adverse scenario starts with home prices already significantly depressed and unemployment higher than the start of the 2009 downturn
  - This results in a greater proportion of the HELOC portfolio 'underwater' with loan amounts greater than the starting value of the home, thus reducing the population of HELOC customers that are able to refinance
  - ***In addition, the firm's models predict total balance, and do not individually evaluate utilization on existing lines, which tend to increase when the economy deteriorates***
- Because the model moves loan balances based on the absolute change in house price/unemployment, ***the pure modeled results overstate the runoff in the portfolio*** versus what would actually happen

Example: Qualitative Approach

- ***To account for this, the firm's management makes a qualitative adjustment to reduce the run off***
  - As a result, the loan balances from the modeled results increase
  - The impact of these adjustments, on HELOC loan balances, ranges from an increase in balances of $15mm at the start of the forecast period, up to a ***cumulative increase of $270mm by the end of the 9-quarter forecast period***

Principle 3: Resource Estimation

The BHC has a clear definition of available capital resources and an effective process for estimating available capital resources (including projected revenues) over the same range of stressful scenarios used for estimating losses.

- Projections of pre-provision net revenue (PPNR) should be consistent with:
  - Paths of on-and off balance-sheet exposures and risk-weighted assets (RWA)
  - Assumptions used for loss estimation
  - Assumed scenario conditions
- BHCs should consider how their activities and business focus may evolve over time under varying scenario conditions
- BHCs should project all key elements of PPNR at a level of granularity:
  - Consistent with the materiality of revenue and expense components
  - Sufficient to capture differing drivers of revenue and expenses

* PPNR = Net Interest Income + Non Interest Income – Non Interest Expenses

Principle 3: Resource Estimation

The BHC has a clear definition of available capital resources and an effective process for estimating available capital resources (including projected revenues) over the same range of stressful scenarios used for estimating losses.

- Assumptions should be consistent with assumed scenario conditions, particularly assumptions related to business model and strategy:
  - Deposit growth
  - Pricing assumptions
  - Expense reductions
  - Other management actions
- Management should evaluate the reasonableness and timing of projected strategies to ensure they are realistic and achievable for a given scenario
  - Assumptions should be supported by quantitative analysis or empirical evidence
- PPNR, loss, balance sheet, and RWA projections should present a coherent story within each scenario

Principle 4: Impact on Capital

The BHC has processes for bringing together estimates of losses and capital resources to assess the combined impact on capital adequacy in relation to the BHC's stated goals for the level and composition of capital.

- BHCs should have well-established processes for:
  - Aggregating loss, revenue, expense, balance sheet, and RWA estimates
  - Providing multi-layer review and challenge of aggregate results
  - Assessing the post-stress impact to capital
- BHCs that are more effective have established centralized groups that:
  - Source estimates from a range of internal parties involved in scenario analysis
  - Ensure coherence of component estimates and aggregate results
  - Apply and document adjustments resulting from "management challenge"
  - Communicate key assumptions, uncertainties, and process limitations

Principle 5: Capital Plan, Policy

The BHC has a comprehensive capital policy and robust capital planning practices for determining capital goals, level and composition of capital, and capital actions as well as maintaining capital contingency plans.

- A capital policy is a written assessment of the principles and guidelines used for capital planning, capital issuance, and usage and distributions
- A capital policy should describe:
  - Capital goals and targets aligned with a BHC's risk appetite and risk profile
  - Guidelines for dividends and stock repurchases
  - Decision processes for capital goals, capital level and composition, capital actions
  - Roles and responsibilities of key decision makers
  - Methods for designing stress scenarios that reflect a BHC's unique vulnerabilities
  - Capital contingency plans
- Contingency plans should include triggers, associated actions, and escalation procedures to address potential capital shortfalls

Principle 5: Capital Plan, Policy

The BHC has a comprehensive capital policy and robust capital planning practices for determining capital goals, level and composition of capital, and capital actions as well as maintaining capital contingency plans.

- **"Capital goal"** refers to the level of post-stress capital a firm has deemed necessary to remain a going concern over the planning horizon
  - Should reflect expectations of stakeholders (shareholders, rating agencies, counterparties, creditors) and current and future regulatory requirements
- **"Capital target"** refers to the level of capital necessary today to meet regulatory capital requirements and maintain post-stress capital levels consistent with capital goals
  - Capital targets should be set at a level above capital goals to ensure that capital levels remain adequate during periods of stress
  - Capital targets should take into consideration forward-looking elements, the impact of stress events, and the uncertainty inherent in the capital planning process

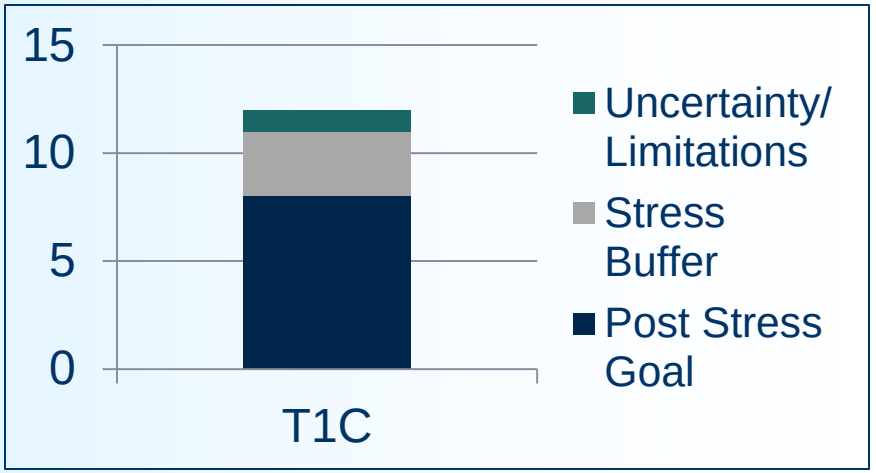
Example: Capital Goals & Targets

FOR ILLUSTRATIVE PURPOSES ONLY AND SHOULD NOT BE CONSIDERED A SPECIFIC EXPECTATION FOR FIRMS

Goal - Tier 1 common minimum of 8% (Post-Stress)

Factors considered:

- Regulatory Requirements
- Credit Ratings
- Failed Bank Analysis
- Shareholder Expectations
- Counterparty Expectations



Target - Tier 1 common of 12% (Pre-Stress)

Examples:

- CCAR BHC stress testing results, mid-year DFAST stress testing results, stress testing results from additional scenarios
- Uncertainty and limitations in risk capture and loss / resource estimation that are not directly measured in stress test outcomes

Principle 6: Internal Controls

The BHC has robust internal controls governing capital adequacy process components, including policies and procedures; change control; model validation; comprehensive documentation; and review by internal audit.

- BHCs should have strong internal control frameworks that include:
  - Regular and comprehensive review of internal audit
  - Robust and independent model review and validation practices
  - Comprehensive documentation, including policies and procedures
  - Change controls
- Internal audit should review the full end-to-end process to ensure it is functioning as intended
- BHCs should conduct independent review and validation of all models used for capital planning and stress testing
- Internal controls should ensure integrity of reported results

Principle 7: Governance

The BHC has effective board and senior management oversight of capital planning processes, including review of the risk infrastructure, loss and resource estimation methodologies, capital goals, stress scenarios, and limitations and uncertainties, as well as approval of capital decisions.

- Senior management is responsible for ensuring that capital planning activities are effective by:
  - Ensuring that effective controls are in place around the capital planning process
  - Ensuring that stress scenarios are sufficiently severe and cover the BHC's material risks and vulnerabilities
  - Ensuring all weaknesses, assumptions, limitations and uncertainties are identified, evaluated for materiality, and communicated to the board
- Board should receive sufficient information at least quarterly to understand material risks/exposures and to inform and support its capital decisions
- Board should challenge (and not "rubber stamp') results. Capital decisions should be documented

Objective 4: Major Challenges

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Major Challenges

Scenario Design:

- Scenario design process should be linked to the risk identification process
  - Scenarios should stress a BHC's material risks and unique vulnerabilities
- Internally-developed scenarios should:
  - Be tailored to the unique business, portfolio characteristics, and revenue drivers
  - Not feature assumptions that specifically benefit the BHC
- Range of practice
  - Internally-developed scenarios – internal models vs. expert judgment
  - Third-party macroeconomic scenarios – should be tailored to a BHC's risk profile
- No scenario will capture all potential risks

Major Challenges

Data Quality:

- BHCs should develop and use internal data to estimate losses, revenues, expenses, and asset and liability balances
- When internal data is limited, BHCs may need to rely on external data
  - External data can also be used to supplement internal data to increase the robustness and sensitivity
- When using external data, BHCs should:
  - Ensure it reasonably approximates underlying risk characteristics of their portfolios
  - Adjustment model outputs to account for differences in risk characteristics and performance
- BHCs should not exclude certain loss data from internal data sets

Major Challenges

Difficult-to-Quantify (DTQ) Risks and Uncertainty:

- DTQ risks are material risks other than credit, market, and operational risks
  - Most common: reputational risk, strategic risk, compliance risk, model risk
- Most common practices for capturing DTQ risks as part of capital planning:
  - Assessing the impact in terms of reduced revenue or increased expense
  - Establishing an incremental cushion above the capital targets (“add-on”)
- BHCs that use capital target add-ons should:
  - Clearly articulate which risks are captured in capital targets
  - Explicitly attribute the amount of the add-on to specific risks or uncertainties
  - Transparently document the methodology with sufficient support/analysis
  - Not use them as a “catch-all” for all risks not captured elsewhere

Major Challenges

Model Validation:

- All stress testing models should be validated for their intended use
  - Business-as-usual models may be inappropriate for stress loss forecasting
- Model validation should include an evaluation of conceptual soundness, ongoing monitoring, and outcomes analysis
  - Outcomes analysis of stress testing models is challenging due to limited realized outcomes
  - To compensate, BHCs should use sensitivity analysis and benchmark models
- BHCs should address models with identified weaknesses or not validated
  - Restrict model use
  - Use sensitivity analysis and benchmark models to assess primary model output
  - Apply conservatism or well-supported adjustments to model estimates, if needed

Major Challenges

Effective Challenge:

- Challenging the reasonableness, consistency, and coherence of assumptions, estimates, adjustments, and results is critical to the capital planning process
  - At the individual model level and as part of the aggregation process
  - By the business lines, central planning functions, and treasury
  - At the aggregate level by senior management and the board of directors
- Board should receive sufficient information to evaluate and challenge the capital planning process and results before making capital decisions
  - Information should allow the board to understand and evaluate:
    - Appropriateness of scenarios
    - Reasonableness and consistency of results, given scenario conditions
    - Impact of key limitations, assumptions, and uncertainties

Objective 5: Supervisory Assessment

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Supervisory Assessment

CCAR Process:

- BHCs with greater than $50 billion in total consolidated assets are required to submit the results of company-run stress tests for 5 scenarios:
  - 3 Supervisory Scenarios (Baseline, Adverse, Severely Adverse)
  - 2 BHC Scenarios (Baseline, Stress)
- In addition, pursuant to the Capital Plan Rule, BHCs must also submit a capital plan
  - The capital plan should sufficiently detail the BHCs capital planning process and the process for deriving stress test estimates
  - A BHC must also submit planned capital distributions as part of its capital plan
- Objection to a plan results in the inability for BHC to execute planned capital distributions

Supervisory Assessment

CCAR Process:

- The Federal Reserve may object to a BHCs capital plan on a quantitative or qualitative basis
- Quantitative Assessment
  - The Federal Reserve uses supervisory models assess whether a BHC is capable of continuing to meet minimum capital requirements and;
  - a tier 1 common capital ratio of at least 5 percent throughout the planning horizon
- Qualitative Assessment
  - Comprehensiveness of the capital plan, suitability of scenarios, and extent that the analysis captures and addresses salient risks
  - Reasonableness of assumptions and analysis, and robustness of overall CAP
  - The BHC's capital policy

Supervisory Assessment

CCAR Process:

- The Federal Reserve may object in whole or in part to proposed capital actions in the plan
- Limited Adjustment to Planned Actions
  - BHCs may make a one-time adjustment to *reduce* planned capital distributions prior to disclosure of the final CCAR results
- Public Disclosure
  - The Federal Reserve will publish the final results of its supervisory-run stress tests
  - BHCs are also required to publicly disclose the results of company-run stress tests
- Resubmission
  - BHCs that receive an objection to its plan must resubmit within 30 days

Questions?

Capital Planning Framework: Applicable Guidance

Risk Identification (SR 95-51)	• Guidelines for rating risk management processes and internal controls
Capital Planning Process (SR 09-4)	• Guidance on the payment of dividends, stock redemptions, or stock repurchases by BHCs in the context of their capital planning processes
Stress Testing Process (SR 12-7)	• Guidance on designing and implementing an effective stress testing framework for banking organizations with more than $10 billion in assets
Dodd-Frank Act Stress Tests (DFAST Rule)	• Requires stress tests semi-annually for banking organizations with $50 billion or more in assets and annually for banking organizations with $10-50 billion
Model Risk Management (SR 11-7)	• Guidance on model risk management, including: (1) model development, implementation, and use; (2) model validation process; and (3) model governance
Basel Capital Accords	• International regulatory capital standards set through a number of capital accords and related publications that have collectively been in effect since 1988
Capital Planning at Large BHCs	• Supervisory Expectations and Range of Current Practice August 2013