Risk Identification, Scenario Design and Loss Estimation
Morgan Stanley Presentation to the FRB Model Symposium

October 4, 2017
The Risk Identification Process

1. Risk Taxonomy
   - Hierarchical taxonomy of risks that standardize risk definitions across risk types, which enables consistent risk categorization across lines of business

2. Risk Inventory
   - Detailed listing of unique risks emerging from Firm-wide business activities including key drivers of risk
   - Iterative process involving multiple stakeholders (e.g., lines of business, risk management)
   - Developed at a line of business level (i.e., market, credit, earnings, strategic, and reputation risks) and a Firm-wide level (i.e., funding & liquidity, operational, and capital & RWA risks)
   - Subject to review, challenge, and governance framework
   - Refreshed on a quarterly basis

3. Materiality Assessment
   - Materiality framework
     - Assumption of stress as pre-condition to materiality assessment
     - Assessment of materiality at most applicable level of granularity
     - Very low materiality threshold relative to capital
     - Combination of quantitative and qualitative assessments
     - Considers potential impact to Common Equity Tier 1 (CET 1) ratio, stress loss, profit before taxes (PBT), and other comprehensive income (OCI)

4. Material Risks Aggregation
   - Identifies and captures the Firm's material risks across businesses
   - Inventory of material risks further enhanced through:
     - Business-as-usual senior management reporting
     - Additional reviews of non-material risks to assess potential for collective materiality
     - Review of new product approvals/initiatives
     - Quarterly review to evaluate potential changes, new or emerging risks
The Scenario Design Framework

Scenario Design and Generation

5. **Scenario Design**
   - Material risk themes serve as an organizing framework for the Firm’s material risks to support scenario design; however, they do not replace the granularity of the risk inventory
   - Detailed risks within each theme are considered and evaluated in the scenario design steps
   - Scenario design features three unique components
     - Upfront market shock
     - 9-quarter market/macro scenario
     - Idiosyncratic events

6. **Scenario Generation**
   - Generation of upfront market shocks and 9-quarter variable paths linked directly to the risk inventory
   - Develop shocks within and across specific asset classes
   - Identification of core variable shocks and generation of expansion variables
   - Severity of paths tailored to stress unique Firm concentrations
   - Inclusion of material, event-driven risks that are additive to 9Q scenario stresses and may not arise from the market/macro environment

7. **Documentation**
   - Finalize scenario narrative for each component:
     - Upfront market shock
     - 9-quarter market/macro scenario
     - Idiosyncratic events
     - Review and analysis of risks-not-captured in the Firm’s scenario:
       - Not coherent with the scenario design
       - Less material risks that are already captured in the scenario via stress of a similar more material risk
       - Event-driven risks that do not align with the overall scenario severity and objectives
Risks, Materiality, Scenario Factors/ Variables and Results
Examples From the Risk Inventory

The inventory is refreshed on at least a quarterly basis factoring in (i) new products/ business initiatives, (ii) changes to the Firm’s exposures, business mix or risk profile and (ii) changes to the market/ macroeconomic environment.

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<th>Risk Taxonomy</th>
<th>Risk Inventory</th>
<th>Scenario Design and Generation</th>
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<tr>
<td><strong>Level 1</strong></td>
<td><strong>Level 2</strong></td>
<td><strong>Level 3</strong></td>
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<tr>
<td>Market Risk</td>
<td>Corporate Credit</td>
<td>Concentration Risk</td>
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<tr>
<td>Credit Risk</td>
<td>Obligor Credit Risk</td>
<td>Geography Concentration</td>
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**Sample Elements Included in the Firm’s Risk Inventory**

**BU Owner: FID**
- **Risk Description:** Sector Concentration, Potential for M/M loss due to changes in industry / sector specific credit spreads.
- **Key Risk Drivers:** Sector specific credit spread concentrations.
- **Risk Rating:** Medium
- **Material Risk:** Yes
- **Scenario Factor:** More severe spread widening in sectors where the Firm is concentrated.

**BU Owner: IBD**
- **Risk Description:** Geography Concentration, The Firm’s lending business has concentration to obligors in certain geographies.
- **Key Risk Drivers:** Country specific interest rates, Country specific spreads.
- **Risk Rating:** High
- **Material Risk:** Yes
- **Scenario Factor:** Decline in GDP Growth, Spread widening.

Feedback loop from scenario results to materiality assessment and scenario factors.
Integrated Role of Risk Identification/ Scenario Design into Capital Planning and Risk Management

Risk Appetite, expressed through multiple metrics including limits on stress losses, helps provide a constraint on risk-tasking activities
- Limits include stress loss and other limits on key risk indicators

Identifies unique risks that exist across risk types
- Establishes foundation of risk types
- Supports controls that help ensure all risk types are included in risk analysis and reporting

Capital adequacy assessed through BHC scenarios
- Scenarios assist in setting the Firm’s capital targets
- Consideration of risks not captured in the stress scenarios
- Post-stress capital capacity informs risk limits

Inventories where each of the unique risks exist across businesses
- Provides comprehensive inventory of risks by business
- Separates material and non-material risks

Integrated stress tests estimate losses under varied severities
- Less severe scenarios provide practical day-to-day assessment of Firm-specific risks
- Utilization of stress testing to size emerging risks

Scenario includes necessary variables to capture Firm-specific risks identified in the Risk Inventory
- Upfront market shocks
- 9-quarter variable paths
- Scenarios analysis for operational risks