Morgan Stanley

Risk Identification, Scenario Design and Loss Estimation

Morgan Stanley Presentation to the FRB Model Symposium

October 4, 2017

Morgan Stanley

Risk Identification and Scenario Design Framework

Risk Identification → **Scenario Design and Generation** →

1 Risk Taxonomy
Agree on a common language and level of granularity for describing risks

2 Risk Inventory
Apply the risk taxonomy to MS business activities describing how risks might manifest under normal and stressed nviro m nt

3 Materiality Assessment
Perform a forward looking assessment of risks in a stressed environment based on relevant exposures, BAU processes and ma eriali y framework

4 Material Risks Aggregation
Finalize material risks based on individual and aggr ga e assessments; include additional risks not otherwise captured based on senior management expertise and judgement

5 Scenario Design
Determine factors impacting material risks (e.g., market a d macroeconomic conditions idiosyncratic features and emerging trends) and establish a preliminary scenario narrative

6 Scenario Generation
Generate set of scenario variable paths that stress s le te combination of material risk factors consistent with the scenario narrative

7 Documentation
Finalize scenario narrative and supporting ocumen ati n

Documentation, Continuous Challenge, Governance, and Controls →

The Risk Identification Process

Risk Identification

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

Sample Elements Included in the Firm's Risk Inventory

Risk Taxonomy			Risk Inventory						Scenario Design and Generation	
Level 1	**Level 2**	**Level 3**	**BU Owner**	**Risk Description**	**Key Risk Drivers**	**Risk Rating**	**Material Risk**	**Scenario Factor**	**Key Scenario Variables**	**Scenario Capture**
Market Risk	Corporate Credit	Concentration Risk	FID	**Sector Concentration** Potential for MtM losses due to changes in industry / sector specific credit spreads	Sector specific credit spread concentrations	Medium	Yes	More severe spread widening in sectors where the Firm is concentrated	Industry specific shocks	Captured through industry specific shocks for top sectors
Credit Risk	Obligor Credit Risk	Geography Concentration	IBD	**Geography Concentration** The firm's Lending business has concentration to obligors in certain geographies	Country specific interest rates Country specific spreads	High	Yes	Decline in GDP Growth Spread widening	Country specific GDP Country specific rates and spreads	Captured through regional / country level GDP and spreads

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

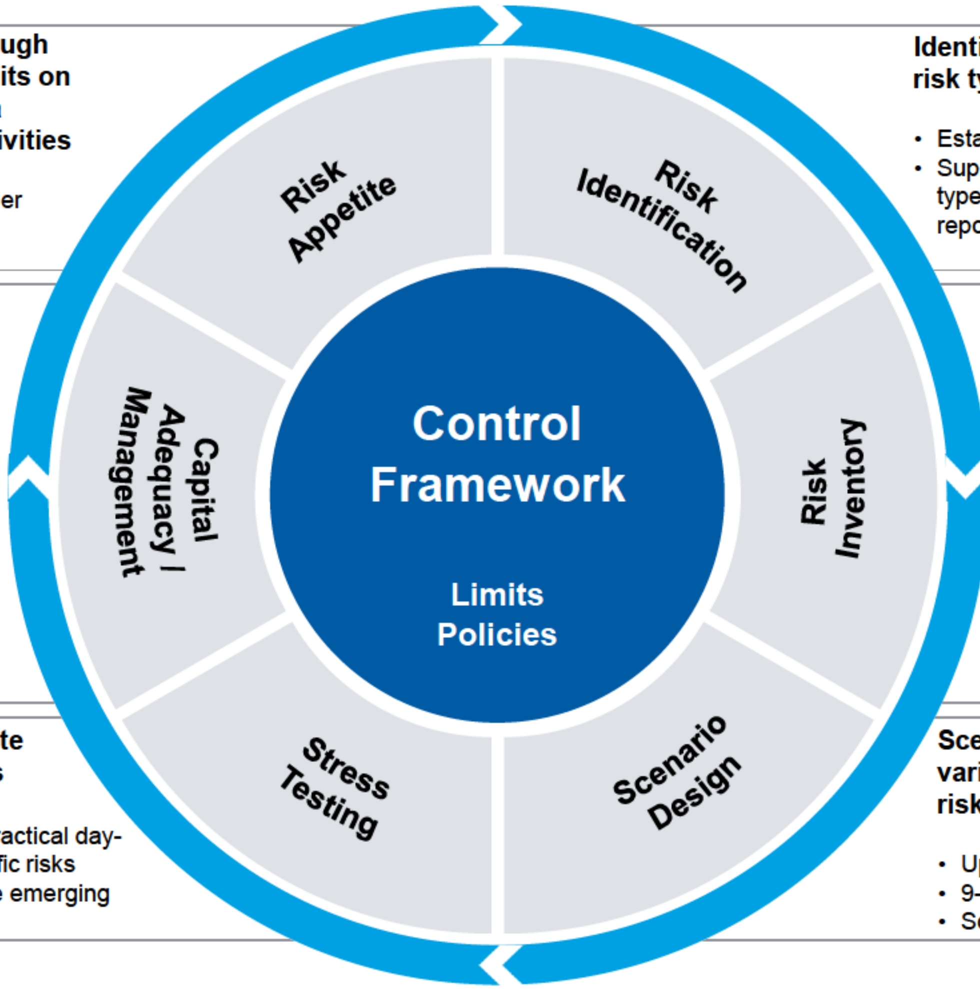
- Limits include stress loss and other limits on key risk indicators

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