Federal Reserve Bank of Boston
Operational Risk Conference

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Topic Outline

- Governance and Oversight
- Overview of Capital Model
- Relevant Risk Reporting
- Business Line Risk Review
“Corporate governance is the glue that holds an organization together in pursuit of its objectives while risk management provides the resilience.”

- Kevin W. Knight
  Chairman
  ISO Working Group on Risk Management Terminology
# Our Risk Management and Governance Framework

<table>
<thead>
<tr>
<th>Risk Category</th>
<th>Board of Directors Oversight</th>
<th>Senior Mgmt Oversight</th>
<th>Independent Decision Making</th>
<th>Coordination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Credit</td>
<td>Risk Committee of the Board</td>
<td>Loan Review</td>
<td>Portfolio Mgmt Committee</td>
<td>Division Portfolio Managers</td>
</tr>
<tr>
<td>Market</td>
<td>Market Risk Committee</td>
<td>Market Risk Committee/Asset &amp; Liability Committee</td>
<td>Market Risk Managers</td>
<td></td>
</tr>
<tr>
<td>Operational</td>
<td>Senior Risk &amp; Control Oversight Committee</td>
<td>Operational Risk Committee</td>
<td>Operational Risk Managers</td>
<td></td>
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Our Operational Risk Governance Hierarchy

- Review open risk issues
- Monitor action plans
- Review new or amended products

Senior Risk & Control Oversight Committee (SRCOC)

- Approve new products
- Business risk reviews
- Develop/promote best practices

Operational Risk Committee (ORC)

Business Infrastructure Groups (BIGs)

Operational Risk Managers (ORMs)

- Implement ORM tools
- Coordinate BIGs
Effective Governance and Oversight: Challenges

- Obtaining buy-in from business lines and providing value
- Avoiding redundancies
- Developing a common risk language and promoting risk awareness
- Overseeing the development of a practical and effective capital model
- Reporting relevant information to internal risk committees and governing bodies
Obtaining Buy-In and Providing Value: Creation of Business Infrastructure Groups

- Single forum for risk management at the business line level – Business Infrastructure Group

- Membership includes risk/control functions for business line (e.g., operational risk, credit risk, market risk, legal, audit, compliance, technology, operations, etc.)

- Chaired by the business owner- ORM facilitates meeting agenda and reporting

- Meets regularly to discuss new and outstanding risk issues, review and approve business practices, identify solutions and track progress on action plans

- Members complete written risk analysis for new products approvals by the Operational Risk Committee (ORC)

- Escalates significant risk issues/new products to ORC and Senior Risk & Control Oversight Committee
Avoiding Redundancies

Challenge: Integrate various regulatory mandates in an effective and efficient way.

- Regularly review existing committee structures, mandates & memberships
- Establish hierarchical structure that leverages current processes
- Expand or consolidate certain committees and/or revise mandates
- Obtain organizational buy-in for changes
Developing a Common Risk Language

Established a standard risk profile reporting format for business risk reviews of business lines incorporating:

- Control environment review
  - Risk scorecard results – status of action plans
  - Key risk indicator trend analysis
  - Operational losses – actual and potential
  - Scenario analysis (in progress)
  - Audit results
  - Compliance results

- Risk mitigation achievements
  - Major improvements (i.e., IT developments, re-engineered processes, etc.)

- Economic Capital
  - Expected losses, potential losses and risk adjusted return
Developing an Effective and Practical Capital Model

Capital Quantification Methods Proposed in the Industry

**Scenario-based Approach**
- Subject matter experts leverage internal & anecdotal knowledge
- External data cases inform scenarios
- Simultaneous loss events considered

**Loss Distribution Approach**
- Apply actuarial methods where internal data is sufficient
- Modeling typically occurs at business line and event type levels
- External data may supplement internal data, using an extrapolation technique or Extreme Value Theory
BNY Capital Model Objectives

- **Risk-sensitive – forward looking**
  - Reflect changes in the business and control environment
  - Adjust for acquisitions and divestitures
  - Capture the risk of multiple simultaneous/linked losses in a risk-sensitive manner

- **Recognizes risk mitigation**
  - Map insurance coverage to business lines, event types or scenarios
  - Possible adjustment to frequencies with qualitative and statistical support

- **Motivate Good Behavior**
  - Integrates the risk management and measurement processes
  - Provides incentives for business managers to mitigate risks
Our AMA Capital Model

- **Internal loss data**
  - Where sufficient, utilized to estimate frequency and severity
  - Reported to senior risk committees and the Board

- **External loss data**
  - Current Economic: Leveraged as a proxy for severity based on extreme value theory in our economic model
  - Planned AMA: Used to inform scenarios and benchmark internal loss estimates for scenarios

- **Scenarios – in progress**
  - Capture the risk of simultaneous loss events and firm-specific risk
  - Capture tail events and calibrate unexpected loss

- **Risk assessment scorecard / KRI's / other qualitative considerations**
  - Improve risk management and suggest model refinement
  - Capital allocation mechanism
Operational Risk Capital: Interim Economic Model

- Capital calculation using “Peaks Over Threshold” methodology
  - Derived frequency distribution using Bank’s firm-wide arrival rate of losses over $1MM (1999-2004) extrapolated QIS industry loss frequency data by business line
  - Utilized FRB-Boston’s study of large operational losses to determine an EVT-based severity distribution for large losses (> $1MM)
  - Combined severity and frequency distributions in Monte Carlo simulations to determine level of total aggregate bank capital required
  - Add-on for losses under $1 MM for EL- used highest single year’s aggregate sum of losses < $1MM.
  - Allocate undiversified total capital to business lines based on scorecards
  - Diversification benefit held at the corporate level
Milestones Reached

- Six years of internal loss data
- Four years experience with KRI monitoring system
- Three years experience with ORM scorecard
- Refinement of risk management governance and oversight
  - Risk management at the business line level (BIGs)
  - Governance and board reporting (Committee structures)
- Scenario analysis workshops with business managers
- Statistical economic capital model

Next Steps

- Incorporate results of scenario analysis into capital model for AMA qualification
Operational Risk Capital Model: Scenario Analysis Goals

- Evaluate relevant external loss data, output from our risk assessment and monitoring tools and internal committee data to generate potential scenarios.
- Obtain expert opinions from business line management and ORM to derive scenario probabilities and severities
- Evaluate exposures related to potential simultaneous events
- Provide frequency and severity data to develop loss distribution tails in capital model
- Increase transparency, evaluate Bank vulnerabilities, and mitigate/transfer risk (where possible)
- Incorporate scenario results into capital model
- Relate all operational risk tools and external data within our framework for relevancy and gaps
Relevant Risk Reporting: An Evolving Process

Stage 1: Educate various committees and Board and develop blueprint for OpRisk framework

- Define operational risk – case studies
- Review regulatory requirements – sound practice standards
- Develop strategy for ORM framework
- Report progress/status of implementation

Stage 2: Build the tools/models

- Demonstrate OpRisk tools and review output
- Review economic/regulatory capital model /capital allocation methodology
Relevant Risk Reporting: An Evolving Process

Stage 3: Report operational risk exposures

- Operational Risk Assessment Scorecard results
- Key risk indicator conditions
- Operational risk loss experience
- Capital requirements/capital allocation/RAROC
Risk Reporting: Business Line Risk Review

Business Line ABC:

- Major Business Activities/Market Statistics/Business Drivers
- Risk Management Process
- Risk Profile and Risk Assessment
- Key Risk Indicator trends
- Loss History
- Revenues/Returns
- Economic Capital
## Business Line Risk Review - Example

### Internal Loss History

<table>
<thead>
<tr>
<th>Period</th>
<th>Amount</th>
<th>Comment</th>
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<tbody>
<tr>
<td>2004</td>
<td>$11.1 MM</td>
<td>80% of total value attributable to 1 large loss</td>
</tr>
<tr>
<td>1999-20003</td>
<td>$  8.2 MM</td>
<td>Mostly due to aged reconciliation differences</td>
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### Relevant External Losses

<table>
<thead>
<tr>
<th>Notable external loss (Name)</th>
<th>Business Line</th>
<th>Amount</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bank ABC</td>
<td>Agency Services</td>
<td>$95MM</td>
<td>Fraud – Ponzi Scheme</td>
</tr>
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### Revenues/Returns

<table>
<thead>
<tr>
<th>Revenues</th>
<th>Operating Margin</th>
<th>Return on Economic Capital</th>
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<tbody>
<tr>
<td>2003</td>
<td>2004</td>
<td></td>
</tr>
<tr>
<td>$316MM</td>
<td>$332MM</td>
<td></td>
</tr>
<tr>
<td>44%</td>
<td>46%</td>
<td></td>
</tr>
<tr>
<td>17%</td>
<td>19%</td>
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</tbody>
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### Economic Capital

<table>
<thead>
<tr>
<th>OpRisk</th>
<th>TOTAL</th>
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<tr>
<td>$XXMM</td>
<td>$531MM</td>
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Operational Risk Reporting – The Road Ahead

**Topics for future Board Consideration:**

- Requests for more business specific risk discussions
- Increasing focus on risk vs. reward analysis
- Insurance analysis/rationalization of coverage
- Market disclosures
- Benchmarking operational risk best practices vs. peers