Capital Allocation for Operational Risk - Securities Firms

Operational Risk Conference

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November 15, 2001
Boston
Operational Risk Management

Agenda

- Operational Risk Management
  - Guiding Principles
  - Operational Risk Health Profile
  - Health Profile Development Approach

- Operational Risk Capital Allocation
Operational risk management at Goldman Sachs is based on three guiding principles:

- **Strong firm wide control culture**
- **Senior management commitment and active participation**
- **Operational risk management should incorporate qualitative and quantitative indicators, with operational loss experience**

**Key Initiatives**

- Independent Operational Risk department
- Comprehensive operational risk management process
- Operational Risk Steering Committee comprised of the firm’s senior leaders
- Integrated operational risk reporting to senior management
- Identification and assessment of qualitative indicators
- Quantitative indicators defined through metrics initiatives
- Consolidated operational loss data gathering process
We are developing a management oversight tool that integrates elements necessary to profile operational risks identified for each business line.

Risk Theme 1: Inaccurate cash / securities movements

- Quantitative Indicators -

<table>
<thead>
<tr>
<th>Metric</th>
<th>Current Month</th>
<th>Prior Month Outlook</th>
<th>3 Month Average Outlook</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avg. daily # of aged fails</td>
<td>20</td>
<td>10</td>
<td>50</td>
</tr>
<tr>
<td>Avg. daily $ cost of aged fails</td>
<td>$XX</td>
<td>$YY</td>
<td>$ZZ</td>
</tr>
</tbody>
</table>

- Qualitative Indicators -

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Current Practice</th>
<th>Best Practice</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>How frequently are failed transaction reports distributed to senior management?</td>
<td>Daily</td>
<td>Daily</td>
<td>Green</td>
</tr>
<tr>
<td>Is a history of causes relating to fails maintained?</td>
<td>Partially</td>
<td>Yes</td>
<td>Yellow</td>
</tr>
</tbody>
</table>

- Incidents & Losses -

<table>
<thead>
<tr>
<th>Risk Theme Totals</th>
<th>Loss Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>Incident ID</td>
</tr>
<tr>
<td>Related Incidents</td>
<td>FFH42DJ</td>
</tr>
<tr>
<td>Related Loss Amount</td>
<td>4729DH644</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Current Incidents</th>
<th>Current Month</th>
<th>Prior Month</th>
<th>Trend</th>
<th>Incident Cost</th>
<th>Occurred</th>
<th>Identified</th>
<th>Resolved</th>
</tr>
</thead>
<tbody>
<tr>
<td>$WWW</td>
<td>$XXX</td>
<td>$ZZZ</td>
<td>Red</td>
<td>$XXX</td>
<td>8/1/01</td>
<td>8/1/01</td>
<td>8/3/01</td>
</tr>
<tr>
<td>$YYY</td>
<td>$YYY</td>
<td></td>
<td>Green</td>
<td>$YYY</td>
<td>8/1/01</td>
<td>8/1/01</td>
<td>8/3/01</td>
</tr>
</tbody>
</table>
September 11th Event

- Operational Risk increased at New York financial services firms
- Goldman Sachs’ Health Profile Report reflected the increased operational risk through negative outlooks for several quantitative indicators

**Sales and Trading**

<table>
<thead>
<tr>
<th>Metric</th>
<th>Outlook</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process: Avg. daily # of aged fails</td>
<td>🔶</td>
</tr>
<tr>
<td>Outstanding derivatives confirmations</td>
<td>🔶</td>
</tr>
<tr>
<td>People: Avg. daily attendance</td>
<td>🔶</td>
</tr>
<tr>
<td>Systems: No. of major system outages</td>
<td>🔶</td>
</tr>
</tbody>
</table>

- Approaches based on gross income, volume of transactions, dollar value of transactions or other exposure indicators could show conflicting results
Our approach has been first to develop risk themes, then to develop their supporting analysis elements.

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Health Profile Development Approach

**Develop Risk Themes**
- Identify Risk Themes
- Understand Risk Themes

**Develop Analysis Foundations**
- Define Indicators
- Pilot Indicators
- Design Systems & Links
- Build Automated Tools

Defined in partnership with business line leaders through Risk Assessment Initiative

Implemented for each of the three analysis elements: Qualitative Indicators, Quantitative Indicators and Operational Loss Data
The identification and gathering of data required for the Health Profile is done through three main initiatives.

- Operational Loss Data
- Quantitative Indicators
- Qualitative Indicators
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Operational Risk Capital Allocation

- Significant progress has been made on both regulatory and industry fronts
  - Increased awareness
  - Dedicated resources
  - Communications toward a common goal

- Regulatory Capital Charge for Operational Risk
  - Operational risk is a pressing concern for both managers and supervisors of financial institutions
  - Explicit recognition of operational risk will help facilitate the development of a truly risk-based regulatory capital framework
  - The issue is not one of principle but rather of practicality - we are a long way from when sound methods can assign explicit capital charges for operational risk
  - Current proposals for operational risk capital charges are too high
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Operational Risk Capital Allocation

- **GS internal loss experience**
  - GS analysis focused on loss experience in excess of a defined threshold for 1998, 1999 and 2000:

<table>
<thead>
<tr>
<th>GS Operational Losses as % of gross income</th>
<th>BIS Basic Indicator Approach</th>
<th>BIS Standardized Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 1%</td>
<td>Alpha to be in the range of 17% - 20%</td>
<td>Corporate Finance: 13-23%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Trading &amp; Sales: 17%-24%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Asset Management: 13%-18%</td>
</tr>
</tbody>
</table>
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Where do we go from here?

- We should capitalize on this momentum to ensure that a regulatory capital framework:
  - Has a proper balance of qualitative and quantitative measures reflecting quality of controls and management
  - Establishes minimum capital requirements consistent with loss experience
  - Contains flexibility for supervisors to impose capital requirements on firms above the minimum requirements based on their overall assessment of the control environment
  - Creates a positive incentive for the reduction of operational risk through improved processes, procedures, systems
GS is evaluating operational risk charging frameworks, including both top-down and bottom-up approaches.

- **Top-Down Approach**

  - Size factors for each business unit
  - Qualitative indicators of business unit’s level of control from Operational Health Profile
  - Estimate of GS total operational risk charge based on internal assumptions and periodically revised

  - Factor model
    - Incorporates size factor and risk assessment score to define percentage of operational risk charge for each business unit
  - Operational Risk charge for each business unit
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Charging Framework

- **Bottom-up Approach**

  - Operational Health Profile
    - Qualitative indicators
    - Quantitative indicators
    - Operational loss data
    - Size factors

  - Identify qualitative and quantitative indicators highly correlated to operational losses
  - Calculate potential future operational losses for each business given highly correlated indicators
  - Operational risk charge
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Conclusion

- Goldman Sachs recognizes the importance of formalizing a process for the management of operational risk

- Substantial human and technology resources from business, support and risk management areas have been allocated to this effort

- Methodologies for the measurement of operational risk are being developed and increasingly used

- We are in the early stages of developing a charging framework which will incentivize our business units to consider and manage their operational risk

- A meaningful capital allocation framework is some ways off
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