Input Data for OpRisk Modeling

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Latest Development in Managing Operational Risk

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Risikocontrolling
Operational Risk
Agenda

- OpRisk Measurement in Commerzbank
- Internal Loss Data Collection
- External Consortium Data
- Gathering Qualitative Information
OpRisk Measurement in Commerzbank

- Internal Loss Data Collection
- External Consortium Data
- Gathering Qualitative Information
OpRisk AMA – objectives
Measuring OpRisk is an important element for the implementation of a sound risk management framework.

- Increase of transparency and support for identification of critical areas in the bank
- Implementation of structured data collection to support the operational risk management
- Calculation of an OpRisk capital figure that is consistent over time and comparable for the different business lines
- Allocation of OpRisk capital to business lines according to internal risk profile
- Integration of OpRisk into overall economic capital concept of Commerzbank
- Implementation of equitable incentive scheme for efficient OpRisk management
- Significant capital reduction compared to Basic Indicator Approach
Data collection as part of OpRisk network
As part of the OpRisk network the data collection serves as direct input for the quantification as well as instrument for the risk management.
Components for OpRisk Measurement

- Loss data determine the risk exposure: potential loss amount & potential frequency.
- QSA discovers problems in processes, controls and staff that could lead to losses in the future.
- How do risk indicators fit into the measurement puzzle?
- Which parts are missing to create the complete picture?
- OpRisk Measurement in Commerzbank
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OpRisk events are categorized by their type, their impact on the P&L, and are assigned to several organizational units.
Data Collection Process – Ensuring High Quality

Clear responsibilities and roles in the collection process ensure high quality of the data and completeness:

- Loss data are the most reliable information for risk analysis
- However, quality of data strongly depends on proper collection process

<table>
<thead>
<tr>
<th>Person who detects the event</th>
<th>Unit’s ORM (OpRisk Manager)</th>
<th>ORM 1 (Originator’s unit)</th>
<th>ORM 2 (Confirming unit)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compiling the OpRisk-notification</td>
<td>ORM sends information to the originator if not originated in own unit</td>
<td>Data entry into LCT</td>
<td>Confirmation of the data entry</td>
</tr>
<tr>
<td>Forwarding to own ORM</td>
<td></td>
<td>Storage of the event documentation</td>
<td></td>
</tr>
</tbody>
</table>
Relevance of Loss Data
Historic internal loss data is a key element for modeling OpRisk and the collection thereof increases risk awareness in the bank.

- Analysis of loss data supports identification of
  - Cost drivers: areas with high frequency and low impact events
  - High risk areas: rather low frequency but severe impact events
- Determination of frequency and severity distribution for capital calculation

Open issues
- Basel II requires 5 (3) year data history:
  - Which history is really required for statistical modeling?
  - How relevant is historic data in case of organizational or process changes?
- Some areas (business line / event type) combinations do not have sufficient data for modeling
## Risk Matrix – Modeling empty Cells

Poor data availability results in empty cells. Modeling might be carried out based on pooled data by event type or business line.

<table>
<thead>
<tr>
<th>Event Type</th>
<th>Internal Fraud</th>
<th>External Fraud</th>
<th>Malicious Damage</th>
<th>…</th>
<th>Business Line</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retail Banking</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>(λ, μ, σ)_{RB}</td>
</tr>
<tr>
<td>Commercial Banking</td>
<td>✓</td>
<td>✗</td>
<td>✗</td>
<td>✓</td>
<td>(λ, μ, σ)_{CB}</td>
</tr>
<tr>
<td>Asset Management</td>
<td></td>
<td></td>
<td>✗</td>
<td></td>
<td>(λ, μ, σ)_{AM}</td>
</tr>
<tr>
<td>…</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Event Type</td>
<td>(λ, μ, σ)_{IF}</td>
<td>(λ, μ, σ)_{EF}</td>
<td>(λ, μ, σ)_{MD}</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Sufficient data for individual model**
- **Not enough data for individual model**

Models based on pooled data by event type

Models based on pooled data by business line

Apply BL- or ET-parameters to empty cells?
OpRisk Measurement in Commerzbank

Internal Loss Data Collection

External Consortium Data

Gathering Qualitative Information
External Data to fill the Gap
The low data density in single risk matrix cells can be supplemented by external loss data information.

- Many events are published in newspapers or risk magazines
- Professional data provider (e.g. Fitch, AON) deliver public loss data and event information collected from newspapers, news services, etc.
- Data consortia (e.g. ORX) exchange loss data from member banks on an anonymous basis

- Public data are biased towards high loss amounts
- The bias depends on event type because only “spectacular” cases are published in the respective news sources
- Information about details of the event are usually very detailed

→ modeling public data is very challenging but the data might be useful for management purposes
Operational Risk data eXchange (ORX)

ORX is founded to exchange high quality Operational Risk loss data between member banks.

- Commerzbank is one of 12 founding member banks of the data consortium ORX*
- Number of member banks is increasing
- Objective: exchange loss data based on clear definitions and categorizations
- Data is collected with common threshold, standardized business line and event type categorization, loss evaluation rules and boundary definitions → data can be used for integration into internal OpRisk model
- In order to guarantee confidentiality of the data only restricted event information is exchanged

* ORX member banks:

- ABN Amro
- Bank of Nova Scotia
- BBVA
- BNP Paribas
- Commerzbank
- Danske Bank
- Deutsche Bank
- Euroclear
- Fortis
- ING
- JP Morgan Chase
- San Paolo IMI
Integration of External Data
Integration of external data into internal measurement and management process is still a key challenge to banks and some open questions need to be solved.

- External loss experience helps to understand and model own risk profile.
- How to determine the relevance of data points?
  - By business line: use all data points of a particular activity
  - By single data point: analyze individual data points
  - By threshold: determine maximum loss for a business line
- Apply scaling to frequency and severity data?
  - What determines the size of a loss? (severity scaling)
  - Is the frequency scalable or does it only depend on particular processes in individual banks?
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The Benefits of Self Assessment

Quality Self Assessment is an important piece for the identification, management and measurement of OpRisk.

- Workshops and questionnaires facilitate discussions about critical areas and increase the awareness of the need to control operational risks.
- Process oriented self assessment generates transparency of the complete process flow and the respective internal controls.
- Identification of high risk areas within an organization and at the interfaces of a process.
- Results of quality self assessment support business line management to establish priorities for process improvements and risk reduction.
- Self assessment data increases granularity for OpRisk measurement compared to loss data.
- Adds forward looking component to pure statistical loss data model.
The Quality Self Assessment Matrix
Quality Self Assessment is an import piece for the identification, management and measurement of OpRisk.

Process Steps
- Production development
- Acquisition
- Business Transaction Sales & Execution
- Confirmation, Settlement & Client Reporting
- Support 1
- Support 2

Assessment Cell of Unit A

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Workflow of Quality Self Assessment

The results of the quality self assessment are part of the capital model. The assessment process has to ensure correct answers.

1. OpRisk Controlling prepares QSA and delivers questionnaire to OpRisk Manager.
2. OpRisk Manager distributes questionnaires to the respective assessors.
3. The assessor answers the questions.
4. After the completion the questionnaire is sent to the approver.
5. The approver verifies the assessment and agrees with the evaluation of the assessor.
6. The questionnaire is valid and returned to OpRisk Controlling.
8. Results are reported and used in OpRisk capital model.
Quality Self Assessment – Analysis of Results

The result of a quality self assessment are ratings from 1 – 6 for each assessment cell, organization, risk class and business line.

- Ensuring comparability between different business lines is important
  → Calibration of ratings is major issue
- Calculation of ratings has to reflect riskiness of the findings
  → Weighted ratings could emphasize seriousness of issues

<table>
<thead>
<tr>
<th>Average Rating</th>
<th>2.7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weighted Rating</td>
<td>4.3</td>
</tr>
</tbody>
</table>

The weighted rating is constructed in a way to emphasize the higher rated responses to the questions. This indicates the seriousness of quality issues.

Distribution of Ratings

<table>
<thead>
<tr>
<th>Rating Scale</th>
<th>Relative Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>17%</td>
</tr>
<tr>
<td>2</td>
<td>31%</td>
</tr>
<tr>
<td>3</td>
<td>29%</td>
</tr>
<tr>
<td>4</td>
<td>10%</td>
</tr>
<tr>
<td>5</td>
<td>10%</td>
</tr>
<tr>
<td>6</td>
<td>3%</td>
</tr>
</tbody>
</table>
Key Risk Indicator - Obtaining valuable Information

The changes of KRI values, as compared with defined tolerance ranges, give a qualitative assessment of the inherent risks and serves as an early warning system.

Business experts determine tolerance range for KRI values.

Aggregation by defined rules on the basis of priorities determines rating.

Deviation of actual KRI values from tolerance bounds is measured.

Process

Aggregation Hierarchy

1 2 3 4 5 6

Weak Point

Weak Point

KRI 1 KRI 2 KRI 3 KRI 4

The changes of KRI values give a qualitative assessment of the inherent risks and serves as an early warning system.
Validation of KRIs through Loss Data - Which RIs are really KRIs?
The comparison of predicted riskiness through ratings with actual loss experience in the future should validate the choice of KRIs (back testing).

Open Questions:
- How much data history is needed?
- Is frequency or severity affected most?
- Correlation does not imply causality
- Can high severity / low frequency events be predicted?
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