# Measuring and Managing Operational Risk Under Basel II

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## Outline of Presentation

- Introduction to Operational Risk (OR)
- The Basel II OR framework
- Measuring OR under the AMA
- Latest QIS OR Results
- OR Management
- Evaluation, Implications and Conclusions



## What is OR?

- Applies to all firms (financial and non-financial)
- Used to be a catch-all phrase for non-financial risks
- Current Basel II definition is "*the risk of loss resulting from inadequate or failed **internal processes**, **people** and **systems** or from **external events***"
  - ➢ Includes both internal and external event risk
  - ➢ Legal risk is also included, but strategic, reputational and systemic risks are not
  - ➢ Direct losses are included, but indirect losses (opportunity costs) and near misses are not
    - – How many of the costs associated with 9/11 would be captured?

## Examples of OR Loss Events

| Types of OR* | Examples |
|---|---|
| Internal Fraud | ▪ Unauthorized transaction resulting in monetary loss<br>▪ Embezzlement of funds |
| External Fraud | ▪ Branch robbery<br>▪ Hacking damage (systems security) |
| Employment Practices & Workplace Safety | ▪ Employee discrimination issues<br>▪ Inadequate employee health or safety rules |
| Clients, Products & Business Practices | ▪ Money laundering<br>▪ Lender liability from disclosure violations or aggressive sales |
| Damage to Physical Assets | ▪ Natural disasters, e.g. earthquakes<br>▪ Terrorist activities |
| Business Disruption and System Failures | ▪ Utility outage (e.g. blackout) |
| Execution, Delivery & Process Management | ▪ Data entry error<br>▪ Incomplete or missing legal documents<br>▪ Disputes with vendors/outsourcing |

* Based on Basel Committee's OR loss event classification – see Appendix for details

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## Major OR Characteristics

- Partly endogenous
  - Unwanted by-product of corporate activity
  - Positively related to complexity of operations
- Highly idiosyncratic
  - OR events tend to be less correlated to each other and to other risk types
  - Less directly linked to business cycles
- In principle (partially) controllable ex ante
- Trade-off is mostly risk vs. cost of avoidance, not risk vs. return

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## Key Drivers of Interest in OR

**Recent Experience**
- High-profile cases and related negative publicity
- Examples include Allfirst, Barings, Enron etc.

**Regulatory Pressure**
- Basel II's explicit capital requirements for OR

**Market Developments**
- Additional complexity brought about by automation, outsourcing, large volume service provision, deregulation, M&A, risk transfer etc.

**Firm-wide Risk Management**
- Next frontier in enterprise risk management and business applications, e.g. capital allocation, pricing, performance measurement etc.

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## Size Compared to Other Risks

- OR is sizeable compared to other risk types
  - ➢ Its exclusion can make certain businesses appear artificially attractive, e.g. asset management and trading

| Entity | Methodology | Date | OR Findings |
|---|---|---|---|
| RMG of Basel Committee | Quantitative Impact Survey (QIS2-Tranche 1) of 41 banks | 2001 | 15% (on average) of economic capital |
| MOW | Benchmarking study of 10 banks | 2001 | ~11% (on average) of economic capital |
| MOW | Analysis of OpRisk Analytics loss database | 2002 | 1.05% of risk-weighted assets, corresponding to 13% of the BIS minimum capital requirement |
| RMA / FMCG | Survey of 12 banks | 2002 | 11%-17% of economic capital |
| Boston Fed* | Analysis of OpRisk Analytics and OpVantage loss databases | 2003 | "*Estimates consistent with the amount of OR capital held by several large institutions*" |

* 'Capital and Risk: New Evidence on Implications of Large Operational Losses' by de Fontnouvelle, DeJesus-Rueff, Jordan and Rosengren (Federal Reserve Bank of Boston, September 2003).

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## OR Measurement Pre-Basel II

- OR capital measurement was top-down…

| Approaches | Description |
|---|---|
| Indicator / Benchmarking | ▪ % of income/assets/costs, compared to peers<br>▪ % of non-interest income, compared to non-financial analogs<br>▪ % of total capital calculated to cover financial risks (credit, market etc.) |
| Residual Earnings Volatility | ▪ Deviation in earnings (neutralized for impact of financial volatility) at specified confidence interval |

- … and subject to various problems
  - ➢ Arbitrariness / inconsistency
  - ➢ Comparability
  - ➢ No link to incentives / risk management

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## Basel II Framework for OR

- Scope of application
- Pillar I (minimum capital requirements)
  - ➢ Definition
  - ➢ Business line mapping
  - ➢ Classification of loss event types
  - ➢ Measurement approaches (3)
  - ➢ Qualifying criteria
- Pillar II (supervisory review)
- Pillar III (market disclosure/discipline)
- Quantitative Impact Study (QIS) results

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## Scope of Application for OR

- Primarily intended for internationally active banks and banks with significant OR exposures
- Applied, on a fully consolidated basis, at holding company and lower levels within a banking group
  - ➢ Insurance activities are excluded
- Supervisory approval required for banks to revert to simpler approach once approved for more advanced one

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## Pillar I – Approach 1

- Basic Indicator
  - ➢ Corresponds to the Standardized Approach for credit risk
  - ➢ Capital charge is 15% ('alpha') of bank's average annual gross income over previous 3 years
    - – Gross income should exclude provisions, insurance income, realized profits/losses from sale of securities in banking book, and extraordinary or irregular items
  - ➢ No specific criteria/requirements for its use
    - – Banks are encouraged to comply with Basel Committee's guidance on '*Sound Practices for the Management and Supervision of Operational Risk*' (February 2003)

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## Pillar I – Approach 2

- Standardized / Alternative Standardized
  - ➢ Bank's activities divided ('mapped') into 8 business lines
  - ➢ Capital charge is sum of specified % ('beta') of each business line's average annual gross income over previous 3 years*
  - ➢ Beta varies by business line (12%-18% range)
  - ➢ General criteria required to qualify for its use
    - – Active involvement of Board and senior management in OR management framework
    - – Existence of OR management function, reporting and systems
    - – Systematic tracking of OR data (including losses) by business line
    - – OR processes and systems subject to validation and regular independent review by internal and external parties

* Subject to national supervisory discretion, the Alternative Standardized Approach (ASA) can be chosen. It uses volume of loans and advances (instead of gross income) as the exposure indicator for the retail and commercial banking business lines.

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## Business Line Mapping

| LEVEL 1 | BETA FACTORS | LEVEL 2 | ACTIVITY GROUPS |
|---|---|---|---|
| **Corporate Finance** | **18%** | Corporate Finance | Mergers and Acquisitions, Underwriting, Privatizations, Securitization, Research, Debt (Government, High Yield), Equity, Syndications, IPO, Secondary Private Placements |
| | | Municipal / Government Finance | |
| | | Merchant Banking | |
| | | Advisory Services | |
| **Trading and Sales** | **18%** | Sales | Fixed Income, Equity, Foreign Exchanges, Commodities, Credit, Funding, Own Position Securities, Lending and Repos, Brokerage, Debt, Prime Brokerage |
| | | Market Making | |
| | | Proprietary Positions | |
| | | Treasury | |
| **Retail Banking** | **12%** | Retail Banking | Retail Lending and Deposits, Banking Services, Trust and Estates |
| | | Private Banking | |
| | | Card Services | |
| **Commercial Banking** | **15%** | Commercial Banking | Project Finance, Real Estate, Export Finance, Trade Finance, Factoring, Leasing, Lends, Guarantees, Bills of Exchange |
| **Payment & Settlement** | **18%** | External Clients | Payments and Collections, Funds Transfer, Clearing and Settlement |
| **Agency Services** | **15%** | Custody | Escrow, Depository Receipts, Securities Lending (Customers), Corporate Actions |
| | | Corporate Agency | Issuer and Paying Agents |
| | | Corporate Trust | |
| **Asset Management** | **12%** | Discretionary Fund Management | Pooled, Segregated, Retail, Institutional, Closed, Open, Private Equity |
| | | Non-Discretionary Fund Management | Pooled, Segregated, Retail, Institutional, Closed, Open |
| **Retail Brokerage** | **12%** | Retail Brokerage | Execution and Full Service |

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## Pillar I – Approach 3

- Advanced Measurement Approaches (AMA)
  - ➢ Corresponds to the IRB Approach for credit risk
  - ➢ OR capital charge to be derived from bank's own methods
  - ➢ Its use (partial or full) is subject to supervisory approval
    - – The extent of partial use is determined by bank criteria and is conditional on submission of a plan to roll out AMA fully over time
    - – A hybrid 'allocation mechanism' approach is allowed for the calculation of OR capital for certain internationally active banking subsidiaries*
  - ➢ Broadly similar general criteria and qualitative standards as for Standardized Approach, to be met on initial and on-going basis
  - ➢ Additional quantitative standards
    - – Soundness standard: selected approach must capture 'tail' loss events (i.e. 1-year holding period and 99.9% confidence interval)

* 'Principles for the home-host recognition of AMA operational risk capital', Basel Committee on Banking Supervision (January 2004).

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## Pillar I – Approach 3 (cont.)

- ➢ Additional quantitative standards (cont.)
  - – Regulatory capital requirement for OR is the sum of EL and UL*
  - – Sound, internally determined OR loss correlations can be used
  - – Internal and relevant external loss data, scenario analysis, and business environment and internal control factors should be used
  - – Minimum 5-year observation period for internal loss data**
  - – Criteria for internal loss event capture (e.g. threshold levels, mapping by business line and event type***, recoveries, attribution etc.)
  - – Credit losses from OR to be recorded but excluded from calculations
- ➢ Risk mitigation
  - – Risk mitigating impact of insurance limited to 20% of capital charge
  - – Various compliance criteria for risk mitigation recognition

* "*Unless the bank can demonstrate that it is adequately capturing EL in its internal business practices*" (section 629b, Pillar One, Third Consultative Paper on 'The New Basel Capital Accord', Basel Committee on Banking Supervision, April 2003).

** "*When the bank first moves to the AMA, a three-year historical data window is acceptable*" (section 632, ibid).

*** See Appendix for Basel II's proposed loss event type classification.

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## Alternative AMA Approaches

- Given embryonic state of OR measurement, Basel II lets 'a thousand flowers bloom' in the AMA
- (At least) three types of approaches identified
  - Internal Measurement Approaches (IMA)
    - PD/EAD/LGD-type framework, where capital charge (UL) is a fixed function 'gamma' (calculated by bank itself) of EL
  - Loss Distribution Approaches (LDA)
    - Capital from modeling loss frequency and severity distributions
  - Scorecard approaches
    - 'Base level' top-down OR capital is allocated to business lines based on risk profile and control environment indicators
- This does not preclude the use of a combination of the above approaches, or indeed of others

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## AMA 'Toolkit'

- Internal loss event data
- External loss data
- Scalars / Exposure Indicators
- Scenario analyses
- Key Risk/Performance Indicators (KRIs/KPIs)
  - Quantitative measures serving as early warning indicators
- Control and Risk Self Assessments (CRSAs)
  - Qualitative assessments of inherent risks and controls
- Others, e.g. external environmental assessments, audit scores, management strategic plans etc.

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## AMA – Some Practical Issues

| Topic | Issues |
|---|---|
| Internal loss event data collection | ▪ Selecting minimum materiality threshold<br>▪ Determining frequency and severity of loss events<br>▪ Mapping to supervisory event types/business lines<br>▪ Identifying and leveraging existing historical loss databases<br>▪ Establishing an automated process of collection, validation, attribution and reporting that aligns with incentives<br>▪ Setting the boundary between OR and other risk types |
| Scorecard development | ▪ Determining which KRIs and CRSA scores will be included<br>▪ Adjusting scores to make them objective and consistent |
| Capital modeling | ▪ Using scenarios, external loss data, assumptions and data extrapolation techniques to derive loss distribution<br>▪ Incorporating insurance and correlations<br>▪ Determining granularity of modeling by line/event type |

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## Example: Internal Loss Capture

| | |
|---|---|
| CAUSE | ▪ Internal (people, processes or systems) or external event |
| LOSS EVENT | ▪ Classification (e.g. Basel's Level 1, 2 and 3 event type categories) |
| CONSEQUENCE | ▪ Description of loss (e.g. cash shortage) |
| DISCOVERY | ▪ Detection of loss event (e.g. reconciliation) |
| CORRECTION | ▪ Description of corrective process (e.g. account edits) |
| COST | ▪ Monetary loss type* (e.g. write-down, restitution etc.) |
| ATTRIBUTION | ▪ Determination of source of loss event (upstream) |
| DISCLOSURE | ▪ Loss event capture and reporting to relevant parties |

* See Appendix for monetary loss type classification.

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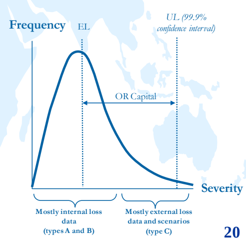
## Example: Loss Modeling

- Populating the loss distribution for a specific business line and event type

**EVENT TYPES**

| | Low Severity | High Severity |
|---|---|---|
| High Frequency | A<br>e.g. routine processing error | N/A |
| Low Frequency | B<br>e.g. branch robbery | C<br>e.g. 9/11 |

**LOSS DISTRIBUTION**

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## Pillars II and III

- Pillar II
  - ➢ The four key principles mentioned also apply for OR
  - ➢ 2003 paper on 'Sound Practices for the Management and Supervision of OR' to form basis for Pillar 2 evaluation
- Pillar III
  - ➢ Qualitative disclosures
    - OR capital approach, including AMA description (if applicable)
    - Various OR management objectives and policies
  - ➢ Quantitative disclosures
    - OR capital charge at the top consolidated level of banking group
    - For banks using the AMA, OR charge before and after the reduction in capital from the use of insurance

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# QIS OR Results

- QIS 3* OR results are broadly consistent with the Committee's objectives
  - ➢ New OR capital requirement outweighs reduced credit risk capital requirements, so overall change is a small increase**
    - OR constitutes 8%-15% of existing (Basel I) capital requirements, depending on selected group of countries
    - Much greater variation of OR results within each group
    - Sizable increase in capital requirements for specialized banks
    - Optional Alternative Standardized approach preferable for banks with high margins (e.g. retail lenders)
- Loss Data Collection Exercise results indicate data availability issues for many business line/event type combinations
  - ➢ See next page

* 188 banks from G10 countries and 177 banks from 30 other countries participated in this exercise. See 'Quantitative Impact Study 3 – Overview of Global Results' (Basel Committee on Banking Supervision, May 2003).

** In order to avoid sample selection problems (e.g. the banks completing the IRB approaches is only a subset of those completing the Standardized approach), only the results from the Standardized approach are analyzed.



# QIS OR Results (cont.)*

% of total gross loss amounts

% of total # of loss events

| LOSS EVENT TYPE / BUSINESS LINE | Internal Fraud | External Fraud | Employm. Practices and Workplace Safety | Clients, Products and Business Services | Damage to Physical Assets | Business Disrupt. and System Failures | Execut., Delivery and Process Mgmt | Total |
|---|---|---|---|---|---|---|---|---|
| Corporate Finance | 0.04% / 0.63% | 0.04% / 0.06% | 0.15% / 0.03% | 0.15% / 2.03% | 0.03% / 0.10% | 0.02% / 0.01% | 0.45% / 0.64% | **0.89%** / **3.51%** |
| Trading and Sales | 0.10% / 0.76% | 0.20% / 0.52% | 0.21% / 0.83% | 0.23% / 2.48% | 0.07% / 1.13% | 0.29% / 0.23% | 9.74% / 8.96% | **10.9%** / **14.9%** |
| Retail Banking | 2.68% / 4.26% | 36.2% / 10.1% | 4.36% / 4.36% | 4.50% / 3.26% | 1.10% / 1.12% | 0.34% / 0.34% | 11.2% / 5.45% | **61.1%** / **29.4%** |
| Commercial Banking | 0.18% / 0.27% | 3.81% / 4.17% | 0.17% / 0.26% | 0.65% / 2.01% | 0.11% / 13.8% | 0.10% / 0.23% | 2.14% / 7.95% | **7.22%** / **29.0%** |
| Payment and Settlement | 0.05% / 0.29% | 0.68% / 0.27% | 0.11% / 0.15% | 0.05% / 0.13% | 0.02% / 0.19% | 0.17% / 1.01% | 2.82% / 1.20% | **3.92%** / **3.25%** |
| Agency and Custody Services | 0.01% / 0.00% | 0.03% / 0.05% | 0.04% / 0.10% | 0.06% / 0.06% | 0.02% / 1.28% | 0.07% / 0.51% | 2.92% / 2.23% | **3.15%** / **4.25%** |
| Asset Management | 0.06% / 0.08% | 0.09% / 0.06% | 0.08% / 0.13% | 0.28% / 0.99% | 0.01% / 0.03% | 0.03% / 0.03% | 1.77% / 1.45% | **2.35%** / **2.78%** |
| Retail Brokerage | 0.12% / 0.79% | 0.04% / 0.02% | 1.68% / 0.65% | 1.14% / 2.03% | 0.01% / 6.58% | 0.11% / 0.36% | 3.75% / 1.25% | **6.91%** / **11.7%** |
| **Total** | **3.31%** / **7.23%** | **42.4%** / **15.5%** | **8.52%** / **6.76%** | **7.17%** / **13.1%** | **1.40%** / **24.3%** | **1.14%** / **2.73%** | **35.1%** / **29.4%** | **100%** / **100%** |

* Sample of 89 banks, 47,269 loss events and €7.8 billion in OR-related losses reported in 'The 2002 Loss Data Collection Exercise for Operational Risk: Summary of the Data Collected' (Risk Management Group, Basel Committee on Banking Supervision, March 2003).

Note: Totals may not add up because no business line/event type information was provided for a few loss events and amounts.



# OR Management Framework*

**Corporate Governance**

- Board of Directors to provide guidance, approve and periodically review bank's OR management framework
- Senior management to translate framework into specific policies, processes and procedures consistently and comprehensively
- Establishment of independent OR management function

**Identification and Assessment**

- OR identification based on process/activity maps, and loss data collection
- Development of forward-looking early warning indicators and self-assessments
- OR quantification, based on data sources and scenario analysis
- Validation and back-testing of results

**Monitoring**

- Systematic tracking of loss events, KRIs and CRSA scores
- Timely, accurate, relevant and periodic MIS and other (e.g. 'heat map') reporting
- Education and communication workshops, Forums etc.

**Control and Mitigation**

- Internal control policies, processes, procedures and systems
- Incorporation in budgeting, strategy and business applications
- Evaluation of alternative risk mitigants

* Largely based on 'Sound Practices for the Management and Supervision of Operational Risk', Basel Committee on Banking Supervision (February 2003).

## Example: OR Control and Mitigation

- OR control and mitigation measures
  - Aimed at both center and tail of OR loss distribution
  - Can be both preventive (ex ante) and mitigating (ex post)
  - Increasingly based on cost-benefit analysis
- There exists a variety of alternative measures
  - Operational excellence initiatives, e.g. six-sigma, TQM etc.
  - Service Level Agreements with vendors/service providers
  - Contingency planning and disaster recovery
  - Capital
  - Risk transfer
    - Insurance, e.g. blanket bond, D&O liability, contingent capital etc.
    - Capital markets, e.g. cat bonds, weather derivatives

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## Evaluation of Basel OR Framework

- Pros
  - Forces banks to focus on growing OR issue
  - Encourages industry efforts for pooling of loss data etc.
  - Allows AMA flexibility and offers simple alternative for smaller banks
- Cons
  - Weak risk sensitivity of non-AMA approaches
  - Arbitrary rules for Basic and Standardized Approaches
    - One-size-fits-all exposure indicators and alpha/beta factors
    - Ad hoc cap on mitigation from insurance
  - High compliance costs vs. unproven business benefits for AMA
    - Relatively few perceived incentives for banks to move to AMA
    - "An exercise in capital allocation and loss data gathering?"*
  - Unclear OR loss classifications and AMA methodologies

* Taken from sub-title of 'Bank Operational Risk Management' (Moody's, June 2002).

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## Likely Impact of OR Capital Charge

- Calibrated to produce minimal change at system level
- Some redistribution of capital requirements towards banks with large specialized processing businesses
  - Examples: brokerage, custody and asset management
  - May incentivize some of these institutions to de-bank
- Smaller domestic banks will opt for the Basic or Standardized/Alternative Standardized approach
- Avoidance of AMA is not an option for most large, internationally active banks
  - A few large domestic banks may 'opt in' for reputational and rating considerations

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## Implications for Emerging Markets

- Similar themes to Basel II's credit risk framework
  - OR framework should not be examined in isolation

| Issue | Questions |
|---|---|
| Scope of application | ▪ Is AMA adoption a realistic prospect?<br>▪ Will Basel II apply on a fully consolidated basis at group level? |
| Calibration | ▪ Aren't the current alpha and beta factors calibrated too high?<br>▪ Will the capital charges encourage foreign banks to move out? |
| Home-host recognition | ▪ How do you ensure coordination in cross-border supervision?<br>▪ How to level playing field between domestic and foreign banks? |
| Transition to Basel II | ▪ Isn't adherence to Basel Core Principles a necessary precondition?<br>▪ Shouldn't customization be based on national circumstances (bank capabilities and supervisory preparedness) and priorities?<br>▪ Isn't a longer/more flexible timeframe required? |

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## Conclusions

- Basel II has made OR a distinct and important discipline in its own right
- Industry-wide convergence to OR standards will continue to evolve for the foreseeable future
  - Loss definitional issues, data collection techniques and quantification methodologies still under discussion
- No one right answer on how to proceed
  - Approach based on strategic priorities, organizational culture, practical (cost-benefit) considerations and market/regulatory developments

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## Appendix

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## Classification of Loss Events

| EVENT-TYPE CATEGORY (LEVEL 1) | DEFINITION | CATEGORIES (LEVEL 2) | ACTIVITY EXAMPLES (LEVEL 3) |
|---|---|---|---|
| Internal Fraud | Losses due to acts of a type intended to defraud, misappropriate property or circumvent regulations, the law or company policy, excluding diversity/discrimination events, which involves at least one internal party | Unauthorized Activity | Transactions not reported (intentional)<br>Trans type unauthorized (w/monetary loss)<br>Mismarking of position (intentional) |
| | | Theft and Fraud | Fraud/credit fraud/worthless deposits<br>Theft/extortion/embezzlement/robbery<br>Misappropriation of assets<br>Malicious destruction of assets<br>Forgery<br>Check kiting<br>Smuggling<br>Account take-over/impersonation/etc.<br>Tax non-compliance/evasion (willful)<br>Bribes/kickbacks<br>Insider trading (not on firm's account) |
| External Fraud | Losses due to acts of a type intended to defraud, misappropriate property or circumvent the law, by a third party | Theft and Fraud | Theft/Robbery<br>Forgery<br>Check kiting |
| | | Systems Security | Hacking damage<br>Theft of information (w/monetary loss) |



## Classification of Loss Events (cont.)

| EVENT-TYPE CATEGORY (LEVEL 1) | DEFINITION | CATEGORIES (LEVEL 2) | ACTIVITY EXAMPLES (LEVEL 3) |
|---|---|---|---|
| Employment Practices and Workplace Safety | Losses arising from acts inconsistent with employment, health or safety laws or agreements, from payment of personal injury claims, or from diversity/discrimination events | Employee Relations | Compensation, benefit, termination issues<br>Organized labor activity |
| | | Safe Environment | General liability (slip and fall, etc.)<br>Employee health & safety rules events<br>Workers compensation |
| | | Diversity & Discrimination | All discrimination types |
| Clients, Products & Business Practices | Losses arising from an unintentional or negligent failure to meet a professional obligation to specific clients (including fiduciary and suitability requirements), or from the nature or design of a product | Suitability, Disclosure & Fiduciary | Fiduciary breaches/guideline violations<br>Suitability/disclosure issues (KYC, etc.)<br>Retail consumer disclosure violations<br>Breach of privacy<br>Aggressive sales<br>Account churning<br>Misuse of confidential information<br>Lender Liability |
| | | Improper Business or Market Practices | Antitrust<br>Improper trade/market practices<br>Market manipulation<br>Insider trading (on firm's account)<br>Unlicensed activity<br>Money laundering |
| | | Product Flaws | Product defects (unauthorized, etc.)<br>Model errors |
| | | Selection, Sponsorship & Exposure | Failure to investigate client per guidelines<br>Exceeding client exposure limits |
| | | Advisory Activities | Disputes over performance of advisory activities |



## Classification of Loss Events (cont.)

| EVENT-TYPE CATEGORY (LEVEL 1) | DEFINITION | CATEGORIES (LEVEL 2) | ACTIVITY EXAMPLES (LEVEL 3) |
|---|---|---|---|
| Damage to Physical Assets | Losses arising from loss or damage to physical assets from natural disaster or other events | Disasters and other events | Natural disaster losses<br>Human losses from external sources (terrorism, vandalism) |
| Business Disruption and System Failures | Losses arising from disruption of business or system failures | Systems | Hardware<br>Software<br>Telecommunications<br>Utility outage/disruptions |
| Execution, Delivery & Process Management | Losses from failed transaction processing or process management, from relations with trade counterparties and vendors | Transaction Capture, Execution & Maintenance | Miscommunication<br>Data entry, maintenance or loading error<br>Missed deadline or responsibility<br>Model/system misoperation<br>Accounting error/entity attribution error<br>Other task misperformance<br>Delivery failure<br>Collateral management failure<br>Reference Data Maintenance |
| | | Monitoring and Reporting | Failed mandatory reporting obligation<br>Inaccurate external report (loss incurred) |
| | | Customer Intake and Documentation | Client permissions/disclaimers missing<br>Legal documents missing/incomplete |
| | | Customer/Client Account Management | Unapproved access given to accounts<br>Incorrect client records (loss incurred)<br>Negligent loss or damage of client assets |
| | | Trade Counterparties | Non-client counterparty misperformance<br>Misc. non-client counterparty disputes |
| | | Vendors & Suppliers | Outsourcing<br>Vendor disputes |

# Monetary Loss Types

| Loss Type | Causes | Monetary Loss |
|---|---|---|
| **Legal and Liability** | Lost legal suit | External legal and other related costs in response to an operational risk event |
| **Regulatory, Compliance and Taxation Penalties** | Penalties paid to the regulator | Fines or the direct cost of any other penalties, such as license revocation-associated costs (excludes lost/forgone revenues) |
| **Loss or Damage to Assets** | Neglect, accident, fire, earthquake | Reduction in the value of the firm's non-financial assets and property |
| **Restitution** | Interest claims (note: excludes legal damages that are addressed under Legal and Liability costs) | Payments to third parties of principal and/or interest, or the cost of any other form of compensation paid to clients and/or third parties |
| **Loss of Recourse** | Inability to enforce a legal claim on a third party for the recovery of assets due to an operational error | Payments made to incorrect parties and not recovered; includes losses arising from incomplete registration of collateral and inability to enforce positions |
| **Write Downs** | Fraud, mis-represented market and/or credit risks | Direct reduction in value of financial assets as a result of operational events |

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