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# Loss Data Collection, Interpretation and Validation

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# Agenda

- Internal Data.
  - 2004 Loss Data Collection Exercise.
  - Status of data collection in the industry.
  - Data Interpretation.
  - Data Issues.
- External Data.
  - Range of Practice.
  - Data Issues.
- Data Validation.
  - General Principles.
  - Mechanisms for validation of internal data.

# Loss Data Collection Exercise

- Conducted by U.S. federal bank and thrift regulatory agencies on a voluntary basis for institutions with a presence in the U.S.
- Objective was to better understand the OpRisk exposure estimates reported in QIS-4, and to better understand the completeness of the loss data on which these estimates are based.
- Requested data on individual losses underlying QIS-4 results that occurred on or before either June 30, 2004 or September 30, 2004.
- We received 23 LDCE responses between December 2004 and April 2005.
- Aggregate results were released at Boston Fed conference in May 2005.
- Feedback sessions were conducted with participating institutions.

# LDCE Data Observations

- 23 participants submitted 1,526,765 losses totaling \$25.9BN.
- Participants reported varying numbers of losses. Six reported fewer than 250 losses, while four reported more than 2,500 losses.
- Data thresholds varied from \$0 (six participants) to more than \$10,000 for some or all business lines (three participants).
- There was also variation in the number of years' data collected:
  - Three participants' data covered 1999 and earlier years.
  - Thirteen participants' data went at least as far back as 2001.
  - Five participants' data began in 2003.

# Internal Data Collection

- Institutions have made considerable progress in developing internal loss data collection systems.
  - Some have established dedicated operational loss databases, while others pull data from the general ledger.
- Many institutions have or are in the process of establishing formal processes for the identification of loss events, as well as database inclusion.
  - Aggregating multiple data points into a single event
  - How to capture near misses
  - Capturing boundary events
- Institutions use, or map to, the seven Basel event type categories.
- Little if any robust analysis to support the appropriateness of chosen data collection thresholds.

# Internal Loss Data Interpretation

## ■ Frequency Analysis

- What proportion of a business line's losses are within each event type?
- How does frequency scale with total assets and other measures of firm size?
- How many losses occur in a business line with respect to specific business line exposure indicators (i.e. how many retail banking losses per billion dollars of core deposits?)

## ■ Severity Analysis

- What proportion of your institution's total loss amount are within each business line and event type?
- Are losses reported in external data for your institution included in your internal data?

# Operational Loss Frequency

Proportion of Losses  $\geq$  \$10,000 by Business Line and Event Type

	Internal Fraud	External Fraud	EPWS	CPBP	DPA	BDSF	EDPM	Other	Fraud	Percent of Total
<b>Corporate Finance</b>	2.4%	3.6%	18.4%	23.9%	0.7%		38.2%	10.2%	2.7%	0.3%
<b>Trading &amp; Sales</b>	0.3%	0.2%	2.3%	2.7%	0.4%	3.3%	90.2%		0.6%	7.3%
<b>Retail Banking</b>	3.8%	56.3%	6.2%	7.3%	0.9%	0.4%	20.4%	1.1%	3.5%	60.1%
<b>Commercial Banking</b>	0.9%	51.8%	3.4%	7.0%	0.1%	0.6%	27.2%	0.4%	8.6%	5.1%
<b>Payment &amp; Settlement</b>	11.7%	9.9%	3.9%	0.8%	0.2%	1.2%	67.0%	0.1%	5.1%	4.5%
<b>Agency Services</b>	0.2%	0.7%	0.8%	6.1%	0.2%	2.8%	89.3%			5.1%
<b>Asset Management</b>	0.1%	10.5%	4.3%	5.5%	0.0%	1.5%	74.6%		3.6%	2.4%
<b>Retail Brokerage</b>	0.8%	1.4%	19.1%	45.5%		0.1%	30.3%		2.7%	7.3%
<b>Other</b>	5.2%	20.8%	22.0%	5.0%	1.5%	0.3%	43.4%	0.9%	1.0%	8.0%
<b>Total</b>	3.4%	39.0%	7.6%	9.2%	0.7%	0.7%	35.3%	0.8%	3.2%	100.0%

# Operational Loss Frequency Examples

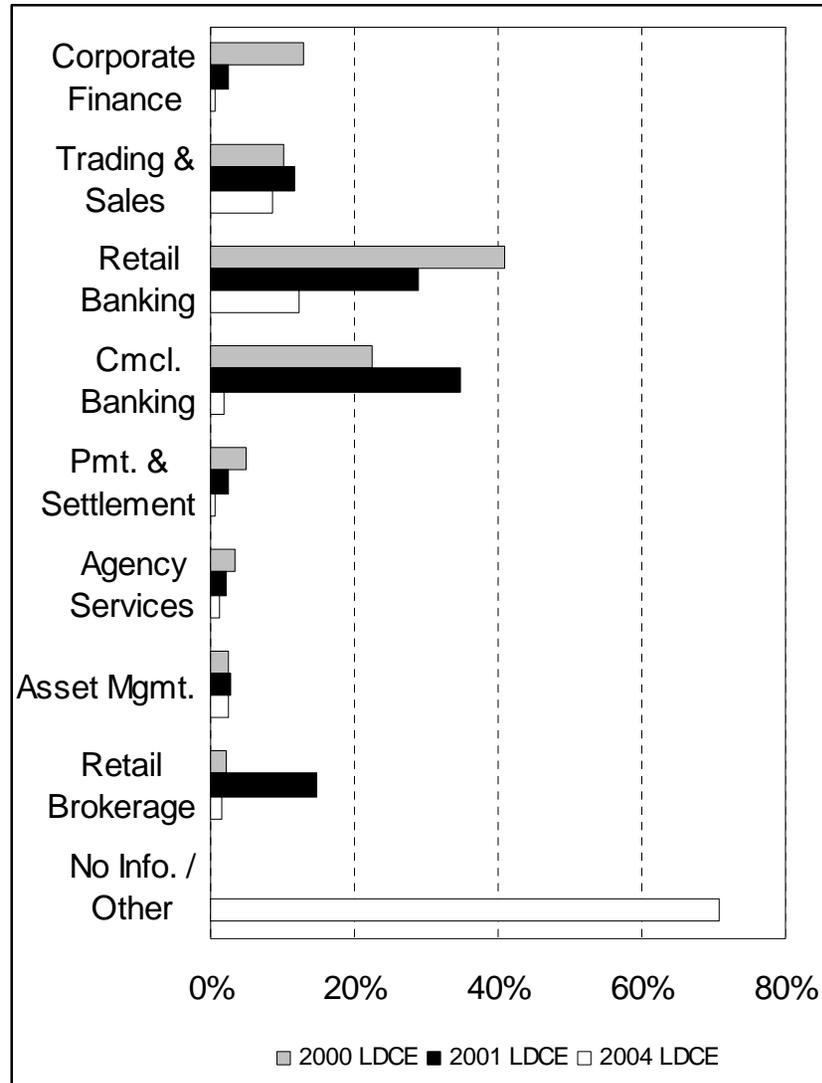
## Retail Banking

<b>Internal Fraud</b>	<b>External Fraud</b>	<b>EPWS</b>	<b>CPBP</b>	<b>DPA</b>	<b>BDSF</b>	<b>EDPM</b>
3.8%	56.3%	6.2%	7.3%	0.9%	0.4%	20.4%

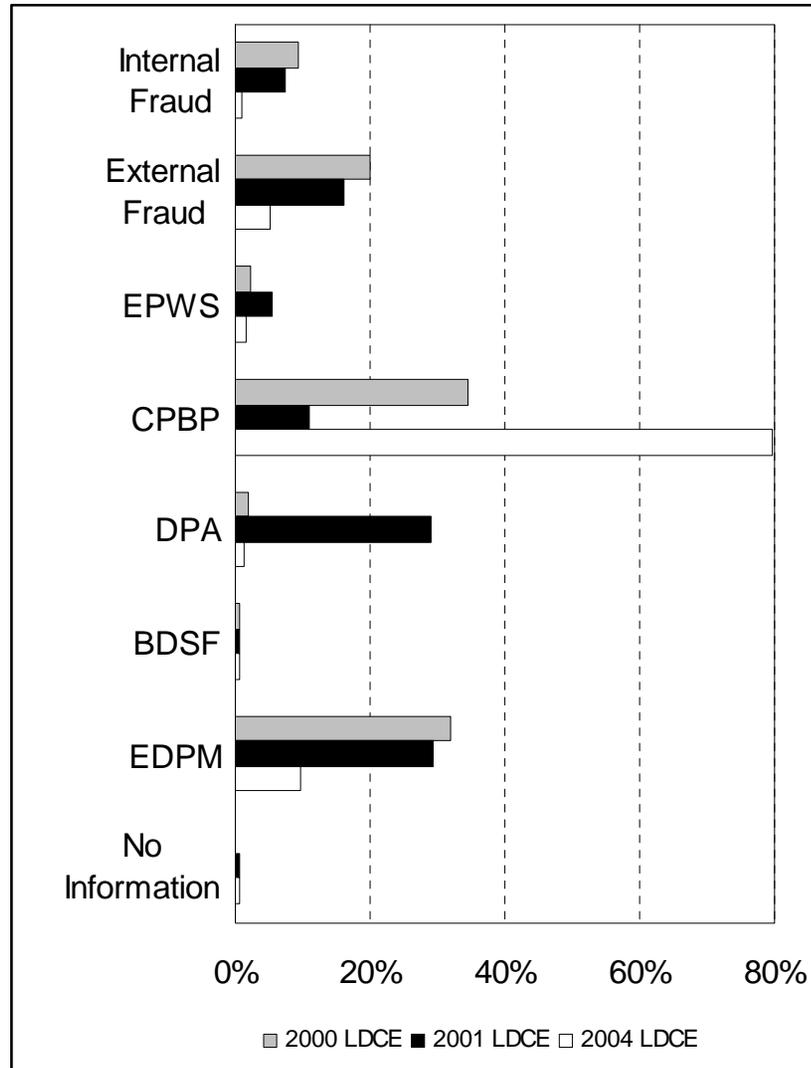
## Asset Management

<b>Internal Fraud</b>	<b>External Fraud</b>	<b>EPWS</b>	<b>CPBP</b>	<b>DPA</b>	<b>BDSF</b>	<b>EDPM</b>
0.1%	10.5%	4.3%	5.5%	0.0%	1.5%	74.6%

# Operational Loss Severity (Business Line)



# Operational Loss Severity (Event Type)



# Normalized Loss Frequency

<b>Loss frequency divided by:</b>	<b>losses ≥ \$20k per year</b>	<b>losses ≥ \$100k per year</b>	<b>losses ≥ \$1M per year</b>
<b>Total Assets in \$Billions</b>			
Cross-firm median	1.76	0.35	0.035
Interquartile range	(1.53-2.18)	(0.31-0.40)	(0.022-0.046)
<b>Tier 1 Capital in \$Billions</b>			
Cross-firm median	31.19	6.11	0.58
Interquartile range	(24.58-39.90)	(4.20-7.56)	(0.37-0.74)
<b>Gross Income in \$Billions</b>			
Cross-firm median	37.53	7.17	0.576
Interquartile range	(28.35-49.90)	(5.27-8.44)	(0.303-0.978)

# Normalized Business Line Loss Frequency

	<b>Results presented as cross-firm medians</b>	<b># of losses ≥ \$10k per year</b>	<b># of losses ≥ \$20k per year</b>	<b># of losses ≥ \$100k per year</b>
<b>Corp. Finance</b>	Losses/New debt and equity issuances	0.013	0.008	0.004
	Losses/Issue Proceeds (\$B)	0.065	0.038	0.019
<b>Trading &amp; Sales</b>	Losses/Gross Income (\$M)	0.013	0.010	0.003
<b>Retail Banking</b>	Losses/Core Deposits (\$B)	4.42	1.83	0.31
<b>Commercial Banking</b>	Losses/Gross Income (\$M)	0.026	0.016	0.004
	Losses/Number of Employees	0.018	0.011	0.002
<b>Pmt. &amp; Settlement</b>	Losses/Number of Employees	0.023	0.009	0.002
<b>Agency Services</b>	Losses/Assets under Custody (\$B)	0.034	0.013	0.004
<b>Asset Mgmt</b>	Losses/Assets under Management (\$B)	0.054	0.035	0.009
<b>Retail Brokerage</b>	Losses/Gross Income (\$M)	0.063	0.046	0.013
	Losses/Number of Employees	0.016	0.012	0.004

# Internal Data Issues

- Treatment of legal losses.
  - Timing.
- Allocation of losses affecting multiple business lines.
- Boundary between Credit Risk and Operational Risk.
  - Retail Banking.
  - Commercial Banking.
- Insurance Recoveries.
  - Linking insurance recovery data to loss data.
  - Captives.
  - Lack of data.

# External Data

- Many institutions have acquired external databases.
- Sources most often observed are vendor and consortium.
- Use of external data varies considerably.
  - Some institutions use external data to fill gaps in internal data.
  - Some use external data to inform scenario analysis.
  - Some compare frequency of internal losses to the frequency of similar losses in external data.
- Selection and scaling criteria for external data are under development.

# External Data Issues

- Selection.
  - Which events could happen to our institution?
- Scaling.
  - If a similar event happened to our institution what could the potential impact be given our size and control environment?
- Estimated exposure vs. actual exposure.
  - Do the external data loss amounts reflect potential losses or actual losses?
- Grouping.
  - Could individual events be grouped as one in external data?
  - Could one large event be reported as several separate events?

# Data Validation

- Validation is an ongoing process.
- Validation must be performed by an independent function.
- The purpose of validation of internal loss data is to ensure that data are complete, accurate, and appropriately classified.
- The purpose of validation of external loss data is to ensure data integrity and applicability.

# Validation Mechanisms for Internal Data

- General ledger reconciliation.
- Frequency and severity analysis.
  - Can results be explained by nature of the institution's business?
- Institutional knowledge.
  - Appropriate business line classification.
  - Appropriate event type classification.
- Investigate data anomalies.
  - Duplicates.
  - Grouping of losses.
- External data comparison.