BASEL COMMITTEE ON BANKING SUPERVISION

BANK FOR INTERNATIONAL SETTLEMENTS

Risk Management Group March 2003

The 2002 Loss Data Collection Exercise for Operational Risk: Summary of the Data Collected

I. Introduction

The following is a summary of the data collected through the 2002 Operational Risk Loss Data Collection Exercise (LDCE) launched by the Risk Management Group (RMG) of the Basel Committee on Banking Supervision in June 2002. The 2002 LDCE asked participating banks to provide information on individual operational losses during 2001, internal capital allocation for operational risk, expected operational losses, and a number of exposure indicators tied to specific business lines. The 2002 LDCE was an extension and refinement of two previous data collection exercises sponsored by the RMG, which focused on banks' internal capital allocations for operational risk and their overall operational risk loss experience during the period from 1998 to 2000.[1]

The goals of this paper are to describe the results of the 2002 LDCE and to compare the data with the information collected by the RMG in its previous data collection efforts. As in the summary of the previous exercise, this paper focuses on the individual loss event data submitted by participating banks.[2] To this end, the paper provides an analysis of the range of individual gross loss amounts and of the distribution of these losses across a set of standardised business lines and event types. It also provides an analysis of the information banks reported on insurance and other recoveries associated with these individual loss events. In both instances, the paper compares the information collected for 2001 with similar information for 2000.

Finally, the paper provides a brief examination of data collected on the share of economic capital that the participating banks allocated to operational risk, as well as their use of information on expected operational losses for pricing, reserving and expensing. The paper ends with a brief analysis of the comprehensiveness of 'exposure indicator' data provided by banks.

The evidence discussed in this paper suggests that the banking industry has made progress in its operational risk data collection efforts. Eighty-nine banks submitted data in the 2002

---

[1] The first exercise (called the Quantitative Impact Survey, or QIS2–Tranche 1) focused on internal capital allocation figures for operational risk, both in aggregate and across business lines, as well as information about overall internal capital allocations, gross income, and other potential exposure indicators. The second exercise (QIS2-Tranche 2) focused on information concerning individual operational risk loss events, the banks' quarterly aggregate operational risk loss experience, and a wider range of potential exposure indicators tied to specific business lines.

[2] A description of the information collected in QIS2-Tranche 1 is contained in "Working Paper on the Regulatory Treatment of Operational Risk" released in September 2001 and a description of the information collected in the QIS2-Tranche 2 is presented in the paper "The Quantitative Impact Study for Operational Risk: Overview of Individual Loss Data and Lessons Learned." Both papers are available on the BIS website, www.bis.org.

loss data survey, a nearly three-fold increase as compared to the 30 banks that participated in the previous data survey. Further, somewhat more banks provided large numbers of individual loss events in their data submissions, and a higher percentage of banks indicated that the data they submitted was comprehensive and complete. Overall, the combined data for the 89 participating banks included more than 47,000 individual loss events.

Nonetheless, even this very large database almost certainly fails to provide a fully comprehensive sense of the range of potential operational risk loss events experienced by banks, because of gaps in data collection. As with the earlier data collection exercises, the pooled data exhibit considerable clustering around certain business lines and event types. While some of this may reflect the underlying nature of operational risk – for instance, there is considerable clustering in the Retail Banking business line, which tends to experience many frequent but small operational risk events – there are also business line/event type combinations with few to none events reported. It is unclear whether the low reporting frequency in these areas reflects the low probability of event types occurring for certain business lines, the short data collection window and/or gaps in data collection. Furthermore, the number of large loss events (those exceeding €1 million in gross loss amount) across all combinations is comparatively small, representing less than 2% of the observations.

The findings of the 2002 LDCE reflect the evolution that is occurring in the area of operational risk loss data capture. Methodologies and approaches for data collection are still in the developmental stage in a lot of the participating banks and this is an important limitation in many of the data submissions. For example, gaps in data collection almost certainly contributed to a considerable variation across banks in the number of events reported. It is also important to recognise that the findings discussed in this summary reflect a short one-year data collection window, which even under the best of circumstances is unlikely to capture many large-impact “tail events”. These factors suggest that it is necessary to be cautious in using the data to draw hard conclusions about the extent of operational risk exposures. Therefore, this paper should be seen primarily as a description of the data received through the loss data survey, rather than an attempt to assess the extent of operational risk at a more general level.

The paper is organised as follows. Section II provides an overview of the 2002 LDCE exercise. Section III presents an analysis of the 2001 individual operational losses and recoveries. This section also compares the 2001 data with similar data collected through the previous data collection exercise for 2000. Section IV presents a brief analysis of the 2001 information on banks’ internal allocation of capital for operational risk and the extent of the use of expected operational loss assessments for decisions related to reserving, pricing, and expensing. A brief analysis of the comprehensiveness of the data submitted on exposure indicators is also presented. Section V concludes.

II. Review of the 2002 Operational Risk Loss Data Collection Exercise

As with the previous data collection exercise, banks participating in the 2002 LDCE were asked to supply several types of information concerning their operational risk loss experience. More specifically, they were asked for information about all individual operational risk loss events with gross loss amounts above €10,000 for 2001. For these loss events, banks were requested to provide information on the calendar quarter in which the event occurred, as well as data on gross loss amounts, insurance recoveries, and ‘other’ recoveries. Regarding recoveries, banks were asked to report the recoveries they received within one year of the loss event separately from the recoveries they still expected to receive within one year of the loss event.

Banks were asked to categorise individual loss events into eight standardised business lines and seven level-1 event types, giving 56 business line/event type combinations. They were also asked to categorise each loss event into one of 20 level-2 event types representing finer breakdowns of the level-1 event type categories.[3] In addition, banks were asked to single out "linked" loss events that affected more than one business line or that could be tied back to more than one event type category. In both instances, banks were instructed to use the same reference number to indicate the portions of a given loss that were allocated either to different business lines or event types.

While the survey asked banks to report all events with gross loss amounts greater than or equal to €10,000, in practice some banks used different minimum cut-off levels in reporting their data. These banks were asked to report what minimum cut-off level they used for loss events in each business line and to indicate if the data submitted were complete given the cut-off used.

In addition to the individual loss data, the survey asked for quarterly information on a set of exposure indicators – including gross income, number of employees, total compensation, and assets – for the standardised business lines. The survey also asked participating banks to report information on their total economic capital, the economic capital for operational risk, and the allocation of the latter across the eight business lines. Finally, banks were asked to indicate if they had estimated operational losses for 2001 and, if so, whether they had used this information for pricing, reserving, and expensing.

The results presented in this paper are based on data submissions of 89 banks from 19 countries in Europe, North and South America, Asia, and Australasia. There was a large increase in the number of submissions since the 2001 data collection exercise. Then, only 30 banks from 11 countries submitted data on operational risk losses. In parallel with the increase in the number of participating banks was an increase in the average number of operational losses submitted per participating institution. The 89 participating banks in the 2002 LDCE reported 47,269 individual losses above the €10,000 threshold, giving an average of 528 losses per bank. In contrast, the 27 banks that participated in the previous data collection exercise, reported 5,265 losses above the €10,000 threshold for the year 2000, giving an average of 195 individual losses per bank.[4]

III. Overview of Individual Operational Risk Loss Data

III.1 Individual Loss Events by Bank

Table 1 summarises the distribution of the number of individual loss events reported by each of the 89 participating banks for the year 2001. The table shows that the range of individual loss events reported by these banks was quite large, ranging from just one event to more than 2,000. Over half the banks (49 out of 89) reported 200 or fewer individual loss events, and the majority of these (27 out of 49) reported fewer than 50 events. At the other extreme,

[3] See Annex 1 for a description of the standardised business line and event type categories used in the survey.

[4] Thirty banks participated in the 2001 data collection exercise, but three of the banks used a uniform minimum cut-off exceeding €10,000.

eight banks reported over 1,000 individual loss events, and five reported more than 2,000 loss events. This is a significant increase in the depth of reporting compared with the previous survey, when no bank reported more than 2,000 individual losses for the year 2000 and only five banks reported more than 1,000 loss events.

As well as giving a sense of the distribution of the number of individual loss events across the banks in the sample, Table 1 provides information on the comprehensiveness of the individual loss data reported by banks. As noted above, banks were asked to give an indication of the extent to which the reported loss events represented all loss events above the minimum cut-off level used to report the data and, if possible, a sense of what portion of overall losses (both frequency and severity) the reported events represented.[5] Columns 3 to 5 of Table 1 summarise this information.

Of the 89 banks participating in the data exercise, 32 indicated that their reported loss events were fully comprehensive for all business lines. Another 11 banks reported that their loss events were comprehensive for at least some business lines ("partially comprehensive" data). However, more than half the participating banks (46 of 89) reported that their data were not comprehensive for any business line, or were unable to provide information about the degree of comprehensiveness.

Table 1

Number of individual loss events reported by banks in the 2002 LDCE

		Of which: comprehensiveness of loss data		
Number of loss events	**Number of banks**	**Fully comprehensive**	**Partially comprehensive**	**Not comprehensive/no information provided**
0-50	27	12	4	11
51-100	8	5	0	3
101-200	14	6	2	6
201-500	17	4	2	11
501-1000	14	3	2	9
1001-2000	3	0	0	3
2001+	5	2	1	2
No information by business line*	1	0	0	1
Total	89	32	11	46

Notes: Comprehensiveness is defined as the number of business lines for which the data were reported as complete by the bank (response of "Yes" to question IL2), given that the bank was active in the business line (ie the bank reported either a loss event or exposure indicator). For business lines in which the bank was active, NI, NA and blank responses to the comprehensiveness were all treated as a "No" response. Fully comprehensive banks are those that reported "Yes" for all business lines. Partially comprehensive banks are those that reported comprehensive data for some business lines but not for others.

* Bank did not report losses disaggregated by business line.

[5] The information banks provided on the comprehensiveness of the data based on severity was not substantially different from the information provided based on frequency.

The statistics on data comprehensiveness should be considered with some caution. For example, of the eight banks reporting more than 1,000 individual losses, only two reported that their data was comprehensive. In contrast, of the 35 banks reporting fewer than 100 losses, 17 indicated that their data was fully comprehensive. This suggests that different banks may have different interpretations of what it means to have "comprehensive" loss data, or that they may have interpreted the question differently in terms of the data collection exercise. More significantly, it suggests the number of observations alone may not always be a reliable indicator of the degree of comprehensiveness of the loss data.

Nonetheless, it is worth noting that compared with the previous data survey, a significantly larger number of the banks participating in the 2002 LDCE indicated they had submitted 'fully comprehensive' individual operational loss data. Then, only six out of the 30 participating banks (20%) considered their data on individual losses to be complete, compared with 32 out of the 89 participating banks (36%) now.

As indicated above, banks were asked to only report operational losses above €10,000 in the survey. Nonetheless, some banks reported data using a different cut-off, probably reflecting their own higher cut-off limits used for internally collecting operational loss data. Differences in cut-offs across banks for a given business line/event type are potentially significant when estimating operational risk loss distributions, since data based on different minimum cut-off levels will cause both frequency and severity estimates to differ across institutions.

Table 2 provides information about the minimum cut-off level used by the banks in the 2002 LDCE, as well as the percentage of the individual losses submitted for these cut-offs.

Table 2

Minimum cut-off levels used by 2002 LDCE reporting banks

Minimum cut-off	**No of banks**	**Percentage of No of losses**	**Percentage of total loss value**
Less than €10,000 for all business lines	5	1.5%	0.8%
€10,000	59	77.6%	75.2%
€10,000 for all business lines	57	75.4%	73.1%
€10,000 for some business lines and more for others	1	0.7%	1.3%
€10,000 for some business lines and no information for others	1	1.5%	0.8%
More than €10,000	13	13.6%	18.1%
More than €10,000 for all business lines*	12	9.2%	17.0%
More than €10,000 for some business lines and no information for others†	1	4.4%	1.1%
No business line information reported	12	7.4%	6.0%
Total	89	100.0%	100.0%

* The cut-offs used ranged between €11,347 and €570,000.

† The minimum loss amounts ranged between €1,000 and €53,000.

For the purposes of the exercise, the majority of banks in the sample (64 out of 89) used minimum cut-off levels at or below €10,000. Altogether, these banks reported about 80% of the individual number of loss events submitted in the 2002 LDCE. Of the remaining 25 banks, 13 indicated that they used a higher cut-off in one or more business lines, and 12 provided no information on the cut-off used in one or more business lines. Of the 13 banks that used a higher cut-off, 12 banks reported using a minimum cut-off for all business lines that exceeded €10,000.

Because of the differences in cut-offs used by banks, the analysis presented in this paper is carried out for two different samples of banks. The first sample encompasses all 89 banks that submitted data (Sample 1). The second sample includes only those 63 banks that said they used a €10,000 (or lower[6]) for all business lines (Sample 2).[7]

III.2 Aggregate Loss Data by Bank

The basic characteristics of the individual loss data submitted by all 89 participating banks are summarised in Tables 3 to 5. Table 3 shows the total number of individual loss events reported in each business line/level-1 event type combination. Table 4 shows the total gross loss amounts of the events in each cell. Table 5 shows the relative frequencies of both the number of individual losses and value of losses for each of the 20 level-2 loss event types.

Table 3

Number of Individual Loss Events per Business Line and Event Type
Sample 1: All Bank and All Losses
89 Banks Reporting

	Internal Fraud	External Fraud	Employment Practices & Workplace Safety	Clients, Products & Business Practices	Damage to Physical Assets	Business Disruption & System Failures	Execution, Delivery & Process Management	No Event Type Information	Total
Corporate Finance	17 0.04%	20 0.04%	73 0.15%	73 0.15%	16 0.03%	8 0.02%	214 0.45%	2 0.00%	423 0.89%
Trading & Sales	47 0.10%	95 0.20%	101 0.21%	108 0.23%	33 0.07%	137 0.29%	4,603 9.74%	8 0.02%	5,132 10.86%
Retail Banking	1,268 2.68%	17,107 36.19%	2,063 4.36%	2,125 4.50%	520 1.10%	163 0.34%	5,289 11.19%	347 0.73%	28,882 61.10%
Commercial Banking	84 0.18%	1,799 3.81%	82 0.17%	308 0.65%	50 0.11%	47 0.10%	1,012 2.14%	32 0.07%	3,414 7.22%
Payment & Settlement	23 0.05%	322 0.68%	54 0.11%	25 0.05%	9 0.02%	82 0.17%	1,334 2.82%	3 0.01%	1,852 3.92%
Agency Services	3 0.01%	15 0.03%	19 0.04%	27 0.06%	8 0.02%	32 0.07%	1,381 2.92%	5 0.01%	1,490 3.15%
Asset Management	28 0.06%	44 0.09%	39 0.08%	131 0.28%	6 0.01%	16 0.03%	837 1.77%	8 0.02%	1,109 2.35%
Retail Brokerage	59 0.12%	20 0.04%	794 1.68%	539 1.14%	7 0.01%	50 0.11%	1,773 3.75%	26 0.06%	3,268 6.91%
No Business Line information	35 0.07%	617 1.31%	803 1.70%	54 0.11%	13 0.03%	6 0.01%	135 0.29%	36 0.08%	1,699 3.59%
Total	1,564 3.31%	20,039 42.39%	4,028 8.52%	3,390 7.17%	662 1.40%	541 1.14%	16,578 35.07%	467 0.99%	47,269 100.00%

Legend	Greater than 20%	10% through 20%	5% through 10%	2.5% through 5%

[6] Though in these cases, if the bank used a lower cut-off, only the losses above €10,000 were considered.

[7] One bank used a minimum cut-off of €10,000 for most business lines but a higher cut-off for a few others. For summary purposes, this bank was included among the 64 categorised as using €10,000 cut-offs, but was dropped when the sample was limited to banks using €10,000 for all business lines.

In total, the 89 banks in the sample submitted over 47,000 individual loss events. However, as shown in Table 3, these events were not spread evenly across business lines and event types. In particular, the data were clustered into four of the eight business lines, with the highest concentration in Retail Banking. This business line accounted for 61% of the individual observations, while Trading & Sales accounted for 11% and Commercial Banking and Retail Brokerage another 7% each. Altogether, these four business lines accounted for 86% of all individual loss events reported. Corporate Finance accounted for the fewest events - just 1% of the total (423 individual events).

A similar clustering is apparent in the level-1 event types. Forty-two percent of the individual loss events were categorised as External Fraud and another 35% as Execution, Delivery & Process Management. Employment Practices & Workplace Safety and Clients, Products & Business Practices followed with 9% and 7% respectively. Altogether, these four level-1 event types accounted for 93% of the individual loss events. Business Disruption & System Failures and Damage to Physical Assets had the fewest number of events: 541 (1.1%) and 662 (1.4%), respectively.

There is also evidence of considerable clustering in the individual business line/event type cells. Just one cell – External Fraud in the Retail Banking business line – accounted for over 36% (17,107) of the individual loss events. This was followed by the event type Execution, Delivery & Process Management in the business lines Retail Banking and Trading & Sales with 11% and 10% of all loss events, respectively. In contrast, 42 of the 56 cells accounted for less than 1% of the total events.

Table 4

Total Gross Loss Amounts by Business Line and Event Type

Sample 1: All Bank and All Losses

Millions of Euros

89 Banks Reporting

	Internal Fraud	External Fraud	Employ-ment Practices & Workplace Safety	Clients, Products & Business Practices	Damage to Physical Assets	Business Disruption & System Failures	Execution, Delivery & Process Management	No Event Type Information	Total
Corporate Finance	49.4 0.63%	5.0 0.06%	2.5 0.03%	157.9 2.03%	8.0 0.10%	0.5 0.01%	49.6 0.64%	0.6 0.01%	273.5 3.51%
Trading & Sales	59.5 0.76%	40.4 0.52%	64.8 0.83%	193.4 2.48%	87.9 1.13%	17.6 0.23%	698.4 8.96%	1.1 0.1%	1,163.1 14.92%
Retail Banking	331.9 4.26%	787.1 10.10%	340.0 4.36%	254.1 3.26%	87.5 1.12%	26.5 0.34%	424.5 5.45%	37.4 0.48%	2,289.0 29.36%
Commercial Banking	21.2 0.27%	324.9 4.17%	20.4 0.26%	156.4 2.01%	1,072.9 13.76%	18.2 0.23%	619.4 7.95%	23.2 0.30%	2,256.8 28.95%
Payment & Settlement	23.0 0.29%	21.0 0.27%	11.6 0.15%	10.5 0.13%	15.0 0.19%	78.6 1.01%	93.5 1.20%	0.3 0.00%	253.4 3.25%
Agency Services	0.2 0.00%	3.9 0.05%	7.6 0.10%	5.0 0.06%	100.0 1.28%	40.1 0.51%	174.1 2.23%	0.8 0.01%	331.6 4.25%
Asset Management	6.4 0.08%	4.6 0.06%	10.2 0.13%	77.0 0.99%	2.3 0.03%	2.3 0.03%	113.2 1.45%	0.05 0.01%	216.5 2.78%
Retail Brokerage	61.5 0.79%	1.2 0.02%	50.7 0.65%	158.6 2.03%	513.2 6.58%	28.0 0.36%	97.1 1.25%	3.4 0.04%	913.7 11.72%
No Business Line information	10.5 0.13%	23.4 0.30%	18.7 0.24%	11.5 0.15%	6.7 0.09%	0.7 0.01%	22.7 0.29%	3.8 0.05%	97.9 1.26%
Total	563.5 7.23%	1,211.3 15.54%	526.6 6.76%	1024.5 13.14%	1,893.4 24.29%	212.5 2.73%	2,292.6 29.41%	71.1 0.91%	7,795.5 100.00%

Legend	Greater than 10%		5% through 10%		2.5% through 5%	

As indicated in Table 4, the total of gross operational risk loss amounts was just under €7.8 billion. The aggregate gross loss amounts were distributed somewhat more evenly across business lines and level-1 event types than the number of individual loss events. However, there was still evidence of clustering. As with the frequency of losses, Retail Banking accounted for the largest share of gross loss amounts, slightly above 29% of the total. The lower percentage of loss *amounts* compared with loss *numbers* reflects the prevalence of smaller-than-average losses in this business line (recall that Retail Banking accounts for 61% of the individual loss events in the sample). After Retail Banking was Commercial Banking with just under 29% of gross loss amounts. Note the large difference between the share of gross losses accounted for by Commercial Banking (29%) and the share of the number of losses incurred by this business line (7%). This difference was largely attributable to operational losses that Commercial Banking sustained in the Damage to Physical Assets event type and, to a lesser extent, losses incurred in the Execution, Delivery & Process Management event category.

In terms of event types, gross loss amounts were concentrated in four categories: Execution, Delivery & Process Management (29%); Damage to Physical Assets (24%), External Fraud (16%) and Clients, Products & Business Practices (13%). Comparing the distribution of the number of losses by level-1 event types with the distribution of gross loss amounts, it is worth noting the difference in the Damage to Physical Assets category; it accounted for less than 2% of the number of losses but over 24% of the gross losses. In contrast, External Fraud accounted for over 42% of the number of operational losses but only 16% of the gross loss amounts.

Looking at the individual cells of Table 4, two cells - Damage to Physical Assets in the Commercial Banking and Retail Brokerage business lines - account for 20% of gross losses. Three further cells - External Fraud in the Retail Banking business line and Execution, Delivery & Process Management in the Trading & Sales and Commercial Banking business lines - together account for a further 27% of the gross losses.

In an attempt to better understand the source of operational losses reported by banks, Table 5 presents the relative frequencies of the number of losses and the gross loss amounts, respectively, by the 20 level-2 event types. Regardless of whether the frequency (Table 3) or the gross amounts (Table 5) of the operational risk losses are considered, it can be seen that for both Internal Fraud and External Fraud the losses are largely due to Theft & Fraud. In the case of Employment Practices & Workplace Safety, Employee Relations is most important. In the case of Clients Products & Business Practices, the bulk of the losses are associated with Suitability, Disclosure & Fiduciary and Improper Business or Market Practices. Finally, for Execution, Delivery & Process Management, the operational losses are mostly explained by Transaction Capture, Execution & Maintenance.

Table 5

Distribution of Individual Loss Events by Event Type Levels 1 and 2
Sample 1: All Banks and All Losses
89 Banks Reporting

Event Type Level 1	Percent of Total Number of Loss Events	Percent of Total Value of Loss Events	Event Type Level 2	Percent of Total Number of Loss Events	Percent of Total Value of Loss Events
Internal Fraud	3.3%	7.2%	Unauthorised Activity	0.34%	1.54%
			Theft & Fraud	2.86%	3.77%
			No Information	0.11%	1.92%
External Fraud	42.4%	15.5%	Theft & Fraud	41.90%	14.49%
			Systems Security	0.14%	0.28%
			No Information	0.36%	0.77%
Employment Practices & Workplace Safety	8.5%	6.8%	Employee Relations	5.26%	5.49%
			Safe Environment	2.10%	0.76%
			Diversity & Discrimination	1.09%	0.39%
			No Information	0.08%	0.11%
Clients, Products & Business Practices	7.2%	13.1%	Suitability, Disclosure & Fiduciary	2.80%	4.63%
			Improper Business or Market Practices	2.85%	5.32%
			Product Flaws	0.11%	0.16%
			Selection, Sponsorship & Exposure	0.43%	0.70%
			Advisory Activity	0.49%	0.27%
			No Information	0.49%	2.05%
Damage to Physical Assets	1.4%	24.3%	Disasters & Other Events	1.34%	24.21%
			No Information	0.06%	0.07%
Business Disruption & System Failures	1.1%	2.7%	Systems	1.06%	2.70%
			No Information	0.08%	0.03%
Execution, Delivery & Process Management	35.1%	29.4%	Transaction Capture, Execution & Maintenance	23.78%	22.08%
			Monitoring & Reporting	1.04%	1.80%
			Customer Intake & Documentation	0.45%	0.32%
			Customer/Client Account Management	1.69%	0.58%
			Trade Counterparties	0.33%	0.29%
			Vendors & Suppliers	0.22%	0.29%
			No Information	7.57%	4.05%
No Information	1.0%	0.9%	No Information	0.99%	0.91%

In considering Tables 3 to 5, it is important to remember that because they were built with the data submitted by all banks participating in the 2002 LDCE, they reflect the use of different minimum cut-off levels by some of these banks. To examine the potential impact of these differences, a sample of banks that reported data using a cut-off for gross losses less than or equal to €10,000 for all business lines was created. In addition, if one of the selected banks used a cut-off smaller than €10,000, events with gross loss amounts below this cut-off were excluded in order to make their data comparable to the banks that used the €10,000 cut-off. This criterion left us with 63 of the 89 banks in the sample (Sample 2). Table 6 presents the distributions of the number of losses and the gross losses for the two samples.

Table 6

Distribution of Individual Loss Events by Gross Loss Amounts

Panel A: Sample 1, 89 Banks Reporting

Gross Loss Amounts (thousands of Euros)	Number of Loss Events		Value of Loss Events	
	Number	Percent of all Loss Events	Total (thousands of Euros)	Percent of all Loss Events
0-10	313	0.7%	1,934	0.02%
10-50	36,745	77.7%	720,489	9.2%
50-100	4,719	10.0%	324,783	4.2%
100-500	4,217	8.9%	847,645	10.9%
500-1,000	563	1.2%	387,818	5.0%
1,000-10,000	619	1.3%	1,748,752	22.4%
10,000+	93	0.2%	3,764,104	48.3%
Total	47,269	100.0%	7,795,525	100.0%

Panel B: Sample 2, 63 Banks Reporting

Gross Loss Amounts (thousands of Euros)	Number of Loss Events		Value of Loss Events	
	Number	Percent of all Loss Events	Total (thousands of Euros)	Percent of all Loss Events
10-50	29,355	79.5%	560,170	9.6%
50-100	3,611	9.8%	247,607	4.2%
100-500	3,057	8.3%	609,858	10.5%
500-1,000	417	1.1%	288,771	5.0%
1,000-10,000	417	1.1%	1,178,471	20.2%
10,000+	65	0.2%	2,952,848	50.6%
Total	36,922	100.0%	5,837,725	100.0%

Sample 2 had just over 10,000 fewer loss events and €1.96 billion less in aggregate gross losses than Sample 1. This represents a loss of approximately 25% of the original sample. Other than the exclusion of losses below €10,000, the distributions of the new sample do not appear to be very different from those in the original sample.

To further evaluate the impact of the changes to the sample of banks, Tables 7 to 9 replicate the information presented in Tables 3 to 5 but for the Sample 2 banks. Comparing the two samples, there are some differences but in general, the conclusions arrived at based on the original sample still hold. The general distribution of both the number and value of events across business lines and event types is unchanged after dropping the banks that used higher minimum cut-offs.

Table 7

Number of Individual Loss Events per Business Line and Event Type

Sample 2: Banks with Cut-offs Exceeding €10,000 and Events Exceeding €10,000
63 Banks Reporting

	Internal Fraud	External Fraud	Employ-ment Practices & Workplace Safety	Clients, products & Business Practices	Damage to Physical Assets	Business Disruption & System Failures	Execution, Delivery & Process Management	No Event Type Information	Total
Corporate Finance	16 0.04%	15 0.04%	71 0.19%	69 0.19%	15 0.04%	6 0.02%	173 0.47%	0 0.00%	365 0.99%
Trading & Sales	36 0.10%	92 0.25%	83 0.22%	86 0.23%	27 0.07%	93 0.25%	3,792 10.27%	3 0.01%	4,212 11.41%
Retail Banking	1,059 2.87%	14,347 38.86%	1,848 5.01%	1,649 4.47%	206 0.56%	128 0.35%	4,266 11.55%	27 0.07%	23,530 63.73%
Commercial Banking	70 0.19%	1,357 3.68%	61 0.17%	221 0.60%	42 0.11%	35 0.09%	723 1.96%	27 0.07%	2,536 6.87%
Payment & Settlement	17 0.05%	299 0.81%	47 0.13%	11 0.03%	5 0.01%	52 0.14%	1,073 2.91%	1 0.00%	1,505 4.08%
Agency Services	3 0.01%	11 0.03%	3 0.01%	6 0.02%	0 0.00%	12 0.03%	896 2.43%	1 0.00%	932 2.52%
Asset Management	25 0.07%	35 0.09%	38 0.10%	72 0.20%	4 0.01%	5 0.01%	609 1.65%	4 0.01%	792 2.15%
Retail Brokerage	55 0.15%	16 0.04%	789 2.14%	500 1.35%	6 0.02%	42 0.11%	1,500 4.06%	0 0.00%	2,908 7.88%
No Business Line information	10 0.03%	52 0.14%	11 0.03%	12 0.03%	10 0.03%	4 0.01%	38 0.10%	5 0.01%	142 0.38%
Total	1,291 3.50%	16,224 43.94%	2,951 7.99%	2,626 7.11%	315 0.85%	377 1.02%	13,070 35.40%	68 0.18%	36,922 100.00 %

Legend	Greater than 20%		10% through 20%		5% through 10%		2.5% through 5%	

Table 8

Total Gross Loss Amounts by Business Line and Event Type

Sample 2: Banks with Cut-offs Exceeding €10,000 and Events Exceeding €10,000
63 Banks Reporting
Millions of Euros

	Internal Fraud	External Fraud	Employ-ment Practices & Workplace Safety	Clients, Products & Business Practices	Damage to Physical Assets	Business Disruption & System Failures	Execution, Delivery & Process Management	No Event Type Information	Total
Corporate Finance	49.4 0.85%	0.2 0.00%	1.7 0.03%	43.2 0.74%	8.0 0.14%	0.5 0.01%	33.6 0.58%	0.0 0.00%	136.6 2.34%
Trading & Sales	50.7 0.87%	33.6 0.58%	18.5 0.32%	70.8 1.21%	27.9 0.48%	11.3 0.19%	472.4 8.09%	0.5 0.01%	685.7 11.75%
Retail Banking	235.0 4.03%	631.8 10.82%	210.9 3.61%	184.3 3.16%	66.8 1.14%	11.1 0.19%	327.7 5.61%	17.0 0.29%	1,684.5 28.85%
Commercial Banking	19.7 0.34%	245.0 4.20%	19.0 0.33%	121.8 2.09%	1062.2 18.19%	11.5 0.20%	538.8 9.23%	20.8 0.36%	2,038.7 34.92%
Payment & Settlement	18.1 0.31%	17.1 0.29%	10.4 0.18%	0.7 0.01%	9.1 0.16%	2.7 0.05%	81.3 1.39%	0.1 0.00%	139.6 2.39%
Agency Services	0.2 0.00%	3.6 0.06%	0.1 0.00%	0.4 0.01%	0.0 0.00%	0.8 0.01%	115.3 1.98%	0.3 0.00%	120.7 2.07%
Asset Management	3.9 0.07%	3.8 0.07%	10.1 0.17%	63.8 1.09%	1.5 0.03%	1.3 0.02%	69.4 1.19%	0.0 0.00%	153.9 2.64%
Retail Brokerage	57.3 0.98%	1.0 0.02%	50.4 0.86%	149.4 2.56%	513.2 8.79%	1.2 0.02%	84.6 1.45%	0.0 0.00%	857.0 14.68%
No Business Line information	8.4 0.14%	3.2 0.06%	0.8 0.01%	0.4 0.01%	6.2 0.11%	0.3 0.00%	1.6 0.03%	0.1 0.00%	21.0 0.36%
Total	442.6 7.58%	939.3 16.09%	321.8 5.51%	634.9 10.88%	1,694.9 29.03%	40.7 0.70%	1,724.7 29.54%	38.0 0.66%	5,837.7 100.0%

Legend	Greater than 10%		5% through 10%		2.5% through 5%

Table 9

Distribution of Individual Loss Events by Event Type Levels 1 and 2
Sample 2: Only Banks with Cut-offs Exceeding €10,000 and Events Exceeding €10,000
63 Banks Reporting

Event Type Level 1	Percent of Total Number of Loss Events	Percent of Total Value of Loss Events	Event Type Level 2	Percent of Total Number of Loss Events	Percent of Total Value of Loss Events
Internal Fraud	3.5%	7.6%	Unauthorised Activity	0.36%	1.27%
			Theft & Fraud	3.01%	3.76%
			No Information	0.12%	2.56%
External Fraud	43.9%	16.1%	Theft & Fraud	43.34%	14.70%
			Systems Security	0.16%	0.37%
			No Information	0.44%	1.02%
Employment Practices & Workplace Safety	8.0%	5.5%	Employee Relations	4.17%	4.00%
			Safe Environment	2.41%	0.94%
			Diversity & Discrimination	1.33%	0.43%
			No Information	0.09%	0.14%
Clients, Products & Business Practices	7.1%	10.9%	Suitability, Disclosure & Fiduciary	2.39%	2.72%
			Improper Business or Market Practices	3.38%	4.71%
			Product Flaws	0.08%	0.14%
			Selection, Sponsorship & Exposure	0.17%	0.36%
			Advisory Activity	0.47%	0.21%
			No Information	0.62%	2.74%
Damage to Physical Assets	0.9%	29.0%	Disasters & Other Events	0.78%	28.93%
			No Information	0.08%	0.10%
Business Disruption & System Failures	1.0%	0.7%	Systems	0.92%	0.66%
			No Information	0.10%	0.04%
Execution, Delivery & Process Management	35.4%	29.5	Transaction Capture, Execution & Maintenance	22.04%	21.76%
			Monitoring & Reporting	1.02%	1.13%
			Customer Intake & Documentation	0.36%	0.20%
			Customer/Client Account Management	1.90%	0.70%
			Trade Counterparties	0.25%	0.20%
			Vendors & Suppliers	0.17%	0.14%
			No Information	9.66%	5.40%
No Information	0.2%	0.7%	No Information	0.18%	0.66%

Comparison of the 2002 LDCE Loss Data with the Previous Exercise

It is interesting to compare the loss event data for 2001 with data collected in the previous exercise. Although the previous exercise covered three years (1998-2000), the following analysis focuses just on data collected for 2000 in order to have an annual comparison and because the data for 2000 were felt to be more complete than for the earlier years. However, one should still consider the results of this comparison with some caution as there are significant differences between the samples of participating banks in the two data surveys. In order to reduce the impact of these differences, the comparison is limited to banks which used a data cut-off of less than or equal to €10,000 and only losses above this threshold. The results for the 63 banks in Sample 2 are therefore used for 2001. For 2000, the sample includes 27 banks. Figures 1a and 1b present the relative frequency distribution of the number of losses per business line and level-1 event type, respectively for the two samples. Figures 2a and 2b repeat this information but for gross loss amounts.

Figure1a: Percent Frequency by Business Line

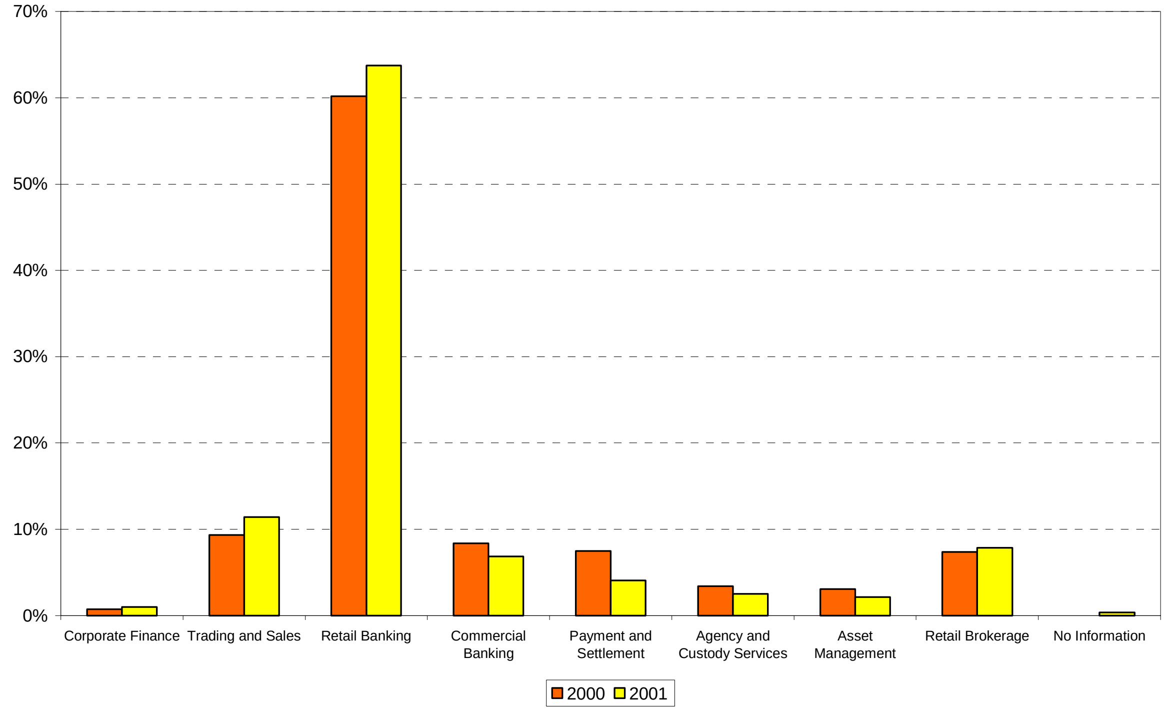


Figure 1b: Percent Frequency by Event Type

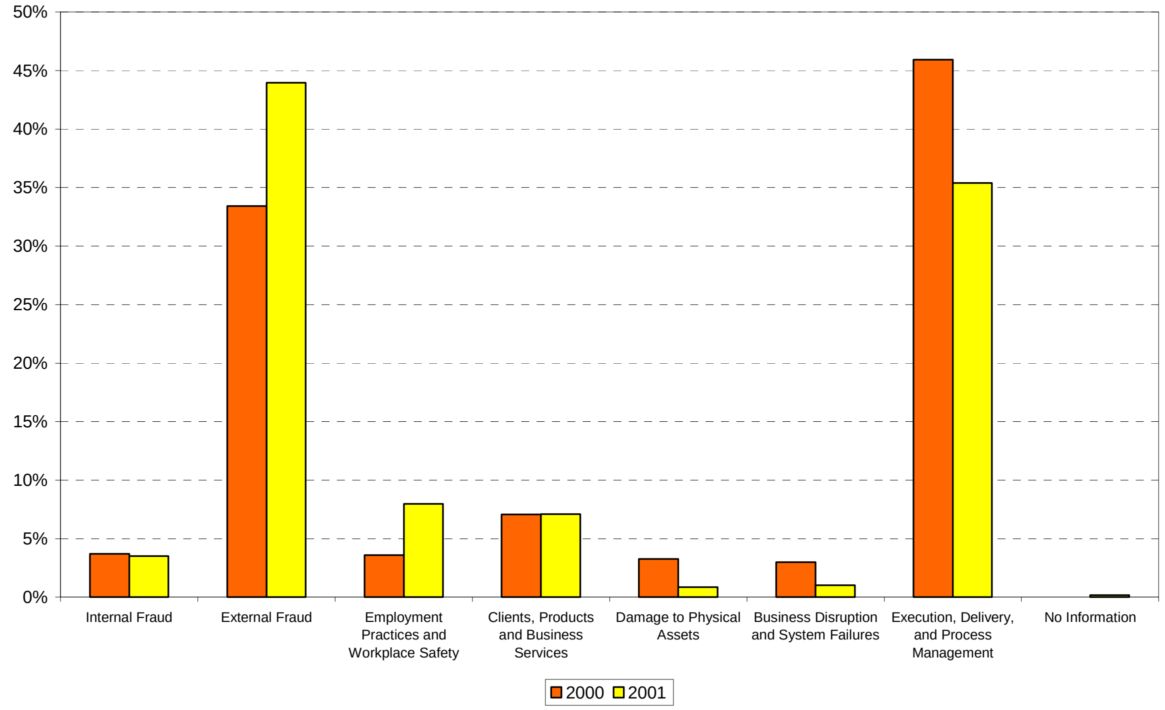


Figure 2a: Percent Severity by Business Line

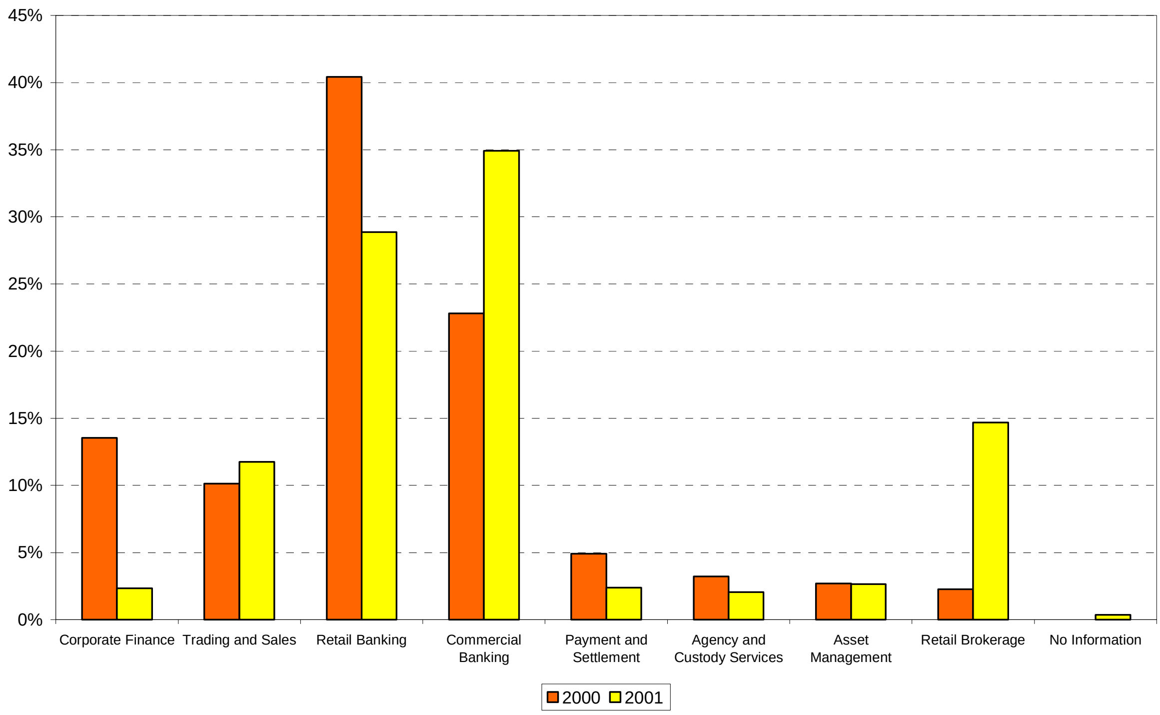
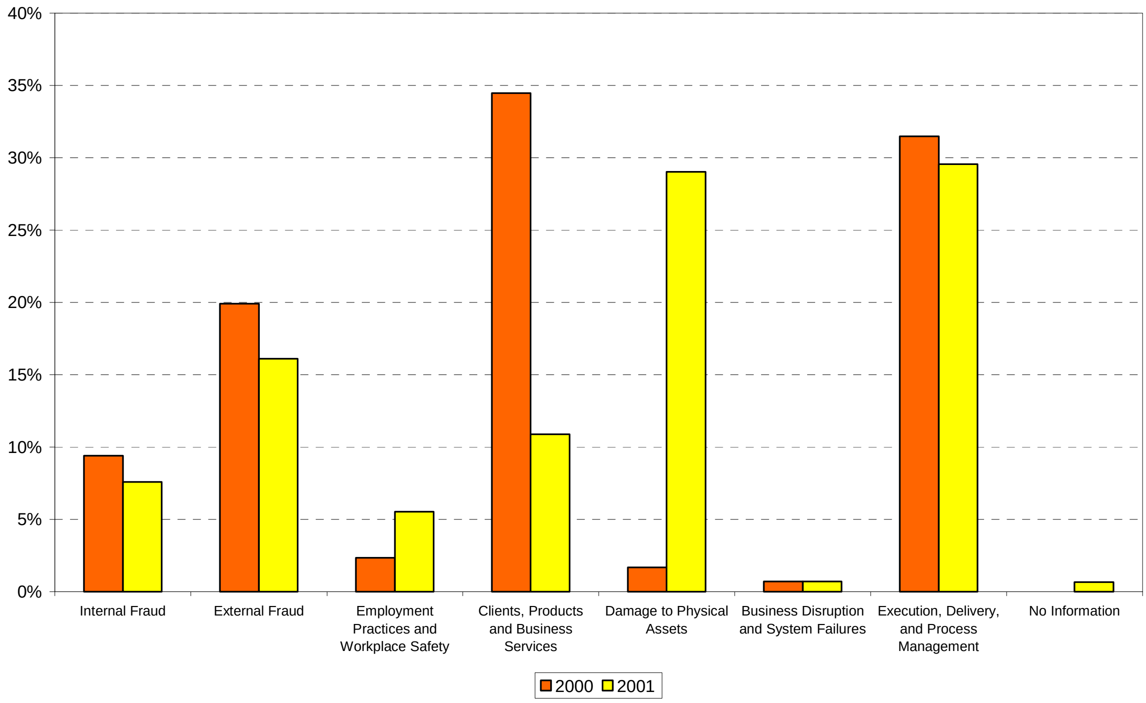


Figure 2b: Percent Severity by Event Type



From the data, it appears that the distribution of the number of loss events by business line has not changed significantly between the two years. In contrast, the distribution of the number of losses by *event types* experienced some striking, though limited changes. Most notably, the distribution for 2001 had a relatively high proportion of loss events in the External Fraud and Employment Practices & Workplace Safety categories, and a relatively smaller share in Execution, Delivery & Process Management. However, the distribution of the gross loss amounts by both business line and event type experienced larger changes between the two years. Though here too the larger changes occurred in the distribution across event types, most notably due to the relative reduction of the share of gross loss amounts in Clients, Products & Business Services and the relative increase in the share in Damage to Physical Assets in 2001.

In comparing the data for 2000 and 2001, it is important to note that one would expect to observe changes in the distribution of loss events across business lines and event types on a year-to-year basis. The distribution of gross loss amounts, in particular, is likely to be sensitive to the incidence of relatively few very large-impact events. This phenomenon is certainly evident in the 2001 data, which contain some large individual loss amounts associated with events of September 11, for example. In addition, the samples used for each year are quite different not only in size but also in composition. For example, there is a large difference in the number of banks in the two samples reporting their data to be comprehensive.

Moreover, while the tabulation presented thus far is informative in many respects, it does not allow identification of the business lines and/or event types that are the largest sources of operational risk. To assess the extent of risk, it would be necessary to assess the extent of variability of both number and value of loss events around their expected, or mean, values. Business lines or event types with large numbers of individual losses or with large total loss values could exhibit large **or** small amounts of this variability over time, and therefore correspondingly large or small degrees of risk. Simple tabulation of the data – as reported above – does not supply significant insight in this regard. To gain such insight, it would be necessary to model this variation, an exercise beyond the scope of this paper.[8]

Finally, since the samples of banks considered here reflect information pooled across banks with varying degrees of complete reporting for loss amounts, the pooled data do not necessarily reflect the aggregate loss experience of the banking industry, or even of the full set of 89 participating banks, for any particular business lines or event types. It is also not clear the extent to which the sample of banks in the survey was representative of the banking industry as a whole.

III.3 Individual Losses that Cross Business-Lines or Event-Type Boundaries

The data presented so far do not take into account the information banks provided on losses that affected either multiple business lines and/or multiple event types. That is, when these losses occurred they have been as independent events. However, it is important to link these losses, as doing so can give a different view of the prevalence of "large" loss events and of the scope of operational loss events.

To that end, banks were asked to identify losses that affected either multiple business lines and/or multiple event types. Of the 89 banks that participated in the survey, 22 reported information on losses that crossed either the business line boundaries and/or the type-event

[8] The RMG is undertaking internal analysis to address such issues.

boundaries. These banks reported that on 568 occurrences they had losses that affected more than one business line or more than one event type.[9] As noted above, linking these losses can give a different view of the prevalence of large loss events for an institution as a whole and for the overall sample. For example, once we take into account all of the links associated with these 568 occurrences, the largest individual loss amount increases for seven of the 22 banks reporting linked events. For four of these seven banks, the largest loss amount increased by more than 50%, and for one bank, it more than doubled.

Of the 568 occurrences that crossed business lines or event types, 515 affected more than one business line and 257 affected more than one event type (see Table 10).

The top panel of Table 10 indicates that 87% of those loss events crossing business lines affected only two business lines. In 10% of these multi-business line events, the losses affected three business lines. The number of instances where the losses affected more than three business lines was limited (13), though in two instances all eight-business lines were affected.

The bottom panel of Table 10 presents the same data but across Level-1 events. Here too, the vast majority of the loss events that crossed the event boundaries (95%) were associated with only two different event type categories. The remaining 5% of the cases were due to losses that crossed three different event types.

Table 10

Individual Losses that Cross Business Lines and Event Types

Panel A: Losses that Cross Business Lines

Number of Business Lines Involved	Number of Loss Events	Percentage of Loss Events
2	450	87.4%
3	52	10.1%
4	2	0.4%
5	4	0.8%
6	5	1.0%
8	2	0.4%
Total	515	100.0%

Panel B: Losses that Cross Events Types

Number of Event Types Involved	Number of Loss Events	Percentage of Loss Events
2	243	94.6%
3	14	5.4%
Total	257	100.0%

Tables 11 and 12 show the business lines and event types that were affected by losses that crossed business line or event type boundaries. The most frequent ‘pairs’ of business lines

[9] Of the 89 participating banks, 33 reported information on 938 corporate centre losses, but these were nearly all assigned to a defined business line (that is, they were not split across business lines). Therefore, these events are not included in the discussion in this section.

affected by single loss events were Retail Banking/Corporate Banking followed by Retail Banking/Asset Management (Table 11). Similarly, the most frequent combination of three business lines affected by single loss events was Retail Banking, Commercial Banking and Asset Management.

Table 11

Frequencies of Loss Events that Cross Business Lines

Number of Business Lines Involved	Business Line Combination*	Frequency	Percentage Frequency
2	3-4	305	67.8%
2	3-7	82	18.2%
2	1-2	14	3.1%
2	2-3	13	2.9%
2	2-5	9	2.0%
2	2-7	7	1.6%
2	1-3	6	1.3%
2	2-4	5	1.1%
2	3-5	4	0.9%
2	3-8	2	0.4%
2	3-6	1	0.2%
2	4-5	1	0.2%
2	5-7	1	0.2%
3	3-4-7	22	42.3%
3	1-2-3	8	15.4%
3	3-7-8	6	11.5%
3	2-3-7	4	7.7%
3	1-2-4	3	5.8%
3	2-3-4	2	3.8%
3	2-3-5	2	3.8%
3	1-3-7	1	1.9%
3	2-3-6	1	1.9%
3	2-4-5	1	1.9%
3	2-6-7	1	1.9%
3	3-4-6	1	1.9%
4	1-2-3-4	1	50.0%
4	3-4-6-7	1	50.0%
5	1-3-4-5-7	4	100.0%
6	1-2-3-4-5-7	4	80.0%
6	1-2-3-4-5-6	1	20.0%
8	1-2-3-4-5-6-7-8	2	100.0%

* The codes in the column are as follows:

1 - Corporate Finance
2 - Trading & Sales
3 - Retail Banking
4 - Commercial Banking
5 - Payment & Settlement
6 - Agency Services
7 - Asset Management
8 - Retail Brokerage

The most frequent combination of event types associated with single loss events was External Fraud and Execution Delivery & Process Management, followed by Internal Fraud and Execution Delivery & Process Management (see Table 12).

Analysis of multiple business lines and event type combinations that are associated with individual loss events provides valuable information on the nature of the data contained in the exercise. However, this information should be considered with some caution. For one, it was reported by only a small number of the participating banks (22 out of 89). In addition, even among these reporting banks, it is unclear the extent to which the information provided was due to "true" patterns of correlations of losses across business lines or event types as opposed to the mapping of their activities into the standardised business lines and event types defined in the survey.

Table 12

Frequencies of Loss Events that Cross Event Types

Number of Event Types Involved	Event Type Combination*	Frequency	Percentage Frequency
2	2-7	163	67.1%
2	1-7	25	10.3%
2	2-4	14	5.8%
2	4-7	12	4.9%
2	1-2	10	4.1%
2	2-6	6	2.5%
2	2-3	5	2.1%
2	3-7	4	1.6%
2	6-7	3	1.2%
2	2-5	1	0.4%
3	2-4-7	7	50.0%
3	2-6-7	2	14.3%
3	3-4-7	2	14.3%
3	1-2-7	1	7.1%
3	2-3-7	1	7.1%
3	3-4-6	1	7.1%

* The codes in the column are as follows:

1 - Internal Fraud
2 - External Fraud
3 - Employment Practices & Workplace Safety
4 - Clients, Products & Business Practices
5 - Damage to Physical Assets
6 - Business Disruption & System Failures
7 - Execution, Delivery & Process Management

III.4 Insurance and 'Other' Recoveries

As part of the 2002 LDCE, banks were asked to provide information on insurance recoveries and 'other' recoveries. For the insurance section of the survey, banks were asked to indicate whether an insurance claim had been filed for each loss event. If a claim had been filed, the bank was asked to indicate the amount of the claim filed. In the event that a claim was filed, the bank was asked to provide the 'amount received' and/or the 'amount expected' to be received with certainty within one year of the loss date. In addition to insurance recoveries, banks were also asked to provide the amount of 'other' recoveries received and/or the amount of other expected recoveries to be received with certainty within one year of the loss date.

For the purposes of this analysis, "insurance recoveries" are defined as the sum of the insurance amount received plus other expected insurance recoveries. Likewise, 'other' recoveries are defined as 'other' recoveries received plus other expected recoveries. Of the operational loss events submitted in the 2002 survey, 936 events had insurance claims filed, 746 events had non-zero insurance recoveries, and 5,632 events had ‘other’ recoveries. Expected recoveries represented a relatively small portion of the total number of events with recovery data. Insurance recoveries were expected for 175 of the 936 events (18.7%) where an insurance claim had been filed. In only 77 of the 5,632 events (1.4%) where ‘other’ recoveries occurred was there an ‘other’ expected recovery.

Before interpreting the results, it is important to note a couple of caveats. Discussions with banks revealed that many had difficulty linking recovery information with specific loss events. To the extent that this was common among banks submitting data, the results stated here may understate the frequency and level of insurance and non-insurance recoveries.

In addition, a significant number of banks reported that they had filed insurance claims for some of their loss events, but also reported a zero recovery amount. As long as banks followed the instructions of the survey, such cases should be interpreted as an insurance payout of zero within one year of the loss event. However, it is plausible that some banks reported a value of zero in cases where they did not have available information on the recovery amount.

Frequency of Recoveries by Gross Loss Amount

Table 13 shows the frequency of insurance claims, the frequency of non-zero insurance recoveries, and the frequency of ‘other’ recoveries, by gross loss amount. Overall, 14.1% of all observations had either an insurance or ‘other’ recovery, with the majority classified as ‘other’ recoveries. Banks filed insurance claims in 2.1% of the events, received non-zero insurance payout in 1.7% of the events, and received some other type of recovery in 12.5% of the events. As reported, 2.1% of all loss events resulted in insurance claims, but only 1.7% of these loss events resulted in insurance payouts. This suggests that in nearly 20% of the loss events where insurance claims were filed, the insurer did not pay the claimant.

The frequency at which insurance claims were filed, and the frequency at which other types of recoveries were made, increased as the loss amount increased. While insurance claims were filed for only 1.1% of loss events where the gross loss amount was less than €10,000, this figure rose to 12.8% for loss events of gross loss amount greater than €1,000,000. Similar patterns existed for the frequency of non-zero insurance recoveries, ‘other’ recoveries, and total recoveries. These results suggest that banks have more options for recovery when loss amounts are large (eg. loss amount exceed deductible) and/or greater willingness to pursue recoveries (eg. willingness to seek legal recourse).

Panel A of Table 13 shows the results for Sample 1 banks. Results for Sample 2 banks are presented in Panel B of Table 13, and are qualitatively similar.

Frequency of Recoveries by Business Lines

Table 14a shows the frequency of insurance claims, the frequency of non-zero insurance recoveries, and the frequency of ‘other’ recoveries, by business line. The frequency of non-zero insurance recoveries across business lines ranged from 0.4% for Trading & Sales to 2.1% in Retail Banking. Corporate Finance, Commercial Banking, Payment & Settlement, and Agency Services all fell within the 1.2% to 1.4% range. Asset Management and Retail Brokerage were 0.6% and 0.7% respectively.

For ‘other’ recoveries the range was larger: from 20.9% of events in Retail Brokerage to only 4.2% of events in Trading & Sales.

The results for Sample 2 banks (Panel B) were qualitatively similar to those for Sample 1 banks (Panel A).

Table 13

Frequency and Number of Recoveries by Gross Loss Amount

Panel A: Sample 1 (89 Banks)

Gross Loss Amount (Euros 1000s)	**% of loss events where an insurance claim was filed**	**% of loss events where insurance recovery is > 0**	**% of events where bank received a non-insurance recovery**	**% of loss events where bank received an insurance and/or 'other' recovery**
0-10	1.1% 25	1.0% 24	10.6% 247	11.6% 271
10-50	1.8% 582	1.4% 450	13.1% 4,334	14.5% 4,780
50-100	2.2% 100	1.8% 79	10.3% 461	12.0% 539
100-500	2.6% 107	2.3% 91	9.6% 388	11.8% 476
500-1000	6.3% 34	5.5% 30	16.0% 87	18.6% 101
Greater than 1000	12.8% 88	10.5% 72	16.7% 115	26.3% 181
All Loss Events	2.1% 936	1.7% 746	12.5% 5,632	14.1% 6,348

Panel B: Sample 2 (63 Banks)

Gross Loss Amount (Euros 1000s)	**% of loss events where an insurance claim was filed**	**% of loss events where insurance recovery is > 0**	**% of events where bank received a non-insurance recovery**	**% of loss events where bank received an insurance and/or 'other' recovery**
10-50	1.1% 310	0.8% 247	14.9% 4,365	15.7% 4,609
50-100	1.9% 67	1.5% 52	12.0% 419	13.5% 470
100-500	2.1% 64	1.7% 51	10.9% 326	12.5% 374
500-1000	6.9% 28	5.9% 24	18.9% 77	21.1% 86
Greater than 1000	9.5% 45	7.2% 34	18.8% 89	25.2% 119
All Loss Events	1.4% 514	1.1% 408	14.4% 5,276	15.4% 5,658

Table 14a

Frequency and Number of Recoveries by Business Line

Panel A: Sample 1 (89 Banks)

Business Line	% of loss events where an insurance claim was filed	% of loss events where insurance recovery is > 0	% of events where bank received a non-insurance recovery	% of loss events where bank received an insurance and/or 'other' recovery
Corporate Finance	2.4% 10	1.2% 5	10.2% 43	11.4% 48
Trading & Sales	0.6% 30	0.4% 21	4.2% 213	4.5% 232
Retail Banking	2.7% 760	2.1% 606	14.6% 4,150	16.6% 4,732
Commercial Banking	1.5% 50	1.2% 40	10.0% 339	11.2% 378
Payment & Settlement	1.7% 31	1.3% 24	4.7% 87	5.9% 109
Agency Services	1.5% 22	1.4% 21	4.6% 69	6.0% 89
Asset Management	0.7% 8	0.6% 7	4.8% 53	5.5% 60
Retail Brokerage	0.8% 25	0.7% 22	20.9% 678	21.6% 700
All Business Lines	2.1% 936	1.7% 746	12.5% 5,632	14.1% 6,348

Panel B: Sample 2 (63 Banks)

Business Line	% of loss events where an insurance claim was filed	% of loss events where insurance recovery is > 0	% of events where bank received a non-insurance recovery	% of loss events where bank received an insurance and/or 'other' recovery
Corporate Finance	2.2% 8	1.1% 4	10.7% 39	11.8% 43
Trading & Sales	0.5% 21	0.3% 14	3.9% 164	4.2% 177
Retail Banking	1.7% 397	1.4% 318	16.8% 3,937	18% 4,234
Commercial Banking	1.6% 39	1.3% 32	12.9% 323	14.1% 354
Payment & Settlement	1.2% 18	0.8% 12	5.1% 76	5.7% 86
Agency Services	0.3% 3	0.3% 3	2.0% 19	2.3% 21
Asset Management	0.5% 4	0.5% 4	5.6% 44	6.1% 48
Retail Brokerage	0.8% 24	0.7% 21	23.2% 674	23.9% 695
All Business Lines	1.4% 514	1.1% 408	14.4% 5,276	15.4% 5,658

Frequency of Recoveries by Event Types

Table 14b

Frequency and Number of Recoveries by Event Type

Panel A: Sample 1 (89 Banks)

Business Line	**% of loss events where an insurance claim was filed**	**% of loss events where insurance recovery is > 0**	**% of events where bank received a non-insurance recovery**	**% of loss events where bank received an insurance and/or 'other' recovery**
Internal Fraud	3.3% 50	2.4% 37	12.4% 190	14.5% 221
External Fraud	1.9% 363	1.6% 316	17.5% 3,403	19.0% 3,699
Employment Practices & Workplace Safety	2.1% 67	1.4% 44	0.5% 15	1.8% 59
Clients, Products & Business Practices	3.1% 104	2.2% 72	19.9% 663	22.0% 733
Damage to Physical Assets	33.9% 220	29.9% 194	3.1% 20	32.8% 213
Business Disruptions & System Failures	6.0% 32	5.2% 28	5.0% 27	10.3% 55
Execution, Delivery & Process Management	0.6% 100	0.3% 55	8.0% 1,314	8.3% 1,368
All Event Types	2.1% 936	1.7% 746	12.5% 5,632	14.1% 6,348

Panel B: Sample 2 (63 Banks)

Business Line	**% of loss events where an insurance claim was filed**	**% of loss events where insurance recovery is > 0**	**% of events where bank received a non-insurance recovery**	**% of loss events where bank received an insurance and/or 'other' recovery**
Internal Fraud	2.3% 29	1.4% 18	13.1% 168	14.1% 181
External Fraud	1.5% 238	1.2% 201	20.2% 3,270	21.3% 3,452
Employment Practices & Workplace Safety	1.4% 42	0.8% 24	0.1% 2	0.9% 26
Clients, Products & Business Practices	2.3% 60	2.3% 59	24.8% 646	27.0% 704
Damage to Physical Assets	26.6% 81	22.6% 69	5.9% 18	28.5% 87
Business Disruptions & System Failures	2.1% 8	1.1% 4	3.8% 14	4.8% 18
Execution, Delivery & Process Management	0.4% 56	0.3% 33	8.9% 1,158	9.1% 1,190
All Event Types	1.4% 514	1.1% 408	14.4% 5,276	15.4% 5,658

Table 14b shows the frequency of insurance claims, the frequency of non-zero insurance recoveries, and the frequency of 'other' recoveries, by event type. The frequency of non-zero insurance recoveries varied widely across event types. Damage to Physical Assets had the highest frequency of non-zero insurance recoveries (29.9%), followed by Business

Disruptions & System Failures (5.2%). All other event types had frequencies of insurance recoveries less than 3%.

The frequency of 'other' recoveries varied widely as well. The event types with the highest frequency of 'other' recoveries were Clients, Products & Business Practices (19.9%), External Fraud (17.5%), and Internal Fraud (12.4%). All other event types had a frequency of less than 10%.

Again, the results for Sample 2 banks (Panel B) were qualitatively similar to those for Sample 1 banks (Panel A).

Total Recovery Amounts by Business Line and Event Type

Table 15 shows total recoveries by business line and event type in absolute amount and as a percentage of all recoveries. Most recoveries were reported for Commercial Banking - in total over €1.5 billion or 67.0% of all recoveries. Retail Banking was second, with €234 million in recoveries (10.3%). No other business lines accounted for more than 10% of total recoveries. Two event types (Damage to Physical Assets and Execution, Delivery & Process Management) accounted for over 80% of all recoveries. No other event type accounted for more than 7% of all recoveries.

Table 15

Total Recovery Amounts by Business Line and Event Type
(1000s of Euros)

	Internal Fraud	**External Fraud**	**Employ-ment Practices & Workplace Safety**	**Clients, Products & Business Practices**	**Damage to Physical Assets**	**Business Disruption & System Failures**	**Execution, Delivery & Process Management**	**All Event Types**
Corporate Finance	32 0.0%	24 0.0%	0 0.0%	37,810 1.7%	247 0.0%	0 0.0%	2,310 0.1%	40,423 1.8%
Trading & Sales	5,387 0.2%	10,252 0.4%	9,268 0.4%	15,341 0.7%	47,978 2.1%	1.998 0.1%	16,108 0.7%	106,332 1.7%
Retail Banking	42,238 1.9%	113,154 5.0%	3,841 0.2%	24,670 1.1%	17,022 0.7%	10,588 0.5%	22,561 1.0%	234,074 10.3%
Commercial Banking	780 0.0%	28,163 1.2%	0 0.0%	3,755 0.2%	1,042,441 45.7%	4,500 0.2%	449,277 19.7%	1,528,917 67.0%
Payment & Settlement	4,546 0.2%	4,209 0.2%	0 0.0%	63 0.0%	12,968 0.6%	57,211 2.5%	13,965 0.6%	92,963 4.1%
Agency Services	0 0.0%	16 0.0%	44 0.0%	0 0.0%	76,135 3.3%	29,099 1.3%	9,501 0.4%	114,796 5.0%
Asset Management	0 0.0%	1,625 0.1%	700 0.0%	9,098 0.4%	1,422 0.1%	814 0.0%	8,738 0.4%	22,397 1.0%
Retail Brokerage	8,875 0.4%	66 0.0%	0 0.0%	1,515 0.1%	118,365 5.2%	0 0.0%	11,903 0.5%	140,724 6.2%
All Business Lines	61,858 2.7%	157,510 6.9%	13,853 0.6%	92,252 4.0%	1,316,579 57.7%	104,211 4.6%	534,364 23.4%	2,280,626 100.0%

Frequency of Events with both an Insurance and 'Other' Recovery

Table 16

Frequency and Number of Joint Recoveries

	Percentage of Individual Loss Events with an 'Other' Recovery, given a Non-Zero Reported Insurance Recovery	**Percentage of Individual Loss Events with a Non-Zero Reported Insurance Recovery, given an 'Other' Recovery**
Business Line		
Corporate Finance	0.0% 5	0.0% 43
Trading & Sales	9.5% 21	0.9% 213
Retail Banking	4.0% 606	0.6% 4,150
Commercial Banking	2.5% 40	0.3% 339
Payment & Settlement	8.3% 24	2.3% 87
Agency Services	4.8% 21	1.4% 69
Asset Management	0.0.% 7	0.0% 53
Retail Brokerage	0.0% 22	0.0% 678
All Business Lines	4.0% 746	0.5% 5,632
Event Type		
Internal Fraud	16.2% 37	3.2% 190
External Fraud	6.3% 316	0.6% 3,403
Employment Practices & Workplace Safety	0.0% 44	0.0% 15
Clients, Products & Business Practices	2.8% 72	0.3% 663
Damage to Physical Assets	0.5% 194	5.0% 20
Business Disruptions & System Failures	0.0% 28	0.0% 27
Execution, Delivery & Process Management	1.8% 55	0.1% 1,314
All Event Types	4.0% 746	0.5% 5,632

In almost all instances where a recovery was reported, the recovery was ***either*** an insurance recovery ***or*** an 'other' recovery. There were only 30 cases, or 0.5% of the events with some type of recovery, where ***both*** a non-zero insurance recovery ***and*** an 'other' recovery were reported for the same event.

As Table 16 indicates, 4% of the loss events that resulted in a non-zero insurance recovery, also resulted in an ‘other’ recovery. Trading & Sales (9.5%) and Internal Fraud (16.2%) were, respectively, the business line and event type with the highest percentage of loss events where there was another recovery given that a non-zero insurance recovery was also present. Several business lines and event types had no such events.

Of those loss events with an ‘other’ recovery, 0.5% also had a non-zero insurance recovery. All business lines had less than 1% of events with ‘other’ recoveries that also reported a non-zero insurance recovery, with the exception of Payment & Settlement (2.3%) and Agency Services (1.4%). Damage to Physical Assets (5.0%) and Internal Fraud (3.2%) were the only loss event types where this percentage was greater than one.

Prevalence of Recovery Type

Table 17

Prevalence of Recovery Type
Sample 1 (89 Banks)

	Percentage of Total Recoveries Resulting from ‘Other’ Recoveries	**Percentage of Total Recoveries Resulting from Non-Zero Insurance Recoveries**
Business Line		
Corporate Finance	89.6%	10.4%
Trading & Sales	91.8%	9.1%
Retail Banking	87.7%	12.8%
Commercial Banking	89.7%	10.6%
Payment & Settlement	79.8%	22.0%
Agency Services	77.5%	23.6%
Asset Management	88.3%	11.7%
Retail Brokerage	96.9%	3.1%
All Business Lines	88.7%	11.8%
Event Type		
Internal Fraud	86.0%	16.7%
External Fraud	92.0%	8.5%
Employment Practices & Workplace Safety	25.4%	74.6%
Clients, Products & Business Practices	90.5%	9.8%
Damage to Physical Assets	9.4%	91.1%
Business Disruptions & System Failures	49.1%	50.9%
Execution, Delivery & Process Management	96.1%	4.0%
All Event Types	88.7%	11.8%

Note: Total Recoveries is equal to non-zero insurance recoveries and ‘other’ recoveries

Note: Because 30 events have recoveries of both types, the sum of the percentages in the two columns can sum to greater than 100%.

As noted previously, the majority of reported recoveries resulted from ‘other’ recoveries, with 88% of total recoveries being from this source and 12% being non-zero insurance recoveries. Table 17 shows for the business lines and event types, the percentage of reported recoveries resulting from these two sources. In the majority of the business lines and event types, the proportions of non-zero insurance recoveries and ‘other’ recoveries were broadly similar to the overall data. However, two business lines, Payment & Settlement (22.0%) and Agency Services (23.6%) showed non-zero insurance recoveries at a relatively higher rate - approximately twice the rate of non-zero insurance recoveries for the sample as a whole. The most significant contribution of insurance as a form of recovery was evident in the event type analysis, which indicated that three event types (Business Disruption & System Failures 50.9%, Employment Practices & Workplace Safety 74.6%, and Damage to Physical Assets 91.1%) derived a majority of their recoveries from insurance recoveries.

Frequency of Recoveries by Characteristics of Reporting Bank

Table 18 shows that those banks which submitted most loss events tended to have the least amount of recovery data (as measured by the frequency of recoveries as a percentage of total number of loss events). For example, 23 banks submitted data with more than 500 loss events. However, of those banks, 17 had recovery data for less than 10% of all events and only six had recovery information for more than 10% of events. In contrast, of the 35 banks that submitted less than 100 loss events, 20 reported recovery data for more than 10% of all events.

Table 18

Frequency of Recoveries by Characteristics of Reporting Bank

Panel A: Sample 1 (87 Banks)*

Percentage of Individual Loss Events where there is an Insurance and/or 'Other' Recovery	Banks with 1-99 Events	Banks with 100-499 Events	Banks with 500 or more Events
0%	9	3	1
0%-10%	6	14	16
10%-20%	3	5	3
20%-30%	4	3	2
30%-40%	3	2	0
More than 40%	10	2	1

* Does not sum to 89 banks because some banks did not break loss events down by business line and event type

Panel B: Sample 1 (87 Banks)*

Percentage of Individual Loss Events where there is an Insurance and/or 'Other' Recovery	Banks with 1-99 Events	Banks with 100-499 Events	Banks with 500 or more Events
0%	7	2	1
0%-10%	6	11	8
10%-20%	2	4	2
20%-30%	4	2	2
30%-40%	2	2	0
More than 40%	6	1	1

Recovery Rates by Gross Loss Amount

Table 19 shows the recovery rate of all insurance claims, the recovery rate of insurance recoveries that yielded non-zero payouts, and the recovery rate for ‘other’ recoveries, by gross loss amount. Recovery rate is defined as the amount recovered as a share of the total gross loss amount.

When a bank was able to make a recovery on an operational loss, on average, 60.6% of that loss was recovered. The average insurance recovery on all claims was 58.4% of the loss amount, the average recovery for insurance recoveries that yielded a non-zero payout was 73.3%, and the average ‘other’ recovery was 58.6% of the loss amount. For both non-zero insurance recoveries and ‘other’ recoveries, those losses that were less than €10,000 had the highest recovery rates at 83%. For non-zero insurance recoveries, recovery rates were fairly stable in the 70-80% range up to the €500,000 gross loss level and then tapered off somewhat above that amount. For ‘other’ recoveries, above the €10,000 gross loss level recovery rates were fairly consistent in the range of 55-65%.

Table 19

Recovery Rates by Gross Loss Amount

Panel A: Sample 1 (89 Banks)

Gross Loss Amount (Euros 1000s)	Recovery Amount as a % of Loss Amount for all Insurance Claims (Includes Zero Recoveries)	Recovery Amount as a % of Loss Amount for all Insurance Claims (Excludes Zero Recoveries)	Non-Insurance Recovery Amount as a % of Loss Amount	Total Recovery Amount, Including Insurance and ‘Other’ Recoveries, as % of Loss Amount
0-10	79.4%	82.7%	83.3%	83.2%
10-50	58.2%	75.3%	57.0%	58.8%
50-100	57.7%	73.0%	56.2%	58.8%
100-500	62.7%	73.7%	61.2%	64.0%
500-1000	46.7%	52.9%	58.6%	66.2%
Greater than 1000	54.0%	66.0%	65.1%	67.6%
All Loss Events	58.4%	73.3%	58.6%	60.6%

Panel B: Sample 2 (63 Banks)

Gross Loss Amount (Euros 1000s)	Recovery Amount as a % of Loss Amount for all Insurance Claims (Includes Zero Recoveries)	Recovery Amount as a % of Loss Amount for all Insurance Claims (Excludes Zero Recoveries)	Non-Insurance Recovery Amount as a % of Loss Amount	Total Recovery Amount, Including Insurance and ‘Other’ Recoveries, as % of Loss Amount
10-50	57.6%	72.3%	58.4%	59.2%
50-100	52.5%	67.6%	56.8%	58.2%
100-500	57.3%	72.0%	60.8%	62.8%
500-1000	42.0%	49.1%	59.1%	66.6%
Greater than 1000	41.0%	54.3%	71.4%	68.9%
All Loss Events	54.6%	68.8%	58.7%	59.7%

Recovery Rates by Business Line

Table 20a shows recovery rate data by business line. The table shows that, for all insurance claims, there was sizeable variation in the recovery rate across business lines. For example, the recovery rate for Agency Services was 72.0%, compared with 36.2% for Corporate Finance. If only insurance recoveries with non-zero payouts are considered, Retail Brokerage was on the low side at 54.8% and Payment & Settlement on the high side at 83.4%. Recovery rates for non-insurance recoveries ranged from 82.0% for Corporate Finance to 43.2% for Retail Brokerage.

Table 20a

Recovery Rates by Business Line

Panel A: Sample 1 (89 Banks)

Business Line	Recovery Amount as a % of Loss Amount for all Insurance Claims (Includes Zero Recoveries)	Recovery Amount as a % of Loss Amount for all Insurance Claims (Excludes Zero Recoveries)	Non-Insurance Recovery Amount as a % of Loss Amount	Total Recovery Amount, Including Insurance and 'Other' Recoveries, as % of Loss Amount
Corporate Finance	36.2%	72.4%	82.0%	81.0%
Trading & Sales	48.4%	69.1%	58.0%	59.5%
Retail Banking	58.3%	731%	58.9%	61.1%
Commercial Banking	66.3%	82.9%	72.6%	73.9%
Payment & Settlement	64.5%	83.4%	74.6%	77.9%
Agency Services	72.0%	75.5%	69.9%	72.0%
Asset Management	59.2%	67.7%	81.0%	79.4%
Retail Brokerage	48.2%	54.8%	43.2%	43.6%
All Business Lines	58.4%	73.3%	58.6%	60.6%

Panel B: Sample 2 (63 Banks)

Business Line	Recovery Amount as a % of Loss Amount for all Insurance Claims (Includes Zero Recoveries)	Recovery Amount as a % of Loss Amount for all Insurance Claims (Excludes Zero Recoveries)	Non-Insurance Recovery Amount as a % of Loss Amount	Total Recovery Amount, Including Insurance and 'Other' Recoveries, as % of Loss Amount
Corporate Finance	32.7%	65.5%	88.4%	86.3%
Trading & Sales	43.8%	65.7%	60.2%	61.0%
Retail Banking	54.6%	68.1%	59.1%	60.0%
Commercial Banking	68.8%	83.9%	73.7%	74.8%
Payment & Settlement	57.1%	85.7%	76.9%	80.0%
Agency Services	57.7%	57.7%	72.4%	73.8%
Asset Management	55.4%	55.4%	85.0%	82.5%
Retail Brokerage	46.1%	52.6%	43.0%	43.3%
All Business Lines	54.6%	68.8%	58.7%	59.7%

Recovery Rates by Event Type

Table 20b

Recovery Rates by Event Type

Panel A: Sample 1 (89 Banks)

Event Type	Recovery Amount as a % of Loss Amount for all Insurance Claims (Includes Zero Recoveries)	Recovery Amount as a % of Loss Amount for all Insurance Claims (Excludes Zero Recoveries)	Non-Insurance Recovery Amount as a % of Loss Amount	Total Recovery Amount, Including Insurance and 'Other' Recoveries, as % of Loss Amount
Internal Fraud	48.7%	65.8%	54.2%	57.6%
External Fraud	61.6%	70.8%	51.9%	53.8%
Employment Practices & Workplace Safety	57.9%	88.2%	25.0%	72.1%
Clients, Products & Business Practices	35.3%	51.0%	95.6%	91.5%
Damage to Physical Assets	72.3%	82.0%	95.4%	83.6%
Business Disruptions & System Failures	69.9%	79.9%	78.9%	79.4%
Execution, Delivery & Process Management	42.0%	76.3%	57.3%	58.1%
All Event Types	58.4%	73.3%	58.6%	60.6%

Panel B: Sample 2 (63 Banks)

Event Type	Recovery Amount as a % of Loss Amount for all Insurance Claims (Includes Zero Recoveries)	Recovery Amount as a % of Loss Amount for all Insurance Claims (Excludes Zero Recoveries)	Non-Insurance Recovery Amount as a % of Loss Amount	Total Recovery Amount, Including Insurance and 'Other' Recoveries, as % of Loss Amount
Internal Fraud	34.2%	55.2%	56.8%	58.2%
External Fraud	56.3%	66.7%	51.6%	52.8%
Employment Practices & Workplace Safety	47.8%	83.6%	58.6%	81.7%
Clients, Products & Business Practices	55.2%	56.1%	96.5%	93.3%
Damage to Physical Assets	65.8%	77.3%	99.5%	81.9%
Business Disruptions & System Failures	50.0%	100.0%	87.8%	90.5%
Execution, Delivery & Process Management	46.6%	79.1%	56.8%	57.5%
All Event Types	54.6%	68.8%	58.7%	59.7%

As shown in Table 20b, classifying the recovery data by event type produces qualitatively similar results to the business line analysis. The range of recovery rates across the event types for both insurance recoveries and 'other' recoveries was wide, with no clear pattern emerging.

Comparison of LDCE Recovery Data and Recovery Data from the Previous Data Exercise

Figure 3a: Frequency of Non-Zero Insurance Recoveries, By Business Line

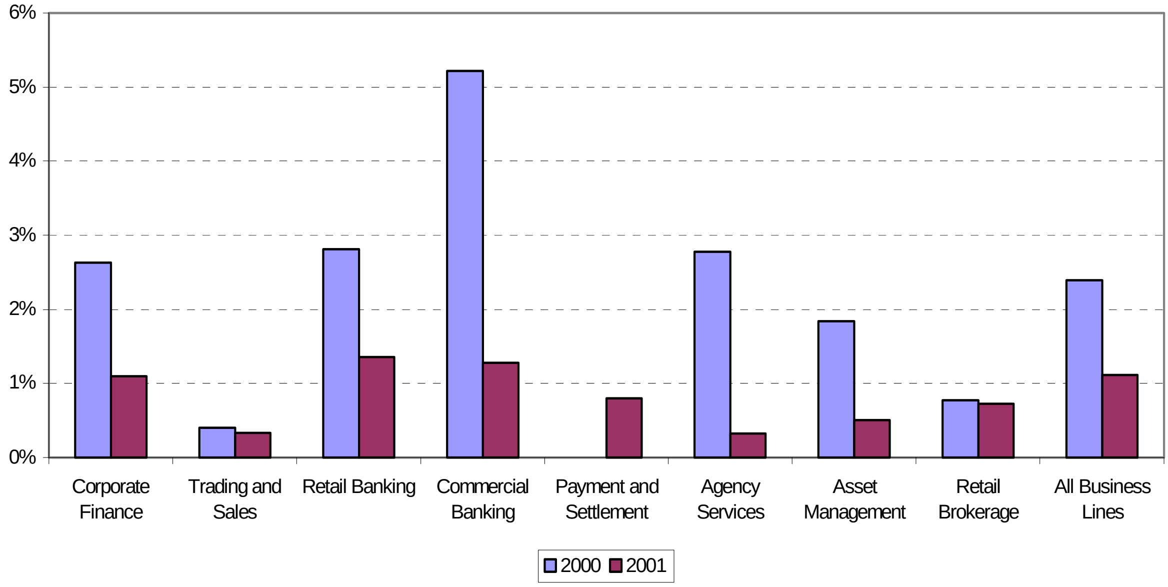


Figure 3b: Frequency of Other Recoveries, By Business Line

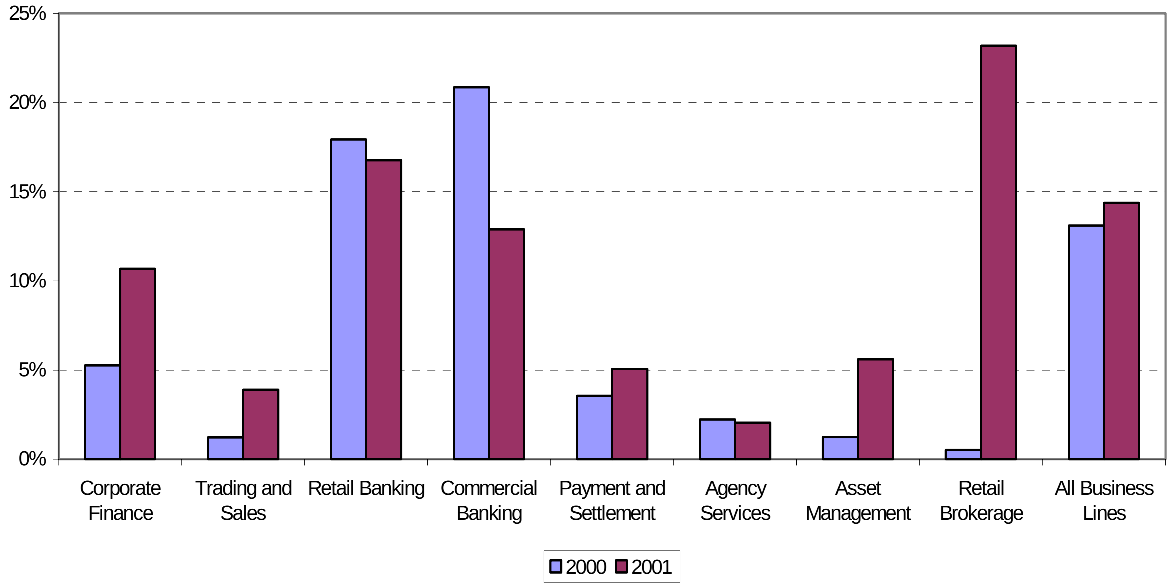


Figure 3c: Frequency of Non-Zero Insurance Recoveries, by Event Type

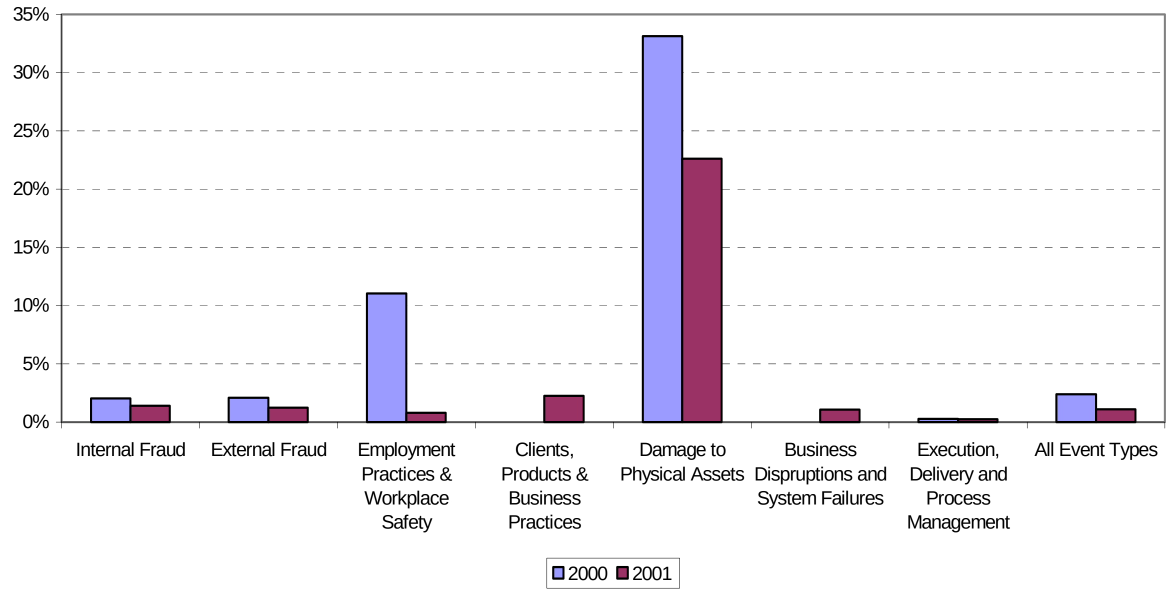


Figure 3d: Frequency of Other Recoveries, by Event Type

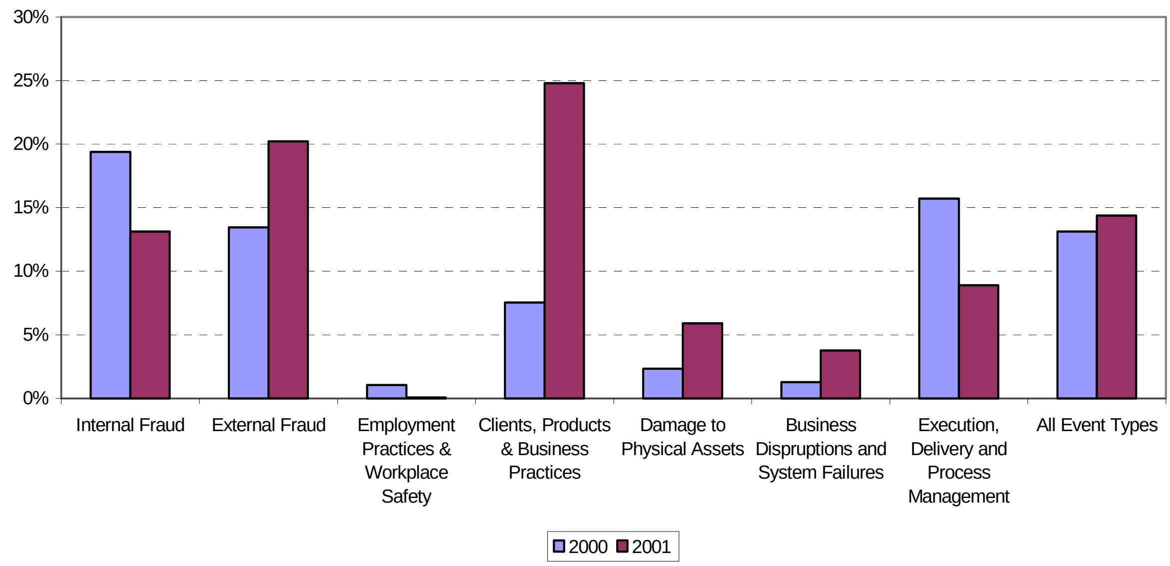


Figure 4a: Recovery Rate of Non-Zero Insurance Recoveries, by Business Line

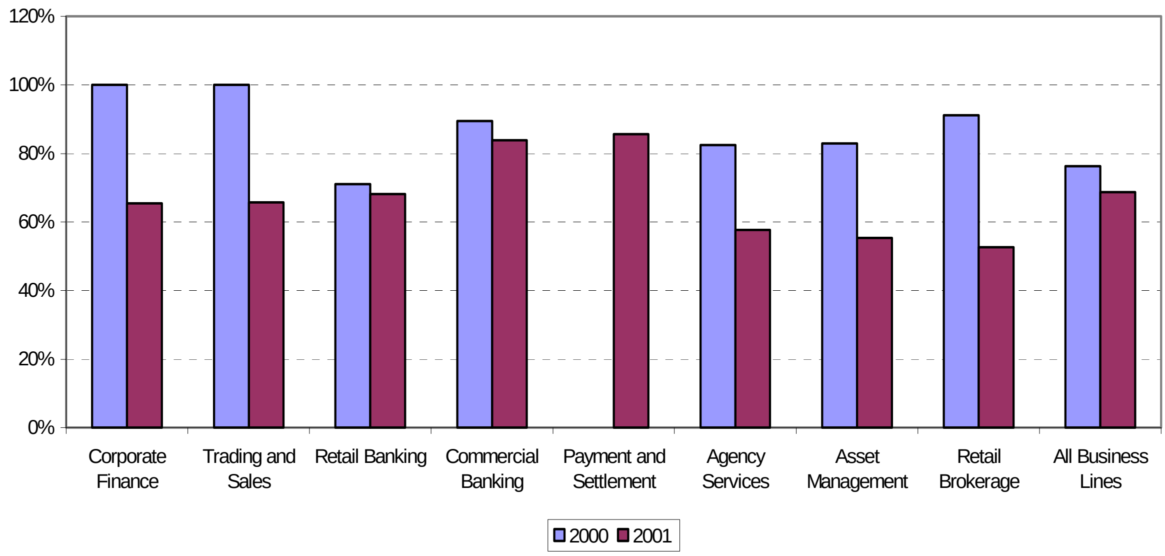


Figure 4b: Recovery Rate of Other Recoveries, by Business Line

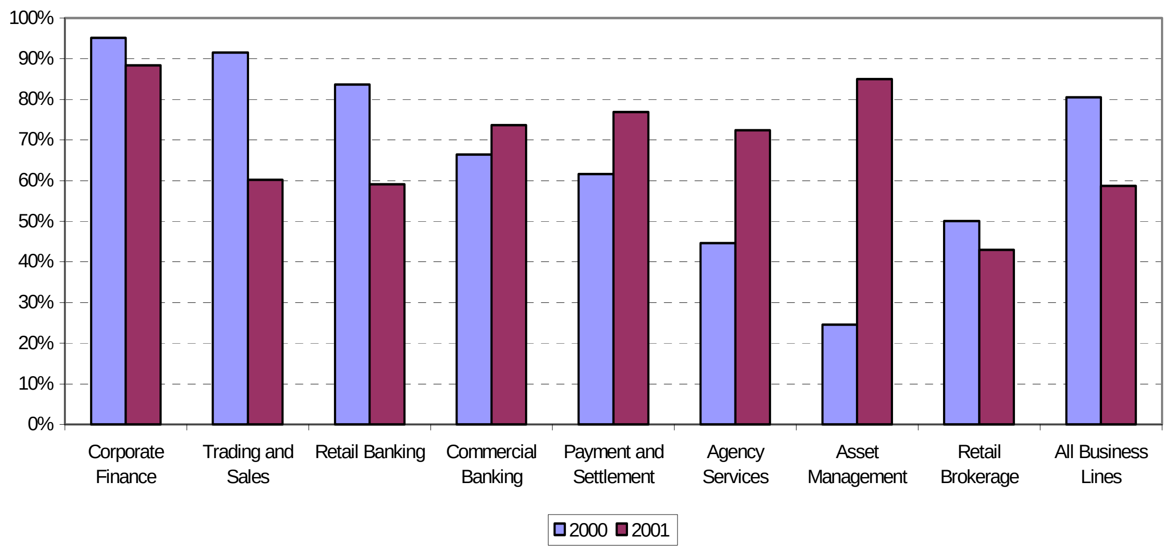


Table 4c: Recovery Rate of Non-Zero Insurance Recoveries, by Event Type

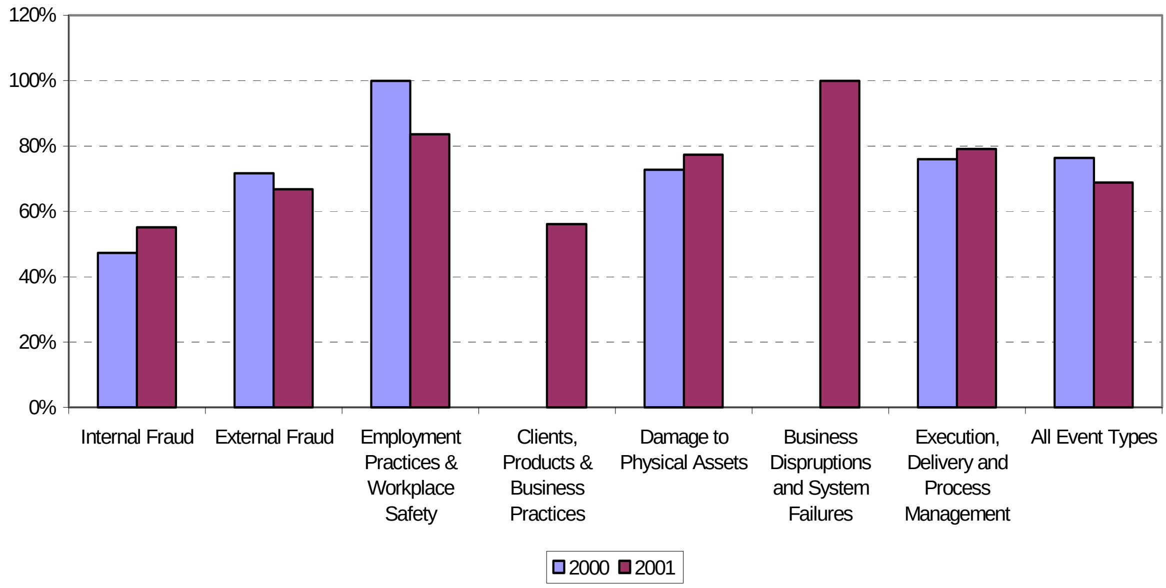


Table 4d: Recovery Rate of Other Recoveries, by Event Type

The following section compares the insurance and ‘other’ recovery data for 2001 with similar data for 2000. For the reasons noted previously in the comparison of loss event data, this analysis also compares 2000 data with 2001 data from just the Sample 2 banks.

Figures 3a to 3d provide information on the frequency of non-zero insurance recoveries and ‘other’ recoveries for both business lines and event types for 2000 and 2001. Overall, the frequency of non-zero insurance recoveries was lower in 2001 (1.1%) than in 2000 (2.4%). As shown in Figure 3a, this was true for all but one business line, with Commercial Banking, and Agency Services seeing the largest changes. As shown in Figure 3b, ‘other’ recoveries occurred at a slightly higher frequency overall in 2001 (14.4%) compared with 2000 (13.1%). The most significant changes on a business line basis were in Retail Brokerage, where the frequency of ‘other’ recovery increased from 5% to 23.2%, and in Commercial Banking, where the frequency of ‘other’ recovery fell from 20.9% to 12.9%.

Figures 3c and 3d compare the frequency of non-zero insurance recoveries and ‘other’ recoveries by event type for the two periods. While most of the event types had relatively modest changes in the frequency of non-zero insurance recoveries, two event types changed considerably. Employment Practices & Workplace Safety declined from 11.1% in 2000 to 0.8% in 2001, whilst Damage to Physical Assets declined from 33.1% to 22.6%. The frequency of ‘other’ recoveries changed substantially for a number of event types between the two periods. Two event types (Internal Fraud and Execution, Delivery, & Process Management) showed an approximately 6% lower frequency of recovery in 2001, whilst External Fraud and Clients, Products, & Business Practices showed material increases in the frequency of ‘other’ recoveries between the two years.

According to the surveys, the recovery rates for both non-zero insurance recoveries and ‘other’ recoveries were lower in 2001 than 2000. The overall recovery rate on non-zero insurance recoveries was 68.8% in 2001 compared to 76.3% in 2000. The change was larger in ‘other’ recoveries, where the overall recovery rate fell from 80.5% to 58.7%. Figures 4a to 4d show the recovery rates for the two datasets by business line and event type. Recovery rates for non-zero insurance recoveries were lower for seven of the eight business lines in 2001 compared with 2000. Looking at recovery rates for ‘other’ recoveries by business line, no clear pattern emerges. On an event type basis, non-zero insurance recoveries and ‘other’ recoveries also showed no clear pattern in terms of changes in recovery rates between the two years. However, the differences in the 2001 recovery rates by event type compared to the 2000 recovery rates were much greater in the ‘other’ recovery data than in the non-zero insurance data.

While these results are interesting, the caveats cited earlier about analysing the 2000 and 2001 loss data also apply. These include the fact that the comparisons are just between two years of data, the samples are quite different in size and composition, and it is not clear to what extent the samples are representative of the wider banking industry. Therefore, it would be inappropriate to draw conclusions as to the actual frequency of recoveries or recovery rates over a longer horizon, or to draw inferences about the relative extent of recovery in the different business lines and event types based on this data.

IV. Economic Capital for Operational Risk, Expected Operational Losses and Exposure Indicators

Three further sets of data were collected in the 2002 LDCE: banks' allocation of economic capital for operational risk; banks' use of information on expected operational losses for pricing, reserving or expensing; and the information banks provided on several potential exposure indicators.

IV.1 Bank Allocation of Economic Capital for Operational Risk

Table 21

Economic Capital for Operational Risk Ratio

Panel A: Economic Capital for Operational Risk Ratios

Business Line	Mean	Median	Min	Max	Frequency
Ratio of Economic Capital for Operational Risk to Total Economic Capital:					
Entire Bank	15.46%	14.08%	0.09%	40.87%	47
Shares of Economic Capital for Operational Risk by Business Line:					
Corporate Finance	7.56%	2.81%	0.20%	52.13%	16
Trading & Sales	17.80%	16.47%	3.01%	56.22%	32
Retail Banking	45.54%	44.45%	6.71%	87.50%	39
Commercial Banking	17.51%	15.21%	4.39%	62.07%	36
Payment & Settlement	8.00%	6.06%	0.02%	25.92%	21
Agency Services	6.52%	2.65%	0.49%	43.49%	18
Asset Management	7.22%	5.00%	0.05%	21.93%	31
Retail Brokerage	7.54%	6.34%	0.06%	33.86%	23

Panel B: Shares of Gross Income by Business Line

Business Line	Mean	Median	Min	Max	Frequency
Corporate Finance	7.81%	2.82%	-2.67%	62.44%	16
Trading & Sales	15.71%	13.46%	1.07%	45.84%	30
Retail Banking	48.97%	48.53%	11.92%	89.36%	37
Commercial Banking	23.57%	22.99%	3.15%	62.07%	35
Payment & Settlement	5.06%	3.66%	0.02%	15.76%	19
Agency Services	4.44%	1.69%	0.00%	33.59%	18
Asset Management	4.47%	3.55%	0.01%	15.47%	29
Retail Brokerage	6.52%	4.57%	0.29%	20.74%	21

Note: Panel B takes into account only banks and business lines that had data for economic capital for operational risk. Frequencies in Panel B may be lower than frequencies in Panel A if a bank reported economic capital for that business line but no gross income data.

Of the 89 banks participating in the 2002 LDCE, 60 provided information on economic capital.[10] Of these 60 banks, 47 provided information on economic capital for operational risk and 42 provided information on economic capital for operational risk by business line. Panel A of Table 21 summarises the data.

As Table 21 shows, the 47 banks reporting information on economic capital for operational risk allocated on average 15% of their economic capital for this risk. However, this ratio varied considerably across banks, as indicated by the large difference between the minimum (0.09%) and maximum (41%) values.

The distribution of economic capital for operational risk across business lines shows that, on average, banks allocated the largest share to Retail Banking (45.5%), followed by Trading & Sales and Commercial Banking, each accounting for around 18% of banks' economic capital for operational risk. The other five business lines all accounted for between 6% and 8% of economic capital for operational risk.

Although these figures are informative, it is important to note that the striking differences in the shares of economic capital for operational risk between these three groups of business lines are unlikely to be indicative of differences in the degree of operational risk across business lines. For one, not all of the participating banks that provided information on the allocation of economic capital for operational risk across the business lines have activities in all eight business lines (see the last column of Panel A of Table 21). Moreover, even among those banks that operated in the same set of business lines, the distribution of economic capital across their business lines would likely be driven by the relative importance of the business lines within the institutions' overall business activities. Note, for instance, the similarities between the distribution of economic capital for operational risk across business lines (Panel A of Table 21) and the shares of gross income by business line (Panel B of Table 21). This suggests that the apparent concentration in Retail Banking probably reflects the business focus of the participating institutions, as much as the inherent degree of operational risk in retail banking activities. Finally, differences in the definition of economic capital and differences in calculation methodologies – particularly those still under development – at various participating institutions could make the data submissions not fully comparable, and therefore contribute to non-risk-related differences across business lines.

IV.2 Bank use of Expected Operational Losses

In the 2002 LDCE, banks were asked to indicate whether they estimated expected operational losses and, if so, whether they used this information for pricing, reserving or expensing at the bank level and by business line (see Table 22).

As Table 22 shows, only one-third of the participating banks (33 out of 89) said that they estimated expected operational losses. Less than half of the 33 reported using this information for pricing or reserving, though somewhat more indicated that they used this information for expensing. The numbers were significantly lower at the business line level, though this will partly reflect the fact that not all banks had activities in all eight of the defined business lines. With this caveat in mind, the data seem to suggest that banks make more

[10] Banks were asked to report economic capital for operational risk excluding reputational, business, and strategic risk. In addition, they were asked to report economic capital based on a 99.9% confidence interval and a one-year holding period.

use of the information on expected losses in Retail Banking, particularly for pricing and expensing. In contrast, this information was used least often for Corporate Finance.

It is important to note that the 2002 LDCE did not provide banks with definitions of “expected losses” or any of its potential uses, “pricing”, “reserving”, or “expensing.” As a result, this information should be considered with some caution. In particular, it is unclear the extent to which the information provided on these issues is fully comparable across banks.

Table 22

Number of Banks that use Expected Operational Losses

Business Line	Number of Banks that estimate Expected Losses	Number of Banks that use Estimated Operational Losses for:		
		Pricing	Reserving	Expensing
Entire Bank	33	13	14	19
Corporate Finance	6	2	3	2
Trading & Sales	14	6	5	6
Retail Banking	23	12	9	14
Commercial Banking	19	7	5	9
Payment & Settlement	14	5	8	8
Agency Services	11	5	4	5
Asset Management	19	7	6	10
Retail Brokerage	15	6	4	8

IV.3 Exposure Indicators for Operational Risk

As with the 2001 data collection exercise, banks participating in the 2002 LDCE were asked to provide information by business line for several potential exposure indicators. Table 23, Panel A, summarises the information banks reported for the various exposure indicators for 2001. Panel B, in turn, provides some information on the comprehensiveness of the exposure indicator data provided. Comparing the data, it is apparent that most banks were able to provide information on gross income, number of employees, and employee compensation broken down by business line. In contrast, fewer were able to provide business-line-level information on the book value of physical assets or total assets.

Looking at the comprehensiveness of the 2000 exposure indicator data (provided in the previous data collection exercise and reported in Panel C of Table 23), the pattern is similar. Then, most banks also had information on gross income, number of employees and employee compensation per business line, but appeared to have more difficulty reporting information per business line on the book value of physical assets and overall assets. However, it should be noted that the information contained in Panels B and C are not fully comparable. Apart from the differences in the samples of banks across the two years, the 2002 LDCE allowed the better differentiation between cases where banks did not report data for a given business line because they did not have the data, and those cases where banks did not report data because they were not active in the particular business line. Nonetheless, the available information seems to suggest that, as of 2001, gross income, number of employees and employee compensation were the most commonly available exposure indicators at the business line level.

Table 23

Exposure Indicators

Panel A: 2001 Total Value, 89 Banks Reporting

Business Line	Assets	Employees	Compensation	Physical Assets	Deposits	Gross Income
Corporate Finance	NA	331	14,339	82,293	NA	36,061
Trading & Sales	NA	911	32,865	291,803	NA	114,947
Retail Banking	18,131,218	5,553	70,167	286,957	14,268,027	274,984
Commercial Banking	18,706,716	1,259	22,261	175,565	NA	132,004
Payment & Settlement	NA	376	6,750	14,393	NA	45,603
Agency Services	98,297,656	249	4,783	9,151	NA	13,025
Asset Management	22,743,659	276	7,467	9,177	NA	24,638
Retail Brokerage	NA	477	15,159	14,372	NA	24,975

Panel B: 2001 Percentage Frequency, 89 Banks Reporting

Business Line	Assets	Employees	Compensation	Physical Assets	Deposits	Gross Income
Corporate Finance	NA	79%	73%	54%	NA	89%
Trading & Sales	NA	86%	80%	59%	NA	94%
Retail Banking	80%	87%	81%	69%	79%	94%
Commercial Banking	78%	87%	81%	62%	NA	94%
Payment & Settlement	NA	76%	67%	44%	NA	73%
Agency Services	54%	71%	62%	41%	NA	72%
Asset Management	69%	82%	75%	57%	NA	88%
Retail Brokerage	NA	65%	60%	52%	NA	71%

Panel C: 2000 Percentage Frequency, 27 Banks Reporting

Business Line	Assets	Employees	Compensation	Physical Assets	Deposits	Gross Income
Corporate Finance	NA	100%	95%	70%	NA	100%
Trading & Sales	NA	95%	91%	73%	NA	100%
Retail Banking	80%	92%	88%	72%	52%	100%
Commercial Banking	74%	91%	87%	70%	NA	100%
Payment & Settlement	NA	100%	95%	58%	NA	89%
Agency Services	56%	100%	88%	63%	NA	100%
Asset Management	78%	100%	89%	72%	NA	100%
Retail Brokerage	NA	93%	87%	73%	NA	100%

Note: All numbers reported in Panel A are in millions of euros (thousands for employees). Panels B and C report the percentage of banks that report a non-zero exposure indicator. Panel B percentages are calculated as a percentage of the total number of banks reporting a response other than NA (Not Applicable) for that exposure indicator. Panel C percentages are calculated as a percentage of the total number of banks that reported any non-zero exposure indicator for that business line. Due to the differences in methodologies of Panels B and C, the percentages are not exactly comparable. For all Panels, a bank is considered to have reported an exposure indicator if the bank reported a value for any quarter of the year.

V. Final Remarks

The 2002 LDCE was a very valuable exercise. It confirmed that the banking industry has made progress in its operational risk data collection efforts since the survey carried out one year ago. There was a large increase in the number of participating banks and on average the banks submitted more information on their operational losses. In addition, a larger proportion of the participating banks considered their data submissions to be comprehensive.

Despite this progress, inferences based on the data should still be made with caution. The data collected under the 2002 LDCE continue to reflect methodologies and approaches for data collection that are still in the developmental stage in many of the participating banks. In addition, the most recent data collection exercise provides data for only one year and, even under the best of circumstances, a one-year collection window will provide an incomplete picture of the full range of potential operational risk events, especially of rare but significant “tail events”. Linking the 2002 data to earlier data collected by the RMG provides a somewhat longer historical data horizon, but even then, the available data go back only to 1998, and there are considerable differences across the years in terms of the completeness and robustness of the data.

Notwithstanding these problems, discussions with banks suggest that the quality and quantity of operational risk data collected by many institutions are improving rapidly, and that future data collections exercise could yield correspondingly improved results. The hope is that progress being made by the banking industry in their internal data collection efforts could result in continued growth in the number of banks participating in any future data collection exercises – whether sponsored by the Basel Committee or initiated by the banking industry – and, perhaps more significantly, improvement in the depth, robustness, and comprehensiveness of the data submitted by individual banks. Such improvements, should they materialise, would be an important step towards constructing a comprehensive dataset that would permit more confident inferences about the nature and incidence of operational risk.

Annex 1

Business Line and Event Types Level 1 and 2 used in the 2002 Loss Data Survey

Business Lines
Corporate Finance
Trading and Sales
Retail Banking
Commercial Banking
Payment and Settlement
Agency Services
Asset Management
Retail Brokerage

Event Types	
Level 1	**Level 2**
Internal Fraud	Unauthorised Activity
	Theft & Fraud
External Fraud	Theft & Fraud
	Systems Security
Employment Practices & Workplace Safety	Employee Relations
	Safe Environment
	Diversity & Discrimination
Clients, Products & Business Practices	Suitability, Disclosure, & Fiduciary
	Improper Business or Market Practices
	Product Flaws
	Selection, Sponsorship, & Exposure
	Advisory Activity
Damage to Physical Assets	Disasters and Other Events
Business Disruption & System Failures	Systems
Execution, Delivery, & Process Management	Transaction Capture, Execution, & Maintenance
	Monitoring & Reporting
	Customer Intake & Documentation
	Customer/Client Account Management
	Trade Counterparties
	Vendors & Suppliers