

Loss Data Highlights Characteristics of Operational Risks Faced by Japanese Banks¹

A recent study shows that although the operational risk losses of Japanese banks are smaller than are those of US banks in terms of frequency and severity, they do have some similarities.

In August, the Financial Services Agency (FSA) and the Bank of Japan (BOJ) published a summary of a study on losses arising from operational risk ("op risk") based on data collected from 14 Japanese banks². Although similar surveys on op risk loss data have previously been conducted by the Basel Committee on Banking Supervision (in which financial institutions in G10 member countries, including Japanese banks, have participated)³ and by the US banking supervisory authority covering the US banks⁴, this is the first survey focusing exclusively on Japanese banks. This article compares the results of the Japanese survey with those of the US survey to highlight the characteristics of op risk faced by Japanese banks.

¹ Translated into English by Bank of Japan from an article first featured in the "Kinzai Financial Weekly" published by the Kinzai Institute For Financial Affairs, Inc.

² For survey details, see "Results of the Operational Risk Data Collection Exercise" on the BOJ website: <http://www.boj.or.jp/type/ronbun/ron/research07/data/ron0708b.pdf> or the FSA website: http://www.fsa.go.jp/news/19/qinkou/20070810_1.pdf (these URLs lead to the same document).

³ For details on the survey conducted by the Basel Committee on Banking Supervision, see: <http://www.bis.org/bcbs/qis/qisopriskresponse.pdf>, <http://www.bis.org/bcbs/qis/ldce2002.pdf>

⁴ For details on the survey conducted by the US banking supervisory authority, see: <http://www.bis.org/bcbs/qis/ldce2002.pdf>.

~ Downside of the Lack of Data on Major Loss Incidents ~

Driven mainly by regulatory factors, in recent times there has been a growing emphasis on op risk, in contrast with the previous emphasis on market and credit risk. Changes in the banking environment have also led to an increased focus on risks of an operational nature⁵. Since the end of March 2007, when Basel II came into force, banks have been required to allocate regulatory capital for the op risks they face. From the end of March 2008, banks that meet certain criteria will be allowed to use the “Advanced Measurement Approach” to measure op risk for regulatory capital, which allows the use of internal models.

The lack of available data is one of the key obstacles to managing op risk. Dependable data are the key to understanding any kind of risk, regardless of its nature; however, very few, if any, banks maintain sufficient internal op risk loss data – in particular, data on “low-frequency, high-severity losses” that rarely occur, but have significant impact when they do.

For this reason, there is a greater lack of loss data on op risk than on either market or credit risk. For market risk, long-term data on daily profits and losses can be used to estimate the magnitude and probability of future losses. For credit risk, although less data are available, the level of credit risk can be estimated based on historical changes in credit ratings and loss data per interim period – data that have been collected in detail since the end of the 1990s.

The problem of the lack of op risk data – and for low-frequency, high-severity losses in particular, – has had a more serious impact on Japanese banks than on their foreign counterparts, as Japanese banks have historically had better control over op risk and have been hit with fewer major losses. This leaves Japanese banks in a dilemma, in that their lack of op risk losses in the past leaves them with little to go on in attempting to gain a full understanding of op risk.

~ Fourteen AMA-oriented Banks Provided Data ~

While individual banks may not have sufficient internal data on low-frequency, high-severity losses, data can be pooled from a number of banks to overcome the data paucity problem⁶. In some overseas countries, privately run institutions process and repackage data collected from member banks. Naturally, various bank-specific factors need to be adjusted to allow loss data collected from such banks to be pooled in a mutually comparable form. However, in Japan, partly as a result of difficulties in adjusting for such factors, no such multibank pooled database exists.

⁵ For details on this point, see “Discussions on Further Advancing Operational Risk Management”:
<http://www.boj.or.jp/en/type/release/zuiji/data/fsk0509b.pdf>.

⁶ Strictly speaking, while data pooling is useful for loss events limited to individual banks, it does not reduce the problem associated with a paucity of data for loss events that affect a number of banks at the same time (such as a disaster that affects a wide area).

The Japanese op risk data survey, which was jointly conducted by the FSA and the BOJ, was aimed at gaining a better understanding of op risks faced by Japanese banks, which would be shared by the global regulatory authorities. Although the survey data may not necessarily reduce the need for a multibank database, as mentioned above, it should be useful as a basis for gaining a general understanding of the op risk situation of Japanese banks and the characteristics of op risks they face, compared with those faced by overseas banks.

The survey results were compared with those from the US survey conducted in 2004 (see Table 1), both surveys having been carried out on a voluntary basis (note that while the data collected in the Japanese survey were collected through the end of February this year, in the US survey, they were collected at the end of November 2004). The participants in the surveys (14 Japanese and 23 US banks, respectively) were banks that were considering applying to use the Advanced Measurement Approach (AMA) for op risk management and quantification under the Basel II framework. We asked the banks to report their internal loss data, including the amount of each loss, date, business line and event type (for both Japan and the US) as well as the major scenarios (for Japan only) collected by the banks.

(Table 1) Comparison between US 2004 LDCE and Japan 2007 LDCE

	US 2004 LDCE	Japan 2007 LDCE
Conductors of the survey	US federal bank and thrift regulatory agencies	Bank of Japan, Financial Service Agency
Participants	US banks	Japanese banks
Timing of the survey	2004	February 2007
Number of participants	23	14
Number of losses	About 1,530,000	About 160,000
Total loss amounts	\$25,920 million (Gross amount)	2,813 (Gross Amount, 100 million yen) 1,766 (Net Amount, 100 million yen)
Period of data	Not specified (varies from bank to bank)	

The characteristics of op risks carried by Japanese banks demonstrated by the survey results, in addition to a comparison with the US survey results, are described below.

~ In Terms of Frequency and Loss Amounts, Operational Risk Losses Incurred by Japanese Banks are Less than 10% of those Suffered by their US Counterparts ~

A simple comparison of the two surveys (Table 1) shows a wide disparity between the two countries in terms of the frequency and severity of operational risk losses. While the Japanese survey revealed 160,000 loss events with a total amount of JPY281.3 billion, the US survey revealed far higher figures of 1,500,000 loss events with a total amount of US\$25.92 billion (approximately JPY3,100 billion). Loss amounts were calculated on a gross basis, without taking into account subsequent recoveries.

A strict comparison of the two sets of survey results is not possible owing to differences in the number of banks covered by each survey (14 in Japan and 23 in the US) and the sizes of the banks surveyed, as well as the different time frames over which data were collected, which varied by bank. Nevertheless, the fact that total assets per bank covered by the two surveys were broadly similar⁷ and that data were collected from most banks over a 3- to 5-year period, supports the conclusion that op risk losses incurred by Japanese banks are considerably smaller than those suffered by their counterparts in the US.

To enable a more precise comparison between Japan and the US, the number of loss events per year divided by total assets, Tier I capital, and gross incomes are shown in Table 2. A typical Japanese bank has 0.08 op risk losses per year involving the loss of no less than JPY2 million per JPY100 billion in total assets (in other words, a typical bank with total assets of JPY10 trillion has eight loss cases of such a magnitude per year)⁸. Table 2 shows that half of all Japanese banks surveyed suffer between 0.05 and 0.10 op risk loss cases per JPY100 million in total assets.

⁷ Since the identities of the banks surveyed were not disclosed in either survey, it is difficult to perform a strict comparison. However, if we extract the top 14 Japanese and top 23 US banks in terms of total assets, average total assets per bank are approximately US\$390 billion (approximately JPY47 trillion) for both countries (figures from the Top 1000 World Banks listed in "The Banker", July 2007).

⁸ In this survey, the figures for the banks surveyed were sorted in descending order and the median figure was used as the figure representing a typical example of the sample taken. For example, "the survey result was 0.08 cases" means that, since 14 banks were surveyed, the average of the 7th- and 8th-ranked banks was 0.08.

(Table 2) Annualized loss frequencies as a percentage of total assets, Tier 1 capital, and gross income

Japanese banks

	Losses ≥ 2 million yen	Losses ≥ 10 million yen
Loss frequency divided by total assets in 100 billion yen	0.08 (0.05–0.10)	0 (0–0.0028)
Loss frequency divided by Tier 1 capital in 100 billion yen	1.89 (0.78–2.48)	0 (0–0.07)
Loss frequency divided by gross in 100 billion yen	4.42 (2.83–6.06)	0 (0–0.16)

US banks (Institutions reporting ≥ 1,000 losses)

	Losses ≥ \$20k	Losses ≥ \$100k
Loss frequency divided by total assets in \$billions	1.76 (1.53–2.18)	0.035 (0.022–0.046)
Loss frequency divided by Tier 1 capital in \$billions	31.19 (24.58–39.90)	0.58 (0.37–0.74)
Loss frequency divided by gross income in \$billions	37.53 (28.35–49.90)	0.576 (0.303–0.978)

By contrast, the US banks surveyed had an average of 1.76 op risk losses of no less than US\$20,000 (approximately JPY2.4 million) in a year per US\$1 billion (approximately JPY120 billion) in total assets. In other words, a typical US bank with total assets of US\$100 billion (approximately JPY12 trillion) has 176 such cases per year, or approximately 20 times the number of losses suffered by Japanese banks. If the figures are divided by Tier 1 capital and gross incomes, the differences between the figures have been scaled down to reflect the lower levels of capital and lower profit levels of Japanese banks. Nevertheless, regardless of the measure used, the fact remains that there is a large difference between Japanese and US banks in terms of the loss frequency.

The same applies to loss amounts (Table 3). Japanese banks, on average, incur losses equivalent to 0.0016% of total assets per year. By contrast, a typical US bank incurs op risk losses equivalent to 0.06% of total assets per year. In other words, while a typical Japanese bank with total assets of JPY10 trillion suffers losses of only JPY160 million per year, the figure for a US counterpart with the same level of total assets is JPY6 billion per year, or approximately 40 times higher than its Japanese counterpart.

(Table 3) Average annual loss (AAL) as a percentage of total assets, Tier 1 capital, and gross income

Japanese banks

	Losses \geq 1 million yen
AAL divided by total assets	0.0016% (0.0005%–0.0033%)
AAL divided by Tier 1 capital	0.0411% (0.0083%–0.0762%)
AAL divided by gross income	0.0866% (0.0397%–0.1960%)

US banks (Institutions reporting (1,000 losses)

	Losses \geq 1 million yen
AAL divided by total assets	0.06% (0.03%–0.13%)
AAL divided by Tier 1 capital	0.83% (0.48%–2.14%)
AAL divided by gross income	1.00% (0.50%–2.86%)

As the comparisons made above are between typical examples of the banks surveyed⁹, the significance of these comparisons depends on the homogeneity of the banks surveyed as a whole. The nature and number of banks surveyed, in addition to the fact that they were seeking to use the Advanced Measurement Approach for their op risk management, means that a strict comparison on this point is not practicable. Despite this, it is reasonable to assume that both groups comprise leading banks that are representative of their respective countries, and that they were looking to implement advanced risk management strategies.

Furthermore, as described above, the similar total asset levels of the banks surveyed in the respective countries also points to the homogeneity of the group as a whole. This indicates that the significant difference between Japanese and US banks in terms of op risk losses may not necessarily come down to size differences or the significance of the sample banks to the macroeconomies of their respective countries.

⁹ In the US survey, the figures are shown for two groups: banks with 1,000 or more loss data and those with less than 1,000 loss data; the total number of losses is not disclosed. The comparison made here with Japanese banks is with the group of US banks with 1,000 or more loss data.

~ Japanese and US Banks are Similar in Terms of Losses by Event Type and Business Line ~

Although there is a disproportionate difference between Japanese and US banks in terms of the number of loss events and the amount of op risk losses, the two countries unexpectedly have much in common in other respects, as shown by the figures for losses by event type and business line, using Basel II definitions.

First, by business line (Table 4), losses in retail banking account for the majority in both countries. On this measure, losses incurred by banks in the two countries are broadly similar, except that US banks suffer only about 25% of the number of commercial banking loss events experienced by banks in Japan.

(Table 4) Percentage of annualized loss frequencies by business line and event type

By event type

	Internal Fraud	External Fraud	Employment Practices & Workplace Safety	Clients, Products & Business Practices	Damage to Physical Assets	Business Disruption & System Failures	Execution, Delivery & Process Management	Others	Total
Japanese banks	1.8	36.5	1.5	8.8	1.9	10.9	38.6	0	100.0
US banks	3.4%	39.0	7.6	9.2	0.7	0.7	35.3	4.0	100.0

By business line

	Corporate Finance	Trading & Sales	Retail Banking	Commercial Banking	Payment and Settlement	Agency Services	Asset Management	Retail Brokerage	Others	Total
Japanese banks	0.5	4.7	57.2	25.7	0.6	5.3	2.1	3.5	0.4	100.0
US banks	0.3	7.3	60.1	5.1	4.5	5.1	2.4	7.3	8.0	100.0

Turning to event type, the “Execution, Delivery & Process Management” and “External Fraud” categories account for approximately 40% of losses in both countries. Of these cases, the high percentage of “system failures” (approximately 10%) is quite notable for Japanese banks. This may be partly because many Japanese banks treat personnel costs (i.e., overtime) incurred in responding to systems failures as op risk losses.

Looking next at the amount of losses by business line (Table 5), it is notable that the “Other” category accounts for more than 70% of losses in the US, which may be explained by the fact that the US survey classified all losses that did not fall neatly into another category as “other” losses. For this reason, it is difficult to carry out any meaningful comparison between the two countries based on these figures.

(Table 5) Percentage of annualized loss amounts by business line and event type

By event type

	Internal Fraud	External Fraud	Employment Practices & Workplace Safety	Clients, Products & Business Practices	Damage to Physical Assets	Business Disruption & System Failures	Execution, Delivery & Process Management	Others	Total
Japanese banks	2.9	8.3	1.0	24.8	4.5	3.9	54.6	0	100.0
US banks	0.9	5.1	1.7	79.8	1.4	0.8	9.6	0.7	100.0

By business line

	Corporate Finance	Trading & Sales	Retail Banking	Commercial Banking	Payment and Settlement	Agency Services	Asset management	Retail Brokerage	Others	Total
Japanese banks	0.3	25.2	21.5	45.4	0.1	3.8	1.5	2.0	0.2	100.0
US banks	0.5	8.6	12.3	1.8	0.6	1.1	2.5	1.6	70.8	100.0

Based on event type, the two event types of “Execution, Delivery & Process Management” and “Clients, Products & Business Practices” comprise a large percentage of losses incurred by banks in both countries. There still is a difference in that “Clients, Products & Business Practices”, which is estimated to be mostly associated with litigation, accounts for 80% of op risk events in the US. Alternatively, the majority of Japanese op risk events fall into the “Execution, Delivery & Process Management” category. This may merely reflect the difference in the classification approaches taken to these event types in the two countries¹⁰.

¹⁰ Japanese banks often classify loss cases that should be classified in the “customer, product or transaction” category in the “process control” category because they tend to attribute the cause to a control problem. By contrast, US banks tend to classify similar cases as losses arising from “customer, product or transaction” rather than from “process control”, as a measure to reduce litigation by making no admission of error on the part of the bank.

Another unexpected discovery is the apparent similarity in “severity distribution of loss per event” (i.e., the potential severity of the loss if an op risk loss event occurs) between the two countries (Table 6). We note similarities in (1) the distributions of losses by severity; and (2) the 25%, 50%, 75% and 95% figures for losses of no less than JPY1 million. On the latter point, the number of losses of no less than JPY1 million, as a percentage of the total number of all losses, is almost the same for the two countries. This point is quite important in the quantification of op risk¹¹.

(Table 6) Severity of losses

Distributions of losses by size of loss

Size of loss*	100–200	200–500	500–1,000	1,000–10,000	10,000+
Japanese banks	50.8%	25.2%	9.8%	10.9%	0.0%
US banks	46.9%	30.3%	11.1%	9.7%	1.0%

* Japanese banks: In 10,000 yen; US banks: In \$100 (e.g., 10,000 means 100 million yen for Japanese banks, \$1 million for US banks)

Percentiles of the loss severity distribution

–For losses no less than 1 million yen for Japanese banks, no less than \$10,000 for US banks

	25th percentile	50th percentile	75th percentile	95th percentile
Japanese banks (in 100 yen)	14,831	19,395	49,325	248,204
US banks (in \$1)	13,436	21,277	42,155	206,492

* US banks: Institutions reporting greater than or equal to 1,000 losses

¹¹ At present, the “loss distribution approach” is the most representative approach for the calculation of op risk. This is a method for calculating op risk losses that may be incurred during the course of a year on the assumption that the severity of any op risk loss incurred is determined independently of the timing of the loss. This approach requires the use of the “loss frequency distribution”, which represents the “frequency of op risk incidents during the year”, and an estimate of the “distribution of loss severity per event”, which represents the “severity of op risk loss if an op risk loss incident occurs”. Importantly, it is well known that the latter has a significant impact on op risk quantification results. For studies on this subject, see, for example, “The Effect of the Choice of the Loss Severity Distribution and the Parameter Estimation Method on Operational Risk Measurement”, available at: <http://www.boj.or.jp/en/type/ronbun/ron/research07/data/ron0712c.pdf>.

~ Further Utilization of the Data Collected ~

As mentioned above, this survey and the comparative analysis with the US survey leave certain questions unanswered. First, there is the question of data reliability. The data collection period was no more than 10 years, and, in some cases, the data do not cover even one year. For this reason, there is a particular concern surrounding the collection of data on “low-frequency, high-severity losses”, which have a great impact on the calculation of risk amounts.

Furthermore, we cannot reach a definite conclusion that the amount of op risk carried by Japanese banks is much smaller than that carried by US banks based solely on the above comparative analysis. For example, while the damage caused by a major earthquake is quite important in the quantification of op risk for Japanese banks, the Japanese survey did not include any data on major earthquake damage in a metropolitan area, as no such earthquake has occurred for a long time. In addition, further analysis of risk factors may reveal that major loss events that have been categorized as credit risk losses actually contain significant elements of op risk.

Although certain issues remain unresolved, the Japanese survey is innovative in the sense that it is the first survey to use data to reveal the nature of op risk carried by Japanese banks. Ongoing analysis of the data and the collection of new data should assist Japanese banks to understand and manage their op risk in a more sophisticated manner.

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