

Summary Record of the Operational Risk Scenario Analysis Workshop Session

On July 18th and 19th, the Center for Advanced Financial Technology held a 2-day workshop entitled "Operational Risk Scenario Analysis Workshop".

Details of the Operational Risk Scenario Analysis Workshop

Venue for the Workshop: Main Conference Room, 9th Floor, Head Office, Bank of Japan

Speakers: Center for Advanced Financial Technology of the Bank of Japan, 2 overseas banking authorities [Note 1], commercial banks (2 domestic and 2 overseas banks [Note 1]), 2 consulting firms and 1 member of the academic community

Participants: 50 individuals from 36 organizations [Note 2] (27 domestic financial institutions, 2 overseas financial institutions and 7 other organizations).

Organized by: The Center for Advanced Financial Technology , Bank of Japan

Agenda: See the Attached

Note 1: Among the speakers, the French Banking Commission and the Commonwealth Bank participated in the form of a conference call from abroad.

2: The number of participants not including speakers.

1. Overview of scenario analysis and the objectives of the Scenario Analysis Workshop

As the deadline for the Basel II implementation approaches, major financial institutions worldwide, including major Japanese banks, are now preparing to introduce an internal rating based approach to credit risk management and an advanced measurement approach to operational risk management. Of these, the advanced measurement approach, for which no standardized approach of the industry has necessarily been established, allows a flexible response by authorities upon implementation so that the risk management approach applied is appropriate for the risk profiles of the individual financial institutions and that the approach maximizes their creativity.

In this context, one of the approaches of particular note in the field of operational risk quantification is scenario analysis. Scenario analysis is also one of the four

elements that must be taken into consideration in the quantification of operational risk as required by Basel II. In general, while accumulation of internal loss data relating to operational risk is as yet insufficient, methodologies for interpreting events with low frequency but high severity losses (for example, huge earthquakes and losses caused by the failure of main computing systems) has become a major issue in the field of risk quantification. Scenario analysis has been expected to be one of the ways that can be used to overcome such issues.

Basically, scenario analysis is a means of assuming an operational risk scenario by estimating the frequency and the severity of the loss event which may be faced by a financial institution. And this risk scenario is used for risk control measures, including the quantification of risk based on the financial institution's internal and external experience and knowledge. For example, if most employees feel that, based on their years of experience, a loss of cash amounting to several hundred million yen may occur once in twenty years, it is possible to use this information when formulating risk scenarios. It is also possible to formulate a scenario that includes the amount and the frequency of losses incurred by a particular financial institution based on the data published by the public sector as to frequency of and the severity of damage caused by an earthquake of the same magnitude as the Great Kanto Earthquake.

As just described, scenario analysis is used to convert the internal and external experience and knowledge within financial institutions into more concrete and standard data, which can be applied when forecasting and formulating measures to guard against possible loss events in the future. However, how to maintain the objectivity and comprehensiveness of such scenarios during the course of this process has become a major issue. The primary objective of this Workshop is to obtain input from the perspectives of various domestic and international financial institutions and supervisory authorities on how to deal with such issues while at the same time recognizing the usefulness of scenario analysis.

2. Summary of presentation

—See http://www.boj.or.jp/en/type/release/zuiji_new/fsc0608a_add.htm#a for the presentation material used by the speakers. Also, see http://www.boj.or.jp/en/type/release/zuiji_new/data/fsc0608be14.pdf for questions and answers during the Workshop.

(1) Speeches from the Center for Advanced Financial Technology of the Bank of Japan

Tsuyoshi Oyama, Deputy Director-General of the Center for Advanced Financial Technology, opened the Workshop with a keynote speech and explained the importance of scenario analysis and the usefulness of building a certain consensus relating to the “world”, which operational risk management / scenario analysis tries to capture. He noted the importance of financial institutions building such consensus in order to secure a “level playing field”.

Next, Takashi Arai, Director of the Center, discussed the basic issues relating to scenario analysis, (i) the concepts and concrete examples of approaches to define scenarios relating to the risks to which financial institutions are exposed (the top-down approach, in which risks are identified from a management perspective; and the bottom-up approach, in which the risks are clarified by the relevant operational departments), (ii) the scope and concrete examples of events that should be assumed (for example, events that can be considered the boundary cases of operational and business risks), (iii) an approach to estimate the occurrence frequency and the severity of loss (including guidance on how to combine expert judgments with publicly available information, how to reasonably recognize the severity of loss from an economic perspective, etc), and (iv) the importance of ensuring the appropriateness of the scenarios and taking the operational departments’ burdens in terms of the development of the scenarios (including the ways of verifying the scenarios) into consideration.

Lastly, Tsuyoshi Nagafuji, Director of the Center, explained the results of quantification of the operational risk capital of major Japanese banks as a whole. This quantification was performed by using internal loss data obtained from major Japanese banks and data based on scenario analysis. According to his explanation, this quantification remained a number of issues to be solved, but it made obvious that: (i) partly because an empirical distribution was used for the quantification, the impacts of the highest severity losses were quite large, (ii) depending on the relationship with the assumed confidence level, small changes in the frequency may sometimes have a great impact on the overall results, and (iii) in general, how to assume the frequency and the severity of an earthquake

will have an enormous impact on the risk volume.

(2) Presentations by participating financial institutions

The Commonwealth Bank of Australia (Mr. Denis Taylor, Mr. Mark Shelton and Mr. David Farmer), Shinsei Bank (Mr. Hanzawa, Deputy Director, Risk Control Department) and JP Morgan Chase & Co. (Mr. Robin L. Phillips) outlined the advanced approaches adopted by their institutions in regards to operational risk quantification and scenario analysis. Common points in the commentaries of these banks included the fact that they organized workshops and created teams to review / assess individual scenarios and to endeavor to increase the appropriateness of the scenario analysis process, which is likely to be highly dependent on subjective judgments. Summaries of these discussions are as described below.

The Commonwealth Bank of Australia explained that (i) the risk assessment experts assigned to each operational department (Subject Matter Expert: SME) are responsible for the identification of risk events, but estimation of the frequency and the severity of the losses are conducted separately as part of an across-the-board workshop under the control of an operational risk management group, (ii) banks are basically expected to verify the scenarios by (a) utilization of the risk information provided, (b) the plausibility of the estimated frequency and severity of loss, and (c) the qualitative evaluation focusing on the accuracy and comprehensiveness of the risk information, and they are expected in the future that the standardization of the scenarios will develop as the benchmarking performed between banks develops, and (iii) technical issues when conducting a scenario analysis include (a) how to combine scenario data that depend on different frequency and severity distributions to make a risk measurement class (BuRT: Business/RiskType) in which the data can be regarded as depending on a single frequency distribution and a single severity distribution, and (b) how to check the scenario data obtained by a bottom-up approach from the perspective of a top-down approach.

Shinsei Bank explained that (i) while departments actually engaging in business operations draft individual scenarios based on dialogue with a neutral administrator, a “verification team” composed of the departments in charge of

risk management and internal audit is responsible for verification of the content of the scenarios; and (ii) points to be considered when conducting a scenario analysis are (a) when drafting scenarios, emphasis is placed on low-frequency high-severity events which are important for risk quantification, and (b) when verifying the scenarios, they ensure that the scenarios' consistency with an awareness of the relevant business line confirmed by the verification team through interviews, that identification of scenarios involving multiple departments has been conducted in a proper manner, and that similar scenarios are consistent between different departments.

JP Morgan Chase & Co. explained that in their institution (i) experts organize teams from each of the major lines of business to formulate scenarios assuming frequency / amount of loss, (ii) when quantification of operational risk, large losses of US\$1 million or more involves combining scenario data and internal loss data in a ratio of four to one, respectively, through a Monte Carlo Simulation; and (iii) they have found that even though they have now accumulated internal data for more than four years, the internal data do not always represent the risk profiles for a number of measurement units and scenario analysis will therefore continue to play an important role in their quantification of operational risk. The scenario process is being evolved to capture loss estimates in relation to key business metrics (e.g. number of loans, average loan size, number of originations per month).

.

(3) Presentation by overseas regulatory authorities

Dr. Duc Pham-Hi of the French Banking Commission and Dr. Eric Rosengren of the Federal Reserve Bank of Boston introduced their financial institutions' initiatives for scenario analyses in their countries.

Dr. Pham-Hi pointed out that there are three types of approaches based on the examples of scenario analysis applied by French financial institutions, namely, (i) an approach where the risks associated with daily operations identified by workers are extracted in the form of probability density functions through the development of scenarios (distributional scenario approach), (ii) an approach where business experts organize a committee to review a number of worst case scenarios (earthquakes, terrorist attacks, etc) (circumstances scenario

approach), and (iii) an approach to model the causal association between risk factors and losses (mechanism scenario approach). The issues associated with each of these approaches are (i) how to overcome the instability of the results of quantification resulting from difficulties in fine-tuning the model, (ii) how to overcome lack of objectivity due to the unavailability of an established methodology, and (iii) how to verify the credibility of a complex model structure, respectively. In addition, he explained that in terms of a supervisory function, as methodologies are still in development, confirmation of sufficiency of Operational risk cushion capital is most important. He noted that in the future scenario analysis could benefit from schemes based on real options and Bayesian theory.

Dr. Rosengren commented that in scenario analysis workshops composed of managers of multiple lines of business, consulting firms are often involved in the development of scenarios. In addition, he explained that based on a comparative analysis of data for high-severity publicly released in the US, Japan and Europe, while a share of losses caused by fraud is remarkable in Japan, in the US, a share of compensatory payments resulting from lawsuits with clients (“Clients, Products & Business Practices” according to the classification of Basel II) is notable and that, in this context, quantification of litigation risk has become important for financial institutions. In addition, after pointing out that information gathered for the formulation of scenarios is highly dependent on the ways questions are asked by the person who collects the information, he suggested that a method for financial institutions to formulate appropriate and objective scenarios would be to apply an approach based on “behavioral economics” to scenario analysis.

—In this regard, he explained that, for example, (i) when asking a question to determine desirable measures to be taken to protect against an outbreak of a highly contagious epidemic that may potentially cause 600 deaths, even though both expressions have practically the same meaning, respondents will tend to accept the measure which saves “200 out of 600 people” but not the measure which despair of “400 out of 600 people”, and (ii) respondents also tend to prefer unassertive expressions such as “A may be B” rather than blunt expressions such as “A is B”. He pointed out that when conducting interviews with operational departments in order to develop scenarios, it is

necessary to pay attention to how the questions are asked and to ensure that they are not asked in a manner that biases the answers towards a particular result.

(4) Presentations by Dr. Nakagawa, Associate Professor of the Tokyo Institute of Technology, and Mr. Mike Finlay, Risk Business International

Dr. Nakagawa, Associate Professor, Tokyo Institute of Technology introduced a method of operational risk quantification in terms of Value-at-Risk (VaR) using the “Extreme Value Theory (EVT)”; it is an approach to understanding events commonly known as tail events (low-frequency events that result in high-severity), which are important in operational risk management. He also mentioned how to deal with loss scenarios. As a method to quantify the distribution of large loss, he explained the “Peak-Over-Threshold (POT) approach”, which is an approximation approach based on the extreme value theory; the Generalized Pareto Distribution (GPD) is used for approximating the conditional probability of excess losses data that exceed a certain threshold. This approach uses only high-severity data for analysis. On certain occasions it may use scenario analysis data with actual high-severity data.

Also, he noted that (i) it is difficult to generally show what is the appropriate combination of distributions and estimation method, (ii) the impact of large loss scenarios is often too big, so appropriate scaling or some data modification is required, and (iii) sufficient analysis of loss event data is required and, to this end, it is necessary for the industry to share their knowledge on operational risk.

Mr. Finlay, Risk Business International, explained the trends surrounding scenario analysis in major international financial institutions. He noted that, as concrete examples, (i) institutions now clearly distinguish risk “analysis” through scenario analysis from risk “evaluation” based on the CSA (Control Self Assessment [Note 3]), (ii) it is useful to change the risk control approach in the vicinity of the boundary point that represents “UL₁₀” on the loss distribution of operational risk (the maximum amount of loss that may be suffered by a financial institution once in 10 years), and it is effective to understand / manage the risks through CSA and KRI (Key Risk Indicators) in the case of risk events under the “UL₁₀” threshold and through a management approach focusing on scenario analysis over the “UL₁₀” threshold, (iii) for quantification of operational risks,

although many organizations started with the LDA (Loss Distribution Approach using only internal loss data), some organizations adopted the SBA (Scenario Based Approach: a quantification approach using only scenario data through scenario analysis) due to a lack of relevant data; however, looking at the recent situation, from the perspective of finding a usable risk control management method, a number of organizations are heading towards a hybrid system combining the LDA and the SBA, and (iv) in quantification of operational risk, while the internal loss data determines the body part of the loss distribution and the frequency distribution, it may, in the near future, become the best practice to determine the tail part of the loss distribution or the loss severity distribution as a whole using the results of the scenario analysis.

Note 3: In his speech, Mr. Finlay used the term “RCSA (Risk Control Self Assessment)” (this is almost synonymous with CSA).

(5) Presentation regarding evaluation of seismic risk

President Kanemori of OYO RMS and Mr. Nakamura, General Manager of Shizuoka Bank, gave presentations on seismic risk, which is one of the most important topics for operational risk management by Japanese financial institutions. They discussed relevant measures from the perspective of an expert on seismic risk assessment and a manager in charge of a risk management operation to prepare for a Tokai earthquake, respectively.

President Kanemori, OYO RMS, noted that in the field of seismic risk, developments in quantitative analytical methods over approx. 10-20 years have resulted in the establishment of the following quantitative seismic risk analysis methods including (i) prediction of ground motion, (ii) prediction of the severity of damage to tangible assets based on damage to buildings, (iii) prediction of the opportunity cost (lost profits) due to suspension of operations (a kind of scenario analysis method), and quantitative seismic risk analytical methods which considers occurrence probability of many possible earthquakes (many scenarios). As a precondition to understanding these methods, he explained the mechanism of occurrence of huge earthquakes and the historical occurrence of massive earthquakes over the last several hundred years in the Kanto and Tonankai Regions. In addition, he pointed out that for financial institutions it is

important to consider and strike a balance between the amount of information required and the cost of obtaining this information in an expedient manner while also taking the size of the margin of error associated with the prediction into account in an explicit way.

Mr. Nakamura, General Manager of Shizuoka Bank, introduced a qualitative risk management approach implemented by the bank that assumes the occurrence of a Tokai earthquake (seismic isolated / vibration controlled facilities, backup systems and drills) and a quantitative risk management method (estimation of losses, capital allocation and risk hedging transactions). He explained that for the quantitative risk management method, in addition to the destruction of the computer center and branches after the occurrence of the earthquake, losses associated with risk categories other than operational risk, such as increased credit cost due to bankruptcies, related failures of obligors and declines in the price of the stock held by the bank are also taken into consideration. The bank also conducts segment analysis of its credit portfolio and discusses suitable measures to reduce seismic risk based on these results. In other words, the bank believes that (i) in the case of apartment and mortgage loans, the introduction of portfolio-type credit derivatives are effective and (ii) in the case of loans to major local companies, the individual issue of credit derivatives are effective and (iii) in the case of loans to small- to-medium sized local businesses, reducing the risk through providing such businesses with guidance on countermeasures against earthquake risks is effective.

3. Panel discussion

At the end of the Workshop, Tsuyoshi Oyama of the Center for Advanced Financial Technology, Bank of Japan, led discussions on four subjects: (i) the scope of events to be assumed for scenario analysis, (ii) means of ensuring the objectivity of the scenarios, (iii) the pros and cons of standardization of scenario analysis, (iv) the relevant background for introducing scenario analysis (implications of introducing scenario analysis from an economic perspective). Summaries of the discussions under each subject area are as follows.

—See http://www.boj.or.jp/en/type/release/zuiji_new/data/fsc0608be13.pdf for details of discussions.

With regard to “the scope to be assumed for scenario analysis”, the following opinions were expressed: (i) it is important to incorporate an appropriate number of low-frequency (once in 100-200 years, for example) scenarios that have a great impact on institutions and, for this purpose, it is necessary that an inter-organizational team conduct constant verification of the comprehensiveness of the scenario, (ii) it is necessary to cover historical risk events faced by the banking industry, (iii) in Japan’s case, earthquakes can be an indicator of risk, and (iv) although there is no definitive indicator of risk, it is important to incorporate as many stress scenarios as possible with a primary focus on the departments in which the bank selectively invests its resources.

For “ensuring the objectivity of the scenarios”, the following suggestions were made: (i) introducing a method to solve the problems that the answers vary depending on the ways in which the questions are asked, (ii) everybody inside and outside the industry should get together to have discussions over the risk assessment and find as many ways as possible to increase its objectivity, which is by its nature “subjective”, and (iii) at the very least, checking scenarios for “consistency” and “compliance” is necessary. In addition, if data collection progresses, validation using the empirical distribution of a bank’s internal losses or external data will become possible.

In regards to “the pros and cons of standardization of scenario analysis“, the following opinions were expressed: (i) while scenarios assuming earthquakes and terrorist attacks are meaningful, benchmarking will be the limit for scenarios assuming other risks and excessive standardization can harm creativity, (ii) while operations varying little with time are suitable for standardization, it is more difficult to standardize new operations, (iii) in addition to the events to be assumed, the process of scenario development can be considered for standardization; however, at the present stage, it is only possible to say that benchmarking analysis supported by data consortium initiatives is useful, (iv) flexibility is necessary for scenario analysis, and so a universal list of scenarios that can be shared by everybody may not be available, even in the future, and (v) in the case of earthquakes, model-driven progress on standardization has been made; however, we need to keep in mind that if standardization is advanced at too early a stage, there is a risk that it may converge at the lowest level.

In relation to “the relevant background for introducing scenario analysis (implications of introducing scenario analysis from an economic perspective)”, participants expressed the views that (i) generally speaking, management is not willing to spend money on risk management so, in this context, it is certain that regulations such as Basel II will support the introduction of scenario analysis, (ii) the introduction of scenario analysis and other tools is not expensive and even without Basel II a similar scheme would perhaps have been introduced; however, it is true that Basel II has played a positive role in raising awareness in the field, and (iii) scenario analysis fits the needs of corporate managers and administrators, and a similar analytical method has already been common business practice for a long period of time, so it is not only because of Basel II that the introduction of scenario analysis has progressed.

End of Document