

## **Economic Capital Management Workshop Summary Record**

On July 11 and July 12, the Bank of Japan's Center for Advanced Financial Technology held a two-day workshop entitled "Economic Capital Management Workshop."

### Economic Capital Management Workshop: Speakers and Participants

Venue: Bank of Japan Head Office, 9th Floor Conference Hall

Speakers: Center for Advanced Financial Technology, Bank of Japan; overseas banking authorities [2]; commercial banks [3](domestic [1], overseas [2]\*); consulting firms [3] (domestic [1], overseas [2]).

Participants: 59 persons\*\* from 33 institutions/organizations (domestic banks [25], foreign banks [3], others [5]).

Panelists: Day One: domestic banks [3]; Day Two: overseas banking authorities [2], foreign banks [2], consulting firms [2].

Secretariat: Center for Advanced Financial Technology, Bank of Japan

Notes:

\* Presentation by Wachovia Bank was made by teleconferencing.

\*\* Excludes speakers.

### **1. Purpose of Workshop**

Financial institutions throughout the world are developing frameworks for "economic capital management" in response to the diversification of financial businesses, rapid progress in financial engineering, and the implementation of Basel II. The objective has been to develop precise measures of the various risks that financial institutions are exposed to, and to actively utilize such assessments in determining capital adequacy and in formulating business strategies. In this process, a number of problems have been identified that need to be resolved. These include: determining the perspective for risk measurement; identifying risks that need to be covered and their measurement methodologies; devising methods for aggregating different types of risks and awareness of diversification effects; and methods for incentivizing the sectoral allocation of economic capital.

The purpose of this workshop is to develop a deeper awareness of the possibilities and challenges of economic capital management, including the question of whether unique conditions in Japan require special consideration, through presentations made by Japanese and foreign experts and practitioners, and through active discussions among participants.

### **2. Summary of Presentations**

Presentation materials used by the speakers can be accessed at:

<http://www.boj.or.jp/en/type/release/zuiji07/fsc0707a.htm#a>

Please note that several of the presenters did not speak on behalf of their respective organizations.

## **(1) Speech Given by Head of the Center for Advanced Financial Technology, Bank of Japan**

In addition to the keynote speech made by the Head of the Center for Advanced Financial Technology, two other presentations were made by the Bank of Japan on the subject of challenges in economic capital management facing Japanese banks, and challenges in economic capital management facing regional banks.

<Keynote Speech: Mr. Atsushi Miyano, Head of the Center for Advanced Financial Technology, Bank of Japan>

Economic capital management functions as a tool for enhancing profitability and soundness, and facilitates transparent communication with various stakeholders. The importance of economic capital management has increased with the changes in the environment surrounding financial institutions. These include the transition to the new banking regulation and supervision framework of Basel II, progress in financial innovation, and the expanding frontiers of financial businesses.

There is no universal method in economic capital management. Rather, it is important for financial institutions to pursue the best practices that suit their own environment and management objectives. Compared to major European and U.S. banks, the management of Japanese banks is characterized by a stronger focus on relationship banking, which involves complex risks that are difficult to measure objectively. For instance, Japanese banks have larger equities risks because of the tendency to hold the shares of obligors. Within the framework of economic capital management, it is important to differentiate between factors that are related to value creation and those that are not. This differentiation is of essential importance to Japanese banks in developing competitive businesses, including their re-entry into overseas markets.

<Mr. Tsuyoshi Oyama, Deputy Director-General, Bank of Japan>

Economic capital corresponds to the volume of risk evaluated from an economic perspective. Financial institutions can use this concept to facilitate communication with their principal stakeholders and to devise more effective business models. While major foreign banks are diversifying their risks and shifting to businesses where risks can be more easily detached, the business model of Japanese banks is internationally unique in that Japanese banks continue to hold considerable relationship-related risks. This uniqueness is strongly related to the costs and benefits of building traditional relationships, as well as to the evaluation of pertinent risks. In light of the ongoing changes in their external environment, it is essential for Japanese banks to revamp and overhaul their business models by strengthening economic capital management.

Japanese banks face the following major challenges in economic capital management. (1) Recognizing major risks: How should relationship-related risks be recognized and assessed. (2) Setting risk appetite: Given that many major overseas banks have adopted confidence levels of 99.9 percent and above, how to set a confidence level that satisfies both management and major stakeholders. (3) Risk quantification: How to treat risks that are difficult to quantify; how to clarify the relation between stress testing and VaR; what

assumptions to make on risk correlation; how to be consist in the treatment of external environment factors and internal control factors. (4) Definition of capital: How to maintain consistency in accounting methods for treatment of latent profits. (5) Use of economic capital management: Given the features of assets and liabilities that do not appear on the balance sheet (e.g., value of strong relationship with obligors, Japanese employment practices based on long time horizon), how to incorporate the outcome of economic capital management in management decisions.

<Mr. Tomoyuki Fukumoto, Director, Bank of Japan>

In the area of integrated risk management, most Japanese regional banks have established formal frameworks for measurement and integration of risks and capital allocation. However, it is said that considerable gaps exist between risk measurements and management perception of risk. Moreover, regional banks are still engaged in a trial-and-error approach to how risk measurements can be used in improving risk/return characteristics. Many problems remain to be resolved before economic capital management is assigned real importance and is fully utilized by regional banks.

Regional banks need to develop custom-made systems that match their specific requirements. Regional banks face the following challenges in economic capital management: (1) To define management goals and determine how much weight should be given to the improvement of risk/return characteristics; (2) To narrow the gap between risk measurements and the risk perceptions of management and business lines; (3) To devise ways to assess long-term risk/return characteristics; (4) To devise ways to control risk; and (5) To devise ways to encourage business lines to act on the basis of risk/return characteristics.

## **(2) Speeches Given by Financial Institutions**

Presentations were made by the following financial institutions concerning the status of economic capital management in their respective institutions. Among Japanese financial institutions, a presentation was made by Sumitomo Trust Bank, and among overseas financial institutions, presentations were made by DEPFA Bank and Wachovia Bank.

<Mr. Yasuhiko Tara, Senior Manager, Corporate Risk Management Department, Sumitomo Trust Bank>

The main features of Sumitomo Trust Bank's integrated risk management are as follows: (1) Economic capital management is used in assessing both capital adequacy and capital efficiency; (2) Credit, equities, interest, and operational risks are under integrated management; (3) Correlations between the broad risk categories of equities, credit, and interest risks are taken into consideration; and (4) An 99.9 percent level of confidence has been adopted.

Regarding capital utilization, sectoral allocation of capital is defined as "Tier I + valuation profits on securities x 60%." Total risk taken with consideration give to diversification effects is kept within this range. On the other hand, the risk buffer ceiling is defined as "risk capital + permanent subordinated bonds." Capital adequacy is assessed by comparing this to the

volume of integrated risk under stress with less diversification effect. The diversification effect is determined by expert judgment based on market indicators.

Business planning at Sumitomo Trust Bank takes the following approach. Annual plans are determined in a top-down manner. Based on this, operational and profit targets are formulated in a bottom-up direction. The board of directors then determines risk-capital limits to be consistent with these targets. In determining the allocation of risk capital, both economic value volatility (VaR) and earnings volatility (EaR) are taken into consideration to achieve efficient capital utilization and sustained profit growth at the same time. The Corporate Risk Management Department is responsible for monthly monitoring and reporting to the board of directors. As indicators of profitability, sectoral SVA (risk adjusted earnings/capital cost) and sectoral ROE (risk adjusted earnings ÷ risk capital limit) are used to assess the performance of each sector.

By using this system, a PDCA cycle for risk management has been established and a common metric for investment decisions at time of investment has been created. As a result, Sumitomo Trust Bank has acquired a business control tool in the form of a common internal and external language.

<Mr. Magnus Agustsson, Managing Director, DEPFA Bank>

DEPFA Bank launched its economic capital management project in the fall of 2006. The project has been making good progress in the bank. For measuring economic capital, data is based on internal ratings. Credit risks are computed using MTM mode to measure variance risk in economic value due to rating migration. This approach is taken for the following reason. The majority of DEPFA Bank's loans portfolio consists of lending to government institutions that have never defaulted on their obligations. Therefore, in default mode, risk would be nearly zero on a one year horizon. Market risks are computed based on a combination of delta normal VaR and historical simulation VaR methods. Operational risks are computed based on the Basel II standardized approach (TSA). Reputational, strategic, and regulatory risks are also recognized and managed as risk. Liquidity risks have not been quantified yet because of the difficulty in defining liquidity risk. When integrating risks by category, risk diversification effect is taken into consideration using a variance covariance approach.

Measures of economic capital are utilized for the following purposes: assessment of capital adequacy; preparation of external reports for authorities, rating agencies (rating agencies are increasingly incorporating the content and methods of the economic capital management of banks into their rating methodologies), investors, and others; formulation of strategic plans and capital budgeting; internal education; risk and performance analysis; and pricing. The following indicators of risk-adjusted return on capital are used. Actual RAROC is used for performance assessment by segment. On the other hand, for pricing of individual trades, one-year forward expected RAROC based on expected earnings and expected loss is used.

Future challenges include: (1) Improving the precision of aggregation of risks across risk types, which is currently approximated by a variance covariance method; (2) Considering whether capital corresponding to risk should be recognized at book value or economic value; (3) How to adjust between economic capital based on the management of extreme losses and management concern with reducing volatility of earnings. (While adopting a 99.97 percent

confidence level, DEPFA Bank also calculates risks at the 95 percent confidence level for capital allocation.)

<Mr. Gary Wilhite, Senior Vice President in the Credit Risk Management Group, Wachovia Bank>

The following points need to be considered in economic capital management.

The first matter to consider is that it is difficult to measure the risk of certain operations, such as the risks of deposit acquisition and asset management. Using a single metric has the advantage of providing clear answers. Meanwhile, a single metric may lead one in the wrong direction. Wachovia Bank utilizes multiple metrics for different purposes.

Second, one needs to consider “What is at risk?” Is it capital that is at risk or future economic profit? Lending losses and losses related to market trading affect capital. On the other hand, compressed margins and increased competition affect future economic profit. While the latter risk does not require economic capital, these developments are of critical importance in the sense that they impact corporate value.

Third, one needs to determine what returns are required on which risks. Bond investors are concerned about extreme events, while stock investors are concerned about year-to-year fluctuations in earnings. To respond to both needs, first of all, adequate capital is needed to cope with losses generated by extreme events. On the other hand, when allocating capital to portfolios or to lending, it is necessary to weigh the volatility of the portfolio against its expected earnings. For instance, the Wachovia Bank has adopted a confidence level of 99.96 percent for computing the overall allocation of capital. When allocating the same amount among various sectors, capital is allocated based on year-to-years loss volatility.

The fourth issue concerns risks with different time horizons. Various approaches can be taken, such as the time needed to eliminate risk and the time needed to recapitalize. In the former case, it is necessary to consider whether it is possible to stop taking risks for the remainder of the period when capital allocated during the period is hit by considerable losses. Considering measurability and data consistency, some practical approaches would include integrating these for one-year periods or attributing the risk based on a budgeted level of risk-taking.

The fifth issue concerns measuring the risk of new products and businesses. An optimal solution would involve holding extra capital based on scenario analysis. The pricing of new products and businesses may fail to appropriately reflect real risks. Hence, it is desirable to gradually expand such products and businesses while monitoring the reaction of the markets.

### **(3) Speeches Given by Overseas Monetary Authorities**

<Mr. Bob Allen, Senior Advisor, Australian Prudential Regulation Authority>

In the risk management systems of Australia’s six major banks, economic capital covers all the Basel II Pillar 1 risks (market, credit, and operational risks), and within Pillar 2, interest rate risk in the banking book. Treatment of other Pillar 2 risks varies from bank to bank.

A review of total regulatory capital versus total economic capital in major Australian banks shows that the latter generally tends to be smaller. This is most evident with respect to credit risk. However, when economic capital is compared only with Tier 1 regulatory capital, a more meaningful comparison, the economic capital numbers tend to be higher, reflecting the higher economic confidence level. Some Australian banks take risk diversification effects into account, and some have been able to reduce risks by about 20 percent. The regulatory authority monitors the economic capital management of banks from the perspective of depositor protection, and is aware that its perspective differs from that of shareholders and bank managers concerned with maximizing shareholder wealth. For instance, to contribute to depositor protection, regulatory capital consists of “shareholders equity + hybrid debt/equity + some subordinated debt.” However, for purposes of maintaining solvency, capital allocation in economic capital management is limited to shareholder equity. From a regulatory standpoint, the objective is to ensure the soundness of the individual licensed entry. On the other hand, management is more concerned and aware of the capital needed to maintain the solvency of the entire financial group.

In various cases of risk measurement, due consideration must be given to differences in regulatory and management treatment of capital. Examples include differences in determining and estimating risk correlations and confidence levels (regulatory capital reflects society’s tolerance, while economic capital does not take into account potential systemic costs) and time horizons (regulatory capital takes into account normal supervisory review cycles, while the economic capital horizon may also take account of the time required to close down loss making activities or to recapitalize in the event of unexpected losses).

<Mr. David Wright, Group Vice President, San Francisco Federal Reserve Bank>

FRB reviews of the Internal Capital Adequacy Assessment Process (ICAAP) of banks focus on verifying capital adequacy. The key questions posed to banks are: How is risk measured? How reliable is economic capital analysis (quality of data, comprehensiveness of reference data, scope of risks covered, validation process)? How well are concentration and diversification taken into account? What role do factors such as stress testing and economic cyclicity play in calculations of economic capital? How seriously does senior management take economic capital calculation results?

The findings from FRB reviews point to three tiers of internal capital management sophistication: (1) Use of sophisticated statistical approaches to measure risk; (2) Use of quantitative approaches for some business lines, but not others; (3) Use of simple, qualitative or judgmental approaches to economic capital. The ability to measure correlation and concentration risks is limited. Recognition of credit derivatives and portfolio hedges is also limited. Moreover, while an increasing number of banks are using vendor-based models, in many cases the content of the model is not fully appreciated. For this reason, banks (including their senior management) are being encouraged to more fully understand the models and their inherent strengths and weaknesses. The validation of economic capital methodologies remains a challenge for many banks. The following specific problems exist in this area: low levels of documentation; inadequate verification when adopting models; and lack of adequate checking by internal control organizations.

The prerequisites for appropriate economic capital management are the abilities to recognize, measure, and control risk. At the same time, robust controls and governance surrounding the entire economic capital management process are needed.

#### **(4) Speeches Given by Consulting Firms**

Presentations were made by the following consulting firms: Mizuho-DL Financial Technology Co., Algorithmics Incorporated, and Moody's KMV Company.

<Mr. Toshifumi Ikemori, CEO Mizuho-DL Financial Technology Co.: "Risk Measurement Techniques and Business Strategy">

Financial deregulation has increased the pressure on financial institutions to develop their own risk management systems. This pressure comes from two different sources: business liberalization and the elimination of external safety mechanisms. In this environment, banks must effectively respond to two separate risk management requirements. These consist of the global risk regulatory regime, and internal risk management systems that are voluntarily developed to reflect the prevailing conditions in each bank.

Internal risk management systems must be approached from various perspectives. The theoretical concepts of coherent risk measurement<sup>1</sup> and spectral risk measurement<sup>2</sup> need to be understood. Having done that, it is important to clarify the strengths and weaknesses of a risk management system based on VaR. Risk theory in insurance mathematics can serve as a useful reference in computing capital levels needed for avoiding insolvency.

The following factors play an important role in the discretionary development of integrated risk management systems: (1) determination of total risk based on careful review of comprehensiveness, independence, and consistency; (2) choice of measures of risk consistent with measures of profitability, such as term profit-loss approach versus management accounting approach; (3) realization that risk volume should be assessed from the two perspectives of avoiding insolvency and improving profits; and (4) making sure the process does not stop with risk measurement, and that it is carried forward into the development of risk management system.

<Ms. Corinne Neale, Managing Director, Head of Capital Management in Asia Pacific, Algorithmics Incorporated: "Specific Issues of Economic Capital Management: Economic vs. Regulatory Capital and Business Risk">

Regulatory capital computed using the internal rating methodology of Basel II Pillar 1 is based on standardized assumptions. Therefore, regulatory capital does not accord with

---

<sup>1</sup> Coherent risk measure implies that all risk measurement properties (sub-additivity, positive homogeneity, monotonicity, translational invariance) required for developing a theory of risk measurement are satisfied.

<sup>2</sup> Spectrum refers to the intensity of individual elements in a signal, which have been decomposed and arranged in order. For example, light passing through a prism is decomposed and observed as a rainbow spectrum. Spectral risk measure refers to the measure of risk that is expressed using weighted functions of risk avoidance. VaR and cVaR meet the properties of spectral risk measurement. The difference between VaR and cVaR can be expressed in terms of the difference in weighted functions. Mathematically, the two can be treated as one.

economic capital. Pillar 2 aims to compensate for the limitations of regulatory capital. By making some changes in the assumptions of regulatory capital, economic capital can be more realistically recognized. Specifically, a realistic picture of economic capital that takes concentrations into account can be obtained by making the following changes: (1) switch from recognition of losses from default/non-default (default mode) to recognition of losses from credit migration (MTM mode); (2) switch from assumption of infinitely diversified portfolio to assumption of portfolio lumpiness as needed; (3) switch from Basel II factor loading (correlation coefficient) to bank's internal correlation calibration; and (4) switch from one-factor model to multi-factor model.

Pillar 2 emphasizes the importance of stress testing in compensating for the limitations of regulatory capital. For instance, the following approach can be taken in assessing business risk through stress tests: (1) consider what factors may prevent the realization of business plans and business budget; (2) develop stress scenarios; and (3) measure loss impact.

The adoption of advanced measurement methodologies for economic capital facilitates an organization's internal and external communication on risk. Communication is facilitated by the development of a multifaceted risk profile that provides an aggregated overview of risk by sector and risk categories, and reports changes in risk resulting from changes in confidence levels.

<Mr. Brian Dvorak, Managing Director, Credit Strategy Group, Moody's KMV Company: "International Trend of Banks' Economic Capital Management">

Leading banks are using sophisticated models to measure economic capital under the assumption of imperfectly diversified portfolios. The results are being used for making decisions on credit origination, pricing, and portfolios. Leading banks typically measure credit portfolio risk across the entire institution on at least a monthly basis. By using a good credit risk model, it is possible to distinguish between the contribution of individual lending to total credit risk and tail-risk contribution as expressed in the expected shortfall tail.<sup>3</sup> Most leading banks use tail-risk contribution in determining the allocation of economic capital to individual lending accounts. High-profitability customers and low-profitability customers can be distinguished by plotting tail-risk contribution and expected spread for individual customers.

Especially since 2003, there has been acceleration in the use of active credit portfolio management. One leading bank estimates that its loan loss savings were six times what were invested in active credit portfolio management over a three-year period starting in 1998. As a result, the bank was able to originate three times as much lending on the same capital base. By eliminating non-core customers, another bank was able to reduce portfolio size by 35 percent while reducing economic capital by 70 percent. In practice, credit portfolio management is a gradual process in which lending to customers with good return/risk ratios is increased and lending to customers with low return/risk ratios is reduced. Control of lending to a relatively small number of customers can yield large savings in economic capital and improvements in return per risk.

---

<sup>3</sup> Also referred to as cVaR (conditional VaR) or tVaR (tail VaR). Indicates expected losses above the percentile point.

### **3. Panel Discussion**

On Day One (July 11), the challenges of economic capital management for Japanese banks were discussed by a panel of four Japanese banks (Sumitomo Trust Bank, Chiba Bank, Bank of Tokyo-Mitsubishi UFJ).

For summary of the discussions, see:

<http://www.boj.or.jp/en/type/release/zuiji07/data/fsc0707a12.pdf>

On Day Two (July 12), international trends and developments in economic capital management were discussed by a panel consisting of two overseas financial institutions (DEPFA Bank, Wachovia Bank), two monetary authorities (APRA, San Francisco Federal Reserve Bank), and two consulting firms (Algorithmics Incorporated, Moody's KMV Company).

For summary of the discussions, see:

<http://www.boj.or.jp/en/type/release/zuiji07/data/fsc0707a13.pdf>