Advancing Integrated Risk Management

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I. Introduction

In this paper, "integrated risk management" refers to the framework according to which financial institutions first quantify various risks they face (credit risk, market risk, operational risk, etc.) using common standardized methodologies, and then aggregate all the risks so that they can manage the total risk amount to be kept within their capital and also to make such management consistent with other business performance indicators. As the businesses of financial institutions become increasingly complex and diverse, this management approach has been spreading rapidly among major financial institutions in particular. Financial institutions view this framework as a means of ensuring the soundness and stability of their overall management and as a mechanism for making effective use of their capital to enhance management efficiency and profitability.

The Basel II Framework,[1] which is scheduled to be introduced at the end of fiscal 2006, also relies for its basic idea on an integrated risk management approach, and more specifically, Pillar 2 of the framework requires banks to secure ample capital relative to their risk profiles (see Box 1).

At the same time, the Bank of Japan has supported financial institutions' introduction and development of an integrated risk management system through on-site examinations and off-site monitoring with a view to enhancing management efficiency. As part of this support, the Bank released a sound practices paper on integrated risk management systems entitled "Integrated Risk Management at Financial Institutions" in June 2001. The present report, "Advancing Integrated Risk Management," a sequel to the 2001 paper, examines the current status and future issues of integrated risk management, in light of recent developments in discussions of risk management, and of policies adopted by financial institutions in response to the Basel II Framework, especially Pillar 2.

[1] See "International Convergence of Capital Measurement and Capital Standards: A Revised Framework" (June 2004), issued by the Basel Committee on Banking Supervision.

Box 1: Pillar 2 of the Basel II Framework: Supervisory Review Process

The Basel II Framework consists of the three pillars: minimum capital requirement (Pillar 1), the supervisory review process (Pillar 2), and market discipline (Pillar 3).

Pillar 2 identifies the following four principles and calls for banks to adequately capitalize against risks.

Principle 1: Banks should have a process for assessing their overall capital adequacy in relation to their risk profile and a strategy for maintaining their capital levels.

The main features of the capital adequacy assessment process are board and senior management oversight; sound capital assessment; comprehensive assessment of risks; monitoring and reporting; and internal control review.

Principle 2: Supervisors should review and evaluate banks' internal capital adequacy assessments and strategies, as well as their ability to monitor and ensure their compliance with regulatory capital ratios, and should take appropriate supervisory action based on the results.

The basic elements of the supervisory review and evaluation process are adequacy of risk assessment; capital adequacy; the risk control environment; and compliance with minimum standards.

Principle 3: Supervisors should expect banks to operate above the minimum regulatory capital ratios.

Principle 4: Supervisors should seek to intervene at an early stage to prevent capital from falling below the minimum levels required to support the risk characteristics of a particular bank.

This paper is structured as follows. Chapter II provides an overview of integrated risk management at financial institutions in Japan. Chapter III draws on the issues to be addressed with high priority in this area in terms of organizational frameworks; allocation of risk capital; methods for identifying risk; and comparisons of allocated capital and risk. Chapter IV illustrates other issues to be discussed to further enhance the effectiveness of integrated risk management, although not all such approaches or methodologies are necessarily established at present. Finally, Chapter V looks at the use of the information obtained from integrated risk management in corporate management.

To facilitate readers' understanding of various aspects of integrated risk management, an Appendix is attached to provide a brief summary of the current practice of market risk management, which has not yet been discussed in the series of papers on "Advancing Risk Management by Financial Institutions."

II. Overview of Integrated Risk Management at Financial Institutions

Financial institutions that have adopted advanced integrated risk management systems allocate hypothetical capital for internal control purposes to each section within the scope of total capital. Each section then manages the risk so that it does not exceed this allocated capital, known as "risk capital."[2] This risk control mechanism allows institutions to ensure sound management by keeping losses within the scope of capital even if the risk materializes. This approach has been adopted not only by the major financial institutions but also by some regional financial institutions.

Moreover, with a view to making more efficient use of capital and enhancing profitability, some institutions have started to compare the amount of the allocated capital with the resulting returns and reflect the result in business planning or performance evaluations. Integrated risk management can therefore be used not only to ensure sound management, but also to elaborate business strategies.

Chart 1 shows the current stage of integrated risk management frameworks adopted by advanced financial institutions. First, the scope of risk commonly covered is credit risk, market risk, and risk related to holding equity for long-term customer relationships.[3] An increasing number of institutions have recently started to incorporate operational risk in the framework. The value at risk (VaR)[4] approach, which focuses on asset price fluctuations, is becoming a common method to quantify risk. There are risks that cannot always be identified adequately by the standard risk classifications or quantification methods, and therefore questions remain as to how

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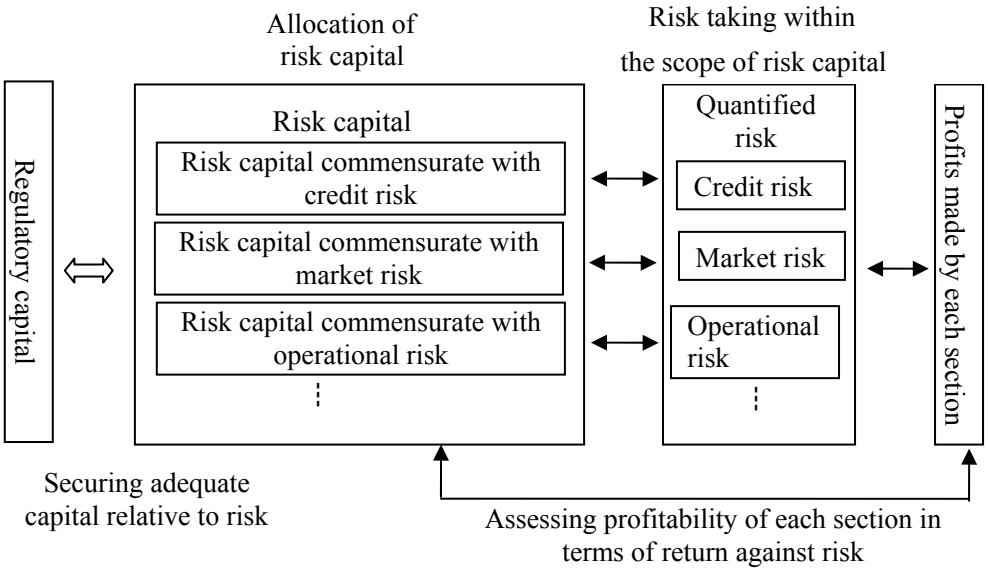
[2] This mechanism requires the ability of the section receiving the allocated capital to control risk (risk capital) proactively. When it is difficult for front offices to do so, as in the case of operational risk, financial institutions quantify risks and ensure risk capital to cover the risk amount, but many institutions do not allocate the risk capital to front offices at present.

[3] The equity held to maintain long-term customer relationships with borrowers. The borrowers' assent is quite often necessary when selling their equity. In contrast, equity traded flexibly for investment purpose is referred to as "trading equity." There is a high possibility that equity held for relationship purpose will have to be held for the long term, and therefore, it is considered to be more exposed to long-term price fluctuation risk than trading equity. Consequently, equity held for relationship purpose and trading equity are generally managed separately for risk management purposes.

[4] Assuming that a financial asset is held for a certain period of time (the holding period), the VaR approach statistically identifies the amount of losses that may be incurred due to asset price fluctuations at a certain degree of probability (the confidence level) on the basis of historical data. More specifically, it estimates the extent to which factors causing changes in the value of the asset (such as yen interest rates in the case of yen bonds) may fluctuate at, for example, a confidence level of 99 percent and for a holding period of one month. The VaR is the change in the market or fair value of the asset corresponding to the fluctuation (the maximum amount of loss that can be forecasted). The VaR can quantify risks associated with various financial assets with a common yardstick even if they are of completely different types, such as foreign exchange, bonds, and stocks. Moreover, the VaR can aggregate risks after taking such factors as correlations into consideration (however, this method does have disadvantages as discussed on Section III on page 17).

these can be incorporated within the integrated risk management framework.

Chart 1: Integrated Risk Management Framework



Financial institutions follow the following process to control risks, primarily in the areas of credit risk, market risk, and risk related to equity held for relationship purpose.[5]

- Allocating risk capital.
- Setting various limits on risk taking based on risk capital.
- Taking risk within the scope of these limits.
- Controlling risk by monitoring compliance with these limits.

Many institutions assess returns against risk or returns against allocated capital through periodical calculations based on profit indicators adjusted for risk (profit after credit cost, profit ratio after credit cost, profit after capital cost, etc.[6]). Of these, profit after credit cost is increasingly recognized as an important indicator when evaluating results. Still, many institutions continue to treat the profit ratio after credit cost and

[5] As mentioned in Footnote 2, many institutions have not yet adopted this process for operational risk management. In view of the implementation of the Basel II Framework, however, practical studies are progressing on the proactive control of operational risk on the basis of allocated risk capital.

[6] Profit after credit cost = net operating profit - credit cost.
Profit ratio after credit cost = profits after credit cost ÷ risk capital.
Profit after capital cost = profit after credit cost - risk capital x capital cost ratio.

profit after capital cost merely as reference indicators, and thus profitability assessment based on efficient use of capital and on capital cost has yet to become widespread among institutions.

This precautionary stance of financial institutions partly reflects the fact that risk quantification techniques are still at the developmental stages, and the data currently available have been mainly collected during the structural adjustment phase of the Japanese economy, which makes interpretation difficult in the current context. Looking ahead, therefore, the important issues for financial institutions are to improve risk quantification techniques and to collect and accumulate data without being biased by structural factors.

III. Integrated Risk Management: Practical Issues to Be Addressed with High Priority

A. Organizational Frameworks

1. Setting up an integrated risk management section

At many financial institutions that have adopted an advanced risk management framework, risk management sections and planning and finance sections have co-jurisdiction over integrated risk management. In such cases, the risk management sections are usually responsible for setting up the appropriate risk control mechanism for this purpose, and also for quantifying and monitoring risk. The planning and finance sections are responsible for allocating risk capital and assessing risk and return.

This division of responsibility reflects to some degree the history of the introduction of integrated risk management, which was initially centered on risk management techniques and thus initiated by risk management sections. Planning and finance sections subsequently became involved in order to make use of the results of risk assessments in formulating business strategies.

Indeed, integrated risk management has two sides: the management of risk amounts to be taken by financial institutions through risk quantification and its monitoring (the perspective of risk management sections); and optimization of business resource allocation through the allocation of risk capital and evaluation of the risk and return ratio of each section and business (the perspective of planning and finance sections). It is important that the risk management sections and the planning and finance sections cooperate in harmonizing these two perspectives.

2. Independence of the risk management section

Although cooperation between the risk management sections and the planning and finance sections is important, it is also necessary to maintain an objective stance in quantifying and assessing risk, and their risk assessment should not be biased by consideration of profits or performance evaluation. It is therefore vital that the independence of the risk management sections be assured when it comes to assessing risk. To achieve this, financial institutions that have adopted an advanced risk management framework have established risk management sections that are independent of their front sections (sections that conduct businesses such as trading securities or lending) for managing market and credit risks.

With regard to operational and other risks that are not easy to evaluate objectively through quantification, the so-called “operations policy and planning section,” “systems policy and planning section” and other sections that are closer to

front sections manage such risks based on qualitative information. Moreover, in some operations, such as credit market transactions and investments in fund products, where risk-related-data collection is not sufficient and thus the identification of risk profile is difficult, many institutions have established an additional section with risk management functions within the front section to support their risk management sections.

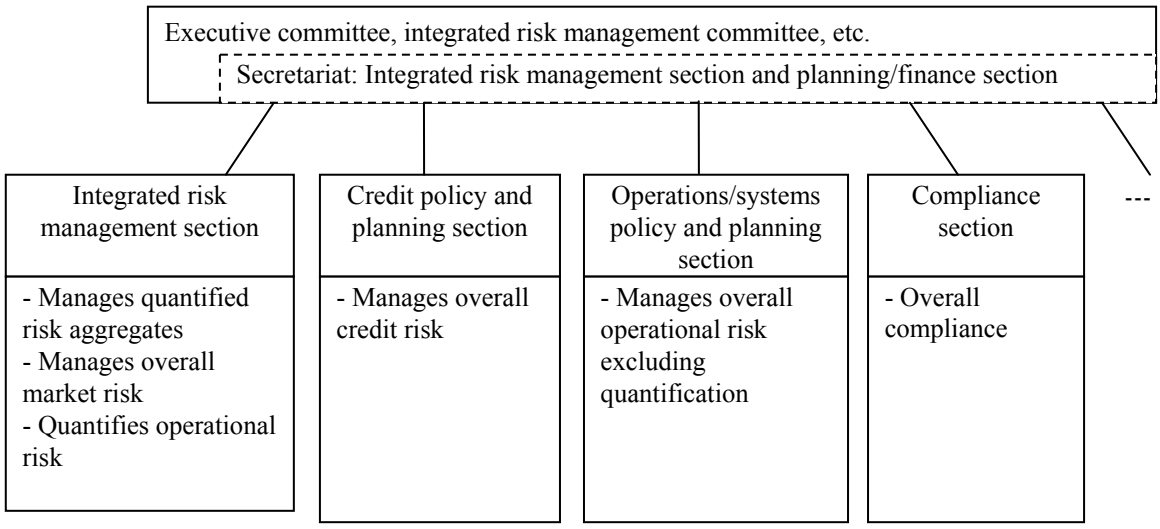
Depending on the type of business, there are some cases where sections closer to front sections manage risk more effectively. Thus, setting up an independent risk management section is not always a good approach. It is essential to ensure that even risk management functions in the front sections are subject to proper checks and balances through regular checks by third parties such as internal auditors. Moreover, if the risk management sections are dispersed in an institution, as in the case of operational risk, it is effective to establish a section with overall control functions in order to reduce inter-sectional discrepancies in risk management and to enhance the management levels of the entire organization.

3. Designing the risk management section

Sections responsible for integrated risk management are often called "integrated risk management sections," or "risk control sections." In fact, however, their responsibility is often limited to managing market risk, quantifying operational risk, and managing aggregates of the various types of risk quantified by other sections.[7] Since integrated risk management aims to manage all the risks facing financial institutions in a unified and comprehensive manner, it is assumed that ideally there should be a single section in charge. At present, however, the circumstances mentioned above make it difficult and perhaps inappropriate in many cases to unify all risk management functions into one section. For this reason, many institutions do not establish a single risk management section but instead use cross-organizational forums made up of representatives of the related sections (such as integrated risk management committees [Chart 2]) to identify risk in a unified and comprehensive manner, and to discuss risk control measures and risk-induced business strategies.

[7] Often, the so-called "credit policy and planning section" manages credit risk, while the so-called "operations policy and planning" and "systems policy and planning" sections have responsibility for operational risk management other than quantification.

Chart 2: Example of an Integrated Risk Management System Using Cross-Organizational Forums



B. Allocation of Risk Capital

1. Approach

In order to distinguish it from capital required under regulations, or "regulatory capital," the capital held against the economically measured risk facing financial institutions is referred to as "economic capital."[8]

It is indeed difficult to flexibly adjust regulatory capital levels to match the economic capital calculated based on ex-post risk amounts taken by the individual sections. For this reason, many financial institutions that have adopted integrated risk management set the maximum amount of usable economic capital as a ceiling after taking regulatory capital levels into consideration, and then manage the risk so that it remains below that ceiling. The key point here is how to set the ceiling for economic capital, that is, the funds to be allocated as risk capital.

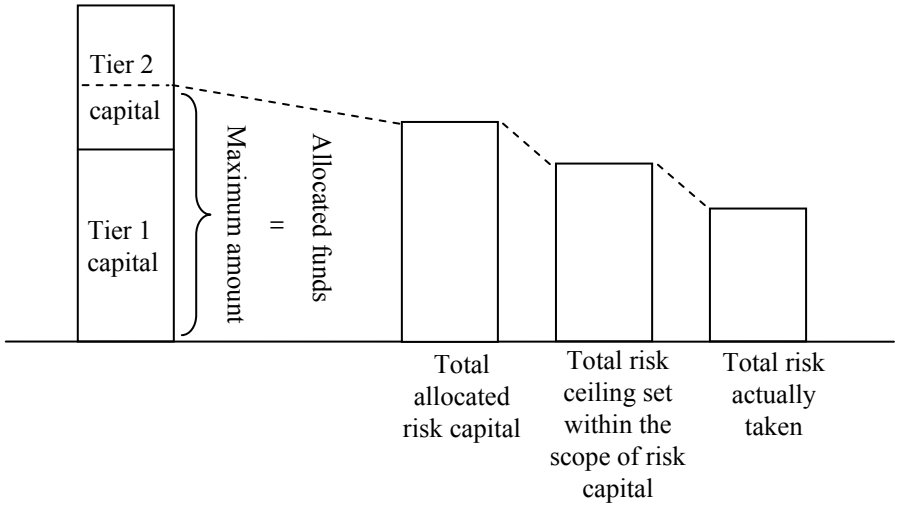
Financial institutions that have adopted an advanced risk management framework set the ceiling for economic capital within the range of Tier 1 capital to Tier 1 + Tier 2 capital,[9] then allocate these funds to individual sections as risk capital (Chart

[8] "Economic capital" means the amount of capital commensurate with the total volume of risk held by a financial institution. For this reason, this term is often used to indicate the scale of the risk itself faced by a financial institution.

[9] In addition to cases where Tier 1 capital is set as the economic capital ceiling, there are cases where perpetual subordinated debt, termed subordinated debt, unrealized gains on investment securities, and other forms of Tier 2 capital are added.

3). Then they compare the allocated risk capital with the amount of risk actually taken.

Chart 3: The Relationship between Economic Capital, Allocated Funds, and Risk Capital



Risk quantification focuses on the possible "losses" that would occur as a result of fluctuations in the value of asset holdings, but sometimes the possible "profits" that can be expected in the future may also matter. For example, the risk associated with certain asset holdings is quantified for the coming year on the basis of historical data. On the other hand, it should also be possible to expect certain profits from these assets over the coming year, so it is conceivable that such profits ought to be added to the funds to be allocated to risk capital.

The idea of adding future profits to the funds to be allocated to risk capital is acceptable if sufficiently accurate and rational forecasts of future profits can be made. Generally speaking, however, uncertainties affecting future profits are often considerable. As a result, most institutions adopt a conservative approach that does not include future profits in the funds for risk capital.

Another reason that a large number of financial institutions adopt this conservative approach is the relatively minor impact of the possible profits given that the institutions assume only a short term, just one year at maximum, for the holding period of assets when quantifying risk (see below). This conservative approach, however, might become difficult to maintain once risk is quantified over periods longer than one year and as commensurate future profits also become larger.[10]

[10] As managerial accounting techniques have become more elaborate and profits can be identified on a monthly basis, it is possible to envisage a situation where they can be incorporated into

In cases where the ceiling for economic capital is set by taking both Tier 1 and Tier 2 capital including subordinated debt into consideration, and all risks materialize, the loss amount will exceed Tier 1 capital. This makes the institution's liabilities exceed its assets (i.e., puts it in danger of bankruptcy). Since subordinated debt is subordinated to senior debt obligations including deposits, depositors are protected even if losses emerge up to the level of Tier 1 + Tier 2 capital. Still, this is unlikely to be an option for the CEOs who naturally seek to maintain a going-concern status for their institution. Consequently, setting the ceiling for economic capital above the level of Tier 1 capital requires special consideration.

Financial institutions also respond differently to the question of whether unrealized gains on securities should constitute the funds for risk capital. In the case of unrealized gains on equity holding with relationship purpose, however, they cannot be used easily to cover the losses that may arise over the coming year due to the difficulty in realizing sales gains in a short period of time. Therefore, institutions should examine fully the feasibility of on-time selling of the assets with low liquidity before counting their unrealized gains as a source of funding for risk capital.

2. Risk capital allocations by holding companies

So far, this paper has looked at integrated risk management for a financial institution on a non-consolidated basis. In the case of a consolidated financial group under the control of a holding company, however, the company generally handles the integrated risk management function for the entire group. Still, it is important that risk management sections and planning and finance sections in the group cooperate closely, and that the independence of the risk management section be ensured when assessing risk.

The holding company is generally expected to allocate risk capital to subsidiary banks (Chart 4), but the allocation method differs depending on the degree to which the holding company is involved in the management of these subsidiary banks. In the case of substantial involvement, for example, a holding company allocates risk capital by risk category and by section of subsidiary banks, in some cases, by subsection. On the other hand, where the holding company does its utmost to respect the discretion of its subsidiary banks, it allocates the entire risk capital to the subsidiary bank and delegates to it judgments on how to allocate the capital to individual risk categories and sections. The subsidiary bank then submits reports to the holding company on the results.

There is as yet no established view on the extent to which holding companies should get involved in the allocation of risk capital within their subsidiary banks. The

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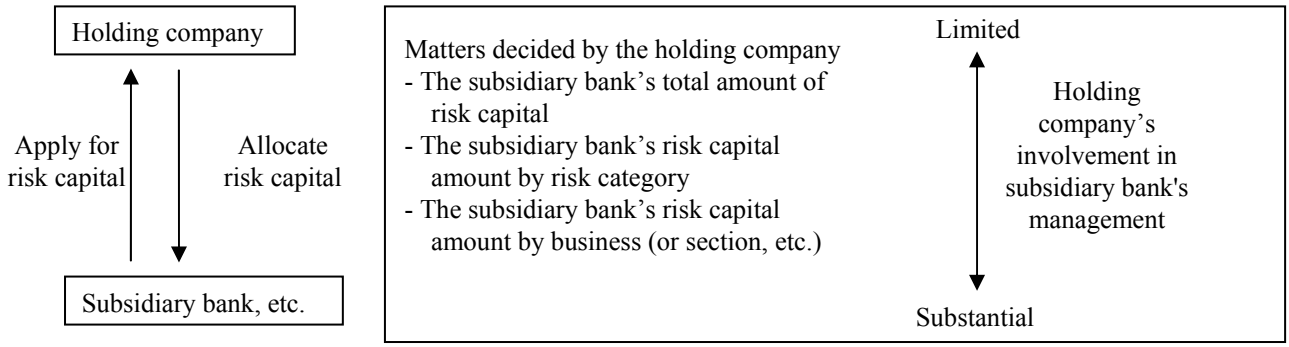
allocated capital each month.

important thing is that financial institutions should at least examine whether holding companies and their subsidiary banks share a common view on integrated risk management, and whether the group as a whole has a consistent mechanism for allocating risk capital.

Chart 4: Risk Capital Allocations from Holding Companies



C. Identifying Risk

1. Target risks

In the case of integrated risk management, financial institutions are expected to identify their total risk exposure in quantitative terms. However, since it is difficult in practice to quantify all risk, it is important for financial institutions to clearly distinguish between risk that can and cannot be quantified, and to decide how to handle the latter.

Financial institutions that have adopted an advanced risk management framework quantify following types of risk: credit risk associated with loan assets (including concentration risk); interest rate risk associated with bonds, deposits, loans, and others, and risk associated with fluctuations in equity holding for relationship purpose, asset-backed securities, derivatives, hedge funds, and others. Recently, many institutions have added operational risk to the scope.

In the area of operational risk, many institutions quantify the risk resulting from inadequate or failed internal processes, people, or systems, as clearly advised in Pillar 1 of the Basel II Framework. Regarding Pillar 2, however, treatment varies for reputational risk (the risk of damage to reputation resulting from clerical errors or computer system malfunctions) and strategic risk (the risk of incurring losses owing to mistakes in business strategy). For example, many institutions do not quantify reputational risk because it is difficult to identify such risk statistically on the basis of historical data, although some quantify the risk using scenario analyses. Furthermore, a conventional definition of strategic risk has not yet been established, and at this stage

some institutions have just begun to initiate studies toward its quantification.[11]

It is also difficult to identify some of the risks arising from rules and practices unique to Japan within the framework of integrated risk management. For example, Japanese institutions may face special risks because of the nature of loans extended to borrowers with which there is a strong relationship and because equity held in cross-shareholdings is difficult to liquidate flexibly. Also, the economic value of loans extended to borrowers with which there is a strong relationship and of deferred tax assets has peculiar characteristics and is intrinsically influenced by the strength of the financial institution holding the loans. Despite the fact that Japanese financial institutions cannot overlook the risks associated with these assets, the difficulty of identifying the risks means that they have not been adequately factored into the integrated risk management framework to date. How to achieve the quantification of these risks remains an important issue for the future and is discussed below.

2. Holding period

In order to quantify the risk associated with asset holdings, it is necessary to statistically identify fluctuations of the value of assets that may occur within a certain period of time with a certain degree of probability. This certain period is normally referred to as the "holding period." For example, if a securities portfolio can be restructured in a short time, the holding period is short. On the other hand, if the portfolio is held for medium- to long-term investment purposes, the holding period is long.

The quantified risk changes dramatically depending on how the holding period is set. For this reason, the holding period must be set after considering sufficiently the risk profiles associated with the assets concerned, investment policies, and the degree of liquidity when asset disposal occurs. In the case of equity holding for relationship purpose, it is necessary to set a longer holding period even if the market liquidity of the equity in question is high. This is because the issuer's (borrower's) assent is often necessary before the equities are sold, and obtaining such assent can take time. Considerable time is also needed to sell assets with low market liquidity in large quantities without having a large negative impact on market prices. Therefore, when setting the holding period for such assets, it is necessary to consider the size of market transactions and whether the transactions are concentrated among certain participants. It is worth noting that at many financial institutions that have adopted an advanced risk management framework, the holding periods for assets subject to market risk are set at

[11] For example, some institutions have begun looking at risk associated with fluctuations in fee income, which has recently started to become a more important source of profits for banks.

one to six months for banking account transactions, one to ten days for trading account transactions, and six months to one year for equity holding for relationship purpose.

In contrast, the holding period for loan assets is usually set at one year regardless of their remaining maturities. The reason for this is the difficulty of securing sufficient observational data if the holding period is set at longer than one year. In fact, however, many loans have remaining maturities in excess of one year, and even in the case of maturities with less than one year on a contract basis, they may be evergreen loans and thus actually have longer remaining maturities than those on a contract basis.[12] For this reason, there are cases in which some financial institutions estimate risk by setting longer holding periods for loans. For example, if the holding period is set at three years, risk is quantified by using the three-year cumulative default rate of a borrower with a similar level of creditworthiness for which historical data are available. In this case, it is common to ensure consistency by factoring in three years of interest income earned by these loans for the funds to be allocated to risk capital.

The idea behind setting the holding periods as described above implicitly assumes that each section takes no additional risk until new risk capital is allocated (normally until the beginning of the following fiscal year) once all allocated risk capital is consumed due to risk materialization. As often observed in transactions associated with market risk and other types of risk, however, it is unrealistic to completely avoid taking any risk until the next capital allocation even in the above case. Consequently, there has recently been a move to standardize the holding period for all assets at one year to coincide with the period for reviewing asset allocations. In this case, however, the question remains of how to reflect any changes in the exposures that may arise from the buying and selling of assets during the holding period in risk quantification.

3. Confidence levels

In addition to the holding periods, it is necessary for risk quantification to set confidence levels—criteria to indicate the probability of risk materialization. For example, if risk is quantified with a 99 percent confidence level, it is expected that any loss amounts that may actually arise will be below the risk amount with 99 percent probability.

The question of how to set confidence levels (e.g., whether to set at 99 percent

[12] Here we assume that financial institutions keep loan assets on their balance sheet until maturity. If loan assets can be liquidated and sold easily in the secondary market, however, it is possible to evaluate them on a mark-to-market basis, then quantify the risk associated with their price fluctuations. In such cases, the holding period for quantifying the risk may be shorter than the remaining maturity of the loan.

or 99.9 percent) is directly linked to management judgments concerning the extent of the risk to be taken by the financial institution. When the confidence level is set at 99 percent and the risk capital to be allocated is set at the same amount as capital, it is assumed that a situation in which total capital is impaired is unlikely to occur, with a 99 percent level of probability. In other words, it signifies that the management is taking the risk that losses may exceed capital and as a result, with a 1 percent probability, the company may fail. If capital is always fixed, setting a higher confidence level means that management is more risk averse. Although this is desirable from the viewpoint of ensuring sound management, it becomes a constraint from the viewpoint of maximizing profits.

Financial institutions that are already engaged in integrated risk management commonly set the confidence level at 99 percent. There are probably two reasons for this: current capital adequacy regulations and the Market Risk Amendment have adopted a 99 percent confidence level; and current capital adequacy levels are generally commensurate with quantified risk at the 99 percent level.

On the other hand, some financial institutions have chosen to set the confidence level higher than 99 percent. This is because the advanced approach for credit and operational risks in the Basel II Framework assumes a 99.9 percent confidence level for risk quantification, institutions seeking high ratings from external rating agencies must manage risk at a confidence level higher than 99 percent, and major U.S. and European banks have already adopted quantification of risk at confidence levels higher than 99 percent.

Whether to set the confidence level at 99 percent or higher is a matter of managerial judgment, and thus, there are no universal criteria. One possible approach is to set the confidence level at 99 percent and use stress tests to deal with risk that are most unlikely to materialize. It is also important for the management to adopt an approach where it proactively discloses its methods for identifying risk and its risk/return results, and then achieves the optimal balance between sound management and profitability, which is sought by the markets and shareholders. On the other hand, financial institutions also must face the fact that players in global markets are increasingly adopting assessment criteria of 99.9 percent or higher. After all, they must decide on confidence levels most suitable to their individual circumstances. It is desirable that institutions aiming to manage at a confidence level of 99.9 percent in the future set a tentative period to examine the adequacy of holding capital against the risk quantified at the 99.9 percent level, and sufficiently study risk management at this level.

4. Correlation between risks

The integrated risk amount differs according to whether individual risks are considered to materialize completely independently or there is some correlation among

them. A conservative approach would generally assume that individual risks are materialized simultaneously, and quantify them on the basis that the correlation coefficient among them is one. In a market where interest rates and stock prices are rising at the same time, a situation often seen during an economic recovery phrase, it is possible that risk associated with the interest rate and equity prices will offset each other, which indicates that risk can be quantified on the basis of risk diversification effects between the two.[13]

In cases where this kind of inter-risk correlation is taken into account for risk quantification, the stability of the correlation needs to be verified thoroughly and a uniform holding period needs to be applied. Moreover, financial institutions should examine whether they can cope with the situation when the stability of the correlation is judged to have collapsed. For example, they should examine whether they can alter the asset structure smoothly in response, whether the current organizational structure does not hinder the inter-sectional risk-taking decisions, and also whether the front offices can respond immediately to the decisions taken by the risk management section.

In the area of market risk, financial institutions that have adopted an advanced risk management framework standardize risk factors to be input into their risk quantification model and through this process they take into consideration the respective correlations for each interest rate grid, or between interest rates and foreign exchange rates. They also take the correlation effect into consideration for interest rate risk and risk related to equity holding for relationship purpose. However, they have not yet confirmed the stability of correlations between a wider range of risk categories, such as credit, market, and operational risks, and thus only a limited number of institutions currently take the effects of these into consideration in integrated risk management.

5. Approaches to deal with a stress situation

In the case of integrated risk management, it is necessary to use standardized quantification methods to quantify different types of risk, and for this statistical methods based on historical data as typified by VaR are usually employed. The advantage of such statistical methods is that they can quantify various types of risk with a common yardstick, but they also have the following disadvantages.

a. Since they quantify risk using historical data from a certain period of time, they cannot necessarily identify risks that are not included in such data, such as large price fluctuations or shocks.

[13] In this case, risk capital is allocated taking the correlation effect into consideration. For example, if the funds to be allocated total 100, 60 is allocated for interest rate risk and 50 for stock price risk (for a correlation effect of minus 10), and risk taking is allowed with this as the upper limit (i.e., risk taking is tolerated up to 110, the simple total of the two types of risk).

b. It is intrinsically difficult to quantify risk associated with factors that have not been recognized sufficiently as risks in the past or with transactions or products for which data have not yet been accumulated.
c. Risk is quantified after assuming that losses follow certain probability distributions, so the precise risk cannot be identified when the assumption breaks down.

One method that can be used to compensate for these disadvantages is stress testing. Stress testing is a process for evaluating the robustness of a financial institution's solvency on the basis of loss forecasts under hypothetical stress environments (stress events). These stress events are provided by various methods, which are not necessarily constrained by standardized conditions such as in VaR.[14]

Several methods are available for assuming stress events, and they can be classified according to their focuses on objectivity or flexibility (Chart 5). The first type aims to reduce judgmental factors to a minimum, and includes the use of actual data on historical market fluctuations and losses from particularly large macroeconomic changes or financial events; and the application of a statistically more conservative approach, such as the use of selected data based on historical events (e.g., the largest historical fluctuation for each individual risk factor as a hypothetical value). On the other hand, another type of method emphasizes flexibility by allowing for a certain amount of subjectivity, and this includes the formulation of hypothetical event scenarios and estimation of various market fluctuations and losses arising from these events based on expert judgments; and the estimation of highly probable market fluctuations and losses, again based on expert judgments but without specifying particular background events.

Chart 5: Methods for Assuming Stress Events for Stress Tests

Focus of method	Assuming events that induce market fluctuations or losses	Not assuming events that induce market fluctuations or losses
Objectivity	- Uses actual data from historical market fluctuations and losses from macroeconomic changes and financial events. Examples -A rise in probability of the bankruptcy rate and a fall in real estate prices during a period of recession	- Uses a statistically more conservative approach, such as employing selected data based on historical events as hypothetical values. Examples - The largest rise in interest rates and fall in stock prices over the past ten years. - A higher confidence level (99.97 percent,

[14] Stress tests are often used to examine the impact of certain market fluctuations on financial institutions' capital. There is also an approach which examines losses from the market fluctuations that could consume all allocated risk capital given the actual financial position. This type of stress tests facilitates the institutions to grasp a rough image of market stress that causes losses exceeding the permissible range.

	- "Black Monday" (Stock market crash of October 1987) - The hike in long-term interest rates at the time of the "Trust Fund Bureau Shock" (December 1998)	etc.)
Flexibility	- Formulate hypothetical event scenarios and estimate market fluctuations and losses. Examples - Chain-reaction failures of major borrowers - Exchange rate fluctuations due to changes in exchange rate systems - Large-scale natural disasters - Computer system malfunctions	- Estimate highly probable market fluctuations and losses, without specifying particular events. Examples -100 basis point hike in interest rates -Steepening of the yield curve

Stress testing helps financial institutions to gain a rough grasp of losses in a stress situation with a certain degree of probability which cannot be fully identified with statistical risk quantification based on historical data.[15] This analysis, therefore, helps them to gain a more concrete grasp of the amount of risk capital that should be held against such risk.

Finally, financial institutions should note that the awareness of stress events must be shared with the management. Otherwise, the institution misses the chance of effectively using the results of stress scenarios or the idea of risk management sections for the management's decisions. Moreover, since there is a complementary relationship between statistical risk quantification based on historical data and stress testing, it is also desirable that they be analyzed and used consistently.

Even financial institutions that have adopted an advanced risk management framework are generally cautious about directly reflecting the results of stress tests in calculations of economic capital. There are several reasons. First, it is not always easy to formulate stress scenarios that are convincing enough to be factored into economic capital calculation. Second, factoring in the results of unduly large stress events may lead to excessively risk-averse management. At the same time, the institutions understand the need to use the results of stress events in some way in the context of integrated risk management. Thus, when allocating risk capital, some financial institutions that have adopted an advanced risk management framework allow a capital buffer that has some relation to the results of stress events.[16]

[15] It is essential, especially with operational risk, to assess the extent of losses that may arise in the extreme stress events that rarely occur. When quantifying such risk, therefore, the type of stress event assumed becomes very important.

[16] There are various approaches to setting the buffer, such as buffers for each section or risk category; buffers for the institution as a whole instead of those restricted to specific sections or risk categories; and buffers prepared for overall risk that is difficult to quantify, in addition to the stress responses of each section or risk category.

D. Comparing Allocated Capital and Risk

In order to ensure sound management of financial institutions based on integrated risk management, it is essential to continuously examine the relationship between the actual amount of risk taken and risk capital after its allocation at the beginning of the fiscal year. In a case where the actual risk taken exceeds or becomes more likely to exceed allocated risk capital during the fiscal year, the institution is required to respond quickly by reducing risk or increasing the amount of allocated capital.

In such cases, institutions usually respond by first reducing risk, because it is not easy to increase the funds available for allocation through a capital increase; in an exceptional case, institutions can draw down a capital buffer that has been reserved for contingencies. Given the impact on projected profit targets, however, individual sections or the management might be reluctant to reduce the risk positions. Even if the institution decides to reduce risk, it may not be able to do so quickly because of constraints on the market liquidity of loan assets or equity held for relationship purpose.

In the above situation, financial institutions must avoid using any technique to window-dress the risk amounts to maintain an appearance that the basic framework of integrated risk management is being maintained. Such techniques would include altering the way risk is quantified by shortening the holding period, or excessively factoring in the correlation effect. In integrated risk management, nothing is more important than management's ability to recognize the actual nature of the risk taken and assess the situation objectively.

In a case where, for some reason, the risk taken erodes risk capital, the basic approach that the financial institution should take is to accurately identify the extent of the erosion, and draw up and implement concrete plans to eliminate it. Even when the risk cannot be eliminated swiftly, the management must clearly identify how much risk has been taken. To this end, the integrated risk management framework offers certain objective indicators. For example, if risk exceeds allocated capital with a 99 percent confidence level, it is possible, conversely, to identify the confidence level at which risk falls within the scope of risk capital. In other words, the financial institution can identify the magnitude of the probability of loss exceeding risk capital, which exceeds the 1 percent level. Management must objectively recognize this probability in managing the organization.

To evaluate just how much risk the financial institution has taken, it is meaningful to confirm the probability that the risk might not only consume all of its risk capital, but also make the institution subject to Prompt Corrective Action (PCA) measures, meaning that its capital adequacy ratio might fall below the regulatory level, which is 8 percent for internationally active banks according to the capital adequacy

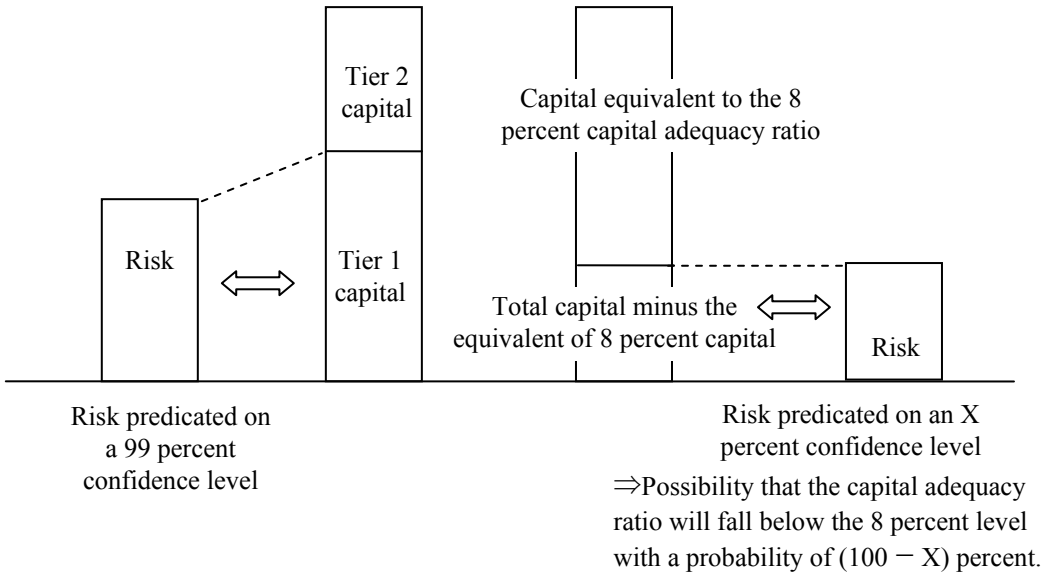
standards of the Bank for International Settlements (BIS). More specifically, this probability can be calculated using the following methods (Chart 6).

a. Quantify risk the institution has taken with a number of confidence levels.

b. Find for the confidence level of X percent at which the risk amount equals to the portion of Tier 1 + Tier 2 capital that exceeds the 8 percent capital adequacy ratio.

c. The above result indicates that, with an X percent probability, the financial institution will not incur large losses that would cause its capital adequacy ratio to fall below 8 percent. In other words, losses sufficient to cause the capital adequacy ratio to fall below 8 percent are assumed to occur with a probability of (100 − X) percent.

Chart 6: Comparison of Financial Strength and Risk: An Example



IV. Other Issues to Be Discussed to Further Enhance the Effectiveness of Integrated Risk Management

Some risks are very important for Japanese financial institutions to address, but the methods for identifying them have not yet been established, and thus they are managed differently from one financial institution to another. This chapter takes up some examples of such risks, which have actually been discussed in connection with recent on-site examinations and off-site monitoring, and examines the issues to be addressed.

A. Interest Rate Risk Associated with Banking Account Transactions

Interest rate risk associated with banking account transactions is usually assessed using methods such as VaR and basis point value (BPV).[17] Financial institutions differ in their assessment method concerning the maturities of certain types of financial products, as they are not always clearly set out. Typical examples are the terms of demand deposits and prepayment features of housing loans.

Under the Basel II Framework, interest rate risk associated with banking account transactions is not treated in accordance with Pillar 1, whereby the supervisory authorities prepare certain quantification methods, but instead is reviewed under Pillar 2, which requires internal controls by individual financial institutions (see Box 2 for details). This reflects the situation where individual financial institutions have different approaches with assumptions on maturity classifications, and this difference sometimes leads to great differences in the quantified interest rate risk.

As Japan has only experienced phases where interest rates fell over a long period of time, it appears to be extremely difficult to empirically estimate and assess the interest rate sensitivity of demand deposits or that of prepayment features of housing loans. Observation indicates that institutions are divided into several types in terms of their methods assuming maturities on demand deposits, for example, some assume ultra short maturities, some long maturities, and others assume amounts divided evenly across the whole maturity brackets. None of these methods, however, have moved beyond the provisional stage to reach a level of sophistication. In addition, some institutions extract the core portions of demand deposits that have been kept long with high stability by using trend analysis, and attempt to use them in setting maturities and managing risk. Methods for assessing interest rate risk associated with banking account transactions are thus not yet established, and various attempts to develop them

[17] BPV measures how much an asset's net present market value changes as a result of a parallel shift of one basis point (0.01 percentage point) in the yield curve. In a parallel shift, the interest rate for all maturities changes by the same number of basis points.

are likely to continue. Under the circumstances in which risk evaluation methods are provisional, it is desirable that risk be assessed conservatively.[18]

Box 2: Interest Rate Risk in the Banking Account under the Basel II Framework

Interest rate risk in the banking account is one of the items that supervisors should review, in a supervisory review process presented as follows.

1. Banks quantify interest rate risk based on standardized interest rate shock as stipulated by supervisors, and report the results.

2. Supervisors verify whether the bank holds capital commensurate with interest rate risk (financial institutions whose interest rate risk accounts for more than 20 percent of the sum of Tier 1 and Tier 2 capital are designated "outlier banks," and as such are subject to particular attention from supervisors under the so-called "outlier regulations").

3. If supervisors determine that capital is insufficient, they require the institution to reduce its risk, hold a specific additional amount of capital, or adopt some combination of the two.

B. Risk Related to Equity Holding

With regard to equity price fluctuation risk, financial institutions that have adopted an advanced risk management framework quantify risk using overall market indices, industrial sector indices, and idiosyncratic movements of individual issues as risk factors. In cases where overall market indices are used to quantify risk, the appropriateness of divergences between the indices and movements in individual issues (specific risk) should be confirmed, and where necessary, risk adjustments or reviews of quantification methods are required.

It is necessary to set holding periods after duly considering several factors such as the purpose of holding the stocks and the time required to sell them. For example, as it is believed selling of equity holding for relationship purpose takes more time than stocks held for trading purpose, the holding period for the former should be set longer to accommodate its characteristics.

[18] Since few assets and liabilities in the banking account are evaluated by the current accounting rule to post profits and losses based on mark-to-market evaluation, financial institutions must pay due attention not only to changes in the economic value of assets such as VaR, but also to those in current profits and losses on an accrual basis.

Some institutions hold the view that since changes in the creditworthiness of stock issuers are reflected in stock prices, credit risk should be included in stock price fluctuation risk. On the other hand, some institutions have been quantifying credit risk separately (especially the default risk portion) and allocating risk capital commensurate with lending.

C. Risk Associated with Preferred Stock

Recently, large financial institutions have been frequently using debt-equity swaps and their underwriting of third-party allotment of newly issued shares to revitalize large borrowers that are financially troubled. While the exact product characteristics vary, the most commonly seen are convertible adjustable-price preferred stocks.[19] These preferred stocks have complicated options, and it has often been difficult to obtain their theoretical prices using the Black-Scholes model. Consequently, financial institutions that have adopted an advanced risk management framework have been evaluating them using the multi-dimensional lattice approach, the multi-dimensional finite difference method, the least squares Monte Carlo method, and other complex methods. Whichever method is used, however, issues remain as how best to handle credit risk (default risk of issuers) and dilution risk in cases where preferred stocks are converted into common stocks.

Previously, it was usual not to consider credit risk (the risk that the price of the common stock, the underlying asset of stock options, will reach zero) when assessing stock options. In recent years, however, option valuation methods that incorporate credit risk have become dominant in the market. In particular, since credit risk cannot be ignored when assessing borrowers that are in the process of major restructuring, it is thought to be appropriate to apply option valuation methods that consider credit risk when assessing the preferred stocks issued by such borrowers. In fact, many financial institutions that have adopted an advanced risk management framework are using such methods.

On the other hand, the handling of dilution risk is more complex. Since the terms of issue for preferred stocks are disclosed, one view is that there is no need to consider dilution risk when assessing preferred stocks because it should already have been factored into the price of the common stocks. This interpretation is persuasive when markets behave rationally. On the other hand, there have been cases where issuing firms buy and retire outstanding preferred stocks on the grounds that they want

[19] These preferred stocks provide the holder with the right to convert them into common stock. This right can be exercised at any time within a certain period, during which the conversion price is linked to the price of the common stock.

to avoid dilution risk. This suggests that the issuer recognizes that dilution risk has not been adequately factored into the stock price. Against this background, some financial institutions that have adopted an advanced risk management framework have been using preferred stock valuation methods that explicitly factor in dilution risk.

In cases where the number of potential stocks greatly exceeds the number of stocks issued and outstanding, it is important to ascertain the extent to which the market has factored in dilution risk, or the extent of market expectations that the issuer will make an effort or obtain its main bank's cooperation, to avoid the materialization of dilution risk.[20] In such cases, the price book value ratio (PBR),[21] the price earnings ratio (PER),[22] and other stock indicators, all of which are adjusted for dilution, can be considered a good basis for judgments.

In any event, the preferred stocks held by Japanese financial institutions cannot be regarded as simple stock options, but actually comprise more complex risk factors such as the issuer's credit risk and dilution risk. Thus, making individual judgments after carrying out multifaceted analyses and studies is considered an effective approach.

D. Risk Associated with Deferred Tax Assets

Deferred tax assets which are acknowledged as assets, may be repudiated in the future, and their value may decline. For this reason, it is necessary to consider a certain amount of risk when assessing their value. It is possible to anticipate cases in which auditors disaffirm some of these assets if there is no prospect for sufficient taxable income within a certain period in the future, or if concerns arise over the going-concern status of the specific financial institution. In this connection, while loans are assets for which the earning base of the borrower matters most, deferred tax assets are assets for which the earning base of the financial institution itself that matters. These characteristics must be taken fully into account when assessing the economic

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[20] Market expectations concerning the materialization of dilution risk depend on the issuer's exit strategy for preferred stocks. More specifically, the extent to which dilution risk may materialize differs considerably according to such factors as whether the issuer has bought and retired preferred stocks; and how the issuer raised the funds for purchasing and retiring them (whether from retained earnings or external funding such as new stock issues). For this reason, the question of how to realize an exit strategy that does not allow dilution risk to materialize becomes an issue for a main bank that has a long-term relationship with the issuer. On the other hand, for non-main banks, speculating as to the type of exit strategy to be adopted by the issuer (or the main bank) and how the stock market may react to it becomes a problem, as they can access only published information concerning the issuer. The problem of preferred stock dilution risk, therefore, involves elements strongly akin to some kind of tactical game between the issuer, main bank, non-main banks, and the stock market involving the exit strategy.

[21] PBR = stock price/book value per share.

[22] PER = stock price/earnings per share.

value of deferred tax assets or the risk they entail.[23]

More specifically, if the risk is associated with taxable income, one approach is to assess the possible fluctuations in the future taxable income based on historical data. Another approach is to assess the risk that deferred tax assets are disaffirmed due to doubts about going-concern status of the financial institution, such as the default probability of the financial institution. This probability can be calculated by setting the confidence level and examining the relationship between capital and the risk taken within the integrated risk management framework (see Chapter III.D).

At present, only a small number of institutions consider the above factors when assessing the risk associated with deferred tax assets. Some institutions calculate this risk amount under the category of institutional risk based on scenario analyses or deduct deferred tax assets from regulatory capital and compare it with risk taken for reference purposes. However, no institution has yet quantified the economic value of such assets or the variability of their value based on the historical data.

As qualitative factors still play an important role in deciding the amount of deferred tax assets in the accounts, it is difficult in some respects to assess the risk of these assets quantitatively. As many financial institutions in Japan still depend heavily on deferred tax assets for their capital, however, they should continue their efforts to assess the risk associated with deferred tax assets in a more objective and systemic manner.

E. Risk Associated with Loans to Borrowers with Strong Relationship

In Japan, strong relationships between borrowers and their so-called "main banks" are often observed. In this relationship, a main bank usually enjoys the largest share of loans to the borrower, while being required to take a certain responsibility for the borrower's financial situation. This relationship may be economically justified by the fact that the main bank temporarily monopolizes the borrower's credit information, and thus other financial institutions cannot easily access this information to the same extent as the main bank.

This practice has often led to an increase in the risk of credit concentration at the main bank, which is often referred to as the "risk of loans shifting from non-main banks to main banks." More specifically, this is a phenomenon in which the main bank is obliged to take over the lendings of non-main banks in cases where a borrower's creditworthiness declines. This takes place against a background in which the impact

[23] According to the *Work Schedule for the Implementation of the Program for Further Financial Reform* announced by Japan's Financial Services Agency in March 2005, the capital adequacy requirements are due to be revised by public notification in the first half of fiscal 2005 after studying the proper regulatory treatment of deferred tax assets in calculating capital adequacy ratios.

on the main bank is much larger than that on non-main banks if the borrower fails. In addition, main banks tend to feel a moral responsibility, which prompts them to avoid exposure to reputational risk. For this reason, loans to borrowers with strong relationship tend to increase once the borrower faces financial problems, and if the borrower eventually fails, it is quite possible that the main bank will incur losses that far exceed the assumptions made at the time of the initial loan.

In fact, such risk has materialized especially among large-scale borrowers from major banks since the end of the 1990s, when the banks accelerated the disposal of nonperforming loans. Despite this experience, however, very few financial institutions have explicitly identified this risk associated with borrowers with which they have a strong relationship within the framework of integrated risk management. It is certainly true that empirically quantifying this risk is technically difficult. Nevertheless, given the existence of historical data for changes in credit amount during past deteriorations in the businesses of borrowers with strong relationship (increase in exposure at default [EAD]), or of changes in loss rates against the original amount of loans if the borrowers fail (increase in loss given default [LGD]), financial institutions should be able to quantify the risk and reflect it in integrated risk management. This kind of approach is expected to be taken in the years ahead.

It should be noted that the economic value of loans to borrowers with strong relationship with their main banks through mutual shareholding or business alliance can suffer the risk of failure not only of the borrower but also, more seriously, of the main bank itself. This is because the borrower in question is completely dependent on its main bank for financing, so if the main bank fails, the borrower will very likely face a credit crunch. That is why a jump in the net asset value of the financial institution is often observed before and after its failure; in the latter case, this is accompanied by a sharp decline in the asset value of the loans to the borrower with particularly strong relationship.

If it becomes possible to objectively identify the risk associated with loans to borrowers with strong relationship, it may become necessary to reduce the risk if it is judged to be large. Financial institutions should meet the transaction needs of borrowers with strong relationship by transferring risk using credit derivatives, switching to syndicated loans, utilizing securitization schemes, and introducing covenants and other devices for managing loans. They are now expected to actively control the risk associated with loans to borrowers with strong relationship, mainly on a risk/return basis.

V. Use of Integrated Risk Management in Corporate Management

So far, this paper has examined the current status of integrated risk management at financial institutions in Japan, and has discussed issues that need to be addressed with the aim of enhancing such management in the future. This final chapter looks at the use of the information obtained from integrated risk management for business strategy.

A. Objective Identification of Risk/Return

1. The risk capital allocation process

In the integrated risk management framework, risk is controlled on the basis of the risk capital allocated to each section. This means that management policies are reflected in the way risk capital is allocated. Allocation of risk capital tends to follow the processes outlined below.

a. Each section draws up the risk taking plans (portfolio plans) necessary to achieve the business plan (profit target) requested by the management. At this point, the risk allocation plan is prepared by organizational units, or by risk category units, or by a combination of both.
b. Risks are estimated according to the risk allocation plans. This process is normally a joint exercise involving the individual sections and the risk management section.
c. Each section applies to the planning and finance sections and the risk management section for the risk capital to cover the quantified risk.
d. The risk management section examines the balance between the risk capital applied for by each section and regulatory capital, and that between the risk allocation plans and risk capital, primarily from the viewpoint of sound risk management.
e. The planning and finance sections examine the balance between the profit target and risk capital, and compare them with historical results, primarily from the viewpoint of managerial efficiency and profitability. However, this process is sometimes omitted at institutions where risk/return analyses are not well established.
f. If deficiencies are detected during the processes of d and e, the planning and finance sections and the risk management section request the individual sections to review their risk capital applications (risk allocation plans). Alternatively, the planning and finance sections may review the initial business plan (profit target).
g. After repeating the above processes, the risk capital plan for the overall financial institution and the individual sections is finally drawn up.

To ensure a balance between the sound management and profitability of the

financial institution under integrated risk management, it is important, during the risk capital allocation process, to hold sufficient discussions within and between the individual sections and between the risk management and the planning and finance sections; review historical usage rates for risk capital and risk/return results; ensure the independence of the risk management section; and allow the auditing section and third parties to check the series of processes appropriately.

2. Risk capital allocation targets

In principle, risk capital is allocated to those sections that actually take the risk of seeking return, but with respect to equity holding for relationship purpose, in many cases the issue of where to allocate capital commensurate with risk becomes debatable. If we focus on the fact that bank branches benefit from holding equity through transactions with these borrowers, it is probably appropriate to allocate risk capital to the corporate sections (front offices such as bank branches). However, there is also a possibility that sections other than the corporate sections may benefit from holding equity for relationship purpose, and it is difficult to quantify the extent of these benefits. On the other hand, if we focus on the fact that unrealized gains from equity holding for relationship purpose have contributed to strengthen the balance sheets of financial institutions in the past, the planning and finance sections might have benefited the most.

Thus, while it is desirable in principle to allocate risk capital to the section that takes the risk and earns the return, quite a few institutions do not always clearly understand which sections earn returns or how much they earn. In reality, therefore, it is necessary to make judgments on a case-by-case basis, by taking past data and future policies into consideration, and by attempting to avoid any deterioration in morale or misalignment of incentives.

3. Use of risk-adjusted profit indicators

Risk-adjusted profit is an indicator for assessing the operational efficiency at financial institutions. This indicator contrasts profits with the risk (the risk capital allocated to cover the risk) taken in order to earn them. Typical indicators include profit after credit cost, profit ratio after credit cost, and profit after capital cost.[24]

With respect to the usage of risk-adjusted profits, financial institutions that have adopted an advanced risk management framework regularly calculate and monitor profit after credit cost, and profit ratio after credit cost, for the entire organization and for individual sections. Moreover, bank branches are becoming familiar with the idea

[24] For the definition of these, see Footnote 6.

that an average of the expected loss for each fiscal year (expected loss [EL]) should be covered by factoring it into pricing.

Against this background, profit after credit cost in particular has become an important indicator for assessing overall performance at sections or bank branches.

At the same time, the importance of the profit ratio after credit cost and profit after capital cost has gained acceptance among financial institutions. However, they have not yet reached the stage where they can use them proactively to assess the performance (risk versus profitability) of individual sections or the efficiency of use of capital for the overall financial institution. Reasons for this include: the need to further improve risk quantification techniques; the difficulty in objectively assessing the profit contribution of individual sections, particularly in the case of transactions involving multiple sections; and the fact that some essential sections (for example, the sections in charge of taking deposits) still suffer huge losses after the deduction of capital costs. It is desirable to further raise the awareness of the significance of risk capital and capital costs, which will lead to a more proactive usage of these indicators and greater efforts to enhance management efficiency.

B. Disclosure

In order for a financial institution to win the markets' confidence in the stability and soundness of its management, it is extremely important that it proactively disclose the status of the risk taken in its overall operations and the adequacy of its capital under the integrated risk management framework. For this reason, the Basel II Framework includes the enhancement of market discipline through ample disclosure under Pillar 3, together with the minimum capital requirements of Pillar 1 and the supervisory review of Pillar 2.

Some financial institutions abroad are already disclosing risk capital by segment and comparisons of it with Tier 1 capital or regulatory capital in their disclosure documents. In contrast, some Japanese financial institutions disclose qualitative information such as overviews of their integrated risk management schemes, but none has disclosed quantitative information such as specific risk capital amounts or risk/return results. Although disclosure of quantitative information pertaining to integrated risk management is not obligatory, even under the Basel II Framework's Pillar 3,[25] the aim of Pillar 3 is to encourage the reinforcement of market discipline by accurately conveying the actual condition of the business to the market, thereby further increasing the incentive to enhance risk management. Thus, it is highly desirable to

[25] Although Pillar 3 of the Basel II Framework does not explicitly require disclosure of information concerning integrated risk management based on economic capital, it asks for a disclosure of "a summary discussion of the bank's approach to assessing the adequacy of its capital to support current and future activities" under "qualitative disclosures."

take a more positive stance toward disclosing information of this kind in relation to risk management and business management.

Appendix: Market Risk Management at Japanese Financial Institutions

In the area of market risk, financial institutions can access a wide range of information on prices and interest rates. In addition, they must meet capital adequacy requirements in which market risk regulations allow them to use the internal models approach for the trading account transactions. Thus, financial institutions set up risk management systems on both the qualitative and the quantitative sides at an earlier stage than any other risk categories, and standardize risk management methods. The following sections provide a simple overview of the type of market risk management generally carried out by Japanese financial institutions.

A. Organizational Frameworks

Sections that engage in market transaction at a financial institution are broadly divided into three: front offices that actually execute transactions; back offices that carry out clerical processes associated with those transactions; and middle offices that manage risk for the overall transactions. The type of system that is desirable for managing market risk depends on the nature of the business and the scale of operations, but most financial institutions separate their front and back offices. Middle-office operations were initially placed within the back office or the planning and finance sections, but to strengthen the independence of the risk management sections, it is becoming more common for financial institutions with operations over a certain size to establish middle offices that are completely independent of other sections.

B. Risk Management Methods

In managing market risk, many financial institutions have adopted methods for identifying the size of their risk exposures using BPV, VaR, and other indicators, monitoring these indicators, and controlling risk.

The simple balance of asset holdings used to be applied frequently as a risk management indicator. This balance permitted a broadly intuitive grasp of the size of the risk exposure, but did not enable financial institutions to quantify the size of the impact that actual fluctuations in interest rates might have on profits and losses through fluctuations in asset values. As a result, BPV came into use as a risk management indicator that quantitatively identifies the extent to which a certain interest rate fluctuation may alter asset value. By allowing changes in asset values to be seen when interest rates move by only a certain amount, BPV has two advantages against the later mentioned VaR: it is easy to understand and involves a small calculation burden.

However, BPV does not take into account factors such as the frequency at which the assumed interest rate fluctuations occur. That is why VaR, which incorporates probabilistic information based on historical data to statistically calculate

maximum losses in connection with interest rate fluctuations, has come into concurrent use. In the context of integrated risk management, it is common for the risk to be monitored and controlled by setting risk ceilings[26] and loss limits[27] based on the risk capital allocated to the market transaction sections so that risk quantified using such methods as VaR and the losses that actually occur are kept within the respective ceilings.

An overview of the actual market risk management process is as follows.

a. Allocate risk capital commensurate with market risk to the market transaction sections.[28]
b. Set the risk ceilings and loss limits within the scope of risk capital. The units' subsections (by section, by dealer, or by product) vary from one financial institution to another. Since risk quantification, monitoring, and risk controls are carried out according to individual units, the units should be set after taking the practical management burden into consideration.
c. The front office takes risks within the scope of the risk ceiling. It manages actual losses so that losses do not exceed the loss limit. The middle office quantifies risk and identifies the loss amount on a daily basis, confirms that the front office conducts operations within the ceilings, and reports to management.
d. In cases where the ceilings are breached by a loss, financial institutions will take actions such as the following. They will either fix the amount of loss by compulsorily reducing and/or closing the position (the so-called "hard limit," which is used mainly for the trading account); or have the front office, back office, and the management discuss its future operations, rather than taking a measure such as compulsory reduction (the so-called, "soft limit," which is used mainly for the banking account).
    - In controlling the limit, financial institutions often set other trigger points known as "alarm points" or "warning lines" that stipulate in advance at levels lower than the ceiling (for example, at 50 percent or 75 percent of the ceiling). If the risk or losses hit these points, the middle office alerts the

[26] The limit on risk that management can accept. Most institutions decide this by using VaR or BPV. If the risk ceiling is based on VaR, and financial institutions have adhered to that ceiling, losses that occur within a certain period are expected to be kept within a certain range with a certain degree of probability (a priori loss control).

[27] Limits on losses arising within a certain period that management can accept. This is commonly based on overall profit and loss (realized profit and loss plus change in latent profit and loss since the beginning of the fiscal year). In order to keep the loss amount within a certain limit, loss limit serves as a trigger for holding discussions on subsequent risk taking policy as the loss amount reaches this limit or for finalizing losses as the loss amount actually hit the limit (ex post loss controls).

[28] Please see Chapter V.A, for more information on the process by which risk capital is allocated to the market transaction departments.

front office and reports to the management.

e. Financial institutions basically set the risk ceiling and the loss limit at the beginning of the fiscal year and remain at a constant level throughout the fiscal year. In a case where the loss amount exceeds a certain level, however, they review the risk limit setting while monitoring the amount of leeway left before the loss limit is reached.[29]

C. Future issues

An analysis of recent market transactions shows that Japanese financial institutions have expanded their range of investment, including structured bonds, real estate investment trusts (REITs), hedge funds, and other assets that used to be uncommon. Investment of these assets often entails a significant challenge for risk management. For example, it is not easy to obtain market price information in a timely manner; there are constraints on market liquidity; and it is difficult to identify the underlying assets or control compliance with contracts in the case where asset management is outsourced. How to manage the risks associated with these assets remains an important issue to be discussed in the near future.

[29] For example, the risk ceiling is set at 90 and the loss limit is set at minus 100 at the beginning of the fiscal year. Under conditions where the loss amount reaches minus 60 during the year, if the institution takes risk up to the ceiling of 90, and that risk materializes further, the total loss amount will reach minus 150, exceeding the loss limit set at the beginning of the fiscal year. For this reason, at the point when the loss amount reaches minus 60, it is possible to reduce the risk ceiling from 90 to 40. In this case, even if risk is taken up to the ceiling of 40 and materializes itself as a loss, the loss amount is kept to minus 100.