Evaluating the Economic Value of Loans and the Implications: Toward Transformation of the Business Model of Banks and Nonbank Firms

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S U M M A R Y

On October 11, 2002, the Bank of Japan published "Japan's Nonperforming Loan Problem," which argued that in order to resolve the nonperforming-loan (NPL) problem a comprehensive approach is needed that centers on the "appropriate evaluation of the economic value of NPLs," "their quick disposal," and "enhancement of earning power on the part of both firms and banks."

As the Bank highlighted in this publication, appropriate provisioning based on an adequate evaluation of the impaired value of loans and the introduction of a new lending strategy based on such evaluation should be a starting point for maintaining the stability and earning power of financial institutions as well as for maintaining the stability and efficiency of the financial system. The Bank believes that the strengthening of the financial intermediary function through these measures, both at an individual institution level and for the financial system as a whole, will contribute to promoting corporate rehabilitation and creating new businesses, which will in the end lead to the revitalization of the Japanese economy.

In the 1990s, U.S. and international accounting standards began to introduce the idea of provisioning based on the evaluation of impaired value, generally calculated using discounted cash flow (DCF) or similar methods. The Basel Committee on Banking Supervision supports this method, arguing that it improves the transparency of financial institution management and strengthens credit risk management capacities. Studies are now underway towards the introduction of a more widely applicable DCF method known as "recognition of collective impairment."

The United States has already established a framework that encourages financial institutions to speedily respond to NPLs. There are two main facets: (1) provisioning practices that require appropriate reflection of the economic value of a loan; and (2) a bankruptcy law system that is oriented towards corporate rehabilitation. As a consequence, financial institutions now take steps to rebuild businesses before the credit quality of borrowers deteriorates and their own losses expand. The result has enabled borrower corporations to smoothly transform their businesses at an early stage in response to changes in competition and advances in technology, and this is one factor on the financial side facilitating transformation of industrial structure.

In Japan, provisioning rules have seen steady improvement over the past several years. In addition, during the first quarter of 2003 large Japanese banks began applying the DCF method to loans to large borrowers that "need special attention." The significance of the introduction of the DCF method in Japan goes beyond the mere improvement of provisioning methods. It can be seen as an important trigger that will lead to appropriate evaluation of the economic value of loans and the provisioning of appropriate reserves for them, changing traditional lending practices and accelerating business rebuilding, with the ultimate result of changing the business models of banks and firms alike.

However, taking full advantage of the implications of the DCF method will require new management efforts on the part of financial institutions to enhance their internal management accounting in ways that acknowledge and utilize the principles of economic valuation. There will be three facets to this: (1) introduction of loan screening procedures that emphasize the cash flow generation capacity of borrowers; (2) introduction of a lending framework that allows institutions to respond to risk profile changes, for instance, the attachment of covenants to loan contracts; and (3) strengthening "workout" departments to better enable them to deal with NPLs and providing a system of incentives for doing so.

Another important task for Japan in developing a loan management and provisioning framework will be to deepen studies of methods to capture the aggregate economic value of groups of loans (recognition of collective impairment). With such methods in place, it will be easier to capture economic value even for loans where it is difficult to estimate individual cash flow. This method will also reduce credit risk management costs and improve credit risk management efficiency.

Obviously, lending practices and business models are built up over many years by the institutional complementarity of various systems and practices. These are not easy to change. Improvements in the provisioning rules must be accompanied by review of the bankruptcy framework, enhancement of secondary markets for loan assets, development of the corporate turnaround business, and a wide range of other efforts. Evaluating the economic value of loans would provide a foundation for achieving these aims.

The Bank of Japan will use its examination and monitoring functions to verify the appropriateness of

provisioning under the newly-introduced DCF method at large banks and the extent of its application in internal management. The Bank will also continue its theoretical and practical studies of the DCF method in order to further develop the method in an ongoing dialogue with all related parties.

I. Introduction

On October 11, 2002, the Bank of Japan published "Japan's Nonperforming Loan Problem," which argued that in order to resolve the NPL problem a comprehensive approach is needed that centers on the "appropriate evaluation of the economic value of NPLs," "their quick disposal," and "enhancement of earning power on the part of both firms and banks."

As the Bank highlighted in this publication, appropriate provisioning based on an adequate evaluation of the impaired value of loans and the introduction of a new lending strategy (business model) based on such evaluation should be a starting point for maintaining the stability and enhancing earning power of financial institutions as well as for maintaining the stability and efficiency of the financial system. The Bank believes that the strengthening of the financial intermediary function through these measures, both at an individual institution level and for the financial system as a whole, will contribute to promoting corporate rehabilitation and creating new businesses, which will in the end lead to the revitalization of the Japanese economy.

After the publication of "Japan's Nonperforming Loan Problem," the government announced its "Financial Revitalization Program" on October 30, in which it instructed large banks to use the DCF method in provisioning for large borrowers in the "need special attention" category. In response, the Japanese Institute of Certified Public Accountants (JICPA) published guidelines on DCF-based provisioning[1] on February 24, and the Financial Services Agency published revisions to the *Financial Inspection Manual* on February 25. Together, these documents establish a clear, practical framework for application of the DCF method.

In this paper, we review the arguments made in "Japan's Nonperforming Loan Problem" and other reports and papers leading up to these events, examine the significance of evaluating the reduced economic value of NPLs and, using such examination as the basis for provisioning, consider the implications for the Japanese financial system. Lastly, we discuss some of the tasks remaining for the future.

Section II reviews the discussion and introduction of the DCF method overseas in provisioning against loan credits and the respective background. Section III considers the theoretical implications of economic value. Section IV builds from the theoretical discussion to consider the implications for Japan of the introduction of the DCF method and expected effects. Section V discusses the institutional issues to be dealt with in the lending businesses of banks in order for these effects to be achieved. Finally, Section VI considers the introduction of "recognition of collective impairment" as a means of further improving DCF-based provisioning. The Appendix provides a brief summary of concepts of economic value and examines recent advances in credit risk pricing theory and their application to business.

II. International Trends in the Evaluation of the Economic Value of Loans

A. DCF Method in Calculating Provisions against Defaults

Since the 1990s, a growing number of countries have begun using the DCF method and others to reflect the "economic value of loans" when pricing and provisioning for NPLs.

The first move in this direction was marked by U.S. Statement of Financial Accounting Standards (SFAS) No. 114, "Accounting by Creditors for Impairment of a Loan," published in 1993. The standard prescribes three methods for measuring the economic value of a loan to serve as the basis for calculating provisioning: (1) the DCF method or, as supplementary methods; (2) market prices; and (3) collateral value. Similar concepts were subsequently published by other bodies, including International Accounting Standards (IAS) No. 39 of 1998 and the 1999 Basel Committee on Banking Supervision ("Basel Committee" hereinafter) report, "Sound Practices for Loan Accounting and Disclosure."[2]

There are technical differences between the three methods, but they all share the basic thrust of the

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1. "Auditor Notes When Banks and Other Financial Institutions Use Estimated Cash Flow (DCF Method) to Provision Reserves."
2. SFAS 114, IAS 39, and the Basel Committee use the following methods to calculate the impairment of loan credits: (1) the DCF method; (2) market prices; and (3) collateral value if the loan depends on collateral. The first is the primary method for SFAS, while the other two are considered supplementary. IAS and the Basel Committee treat all three methods equally.

DCF method, i.e., "using future cash flow as the basis for seeking the economic value of a loan." In other words, if a loan has a market price, that is the market's evaluation of the future cash flow to be obtained from such credit. Even if the loan is valued in terms of collateral value, the price of the collateral, if it is fair, will reflect the future earnings that will be generated by the collateral assets. Because of this, in this paper we focus on the DCF method as the most typical method for evaluating the economic value of loans.

In practice, the DCF method may not be found in all developed countries. While the DCF method is widespread in the United States, some European countries use provisioning rules based on different schemes.[3] Nevertheless, there is active discussion and study of appropriate techniques for evaluating economic value and a common recognition of the issues involved. An exposure draft of proposed revisions to IAS 39 (2002) and a market consultation draft from the American Institute of Certified Public Accountants (AICPA) (2002) point to a more refined version of the DCF method known as "recognition of collective impairment," and there are now various groups studying this method worldwide. We will discuss it in greater detail below.

B. Background to the Method Reflecting Economic Value

Three main trends have provided the impetus for international study and eventual introduction of the method reflecting economic value.

1. Technological advances in information processing

Accounting standards and techniques are generally influenced both by the degree to which trading markets develop for particular goods and services and by technological advances in data processing and risk measurement. In the area of loan credit risk management, advances in the use of computers to maintain and analyze vast quantities of data have made it much easier to calculate default rates and the risks they entail, and there have been vast improvements in the accuracy of results. The concept of discounted cash flow as a means of valuing assets is by no means new, but advances in information processing have made it far easier to implement in practical terms.

2. Need for greater transparency in accounting for financial instruments

As financial transactions become more complex and sophisticated, and market functions more important, investors require more accurate information on the risk profiles of investment targets—not just individual transactions and instruments as well as profits and losses, but also the entire holdings of the entities concerned. The trend towards the DCF method that began in the United States in the 1990s was an offshoot of the Financial Instruments Project of the Financial Accounting Standards Board (FASB), which worked on the fair value disclosure of financial instruments. Greater transparency in financial institution accounting improves the efficiency of accounting-based regulatory regimes such as capital adequacy ratios. In 1999, the Basel Committee warned, "if underlying accounting policies are weak, the resulting capital situation may well be overstated."

3. Need for stronger credit risk management at banks

Since the 1980s, many countries have experienced bank failures, which have focused new attention on the issue of credit risk management at financial institutions. The Basel Committee took the lead in examining "sound practices" in lending and was able to forge an international consensus on DCF-based provisioning. The Basel Committee (1999) argued, "Unless deterioration is identified and losses recognised by the establishment of adequate allowances or charge-offs in a timely manner, a bank may well persist in highly risky lending strategies or practices and thus accumulate significant loan losses, possibly resulting in failure." It went on to warn, "Inadequate accounting treatments undermine the usefulness of capital requirements and hamper proper assessments and sound management and control of a bank's credit risk exposure."

III. Basic Concepts in Evaluating the Economic Value of a Loan and Appropriate Provisions

A. Basic Concept of Economic Value

During the debate on the introduction of the DCF method in Japan, there was a tendency on the part of some to view it as just one other way to calculate provisions, but this is a misunderstanding. The DCF method attempts to evaluate the economic value of a

3. For example, allocate provisioning over time up to maturity.

loan in terms of its future cash flow. Other than a few technical differences (discussed below), the underlying concepts of DCF merely apply to loans the general principles of asset valuation already widely applied to equities, bonds, and land.

The economic value of a loan credit can be seen as the discounted present value of the future cash flow generated by the loan minus the expected loss (credit cost).[4] Therefore, the economic value of a loan will decline should there be a change in terms (say, an interest waiver) that reduces expected cash flow, or should the borrower's credit rating decline so that default probability increases and the risk of loss becomes greater. In other words, the current question of the "economic value of a loan" is the same as the future question of "whether the profits earned on the loan will exceed the expected losses." To put this yet a different way, loans that do not earn sufficient returns to cover future credit costs result in a decline in economic value (see Appendix).

When there is a large decline in economic value, it is incumbent on a bank to take steps to deal with the portion that is below book value, either by attempting to improve the business of the borrower or, if there is little likelihood of that happening, writing off the loss which corporate rehabilitation or liquidation entails. In these cases, the appropriate starting point for dealing with NPLs is provisions against the impaired economic value.

B. Fair Value Accounting and the DCF Method

The DCF method for loans is based on the same concepts that underlie fair value accounting for financial instruments in that it looks at the discounted present value of future cash flow. There are, however, some points of difference. Under the historical cost accounting regime, provisioning covers the amount a debtor is unlikely to pay as impairment. Neither SFAS 114, IAS 39, nor the Basel Committee seek mark-to-market valuation for loans.

The first difference is the discount rate that is applied to discounted cash flow. In fair value accounting, the discount rate is whatever the market interest rate happens to be at the time, so fluctuations in market interest rates prior to the valuation point will be reflected in the asset value. By contrast, the DCF method uses the original lending interest rate as the discount rate and there are no changes in value due to subsequent fluctuations in market interest rate. The reason for this is because, out of all the many risks there are, the DCF method focuses on "credit risk" and attempts to deduce the changes in economic value that result from changes in credit risk.

Obviously, one could argue that loans need to be marked-to-market just like other financial instruments, but this is still a developing issue on both the theoretical and the practical sides, and one of the chief questions yet to be addressed is what to do about market valuation with respect to deposits and other liabilities (whether across-the-board marking-to-market is desirable).

The other difference is that while fair value accounting considers both increases and decreases in asset values, the DCF method looks only at the portion of economic value that has declined to levels below book value and requires the appropriate provisioning against this. There is no accounting treatment for increases in value by, say, a capital increase.

The portion of economic value that is above book value represents net profits from cash flow in excess of credit risk. This is constantly exposed to competition among banks, and there is no certainty that a bank will be able to steadily earn these profits over a long period of time. Such uncertain elements are not directly reflected in capital accounts; rather, it is more appropriate to leave them to the valuation of the market in the form of equity prices.

By contrast, other financial institutions would be unlikely to assume loans that do not have sufficient cash flow to cover credit costs under the initial terms and conditions. If all else remains the same, the financial institution must either continue to hold the loan, dispose of it, or write it off. These are to some extent certain losses, and from an accounting perspective require an explicit reduction in capital in the form of provisioning in order to increase the transparency of bank management.

C. Differences between DCF and Conventional Methods

In Japan, the *Financial Inspection Manual* defines basic provisioning methods for each category of

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4. The *Financial Inspection Manual* says typical examples of the "expected loss rate" are "historical losses with write-off divided by the loan amount" and "probability of default multiplied by the loss given default ratio." Conceptually, both correspond to "credit cost ratio." This paper uses "credit cost" in most cases, with the same meaning as "expected loss." Also, the meanings of "cash flow" are various. This paper uses "cash flow" as the gain from the revenue of principal and interest payments minus fund-raising cost and expenses.

borrower. Below we examine the differences between conventional methods of provisioning and DCF-based provisioning using a borrower that "needs attention" as an example. For our purposes, the conventional method requires the provision of one or three years' expected losses as estimated from historical loss rates or default rates.[5]

The first difference is in the period of time for which losses are estimated. The conventional method requires a fixed estimation period of either one or three years regardless of the time remaining on the loan. By contrast, the DCF method basically attempts to cover all expected losses throughout the life of the loan. Second, the conventional method does not employ the concept of using interest rates to discount future economic value. For example, it merely posts reserves equivalent to expected losses three years hence. The DCF method, on the other hand, posts expected future losses discounted for the interest rate. The third difference is that the traditional method posts reserves against the value of expected losses where the DCF method covers the difference between cash flow and expected losses.[6]

These are all technical differences. More important are the differences in basic accounting concepts. The conventional method of setting aside one-year's worth of expected losses conforms to the accounting principle of managing flow period profits and losses. For example, if it is expected that an average loss of X yen will be generated each year, then setting aside reserves equivalent to one-year's worth of X yen at the beginning of each year is sufficient to cover flow losses.

However, for loans where cash flow is unlikely to cover expected losses, the amounts set aside by the conventional method are insufficient. Should the borrower declare bankruptcy or should the bank decide to sell the NPL, the future stream of losses is likely to be realized all at once. That is why it is more appropriate to use the DCF method as the basis for provisioning for loans whose economic value is already impaired (see Box 1 on pages 24–25).

IV. Implications of Evaluating Economic Value

A. Current Risks/Returns on Loans

Steady improvements are being made to Japan's provisioning rules (see Box 2 on pages 26–27), but there are still many hurdles from the perspective of fully reflecting in provisions the economic value of loans. As discussed above, evaluating the economic value of a loan is essentially a process of gaining as accurate a picture as possible of the relationship between the risks attaching to a loan and the returns. There is the potential for rational activity on the part of firms and banks as well as the financial intermediation function to be distorted if provisioning rules fail to reflect reductions in economic value.

Chart 1 uses the smaller enterprise credit risk information database of the Credit Risk Database (CRD) Administration Council, consisting of a group of credit assurance associations and regional banks, to illustrate the relationship between lending interest and break-even interest (credit cost rate adjusted for fund-raising cost and other expenses). The horizontal axis on the chart shows credit ratings assigned on the basis of CRD credit evaluations; the vertical, interest rates. Generally, the G rating is the borderline between "normal" borrowers and borrowers that "need attention." Ratings below this border area indicate lending interest is below break-even interest and that the loans are in fact not generating any returns. As discussed in the previous section, "profits generated by the loan are less than the expected losses generated by the loan," which indicates a high potential for "impairment of economic value." We have already noted how many banks use conventional methods to allocate provisions for these credits, but it is likely that this does not fully address the reduction in economic value (Chart 2).

The next step is to calculate interest levels for each rating at which it is possible for a borrower company to make payments from cash flow. Generally, borrowers in the "need attention" category or below have rates below the profitable rate. What this means is that the bank continues to lend to borrowers for which it is unable to set interest rates commensurate

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5. The *Financial Inspection Manual* says that provisions against loans to borrowers that "need attention" should be "the amount of expected losses over a set period of time in the future corresponding to the average remaining period of the loan." However, it also says that it is acceptable to provision expected losses over a rationally set period of time commensurate with the degree of credit risk, for example, three years for borrowers that "need special attention" and one year for borrowers that "need attention."

6. Of these differences, the first will result in larger reserve provisions under the DCF method than conventional methods for most loans to borrowers that "need attention," while the second and third will lead to reductions. Because of this, it is impossible to generalize which method will ultimately result in larger provisions.

with credit costs. Estimates of the net profitability of lending operations as a whole after adjustment for credit costs show that loans to "normal" borrowers are profitable but those to borrowers that "need attention" and below are not, so that the operation as a whole generates little or no profit in net terms. By continuing to make unprofitable loans in order to support borrower companies, the bank saps its own strength.

From the perspective of efficient financial intermediation, the fact that payment interest rates are below break-even interest rates would also indicate that funds are being supplied to companies to which it is not rational to be lending. As a result, it is possible that the efficiency of financial intermediation as a whole is eroded, e.g., fund supply to potentially productive borrowers might be choked owing to such irrational lending practices.

B. Lending Practices and Accounting Systems

One factor behind banks continuing to make low- or no-profit loans stems from the time-honored lending practices of the Japanese financial community. Lending practices have emphasized medium- and long-term customer relationships, and even after borrowers face difficulties, banks have continued lending and being involved in the rebuilding process, avoiding reorganization and bankruptcy proceedings wherever possible. Provisioning rules that fail to adequately reflect decreases in the economic value of loan credits have bolstered these traditional lending practices. Financial institutions are able to continue lending without, on the surface, harming their balance sheets because accounting practices do not require loss recognition until there has been a considerable decline in a borrower's credit quality.

These traditional lending practices have been given credit for contributing to the high growth of the past because they allowed borrowers to stabilize their finances and make fixed investments from a medium- and long-term perspective. This mechanism functioned smoothly because the economy was on a prolonged uptrend and banks could be confident that if they just waited out a downturn, the performance of borrowers would recover, collateral values would increase, and loans could be collected. Today, however, we face intense, global-scale competition and structural

transformation in which new companies are born and existing firms fall by the wayside. The lending practices of the past have impeded efforts to improve profitability on the part of both financial institutions and their nonfinancial customers, and have also stood in the way of the resolution of NPLs.

Lending practices in the United States provide a sharp contrast. In the United States, it is common practice to deal with NPLs by clarifying loss-sharing and quickly moving to rehabilitation at an early stage, before any substantial deterioration in corporate value. This practice allows companies to be disbanded and created as warranted by changes in the competitive climate and advances in technology; it makes dynamic changes in the economic structure possible. One of the reasons for this is that the accounting system (which reflects economic value) and bankruptcy laws (which are oriented towards maintaining corporate value and rehabilitating businesses) play significant roles as institutional infrastructure.

C. Effects to Be Expected from the Evaluation of Economic Value

As discussed, Japanese lending structures and lending practices have failed to play an adequate role in dynamically reallocating funds and resources and reactivating the economy during a time of momentous change in the economic environment. The evaluation of economic value and improvements to loan provisioning rules could be a trigger to reform traditional banking practices and, eventually, corporate behavior. The following effects can be expected.

1. Improvement in transparency and governance

The introduction of provisioning rules that reflect economic value will increase the transparency of bank accounting and provide investors, creditors, and depositors with useful information for their decision-making. This will lead to increased credibility of bank accounting and therefore of the financial system as a whole. The markets will be able to precisely value bank management and offer corresponding transaction terms, which will give banks more discipline as well as provide them with incentives to pursue more economically rational behavior. Stronger governance will in turn give banks an incentive to timely dispose of NPLs.[7]

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7. Financial institutions will individually develop and calculate what they consider to be the best models for applying the DCF method, which is why it is so important to disclose the rationale for calculations and the criteria used. Improving market transparency also requires disclosure of specific calculation and application methods for DCF methods.

2. Improvement in earning power of banks

While provisions reflect the impairment of the economic value of NPLs, additional accounting losses entailed from debt restructuring for corporate rehabilitation or liquidation are limited, thus strengthening the incentive of banks to deal with NPLs smoothly and quickly. Since banks would also become more conscious of economic value, they would make further efforts to ensure the economic value of loans. Such transformation of the lending business model to include loan management and NPL disposal would strengthen bank profitability and contribute to the restoration of sound banking.

3. Faster business rehabilitation

Accounting systems that recognize the impairment of the economic value of a loan will require banks to quickly identify rebuilding strategies and take appropriate measures in a timely manner. Early, fast implementation of rebuilding strategies will limit the loss of a borrower's business resources (staff and franchise value). When there is accelerated deterioration in a borrower's credit rating, there will be an irrevocable loss of franchise value (customers, suppliers, and brand), making enterprise rehabilitation more difficult. An early response is important in order to avoid needless corporate attrition and to minimize socioeconomic losses (corporate value, employment opportunities) while enabling smooth transformation of business structures.

4. Reallocation of credit risk through expansion of the secondary market for loan assets

With accounting systems that recognize the impairment of economic value through enhanced incentives to deal with NPLs in a timely manner, the secondary market for loan assets might expand. Such a market would reallocate credit risk rationally, and as a result, efficient risk taking in the whole economy might ensue.

D. The DCF Method and Stability of the Economy

Some critiques have expressed concerns that the use of the DCF method would have negative effects on the economy. There are two basic arguments.

First, there is a concern that banks will become even stricter in their lending stance, which will adversely affect corporate financing and the economy as a whole. Certainly, traditional lending practices have, in some respects, caused banks to bear the risks of economic fluctuations. Nowadays, however, these lending practices have sapped banks of their strength and destabilized the financial system, and inefficient resource allocation may also be increasing downward pressure on the economy. Evaluating the economic value of loans and provisioning based on this value should basically work to remove this downward pressure.

Once provisioning based on economic value prevails, it will mitigate the negative effects caused by uniform, mechanical credit risk management policy that merely refuses lending to companies below a certain borrower class.

Furthermore, during the transformation of lending strategy, corporate liquidations would be unavoidable. These, however, would contribute to promoting more effective financial intermediation in the long term. However, in the short term, we might face a phase where it is necessary to devise ways to ensure financing for sound firms. For example, it would be useful to diversify corporate funding channels such as nurturing new markets that utilize securitization.

The second and more long-term concern is that the DCF method will amplify the swings of economic cycles. Obviously, future cash flow forecasts become overly optimistic during boom periods and overly pessimistic during busts. This may lead to overly easy provisioning standards during booms that cause lending to increase, and then precisely the opposite during busts. In more general terms, the issue is the relationship between financial and accounting systems and economic cycles (the "procyclicality" of regulation), which is still being studied on both theoretical and practical levels.

The DCF method recognizes the economic value of loans and hence gives banks more of an incentive to prepare for the emergence of risks due to changes in economic conditions. If financial institutions are able to manage future risks with more precision, they will not just extrapolate current economic conditions into the future, but will arrive at more cautious methodologies that estimate the future based on an analysis of data covering several economic cycles. The important point is not the mechanisms of the DCF method so much as the risk management attitude on the user side. We believe that introduction

The Basel Committee (2000) said, "A bank should disclose information about the accounting policies, practices and methods it uses to account for its credit risk exposures," and included "the basis of measurement for impaired assets, including how and when the bank determines an asset is impaired" in disclosure items.

of the DCF method will have a substantial effect in promoting stronger risk management systems.

V. Practical Issues in Bank Lending

In the mid-1990s, large Japanese banks began to make a full-fledged switch to the quantitative management of their credit risks. During this process, internal rating systems were established, and measurements of the probability of ratings migration and bankruptcy became more accurate.[8] Recent years have seen the use of internal ratings extend beyond merely setting internal credit limits. Many banks evaluate lending profitability after adjusting for risks as measured by the credit cost rates for different ratings, and set their lending interest levels based on their internal credit ratings. As large Japanese banks develop risk management techniques and accumulate data, they lay the technical foundation for practical application of the DCF method.

Nonetheless, there are still several issues to be addressed before evaluated economic values can be used in practical lending decision-making.

A. Improvements to Internal Management Accounting

Rational decision-making by banks requires more than just evaluating the economic value of loans and provisioning based on it. It is important that internal profit evaluations and management accounting reflect the economic value of loans. Once changes in the economic value of loans are reflected in the internal performance assessment of lending and screening departments, these departments would have an incentive to be conscious of economic value.

Large banks are already making widespread use of credit cost-adjusted profits as the measurement of internal profitability, and credit risk-based measurements are gradually gaining acceptance. Appropriately evaluating the economic value of financial instruments is fundamental to the rational functioning of these management systems.[9]

B. Emphasis on Borrower Cash Flow in Loan Screening

Awareness of the economic value of loans would cause banks to place more emphasis on cash flow as they screen potential loans. The introduction of screening methods that appropriately evaluate the business value of a proposal (even if there is no collateral for it) can be expected to facilitate the supply of funds to new start-ups or rebuilding of businesses.

In addition, when a borrower provides the real estate that it uses in its business as collateral, the value is determined by future cash flow. Since this is merely a part of the business cash flow of the borrower, a decline in the economic value of the loan (decline in the enterprise value of the borrower) would result in a decline in collateral value as well. If the borrower goes bankrupt and collection becomes necessary, much collateral value would have been lost. In other words, evaluation of the credit risk mitigation effect of collateral needs to take into account the essential correlation between collateral and loan values. Management that emphasizes borrowers' cash flow can be expected to improve collateral-based credit risk evaluation.

C. Lending Framework That Responds to Risk Changes

It is important that interest rates be set at levels commensurate to risks in order to maintain the economic value of loans. Should a borrower's credit quality decline and credit costs increase, banks must quickly review their lending policies.

Some Japanese banks have begun to introduce credit cost-based pricing in recent years. Last year, some large banks began disclosing their internal ratings to borrowers and setting interest rates accordingly. Gradually, the idea of setting interest rates that correspond to risk is gaining ground in Japan.

One method of ensuring an early response to declines in creditworthiness that is commonly used in the United States is to attach covenants to the loan contract (see Box 3 on page 28). Should financial conditions of a borrower deteriorate, the covenants dictate that the loan contract be reviewed to take account of the change in credit quality. Setting interest rates and covenants according to internal ratings would enable banks to mitigate the uncertainty in the value of loans and would strengthen discipline in managing borrowers.

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8. On internal credit rating, see Bank of Japan (2001b).

9. Generally, returns after deduction of credit cost are referred to as the "risk adjusted return on assets" (RAROA). There are also attempts to use "risk adjusted return on capital" (RAROC) as a measure of the profitability of capital allocated according to a credit risk framework. Another measure employed is "economic value added" (return after capital costs are deducted). See Bank of Japan (2001a) for details.

D. Organizational Framework That Permits Early Workouts, Business Rebuilding, and Liquidation

Many U.S. banks quickly transfer management responsibilities to a "workout" department that specializes in rebuilding and disposing of problem credits should a borrower's credit rating decline. This allows them to work in collaboration with the borrower to make fundamental changes before there is a significant loss in the economic value of the loan. Cutting problem credits off from the credit generation and screening departments (business line) at an early stage would have the effect of (1) objectively evaluating business conditions of the borrower (preventing the business lines from holding off the addressing of problems), and (2) forcing the borrower to recognize the gravity of the situation because of the changes in people at the bank in charge (Chart 3).

Since there have been stronger calls in recent years for banks to take steps to rehabilitate businesses in a timely manner, a workout system would be a desirable means of accomplishing this. The management accounting for such a system should transfer NPLs from business lines to workout departments priced by economic value. This would have the effect of clarifying responsibility for the decline in economic value. Also, the workout department would in turn have appropriate incentives to increase the economic value of NPLs by taking steps to deal with them (rebuilding, sale, liquidation, etc.) because it would be able to post profits for management accounting purposes (Chart 4).

VI. Future Tasks of Collective Loan Management: Introduction of "Recognition of Collective Impairment"

Practical and theoretical study with respect to DCF methods that would apply to groups of loans ("recognition of collective impairment") is an important step in the further development of loan valuation.

Current accounting guidelines require the DCF method to be used to estimate cash flow for individual loans or companies, but the cash flow forecasts, bankruptcy rates, and credit cost rates used in the DCF method are probability concepts that lend themselves to collective data processing. Traditional credit risk management and accounting audits have been strongly oriented towards the idea that such measurements should be used only in conjunction with a review of the special circumstances regarding specific/individual companies or loans. However, the reality is probably that banks first consider trends among companies of the same size or belonging to the same industry or located in the same geographical area, and only then look at individual circumstances.

Overseas, there are cases of the DCF method being used for collective valuation of groups of smaller credits that have similar risk profiles, and accounting systems have begun to acknowledge the utility of these methods. For example, the exposure draft on proposed revisions to IAS 39 recommends the introduction of collective impairment concepts (Chart 5). AICPA lists collective impairment in the draft practical guidelines published in 2002 and in a form that acknowledges and approves of practices being used by U.S. banks.[10]

Current accounting guidelines in Japan allow the use of the DCF method for credits to borrowers in the "need attention" category, but as of this writing in March 2003, application was almost limited to the large borrowers that "need special attention" at large banks. However, declining credit quality has also resulted in significant declines in economic value for loans to borrowers in the "need attention" category as well. The extension of the DCF method to credits to borrowers that "need attention" is a major issue to be addressed. The problem is that large banks have large numbers of borrowers that "need attention" and the costs of individually applying the DCF method are prohibitive. A collective DCF method would reduce the management costs for broad measurements and therefore be an effective means of overcoming the impediments. Similar merits would be seen if, in the future, regional financial institutions began to voluntarily use the DCF method as well.

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10. It should be noted that the exposure draft for the proposed amendment to IAS 39 (2002, paragraph 112) uses the following treatment for the impairment of loan credits: "An entity first assesses whether objective evidence of impairment exists individually for financial assets that are individually significant and either individually or collectively for financial assets that are not individually significant. If an entity determines that no objective evidence of impairment exists for an individually assessed financial asset, whether significant or not, it includes the asset in a group of financial assets with similar credit risk characteristics that are collectively assessed for impairment. Assets that are individually assessed for impairment and for which an impairment or bad debt loss is or has been recognised are not included in a collective assessment of impairment."

Individual cash flow forecasts are difficult for many loans, but probability-based estimates using a collective DCF method would make it possible to evaluate the economic value of a portfolio as a whole. We therefore believe that collective assessment of impairment would contribute to improvement in bank credit risk management.

A collective DCF method is indispensable for evaluating the economic value and provisioning on a pooled basis, when banks manage some lending products on a pooled basis, e.g., a newly introduced uncollateralized small business loan facility which is managed as part of a portfolio segment with similar risk characteristics for purposes of risk assessment and qualification. Therefore, to allow a collective DCF method would contribute to the development and management of these new lending products.

C O N C L U S I O N

This paper regards the evaluation of the economic value of loans as one trigger to change the business models of banks and, eventually, their client companies. We have attempted to describe the basic concepts involved and the effects that can be expected. We also note that the collective DCF method (recognition of collective impairment) is one of the major tasks to be addressed in the future.

Obviously, lending practices and business models are built up over many years by institutional complementarity of various systems and practices. There has already been considerable progress made in overhauling the bankruptcy framework to provide a climate better suited to dealing with NPLs, but many tasks remain to be addressed. For example, activation of the secondary market for loan assets, use of securitization technology to diversify the channel of risk money supply, establishment of transparent loss-sharing rules for relinquished credits, improving the administration of the tax code as relating to the disposal of NPLs, training of specialists in corporate rebuilding (i.e., "turn-around specialists"), and a wide range of other systems and practices still require comprehensive, integrated reworking. Using the DCF method to accurately evaluate the economic value of loan credits will provide a foundation for the resolution of these issues.

The Bank of Japan will use its examination and monitoring functions to verify the appropriateness of provisioning under the DCF method newly introduced to large banks, and the extent of its application in internal management. The Bank will also continue its theoretical and practical studies of the economic value of loans in order to further develop the method in an ongoing dialogue with all related parties.

Evaluating the Economic Value of Loans and the Implications:
Toward Transformation of the Business Model of Banks and Nonbank Firms

APPENDIX: THE THEORY OF ECONOMIC VALUE AND PRACTICE OF THE DISCOUNTED CASH FLOW METHOD

Let us begin with an intuitive explanation of the fundamental significance of economic value. The basic idea is that economic value is reduced when the future profits to be earned from a loan are less than the losses it is expected to generate.

The next section builds from this intuitive understanding to the generalized discounted present value concept. We include a brief theoretical overview of techniques for evaluating credit risk and realistic methods that large banks can use to develop an accurate DCF method.

A. Intuitive Significance of the Economic Value of a Loan

1. Basic concepts of the economic value of a loan
The economic value of a loan credit can in theory be evaluated as the discounted present value of the future cash flow generated by the loan minus the expected losses. In this formulation, the value of a loan credit is reduced when terms are changed so as to reduce the expected value of revenues (for example, interest is waived), or when the risk of losses is increased because lower credit quality results in a higher default probability.

Equation (1) puts these ideas into simple mathematical terms. We assume that a loan will, on average, generate revenues of G yen each year and that there is an average of L yen in losses (credit cost) from defaults each year. For a normal credit with loan principal (book value) B, the following relationship will hold true for the discounted value obtained from G and L (to simplify equations, the lending period is assumed to be infinite).

$$B \leq \frac{G-L}{1+r} + \frac{G-L}{(1+r)^2}$$
$$+ \frac{G-L}{(1+r)^3} + \frac{G-L}{(1+r)^4} + \cdots$$
$$= \frac{G-L}{r}. \tag{1}$$

The discount rate r is the risk-free interest rate charged by the market.

Let us assume that the value of the loan declines either because (1) interest waivers or the like have caused a decline (from G to G^*) or (2) credit quality has declined, resulting in an increase in the losses to be written off every year (from L to L^*).

Equation (2) shows the relationship between book value and economic value.

$$B > \frac{G^* - L^*}{r} \Leftrightarrow L^* > G^* - rB. \tag{2}$$

In other words, the new economic value $(G^* - L^*)/(r)$ is less than book value B.[11] Likewise, in this condition, the relationship can be rewritten as shown above to illustrate that credit cost L^* is higher than net revenues from the loan $G^* - rB$ (revenues from the loan minus fund-raising expenses).

As can be seen, the current issue of the "economic value of the loan credit" is also the future issue of "whether or not the future profits generated by the loan exceed the expected losses."

When the economic value of a loan credit declines, the loss to be disposed of by the bank (we will call this the "nonperforming value")[12] will be the difference between book value and economic value F.

$$F = B - \frac{G^* - L^*}{r}$$
$$= \frac{L^* - (G^* - rB)}{r}. \tag{3}$$

Equation (3) shows that the starting point for dealing with NPLs is capturing the decline in economic value $(G^* - L^*)/(r)$.

As can be seen, the "nonperforming value" F to be disposed of by the financial institution depends on the future revenues generated by the loan $G^* - rB$ and the expected credit cost L^*.

11. Even if there is no deterioration in cash flow or credit quality after the loan is made, economic value would still be below principal if initial interest rates are not set commensurate to credit costs. The Basel Committee's comments on the exposure draft for the proposed amendment to IAS 39 (2002) ask for this to be clarified.
12. There are many definitions of NPLs, and from a theoretical perspective, an NPL can be defined as a "loan of reduced economic value because of declines in expected returns or increases in the risk of losses (due to deterioration in borrower credit quality)." In other words, it is a "loan with discounted present value below book value (initial principal)" or a "loan with future earnings below expected losses."

2. Relationship between capital and economic value

The same relationship with nonperforming value can be used to evaluate capital value K to be obtained from the loan. K is the difference between the discounted present value of cash flow generated by the loan $G - rB$ and credit cost L, and is expressed as follows:

$$K = \frac{(G - rB) - L}{r}. \qquad (4)$$

Equation (4) illustrates that it is theoretically possible to earn capital as long as net revenues continue to be higher than credit cost L.

The signs are opposite for the equations expressing K and F, but the concepts are the same. In other words, whether $G - rB$ is higher than L will determine whether capital value is obtained or whether nonperforming value is generated. What this means is that questions about whether financial institutions are under-capitalized for the nonperforming assets they are carrying or whether they need to increase their capital are really questions about financial institutions' earnings expectations (the balance between revenues G and credit cost L). Capital shortfalls are ultimately questions about financial institutions' earnings structures.[13]

B. Generalization of Discounted Present Value Concepts and Detailed Example of the DCF Method

1. Discounted present value takes account of credit risk

The theoretical price of an asset with no credit risk and certain future cash flow is expressed as an aggregate discounted present value as shown below:

$$P_t = \sum_{i=1}^{n} \frac{C_i}{\left[1 + R_t^F(i)\right]^i}, \qquad (5)$$

where

P_t: theoretical price at time t,

C_i: cash flow from the present to i terms in the future,

$R_t^F(i)$: risk-free interest rate.

The theoretical price for a case with the potential for default can be expressed as shown below using the cumulative default probability of the borrower $D_t(i)$, the amount collected at the time of default $\varphi_t(i)$,[14] and the risk premium demanded by investors $\xi_t(i)$.[15]

$$P_t = \sum_{i=1}^{n} \frac{\left[D_t(i) - D_t(i-1)\right]\varphi_t(i) + \left[1 - D_t(i)\right]C_i}{\left[1 + R_t^F(i) + \xi_t(i)\right]^i}$$

$$= \sum_{i=1}^{n} \frac{\left[1 - \pi_t(i)\right]^i C_i}{\left[1 + R_t^F(i) + \xi_t(i)\right]^i}. \qquad (6)$$

Note that $\pi_t(i)$ expresses "credit cost rates at each point in time" that satisfy the equation $\left[D_t(i) - D_t(i-1)\right]\varphi_t(i) + \left[1 - D_t(i)\right]C_i = \left[1 - \pi_t(i)\right]^i C_i$.

The cash flow that the financial institution receives from the borrower is the aggregate of "principal and interest payments during the lifetime of the loan" and "amount collected from disposal of collateral at bankruptcy" weighted for the probability of each case occurring. This conceptual framework provides a means of seeking discounted present value by calculating cash flow at different points in the future (Chart 6). This model is generally called the binary tree model. The DCF method guidelines published by the JICPA (2003) include the binary tree model in their examples.

2. Credit risk-based pricing theory

As will be seen from the explanation above, pricing financial instruments that have credit risk (for example, loan credits or credit derivatives) requires information on the future credit quality (or the default probability) of the counterparty. This raises the issue of how to express the future path of default probabilities. There are two main theoretical approaches: (1) the model using a rating migration matrix; and (2) the option pricing model using equity prices.[16]

Model (1) assumes that events such as defaults or changes in credit quality (ratings) can be described by a probability process known as the "jump process." Specifically, it measures the future path of default probabilities from the involution of the rating

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13. These are conceptual arguments on theoretical value, and different from loan accounting, as mentioned above.

14. Consistency between the definition of default and the recovery rate is an important point in DCF calculation. Generally speaking, the stricter the definition of default is, the higher the recovery rate will be.

15. It represents risks corresponding to UL, not including EL.

16. See Oda (1999) and Kusuoka *et al.* (2001) for a theoretical survey of credit risk-based pricing. Model (1) is called a "reduced form model," and model (2) a "structural model." See Jarrow and Turnbull (1995) and Jarrow, Lando, and Turnbull (1997) with respect to the former, and Longstaff and Schwartz (1995) for the latter.

migration matrix. There are problems with this model, because it does not extend to the meaning behind the probability process, but it is very practical because it is suited to the credit risk management information that financial institutions store.

Model (2) assumes defaults if the corporate value of the borrower, which is a probability variable, falls below a certain threshold. The probability process for corporate value is deduced from share price fluctuations, and an option pricing model is used to find the value of the loan credit. Practically, it is difficult for this model to describe "sudden death" defaults. In addition, the computational processes are complex, and it is difficult to apply to borrower companies that do not have share prices.

3. Detailed example of the DCF method

The following shows a method that uses the binary tree model and the future path of default probabilities found in model (1) to find the value, as a typical example of an applied DCF method. While these are theoretical calculations, it is fully possible for the credit risk management systems of large banks to apply them in practical settings.

Since many banks have a rating migration matrix, the future path of default probabilities and survival probabilities could be calculated by accumulated default rates found through involution of the rating migration matrix (Chart 7). A binary tree model is then used to calculate a discounted present value from the survival and default probabilities.[17]

Analysis by rating migration matrix gives the future probability distribution of internal rating or credit quality. Using this analysis, we can examine statistically the rationality of the estimations by banks on changes in credit quality.

17. We do not take account of a credit risk premium equivalent to UL. Theoretical values differ on this point. Normally, internal management will allocate capital for UL, so there is room to consider it as being subject to provisioning.

Chart 1
Profitability and Credit Ratings
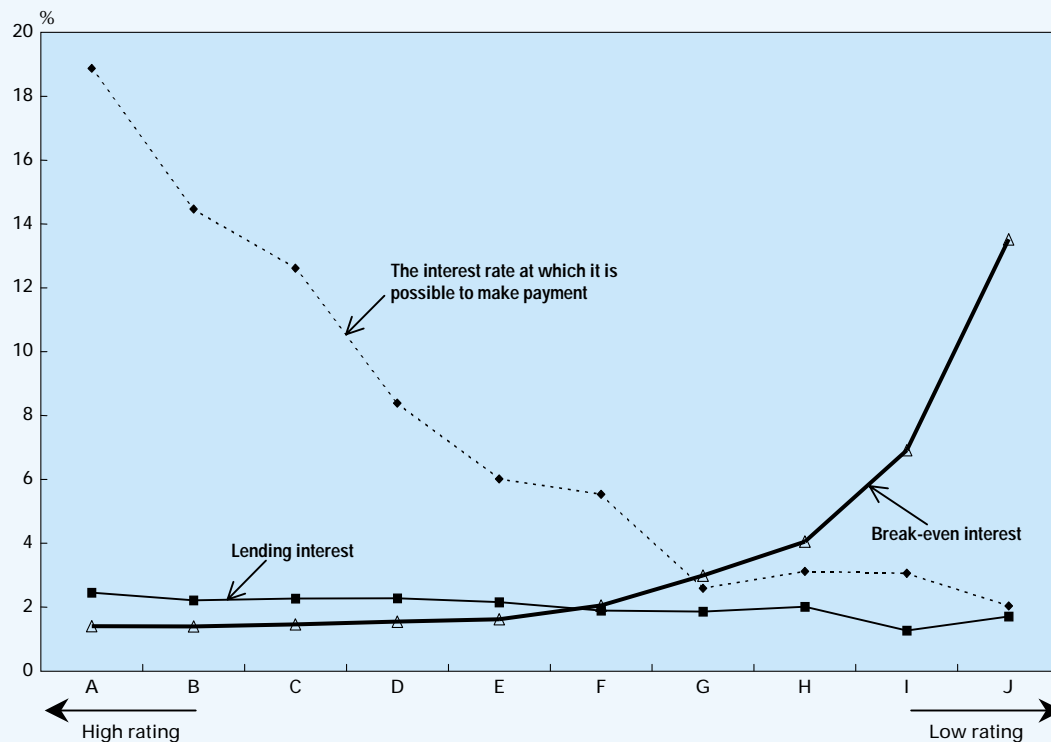
Lending interest = (borrower's) interest payment/(borrower's) liability with interest.

Break-even interest = rate of credit cost* + short-term prime rate**.
    *The ratings below J are defined as a default. The recovery rate is assumed uniformly to be 50 percent.
    **A short-term prime rate is substitution of fund-raising costs and expenses.

The interest rate at which it is possible to make payment = cash flow before interest payment/liability with interest.

- The graph is what was created from the financial data of about 120,000 borrowers which the CRD holds (what was offered from member financial institutions). Ratings were assigned by the Bank of Japan on our side based on the marks of the CRD.
- In a strict sense, differences between lending interest rates and break-even interest rates show a larger profit than the actual ones for normal borrowers, because there are differences of duration, and banks take greater interest risk. Therefore, it is necessary to take into account this factor. However, it has little impact under the present yield curve.
- Break-even interest does not include costs for allocated capital, which covers unexpected credit risks.

Evaluating the Economic Value of Loans and the Implications:
Toward Transformation of the Business Model of Banks and Nonbank Firms

Relation between Provisions and Economic Value of Loans
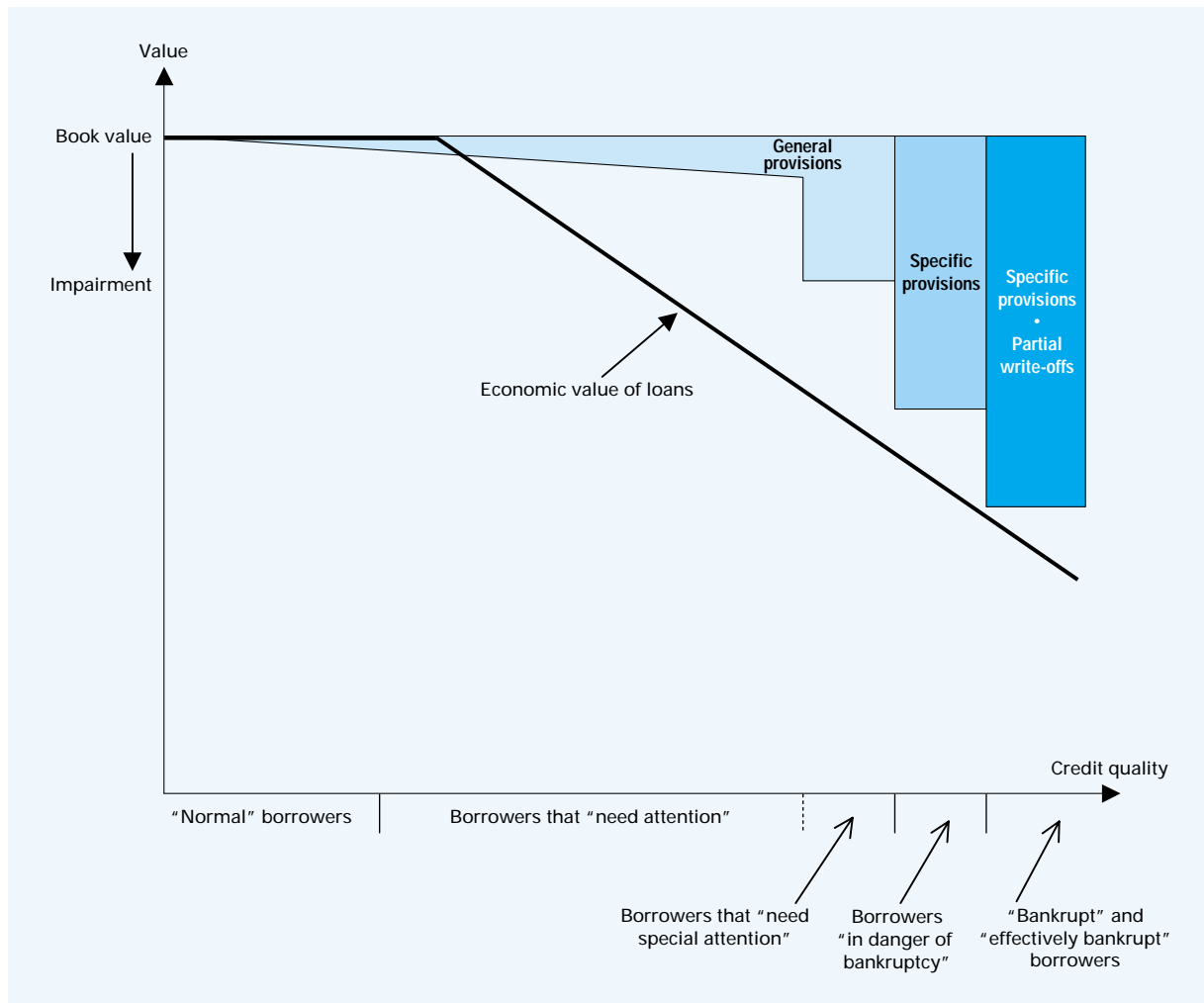
Chart 3
Management of Loans at U.S. Banks

(1) Management of Loans[1]

Asset value

Stage 1

Stage 2

Stage 3

Stage 4

Stage 5

Time

The loan officer recognizes deterioration of credibility, and degrades to Watch List.

The bank begins measures towards the business improvement of the borrower.

Virtual period of workout

Since workout does not work, the bank considers the shift to liquidation procedures.

The borrower lapses into liabilities exceeding assets and loss occurs.

Note: 1. Refer to Morsman (1982), etc.

Evaluating the Economic Value of Loans and the Implications:
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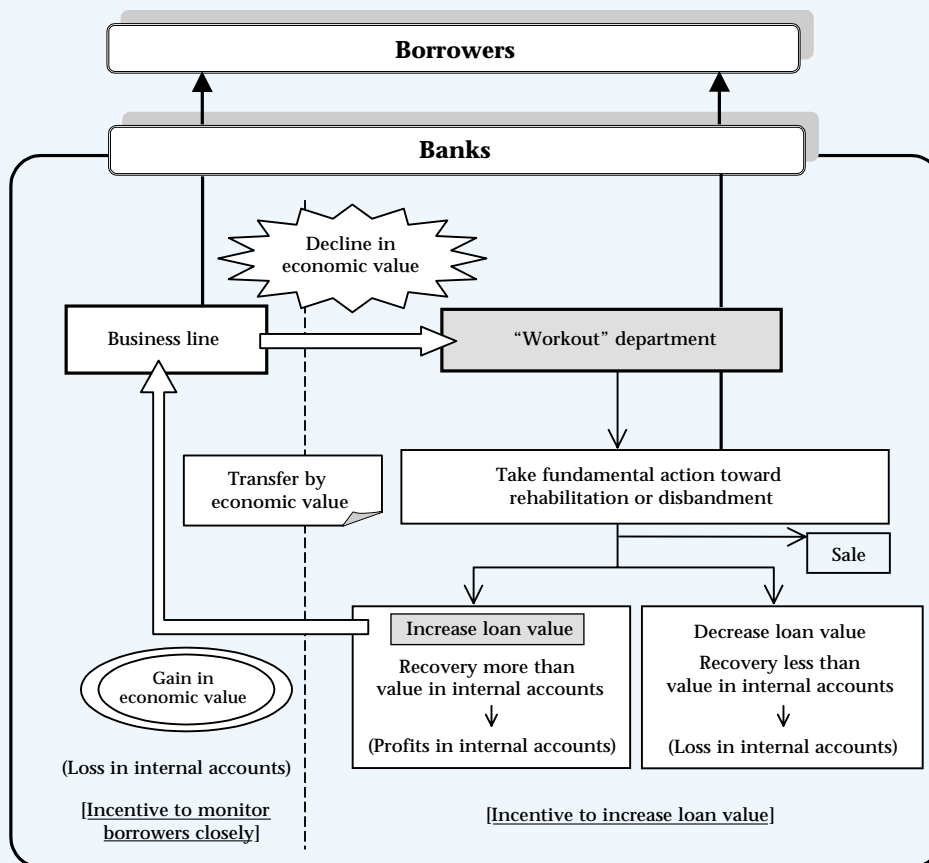
(2) Borrower's Situation and Measures

		(A): Borrower's situation, (B): Measures	Notes
Stage 1	(A)	**Signs of business deterioration** • Change in financial ratios (leverage ratio, profitability, liquidity) • Qualitative change (competition in the industry, looser connection with bank)	• Observance of covenants is a measure of degree of deterioration.
	(B)	→ Added to Watch List. 　Banks abstain from direct action vis-à-vis the borrower.	
Stage 2	(A)	**Borrower's business deteriorates further**	
	(B)	→ Look for buyer who expects business conditions of the borrower will improve. → The bank could ask the borrower to take measures towards business improvement (the beginning of workout), and urge repayment, because violation of covenants is defined as the event of default.	
Stage 3	(A)	**Borrower's problem surfaces—no other potential lenders found** • The bank faces a workout or liquidation (including partial repayment by sale of property, etc.).	• Partial liquidation (sale of some property, etc.) may be effected.
	(B)	→ Criteria for deciding if full-fledged workout is possible: 　• Is the additional loan well secured? 　• Is there a reasonable chance to reconstruct the business? → Upon execution, loan recovery is secured as follows: 　• Measures to be taken, if objectives are not met, are stipulated. (e.g.: when a borrower's profitability is not recovered within 90 days, through the disposal of property, the borrower pays back the total amount of the debt immediately.) 　• Ascertain worth of collateral and prepare procedures to liquidate instantly, if necessary. (Confirmation of mortgage settlement, inventories, management of proceeds and sales credits, etc.)	• Even when repayment of additional loans is expected, there would be a problem if corporate value fell further as a consequence. • Recovery over a short period is expected, say, by the next financial term.
Stage 4	(A)	**Difficult to find any solution by workout based on corporate revitalization**	
	(B)	→ Debt restructuring by partial liquidation. Recovery of the loan total or most of it is possible for creditors. Since asset value might remain, borrowers are cooperative.	
Stage 5	(A)	**Liabilities exceed assets** • Loss expands as time passes. • Since equity value is almost lost, the borrowers become non-cooperative.	
	(B)	→ Reconstruction measures supported by loan abandonment or liquidation through bankruptcy measures.	

Chart 4
Framework of Workout

Borrowers

Banks

Decline in economic value

Business line

"Workout" department

Transfer by economic value

Take fundamental action toward rehabilitation or disbandment

Sale

Increase loan value

Recovery more than value in internal accounts

↓

(Profits in internal accounts)

Decrease loan value

Recovery less than value in internal accounts

↓

(Loss in internal accounts)

Gain in economic value

(Loss in internal accounts)

[Incentive to monitor borrowers closely]

[Incentive to increase loan value]

Chart 5

Accounting for Loans in "Exposure Draft of Proposed Amendments to IAS 39"

```
                            ┌──────────────────┐
                            │      Loans       │
                            └──────────────────┘
                   ┌──────────────────┘     └──────────────────┐
        ┌────────────────────────────┐   ┌──────────────────────────────────────┐
        │  Individually significant  │   │  Not individually significant assets │
        │  assets                    │   │  e.g., consumer loans/mortgages/     │
        │  e.g., commercial loans    │   │  business loans                      │
        └────────────────────────────┘   └──────────────────────────────────────┘
                      │                                      │
        ┌────────────────────────────┐                      │
        │   Individual assessment    │                      │
        │      of impairment         │                      │
        └────────────────────────────┘                      │
              │              │  No objective evidence        │
              │              │  of impairment                │
   Objective evidence        └──────────────┐               │
   of impairment                             ▼               ▼
                            ┌──────────────────────────────────────┐
                            │  Collective assessment of impairment  │
                            │  in a group of financial assets with  │
                            │  similar credit risk characteristics  │
                            └──────────────────────────────────────┘
              │         Objective evidence    │    No objective evidence
              │         of impairment         │    of impairment
              ▼                               ▼               ▼
   ┌──────────────────┐      ┌──────────────────┐   ┌──────────────────┐
   │ Write-off/       │      │ Write-off/       │   │  No impairment   │
   │ provisioning     │      │ provisioning     │   │                  │
   │ of impairment    │      │ of impairment    │   │                  │
   └──────────────────┘      └──────────────────┘   └──────────────────┘
```

Chart 6
Binary Tree Model (Typical Example of Applied DCF Method)
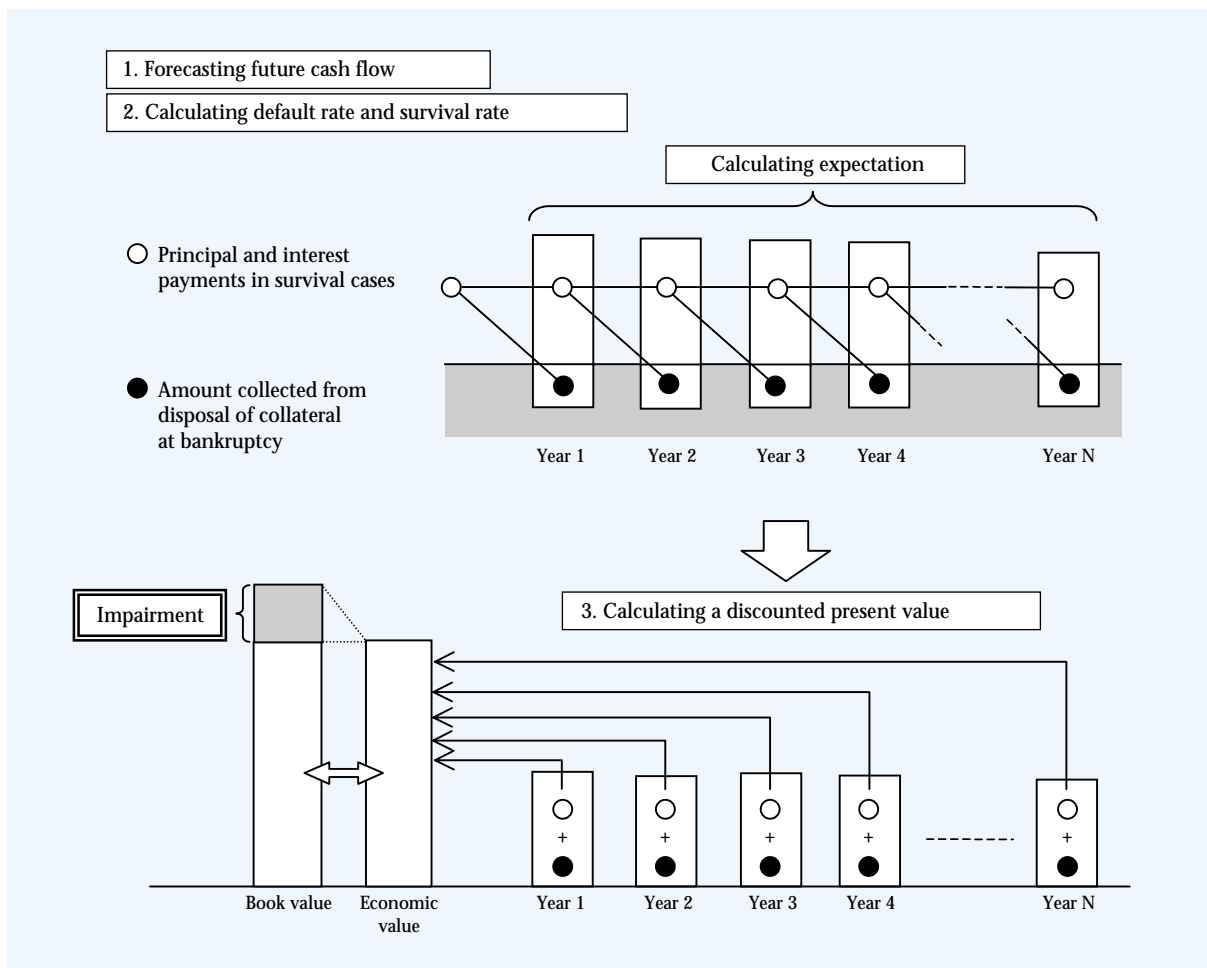
1. Forecasting future cash flow

2. Calculating default rate and survival rate

Calculating expectation

○ Principal and interest payments in survival cases

● Amount collected from disposal of collateral at bankruptcy

Year 1　Year 2　Year 3　Year 4　　　Year N

3. Calculating a discounted present value

Impairment

Book value　Economic value　Year 1　Year 2　Year 3　Year 4　　　Year N

Chart 7
Calculating Accumulated Default Rate through Involution of the Rating Migration Matrix

(1) Rating Migration Matrixes

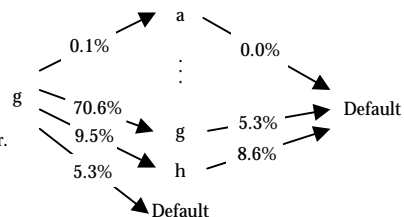one-year rating migration matrix, %

		Rating one year later								Default
		a	b	c	d	e	f	g	h	Default
Rating at the beginning	a	87.9	6.7	1.8	0.9	0.9	0.9	0.5	0.5	0.0
	b	1.7	85.2	11.4	1.0	0.1	0.3	0.0	0.3	0.0
	c	0.0	3.8	80.8	12.3	2.2	0.8	0.0	0.1	0.0
	d	0.0	0.1	6.8	72.9	16.7	2.9	0.4	0.2	0.0
	e	0.0	0.1	0.2	5.6	75.8	16.3	1.5	0.2	0.2
	f	0.0	0.0	0.1	0.5	10.1	75.6	11.5	1.4	0.8
	g	0.1	0.0	0.0	0.1	1.3	13.1	70.6	9.5	5.3
	h	0.1	0.0	0.0	0.0	0.5	3.9	11.4	75.5	8.6
	Default	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
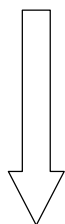
$D = 0.1\% \times 0.0\% + \ldots + 70.6\% \times 5.3\% + 9.5\% \times 8.6\% + 5.3\%$
$\quad = 9.9\%$

The "g" row at the beginning multiplied by the "default" line one year later gives the default probability of an entity in the "g" category two years later.
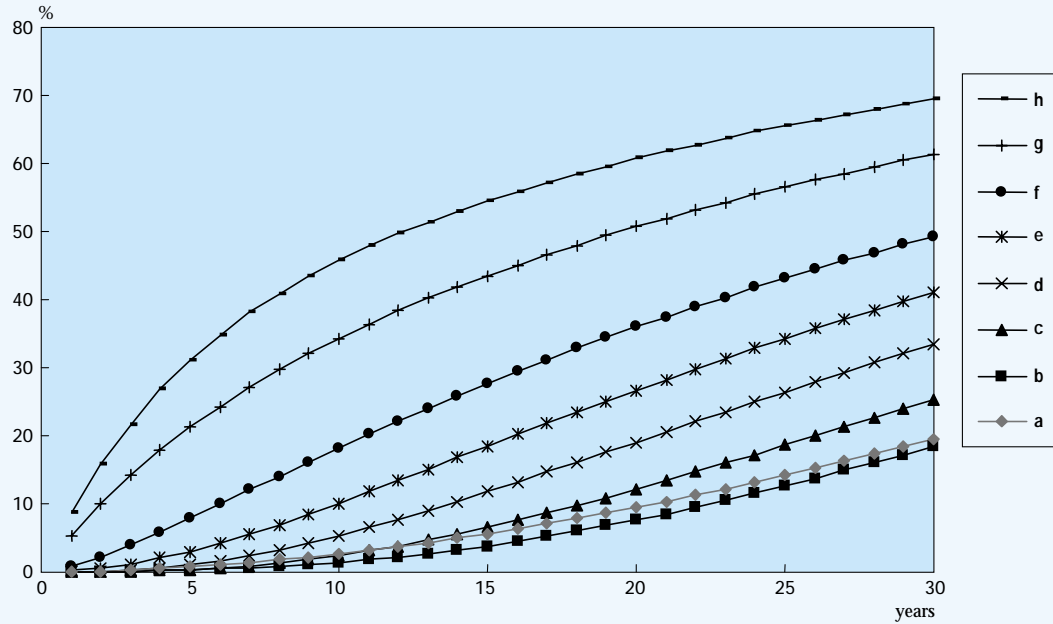

two-year rating migration matrix, %

		Rating two years later								Default
		a	b	c	d	e	f	g	h	Default
Rating at the beginning	a	77.4	11.6	3.8	1.8	1.8	1.8	0.9	0.8	0.1
	b	3.0	73.1	19.0	3.0	0.7	0.6	0.1	0.5	0.0
	c	0.1	6.4	66.6	19.1	5.5	1.9	0.2	0.2	0.0
	d	0.0	0.5	10.5	54.9	25.2	7.1	1.3	0.4	0.1
	e	0.0	0.1	0.7	8.4	60.1	25.1	4.2	0.7	0.6
	f	0.0	0.0	0.2	1.3	15.5	60.4	17.2	3.2	2.2
	g	0.1	0.0	0.0	0.3	3.3	19.7	52.4	14.1	9.9
	h	0.2	0.0	0.0	0.1	1.3	7.4	17.1	58.2	15.8
	Default	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0

Chart 7 (continued)

(2) Accumulated Default Rates

- This graph shows the future accumulated default rate curves for internal ratings. We can estimate the future accumulated default rates by involution of a rating migration matrix. The curve of the "g" category shows a 5.3 percent downgrade to default one year later and 9.9 percent two years later.

Evaluating the Economic Value of Loans and the Implications:
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1. Credit Risk and Credit Cost

Portfolios are generally thought to have two types of credit risk: (1) credit costs expressed as the average amount of losses expected in the future ("expected loss" [EL]); and (2) narrowly defined credit risks equivalent to the maximum loss that could happen within a certain confidence interval after EL is deducted ("unexpected loss" [UL]) (Chart 1 for Box 1).

EL should be included in lending interest as the necessary cost of risk-taking, and UL should be thought of as the latent potential for loss inherent in risk-taking should there be an unexpected swing in EL. Losses may be greater or less than EL, and it is therefore inappropriate to add UL as is to lending interest rates and pass it on to customers. General risk management practice is to allocate capital to serve as a buffer against UL in internal management accounting and to reflect only capital costs in lending interest.

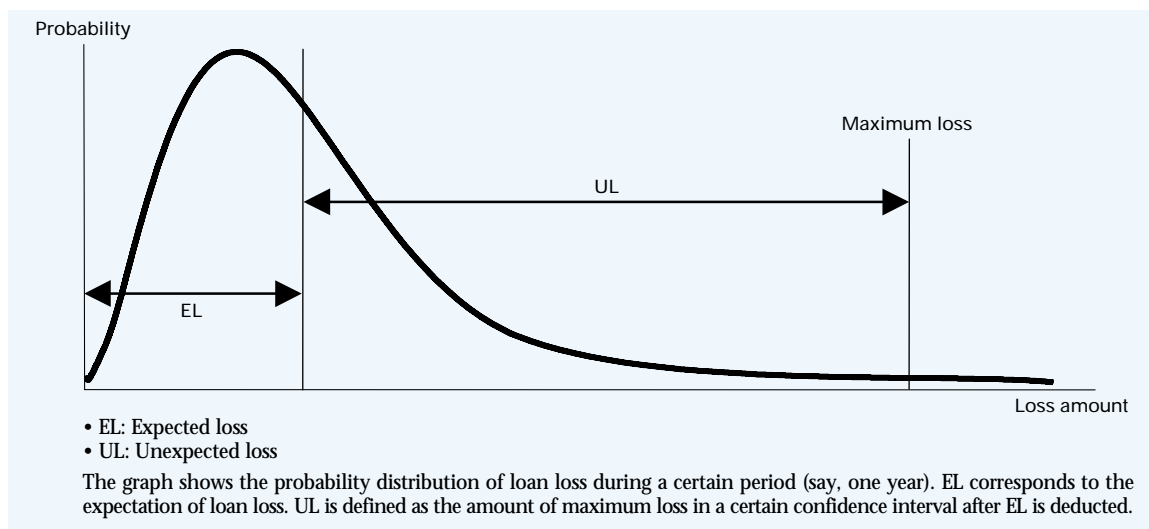**2. Credit Cost-Based Provisioning and DCF-Based Provisioning**

For normal loans, the U.S. *Commercial Bank Examination Manual*[1] requires the allocation of one-year's worth of EL as provisioning, and Japan's *Financial Inspection Manual* also treats EL in a similar manner (in Japan, for loans in the "need attention" category too). Although EL is covered by revenue from lending interest, one-year's worth of EL as provisioning is allocated as a conservative custom. This EL-based conservative provisioning is conceptually different from provisioning against impairment of economic value based on the DCF method.

As for normal loans, economic values do not decline because expected cash flows cover EL. Since economic value is decided by the relation between cash flow and EL, even if EL is large, there is no impairment of economic value as long as interest is sufficient to cover. To the contrary, should the credit quality of borrowers decline, EL cannot be covered by cash flow, and then present economic values decrease.

The upper graph in Chart 2 for Box 1 shows the flow base relations between the one-year EL rate and the return ratio for banking businesses. From left to right, credit quality deteriorates and the EL rate increases. The lower graph shows the economic value of loans as a stock base concept. Value starts declining around the credit quality where the EL rate exceeds the return ratio in the upper graph. The present discounted value of the negative difference between the EL rate and return ratio corresponds to the decline in economic value.
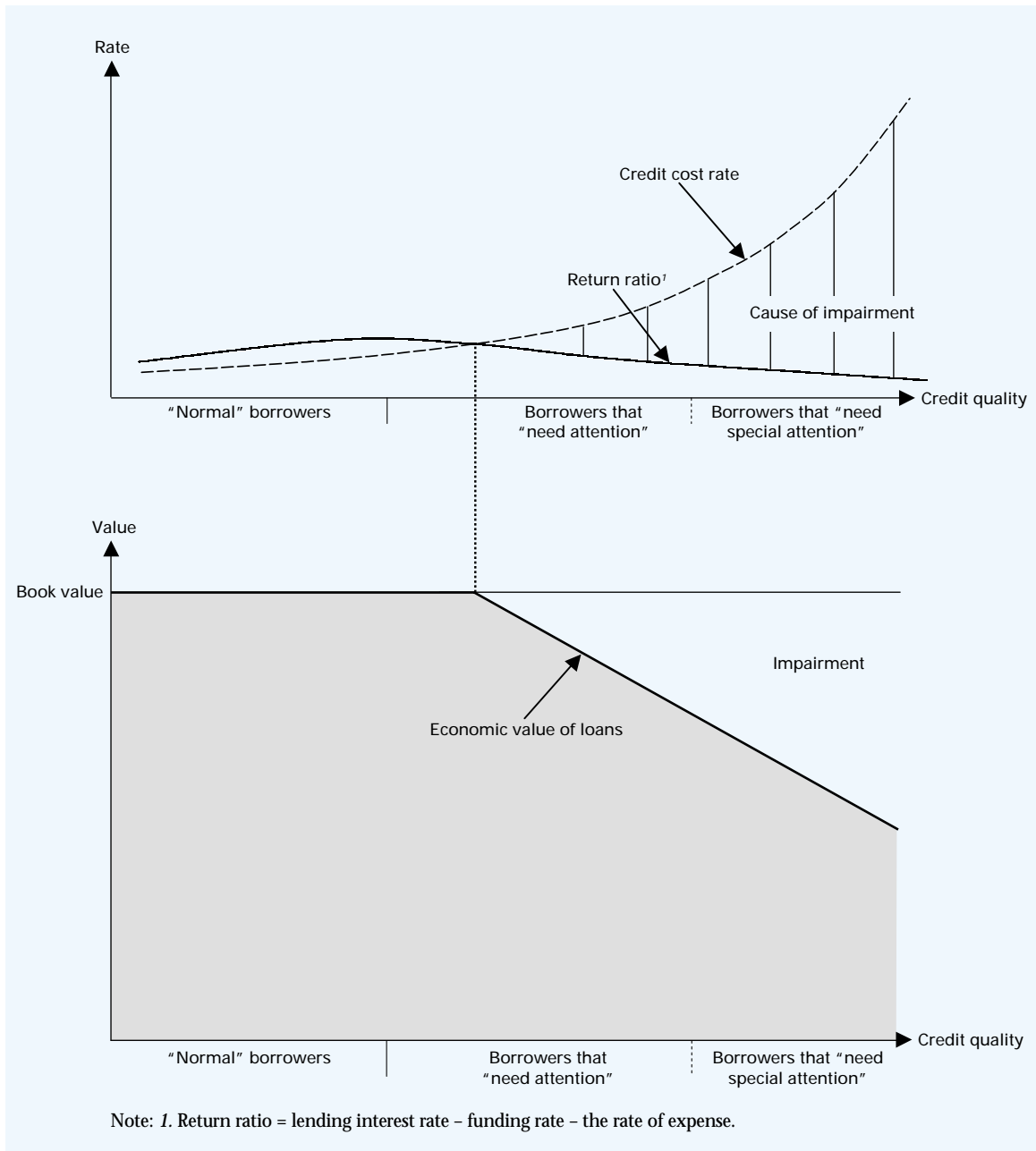
Chart 1 for Box 1 **Probability Distribution of Loan Loss**

• EL: Expected loss
• UL: Unexpected loss

The graph shows the probability distribution of loan loss during a certain period (say, one year). EL corresponds to the expectation of loan loss. UL is defined as the amount of maximum loss in a certain confidence interval after EL is deducted.

1. The methods in the *Commercial Bank Examination Manual* are not particularly binding. U.S. banks are allowed a wide range of variation in reserve provisioning as long as they remain within the scope defined by the Financial Accounting Standards. However, they are also required to disclose the method they employ and provide documentation for it.

Chart 2 for Box 1 **Relation between Profitability and Economic Value**

Rate

Credit cost rate

Return ratio[1]

Cause of impairment

"Normal" borrowers

Borrowers that "need attention"

Borrowers that "need special attention"

Credit quality

Value

Book value

Economic value of loans

Impairment

"Normal" borrowers

Borrowers that "need attention"

Borrowers that "need special attention"

Credit quality

Note: 1. Return ratio = lending interest rate – funding rate – the rate of expense.

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Box 2 **History of Provisioning Rules and Framework for New DCF-Based Provisionings**

A cursory review of Japan's provisioning rules shows that the general provision against defaults was based on the Ministry of Finance final accounting preparation standards, and in most cases provisions were made uniformly with reference to the loss recognition ceilings found in the tax code. There was a shift to a framework based on default history at the end of the 1990s when the JICPA introduced practical guidelines and regulators introduced self-assessments and the *Financial Inspection Manual*. The result was a significant increase in general provisions against defaults. This, combined with the subsequent write-off of large amounts of NPLs, resulted in a rising trend for provision rates (Chart 1 for Box 2).

General practice for specific provisions also tended to calculate the uncollectible amount for bankrupt borrowers based on tax-free standards.[1] The introduction of the *Financial Inspection Manual* expanded the scope of provisions by requiring taxed reserves be allocated for credits deemed

uncollectible even if the tax-free requirements in the tax code were not met.

The publication of the JICPA guidelines and revision to the *Financial Inspection Manual* in February 2003 marked the beginning of full-fledged application (during the business year to March 2003) of the DCF method to provisioning against loans to large borrowers that "need special attention" at major banks (Chart 2 for Box 2).

The DCF method has already been permitted for borrowers that "need attention" or are "in danger of bankruptcy" in Report No. 4 of the Special Committee on Bank Audit of JICPA (1999 revision). However, no detailed rules were provided, so use was limited. The recent publication of guidelines and revisions to the *Financial Inspection Manual* provide specific methodological descriptions and, in principle, require major banks to use the DCF method for loans to large borrowers that "need special attention." They also permit the use of the DCF method for smaller credits and credits to borrowers that "need attention."

Chart 1 for Box 2 **Developments in General Provision Rates (Large Banks)**

Sources: Data released by the Financial Services Agency (FSA).
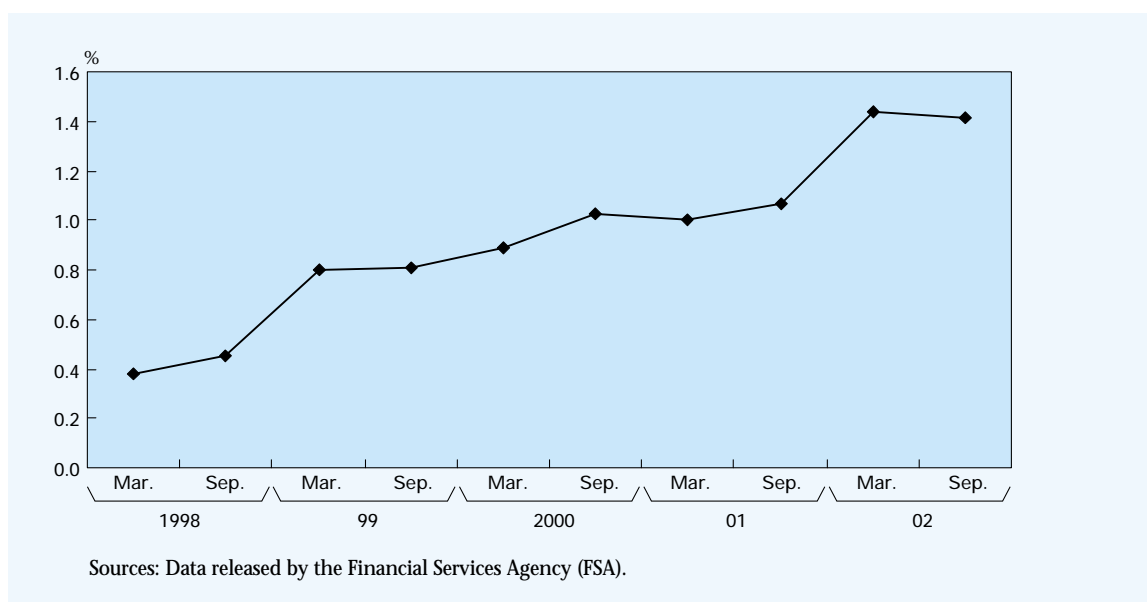
1. This more or less corresponds to the traditional "special account for credit write-offs." General practice under the NPL write-offs certification program is to take a tax-free write-off of an amount certified by the financial inspector to be a "credit deemed uncollectible or valueless or of similar nature."

Chart 2 for Box 2 **Framework of New Provisioning Rules**

Borrower category	Accounting rules	Financial Inspection Manual	
		• **Loans to large borrowers (more than 10 billion yen) of large banks**	• **Loans to small borrowers of large banks** • **Loans to borrowers of regional banks**
Borrowers that "need attention"	→ **Credit cost based** • In principle, based on the estimate of an expected loss amount for a set period in the future that corresponds to the average time to maturity of the credit using historical loss rates or default rates. • For the time being, expected loss amounts can be estimated for the next one year (borrowers that "need attention") or three years (borrowers that "need special attention"). → **DCF method**	→ **Credit cost based** • In principle, based on the estimate of an expected loss amount for the average time to maturity of the credit. • Expected loss amount for the next one year is acceptable. ◇ **DCF method permitted** ◇ For credits of borrowers upgraded from "need special attention" or "in danger of bankruptcy," the DCF method or method regarding credits to borrowers that "need special attention" is applied.	→ **Credit cost based** • In principle, based on the estimate of an expected loss amount for the average time to maturity of the credit. • Expected loss amount for the next one year is acceptable. ◇ **DCF method permitted**
Borrowers that "need special attention"	◇ New guideline for practical application of the DCF method.	◇ **DCF method, in principle** ◇ For credits of borrowers for which banks cannot use the DCF method, the expected loss for the time to maturity is individually estimated.	→ **Credit cost based** • In principle, based on an estimate of an expected loss amount for the average time to maturity of the credit. • Expected loss amount for the next three years is acceptable. ◇ **DCF method permitted**

◇ New rules introduced in 2003.
→ Existing rules.

Box 3 **Use of Covenants to Manage Loans (U.S. Example)**

U.S. banks sign loan contracts that include covenants with the borrower to maintain the integrity of the loan, and this helps to improve the effectiveness of credit management (Chart 1 for Box 3). The "covenants" are set in addition to provisions for repayment conditions and interest rates (Chart 2 for Box 3).

The effects of negative covenants:

(1) Potential for early collection

Violation of covenants invokes the default clause, making it possible to cancel the loan, so the bank is able to collect before the loss of credit value progresses.

(2) Effective monitoring

Violation of covenants is used as one measure of the deterioration of credit quality. Improvement measures can be required immediately after a violation is identified.

(3) Stronger discipline of borrowers

Chart 1 for Box 3 **General Description of Loan Contracts**

1.	Description of loan
2.	Provisions on disclosure of facts and collateral
3.	Affirmative covenants
4.	Negative covenants
5.	Fund remittance requirements
6.	Default provisions
7.	Credit renewal procedures
8.	Contract modification procedures
9.	Other detailed provisions

Chart 2 for Box 3 **Covenant Types**

	Negative covenants	Affirmative covenants
Description	Restrictions on borrower activities that would affect the security of the loan	Obligations to be actively undertaken by the borrower
Type	(1) Financial restrictions clause (2) Negative pledge[1] (3) Miscellaneous (maintenance of earning power, etc.)	(1) Obligation to submit financial statements (2) Obligations to report other material issues
Use in Japan	Few examples in Japan	Generally included in Japanese lending practices

Note: 1. Provision that prohibits setting additional collateral rights for other creditors against the property put up as collateral.

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