

**Discussions on Advancing Credit Risk Management through Internal Rating
Systems (1)——Summary of Discussions at the “Study Group on the
Advancement of Credit Risk Management”**

I. Introduction

In October 2005, the Study Group on the Advancement of Credit Risk Management (hereafter, the Group)¹ began discussions among experienced practitioners of credit risk management to discuss various approaches necessary for advancing credit risk management through the use of internal rating systems. The Group took into consideration, discussions abroad and approaches actually taken by foreign banks with advanced credit risk management expertise.

This paper presents the highlights of the discussions at the past five sessions, the very last of which was held in February 2006.² The Group aims to widely disclose its discussions to financial circles in Japan so that each financial institution may refer to them in advancing credit risk management. This paper is mainly written for financial institutions that aim to establish and strengthen credit risk management in line with top international practices. Discussions at the sixth and the following sessions are scheduled to be published in the future.

This paper does not intend to draw conclusions for each of the issues discussed. It simply aims at presenting issues and discussions concerning the advancement of credit risk management. Opinions are those of members and do not represent those of the organization each member belongs to.

II. Discussions at the Second Session (held on November 10, 2005)

A. Problems in PD Estimation due to Limited Default Data

1. Potential Issues

A portion of portfolios held by financial institutions have a low number of or no default samples (so-called LDPs).³

¹ Center for Advanced Financial Technology in Financial Systems and Bank Examination Department of the Bank of Japan serves as the secretariat of the Group.

² At the first session (held on October 21, 2005), members confirmed the Group’s management policy and issues for discussion. Actual discussions started from the second session.

³ LDP stands for low-default portfolio. Points to be kept in mind in estimating and validating risk

LDPs include loans to highly rated large firms, sovereigns, and financial institutions, as well as loans in a relatively new market (e.g., non-recourse mortgage loans in Japan). The following elements or a combination of them explain why default data is limited for some portfolios. First, the quality of loans in a certain portfolio is very high. Second, the number of loans in a certain portfolio is small. Third, transactions in a certain portfolio have a short history either because the market itself is new or because a financial institution is a recent market entrant.

Due to limited default data, estimation error tends to expand for LDPs and hence the increased possibility of underestimation of PD. Meanwhile, it is difficult in practice to supplement the lack of data using external data, mapping PD to external rating grades, and other measures in the estimation and validation of PD and other risk parameters.

2. Participants' Views

Four approaches below may be taken to deal with the LDP problem. Methods for estimating risk parameters are not yet established for LDPs and various techniques are expected to be developed in the future.

Approaches	Techniques
A. Using internal data of financial institutions	<p>Appropriately map (linking of data) LDPs to other internal portfolios and apply PD of other portfolios after making necessary adjustments.</p> <p>Combine data of the adjacent ratings and subportfolios with similar characteristics to increase the size of data sample for LDPs.</p> <p>Utilize information on the migration of assets categorized as LDPs in PD estimation, to incorporate the possibility of successive downgrades leading to default, together with the possibility of direct transitions to default.</p>
B. Using external data sources (including	<p>Map LDPs to external data source that have data covering longer time periods or have a larger data sample to increase</p>

components for LDPs are mentioned in "Validation of low-default portfolios in the Basel II Framework" Basel Committee Newsletter No.6, September 2005.

pooled data of external organizations and overseas market information)⁴	default samples. Extract PD of LDPs implied in market information (e.g., credit spread) using some pricing models.
C. Using the outcome of default prediction models	Apply PD estimated with default prediction models that use explanatory variables assumed to affect the level of PD (risk driver) instead of directly applying the actual default data (the technique in approach D. below may be used to determine risk drivers).
D. Using expert judgement (qualitative information)⁵	Estimate PD levels based on the empirical knowledge of experts in LDP transactions paying due attention to objectivity of qualitative judgement.

It is necessary to use several methods, which may involve some of the four approaches above, in the process of estimating and validating risk components. The difficulties in their estimation also highlight the difficulties in their validations. Nevertheless, the efforts to enhance quality are expected by, for example, comparing estimates through multiple approaches or confirming similarity in the grading standards of internal and external ratings.

Financial institutions should establish estimation and validation procedures as part of credit policy, and document internal discussions and examinations to maintain transparency and consistency. The options currently available for each type of LDP are limited. It may, therefore, be inappropriate to limit estimation and validation techniques or set a specific operational rule that, for example, requires the use of the most severe results.

Evaluated risk of LDPs should be reflected directly or used as a reference indicator in the pricing of loans. In this way, financial institutions will be able to maintain a certain consistency between risk evaluation and lending practices.

B. Taking into Consideration the Effect of Business Cycles on PD Estimation

⁴ Data from external organizations may be used when they, for example, have longer time-series data, wider range of data covering more firms including foreign ones, and long-term historical data of credit related markets.

⁵ Currently, approach D. is mainly used for LGD estimation though it is not necessarily exclusive to LGD and sometimes also used for PD estimation.

1. Potential Issues

Business cycles are considered to affect the quality of credit portfolios and to cause fluctuations in capital adequacy ratios. It is, therefore, necessary to understand their impacts (how they affect rating migration and default rates) and to prepare adequate buffers for stability in financial institution management. Such understanding helps adequate validation of PD estimation and of internal rating models.

Various technical problems, however, exist in grasping the impact of business cycles. They include the problem of (1) securing long-term time-series data, (2) specifying cyclical factors, and (3) evaluating the way of portfolio management, which may be passive or active against business cycles.

2. Participants' Views

Procedures necessary for identifying the impact of business cycles include the following.

A. Securing data over business cycles	Secure long-term time-series data covering at least two consecutive business cycles (preferably more than two cycles). If it is difficult to satisfy the above conditions, supplement internal data with external data.
B. Analyzing business cycles	Specify factors that explain business cycles.
C. Analyzing the sensitivity of the quality of credit portfolios to business cycles	Understand a bank's own "rating assignment horizon" (whether banks focus only on the current or medium- to long-term conditions of borrowers). In other words, confirm whether banks' rating assignment is based on PIT ⁶ (changes in business cycles are reflected in the form of rating migration) or TTC (changes in business cycles are reflected in the form of changes in the actual default rate for each grade). Analyze the relationship between factors that explain business

⁶ In PIT (point-in-time) rating, risks are evaluated based on the current condition of a firm regardless of the phase of the business cycle at the time of evaluation. In TTC (through-the-cycle) rating, risks are taken into account on the assumption that a firm is experiencing the bottom of the business cycle and is under stress.

	cycles and changes in (1) the pattern of rating migration, (2) the actual default rates for each rating, and (3) the financial condition of debtor firms and subsequent rating changes.
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Concepts of PIT and TTC have not fully taken hold in the risk management process of financial institutions. Also, lack of long-term time-series data still makes it difficult to validate the impact of business cycles on rating migration and time-series changes of default rates.

Regardless of whether an institution is using the idea of PIT and TTC or not, it is important to find out how business cycles affect rating migration and default rates for each grade (as mentioned in C. above) because it helps assess the magnitude of the impact of business cycles as well as the functioning of internal rating systems. Even if strict application of a quantitative approach is difficult, banks should consider recognizing explicitly the impact of business cycles in their risk management processes, using available tools and techniques. For example, economic impacts may be validated through continuous monitoring of the orders and stability of default and migration rates. Also, stress tests may also be applied for migration and default rates to understand how portfolios are affected by business cycles.

III. Discussions at the Third Session (held on December 15, 2005)

A. Problems Related to the Definition of Default

1. Potential Issues

The definition of default under the new regulatory capital framework may be interpreted as identical to borrowers that need “special mention” or those in lower categories under the self-assessment framework. This definition is stricter than that commonly used internally by Japanese financial institutions and is expected to encourage banks to expedite their actions against troubled borrowers and thereby enhance the stability of financial system.

However, the difference between the definition of default used for regulatory purposes and the ones that have been used by Japanese financial institutions for internal operations could pose a challenge of how to maintain consistency between the two in advancing risk management.

2. Participants’ Views

There is no wide difference in the definition of borrowers that need “special mention” used by financial institutions, due to the efforts by financial institutions to follow the self-assessment guideline and by the authorities to clarify the categorization criteria through examinations and other measures. Still, banks would need to make on-going efforts to maintain transparency and consistency in applying their definition of default, and thereby presenting to third parties including authorities that banks are not arbitrarily applying the definition of defaults for the purpose of decreasing the amount of required capital.

As for the problems arising from the differences in the definition of default used by financial institutions and the one applied for regulatory purposes, all concerned parties would need to recognize them and continue to make efforts to address such differences within the process of seeking to ensure appropriate risk management.

It is not expected that the levels of PD and LGD estimated by various financial institutions using the new definition of default should converge to a certain narrow range. Estimated results of these risk components are expected to change, depending on business strategies, geographical regions, and other factors. An important point is that financial institutions need to be capable of providing objective explanations to show that the levels of PD and LGD are estimated without arbitrariness, for example, by using tools such as benchmarking with external ratings.

Even at individual financial institutions, PD levels may differ among portfolios (e.g., between domestic and overseas portfolios, and different products in retail banking). Such disparities do not necessarily deny the consistency of default definition as long as financial institutions are able to give rational explanations of the factors behind the disparities (e.g., business strategies and special factors concerning regional and sovereign characteristics).⁷

Definition of default (or risk components based on this definition) used for internal operations, such as risk management and extension of credit, does not necessarily have to be equivalent to that for regulatory capital (or risk components based on this definition). Regardless of the choice of definition, however, financial institutions need

⁷ For example, if PD of portfolio consisting of credit in the United States clearly differs from that in Japan, the level of the former should be explainable through benchmarking with external ratings and others.

to indicate that they are based on the consistent concepts (e.g. using the same data or estimation methods) and thus they themselves are consistent with each other.

B. Problem of Credit Concentration to a Few Large Borrowers in Estimating Risk Components

1. Potential Issues

A problem of credit concentration to a few large borrowers is often recognized as the so-called granularity problem, the one that affects the risk amount of the overall portfolio. This type of credit concentration could also cause some irregularities in estimating risk components due to the differences in the performance of ratings of large and small borrowers over various phases of business cycles. For example, this credit concentration could entail the situation where average PD weighted by loss amounts constantly exceeds average PD weighted by number of defaults.

Unless borrower ratings are constantly biased in favor of larger size, large disparities between the default rates based on the loss amount and those based on the number of defaulted obligors may be caused by the credit concentration to a few large borrowers. If so, estimation of PD will require some kind of alteration. Japanese default data in the past few years, however, is very likely to also reflect structural changes in the macro economy in addition to cyclical aspects. Consensus has not yet been formed, at this point, on how to identify the effects of these factors.

2. Participants' Views

One effective way of confirming the effect of credit concentration to a few large borrowers is to compare default rates based on the loss amount and those based on the number of defaulted obligors, and then examine the level of disparities and the duration of the existence of such disparities. It goes without saying that this comparison becomes meaningful only if borrower ratings are not biased by the size of borrowers.⁸ For this, if external ratings and others are available for benchmarking, they should be used for validating PD levels of large borrowers.

Even if disparities existed on a continuous basis, this does not necessarily mean that internal ratings and PD estimation methods should be altered. In order to deal with disparities that are mainly caused by credit concentration to a few large borrowers, one

⁸ Measures should be taken so that firm sizes will not bring about systematic bias in rating.

could also consider measures where the level of LGD and EAD may be adjusted or stress test type tools may be applied to prepare for the risk materialization.

IV. Discussions at the Fourth Session (held on January 11, 2006)

A. Problems Related to Internal Rating Systems and Models

1. Potential Issues

Approaches vary among internal rating systems and models. The same risk profile may, therefore, have different quantitative results.

	Backgrounds behind various approaches and some examples
Internal rating systems	<p>Different risk assessment approach toward portfolios with different risk characteristics (by country, by asset type, and by industry) may encourage financial institutions to adopt different rating systems for each portfolio.</p> <p>Rating structure and pool categorization required from the perspective of securing homogeneity of risks may encourage financial institutions to adopt different ranges of creditworthiness and level of concentration of borrowers in each grade.</p> <p>Choice of methods for facility rating, i.e., one-dimensional vs two-dimensional ratings.</p>
Internal rating models	<p>A. Modeling</p> <p>Models that estimate the order of borrowers (facilities) by creditworthiness vs. models that also estimate PD levels of each borrower.</p> <p>Models that are to some extent based on expert judgement vs. models that focus only on the results of default and data on the defaulted borrower without assuming any structural relationship about causality between the two.</p> <p>Choice of a single model vs. multiple models for internal rating system.</p> <p>B. Data to be input into the model</p> <p>Choice of minimum data that a model should incorporate according to a priori knowledge.</p> <p>Method of incorporating qualitative and substantial financial information (e.g.,</p>

	<p>whether to convert it to data which can be input directly into internal rating models or use it to make qualitative adjustments to the results of the model).</p> <p>C. Accuracy of the model Evaluation of model performance using quantitative indicators (e.g., accuracy ratio).</p>
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2. Participants' Views

Details of internal rating systems and internal rating models vary, reflecting the differences in the business models of financial institutions. This is why the same borrower may be evaluated differently by each financial institution.

In view of the above, financial institutions are expected to design internal rating systems that suit their business models. In this process, they are also expected to pay attention to the following points, which may be valid regardless of their business models. First, if different rating systems are assigned to different portfolios, this assignment should be done from the perspective of accurately capturing the risk structure of portfolio as a whole and for each rating grade. Second, rating system structures should not be intentionally altered to underestimate required capital. Financial institutions should set a policy on rating systems and maintain consistency in their operations.

When choosing single or multiple rating systems, for example, there are several merits and possible demerits for each choice. The important point is that financial institutions need to be in a position to explain how they had evaluated them and selected a specific rating system.

	Single rating system	Multiple rating systems
Merits	<p>Simple and clear.</p> <p>Easy to compare different type of credits.</p> <p>Easy to maintain consistency in risk measurement.</p> <p>Provides more data sample for risk quantification.</p>	<p>Consistent with business practices (e.g., rating approval and loan origination)</p> <p>Enables more precise risk evaluation in view of credit characteristics.</p>

Points requiring attention	<p>Are differences in loan transactions captured clearly?</p> <p>Is the adoption of a single rating system hindering the use of ratings by business lines?</p> <p>Is the rating system designed to overcome differences in industry, region, and other characteristics?</p>	<p>Are the costs of losing the merits of a single rating system too much?</p> <p>Is the mapping in terms of risk amounts possible to some extent among different rating systems?</p>
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In general, a rating structure needs to be checked by confirming that (1) there is no excessive concentration of borrowers or facilities in a specific rating grade (unless there is a clear reason) and (2) that the balance between the range of creditworthiness and the number of borrowers in each rating grade is appropriate for an adequate estimation of risk components. In some cases, borrowers may be concentrated in a specific rating grade if the range of creditworthiness of the borrowers concerned is extremely narrow.

Internal rating models may be built with a focus only on default results and data on defaulted borrowers without necessarily paying attention to the causal structure, in order to increase model performance. Such models, however, may face difficulties in (1) addressing aged deterioration of performance of models to be continuously used by fine-tuning and (2) explaining the reasons for the specific rating in a way appealing to business lines. If estimation models are used to obtain PD instead of using long-term average of actual default, the difference between the two results should be explained rationally.

Regarding input data used for building an internal rating model, it is necessary to confirm that all important factors (e.g. country and industry factors) are included. If some are excluded, there should be rational reasons to do so. It is also important to understand how the model responds to the factors that may be critical, regardless of whether they will actually be used or not. This process helps increase the transparency of the selection of these factors. There are many possible ways to incorporate qualitative information and substantial financial information that are not captured by

accounting data.⁹ Financial institutions should choose the methodology, which would produce the least biases in the rating process.

Ex ante and ex post evaluation of internal rating models should be implemented from various perspectives by factoring in the medium- to long-term stability and robustness of the models. For example, it is important to carry out comprehensive and continuous evaluation using statistical evaluation techniques such as the AR test. In the process of such evaluation, it will be effective to compare the model in use with other models to understand its characteristics.

It is important for financial institutions to be in a position to explain the adequacy of their internal rating systems and internal rating models to third parties including the authorities. Meanwhile, the authorities should prepare tools to compare different rating systems and models in order to (1) understand the characteristics of internal rating systems and models used by each institution, and also to (2) grasp the situation of the financial system from a macro perspective. This benchmarking work, however, would not be suggesting the use of any specific rating systems or models by financial institutions.

B. Problems Related to Incorporating Forward-Looking Components in Estimating Risk Components

1. Potential Issues

Estimation of risk components tends to depend heavily on historical data to ensure objectivity. Meanwhile, forward-looking components could often play an important role in developing effective risk management and business strategy.

If risks are assumed to materialize at a certain point in the future by simply following a historical pattern, no wide difference would be observed between estimation based mainly on historical data and that on forward-looking components. This assumption, however, does not hold in cases where the economy undergoes a long-term structural stress, when financial institutions drastically change their business models such as loan

⁹ Qualitative information and financial data may, for example, be used (1) as direct input into the rating model after converting them into quantitative information, (2) as information to make adjustments of preliminary rating, and (3) as information to help judge loan originations and support other front businesses.

origination policies and rating approval criteria, or create a new type of portfolio. In these cases, estimation based merely on historical data may hinder financial innovation and decrease motivation for improving the rating approval process.

If there are large disparities between data used for risk management (estimation based mainly on historical data) and that used for planning medium- to long-term business strategies (estimation based mainly on forward-looking components), financial institutions will need the capability to logically explain such disparities.

2. Participants' Views

Financial institutions may choose to incorporate forward-looking components (e.g., a drastic change of a business model) in the estimation of risk components, which depart from the historical pattern as indicated in the above.

This choice should only be accepted, however, if risk management sections are able to persuasively and objectively explain, to the management and third parties outside, why disparities exist between the estimates mainly based on historical data and those on forward-looking components. Objective reasoning may be given using historical data adjusted for a factor specified to have caused changes in the historical pattern, market information and results of market surveys, developments in leading indicators, results of macroeconomic models etc.

Similar persuasive arguments would be necessary if risk management and business strategies use risk components with different weights of forward looking components.

V. Discussions at the Fifth Session (held on February 9, 2006)

A. Problems Related to the Use of External Data and Models

1. Potential Issues

Use of external data and models could be effective for building internal rating models and estimating PD and other risk components when, for example, (1) the number of samples in internal data is limited, (2) there is a need to use know-how of vendors and other external institutions, (3) there is a need to cut costs for developing internal models, and (4) data and models developed at a key institution within a financial group are applied consistently to other entities in the group.

The use of external data may lead to inaccurate understanding of risk profile if applied

without confirming consistency with internal data. Also, the use of external models may hinder financial institutions from carrying out effective risk management and validation work, if the external models, which do not yet have an established reputation in the market, become “black boxes” due to contractual conditions or due to the lack of experts within a firm who are familiar with the model. Also, external models based on external data may not be well-suited for the business environment of the financial institutions using them.

It should also be well understood that the use of external data and models may lead to unintended changes in a firm’s risk management framework depending on situations at the vendors and external institution, and the details of the contract.

2. Participants’ Views

The purpose of using external data varies and ranges from estimating risk components, to obtaining sample data for building a model, or validating internal ratings. It is important for financial institutions to recognize this purpose clearly. Generally, the more influential the external data on the estimation of risk components become, the more precise the validation of its adequacy should be.

In confirming consistency between external and internal data, it is necessary to understand the differences in various attributions between the two data. For example, if the definition of default and borrower characteristics (e.g., size, industry, and region) differs clearly, adequacy of the mapping process of external data to internal one should be examined considering such differences and in this process attributions important in maintaining consistency between internal and external data should be specified. Even if internal and external data, which are extracted based on a specified attribution, may seem to show consistency, it is preferable to use a model other than internal ones to confirm consistency because the outcome greatly depends on the model output and thus on the structure of internal models. If definitions of default differ for internal and external data, strict adjustments of the definition may be difficult. In this case, external data should be adjusted conservatively given this imperfect adjustment.

Internal rating models that are built using external data may be validated as follows. First, select borrowers who are included both in internal and external data. Then compare rating results of the internal model with that of other models. If large discrepancies exist between the two results, the factors behind them should be

analyzed.¹⁰ It will also be effective to compare default distribution obtained by inputting only external data in the internal model with that obtained from internal data.

Quality of external data, such as ratings by rating agencies, could be ensured to some extent through market discipline if used widely in the markets. External ratings, however, may have different criteria for evaluating firms from the one for business models used by each financial institution. For example, rating agencies may evaluate firms from a long-term perspective, while a financial institution's business model may have a more short-term perspective. In using external data, such differences should be taken into consideration as much as possible. How much attention should be paid to the differences depends on the purposes of using external data (e.g., to be used for estimating risk components or for validating internal ratings).

A system should be established so that the above assessment is carried out in a consistent way within an organization regardless of sections or timing. How strictly such discrepancies should be addressed depends again on the purpose of using external data. For example, when external data is used to estimate risk components such as PD, strict analysis of the consistency between internal and external data should be made because such estimation will directly affect the amount of required capital.

As in the case of external data, external models should be used with clear purpose. For example, it should be decided whether an external model will be used as a main model for internal ratings or as a model to validate a main model.

Data used for building a model or information about the logic of the model are important for risk management purposes, but in some models they are not available to model users, in other words, have become "black boxes". In this case, particularly when the models do not yet have established reputation in the market, financial institutions should, in principle, demand disclosure of information to vendors or external institutions that built the models to the utmost extent. Certain information on models are reasonably "black boxed" because vendors or external institutions want to protect their intellectual property rights and thus retain the commercial merits of developing models. At the same time, however, users of external models should be

¹⁰ This validation method is effective because external vendors or other institutions are likely to have built their models not only by using external quantitative data but also by supplementing qualitative information and others in view of the limitations of external data.

aware that vendors or external institutions may not disclose information for different reasons, for example, in order to hide potential weaknesses of the model.

If some information remain “black boxed” even after financial institutions’ requests of disclosure, financial institutions should clarify exactly what information are unknown. It is also necessary to indicate how and to what extent such information will cause problems in the validation of the model and how such problems may be overcome. Examples of “black boxes,” problems caused by them, and possible measures to deal with them are given below.

“Black boxes”	Assumed problems	Possible measures
Sample data used for building a model.	Model performance will decline if sample data and portfolio held by financial institutions differ greatly.	<p>Validate the model using internal and external data.</p> <p>Obtain information on the attribution of sample data from vendors and external organizations.</p> <p>Request vendors to validate the model using data provided by the user institution.</p>
<p>Model structure and logic.</p> <p>Method of building a model (estimation method and expert judgement).</p> <p>Parameters of a model.</p> <p>Initial output of the model (e.g., scoring).</p>	<p>Unable to identify Factors behind deterioration of portfolio suggested by a model is not necessarily identified.</p> <p>Unable to specify factors behind differences in the rating results of borrowers of similar creditworthiness.</p>	<p>Broadly specify factors by observing differences in the performances of portfolios pooled by obligors’ attributions such as ratings, industry, and firm size.</p> <p>Take various approaches in validation by using third party information in addition to that</p>

		held by institutions themselves.
Validation results of vendors and external organizations.	Unable to precisely validate model performance.	Request disclosure of validation results if model performance verified by internal and external data show significant deterioration.

Choice of measures, in cases where problems due to “black boxes” cannot be dismissed, depends on how external models are used. If external models are to be used as a main model, the problems could be more serious and commensurate measures would need to be taken.

B. Problems Related to LGD Estimation

1. Potential Issues

While PD is an indicator of the probable frequency of loss events, LGD is an indicator of severity of loss against principals for each loss event. Thus, LGD as well as PD are significant indicators used for risk management and quantification of risk based on rating and pooling. There is not necessarily a broad consensus, however, on the definition and estimation method of LGD partly due to lack of data and the existence of technical problems. In the case where accuracy of LGD is significantly low reflecting lack of data and unclear concepts but is not compensated by conservative adjustments nor by conservative estimation of other risk components, required capital calculated by each financial institution may vary greatly.

Reasons behind the difficulties in collecting data of LGD and in estimating LGD can be summarized as follows.

Reasons for the difficulty in collecting data	Need extensive information (cash flow of collection over many years, source of collection and its type, cost of collection, and discount rates reflecting risk premium of the collection). Often need long time periods to fix data points (i.e. until collection is completed after default).
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	<p>Difficult to trace back historical data to reflect changes in the definition of default (e.g., from borrowers in danger of bankruptcy to borrowers that need “special mention”).</p> <p>Difficult to obtain the LGD (1) of default cases that could return to non-default status (e.g. when a broader definition of default such as being equal to borrowers that need “special mention” or those categorized lower) and thus (2) would become difficult to fix loss data.</p> <p>Difficult to obtain information on LGD of housing loans and other retail products from guarantee companies.</p>
<p>Reasons for the difficulty in estimating LGD</p>	<p>Lack of data (see the above)</p> <p>Treatment of discount rates is not yet established.</p> <p>Treatment of the cost of collection is not yet established.</p> <p>Treatment and estimation methods are not yet established for (1) downturn LGD that takes into account the period of recession and (2) correlation between PD and LGD.</p> <p>Methods are not yet established for treating portfolios that have recovered to non-default status from default status.</p> <p>On the LGD estimation method, some including the following points are not yet established.</p> <ul style="list-style-type: none"> --- Model structure (scoring model based on a priori knowledge vs. rating model based on statistical method, rating model vs. direct estimation of LGD). --- Specification of factors affecting LGD (rate of coverage by collateral, relationship between appraised value of collateral and its actual value after liquidation, volatility and trend of collateral value, seniority, length of workout period, characteristics of borrowers <type of industry, rating just before default>, amount of credit <large vs. small>, whether a lending financial institution is the main bank for a concerned obligor or

	<p>not, macro factors such as economic conditions, and others).</p> <p>Approaches for validating estimated values are not yet established.</p> <p>--- Difficult to validate estimated LGD, of which uses for business purposes are not yet established.</p>
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2. Participants' Views

Financial institutions need to clarify the following points when collecting LGD data.

	Point at issue and possible approaches
Definition of default	Use the same definition of default for PD and LGD.
Workout period	<p>Decide the maximum workout period to be counted into LGD estimation in view of difficulty in tracking the amount of collection over longer time periods.</p> <p>--- Only include the amount collected within the predefined maximum period decided or make estimations on the amount of collection for years that exceed the maximum period.</p> <p>--- Conservative treatment is required for the latter.</p>
Treatment of downturn LGD	<p>Determine downturn LGD by taking into account the correlation between PD and LGD, in view of the fact that LGD tends to increase at times of economic downturn as PD increases.</p> <p>Use LGD at the bottom of the economic cycle or default weighted LGD.</p>
Discount rates (DRs)	<p>In theory, DR should be equal to risk free rate plus risk premium on defaulted assets.</p> <p>--- Consider DR as “rates based on contract interest rates on loans (if risk premium is reflected in contract interest rates)”</p> <p>--- Risk premiums should be adjusted to avoid double-counting of risk, if a certain amount of risk is already reflected in estimation of the amount of collection.</p>
Collection cost	Variable expenses including personnel expenses needed for collection work will be calculated by multiplying the standard unit price (derived by actual costs) by the period of collection. Other costs (e.g., servicing fees) will be added as necessary.

Treatment of defaulted assets that recovered to non-default status	EAD discounted by accumulated discount rate over the period required for the asset to become non-default status will be treated as collection.
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Financial institutions should clarify the above points as much as possible and thus collect LGD data in a consistent manner. It is preferable to establish a system that automatically detects aberrant values in the process of data gathering.

In LGD estimation and facility ratings assignment, factors affecting LGD (see the chart above), relationship between these factors and LGD, and sensitivity of LGD to these factors should be taken into consideration. The following process may be modeled for this purpose: (1) the process of defaulted assets returning to non-default status, (2) the process of collection of collateral provided for defaulted assets, and (3) the process of collection of asset portions uncovered by collateral in view of seniority and characteristic of industry.

Financial institutions should also consider the issues related to (1) methods to secure an adequate level of risk homogeneity from the perspective of LGD for each rating categories or pools (e.g. if distribution of LGD for each rating category does not follow normal distribution, financial institutions are expected to explain why) and (2) validation of LGD by backtesting or other tools (in the case where the LGD follows non-normal distribution, expert judgement could also be used for evaluating performance of a model).

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Center for Advanced Financial Technology	Hidehiko Umeda
Center for Advanced Financial Technology	Yasunari Inamura

Observing members

Financial Services Agency

Planning and Coordination Bureau (Supervisory Bureau)	Shunsuke Shirakawa
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Planning and Coordination Bureau (Supervisory Bureau)
Supervisory Bureau

Yasushi Shiina
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