

September 9, 2005

Advancing Risk Management by Financial Institutions

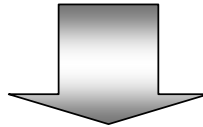
Center for Advanced Financial Technology
Financial Systems and Bank Examination Department
Bank of Japan
Tsuyoshi Oyama

HP : http://www.boj.or.jp/en/set/05/set_f.htm

Email: caft@boj.or.jp

Introduction

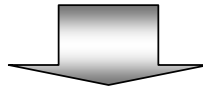
- The experience of overcoming NPL problems since the 1990s...
 - Enhancing the risk management of Japanese financial institutions particularly in the area of credit risk management
 - Entailing stability of financial system, which led to the lifting of blanket deposit insurance in April, 2005



- In this new environment, financial institutions are expected to develop further creative business services that meet the needs of customers through...
 - Assessing various risks not only in a conservative way but also in an accurate way.
 - In other words, financial institutions are expected to grasp the **economic value and its volatility** of all the assets they possess and transactions they engage in, and also to establish a framework that manages these risks **in an integrated way**.

Advancing Risk Management---Means What?

- Our understanding of “advancing risk management”
 - Enhancing the **communication tools** among stakeholders (senior managers, shareholders, regulators, etc.) to reach a consensus view of risk profile and amounts.
 - Not necessarily indicating a more use of Greek letters and math formula



- What FIs need is more objective and more persuasive tools to assess risks
 - Objective and persuasive risk assessments lead to **higher transparency** of risk management process and thereby clarify the responsibility associated with risk taking activities → help ensure the **direction for improving risk management**.
 - **There are no best practices of FIs’ risk management**, which could differ depending on their facing environments → need to establish the **incentive mechanism** to ensure the direction for improving risk management.

➤ In order to assist financial institutions in accomplishing these goals, the Bank of Japan released three papers.

- Advancing Credit Risk Management through Internal Rating Systems
- Advancing Operational Risk Management
- Advancing Integrated Risk Management

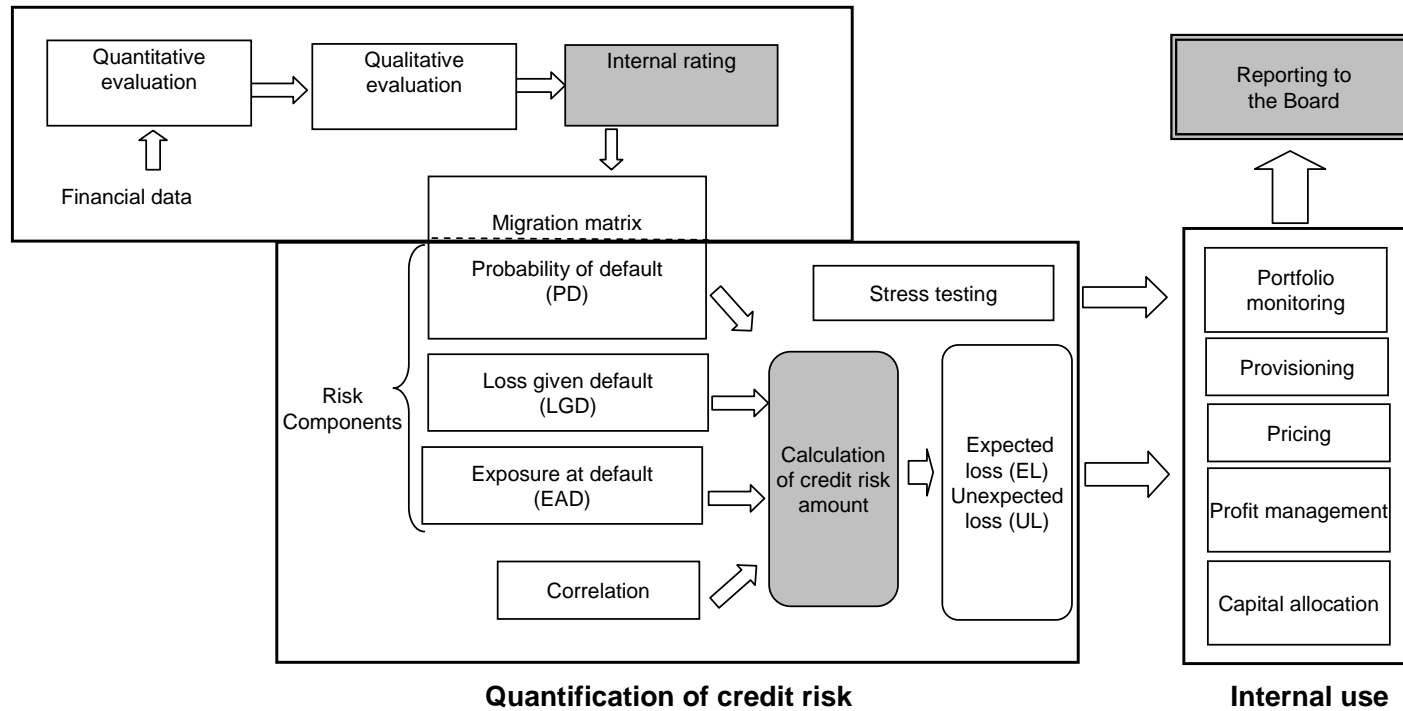
HP: http://www.boj.or.jp/en/set/05/set_f.htm

➤ These papers draw on the issues and measures, on which the Bank of Japan intends to use to start in-depth discussions of risk management with financial institutions at the time of our on-site examinations and off-site monitoring.

I. “Advancing Credit Risk Management
through Internal Rating Systems”

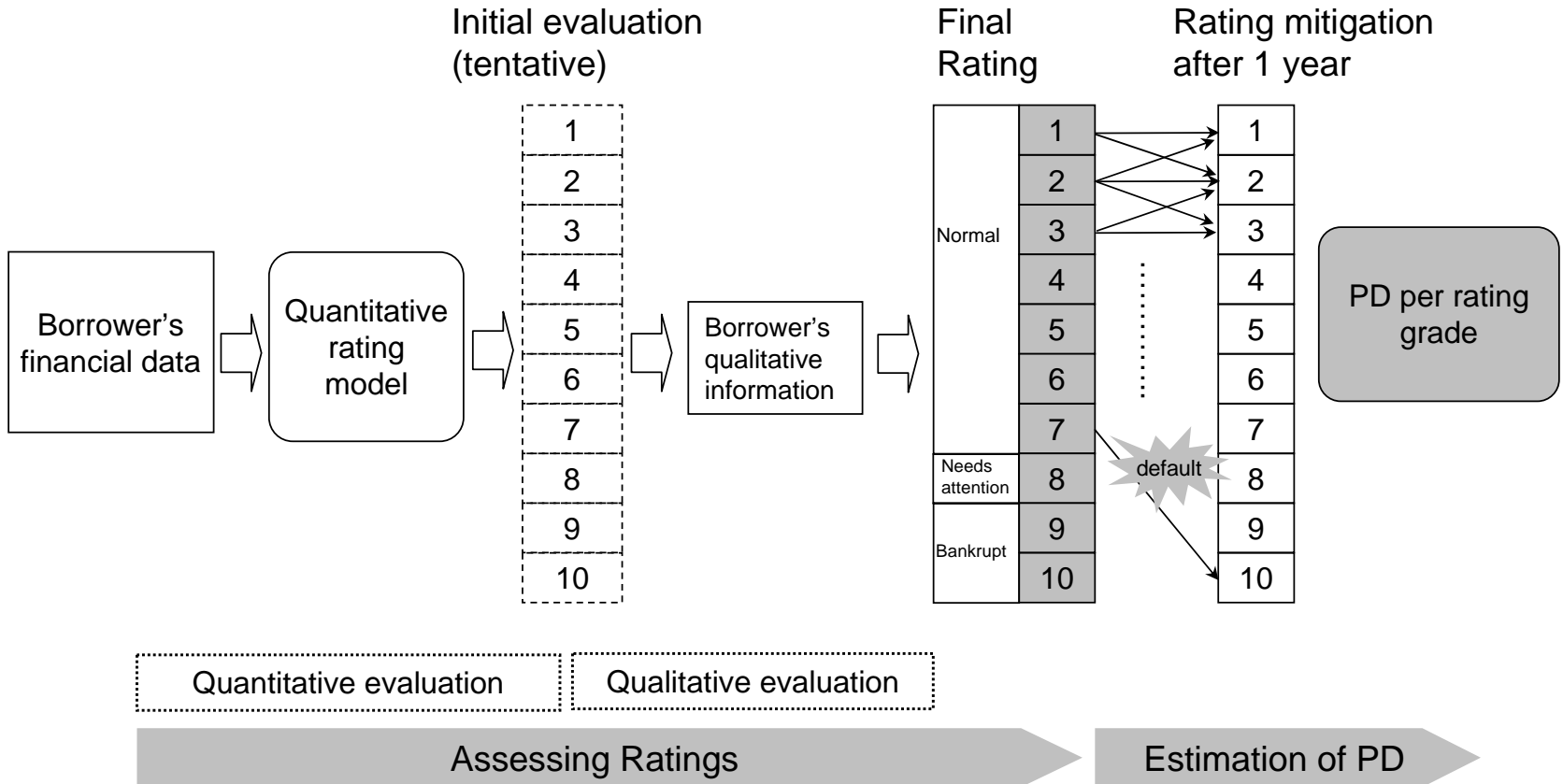
Framework of Advancing Credit Risk Management

<Internal rating systems>



Introduction of internal rating system and risk measurement approach enable FIs to assess objectively the credit risk information and thus contributes to their sound and efficient risk management and business activities.

Process of internal Ratings



What Factors Determine the Ratings?

Borrower ratings (1 to 10)

Grade
1
2
3
...
...
9
10

Borrower ratings

Facility ratings (A to J)
(One-dimensional system)

Grade	Grade
1	A
2	B
3	C
...	...
...	...
9	I
10	J



One-dimensional system bases facility ratings on borrower ratings and makes upward or downward adjustments to the grades as necessary to reflect the characteristics of the loan transaction concerned.

Facility ratings (A to J)

(Two-dimensional system) Ratings based on LGD

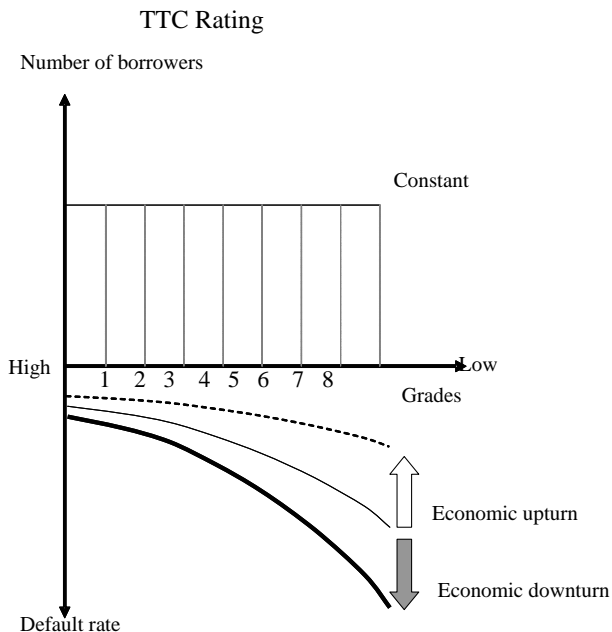
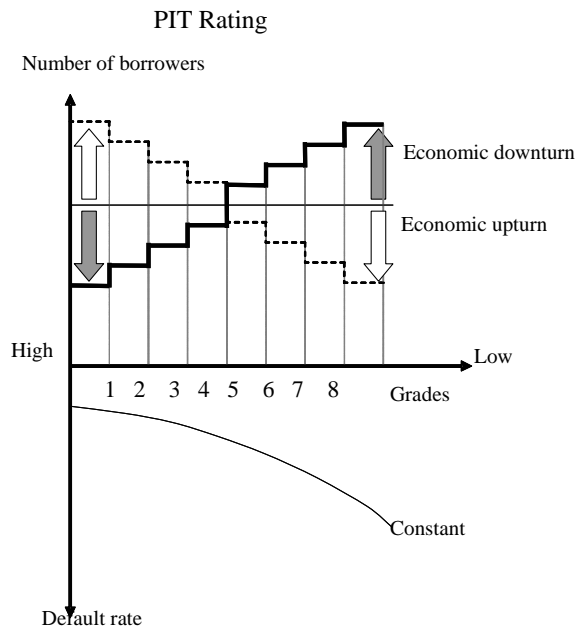
Grade	1	2	3	...	7	8
1	A		I	...	J	...
2	B					
3	C					
...	D					
...	
9	I				J	
10	...					

Borrower ratings

A two-dimensional system combines borrower ratings with evaluation of the features of individual loan transactions independent of borrowers (e.g., ratings based on LGD).

Rating Assignment Horizon and the Business Cycle

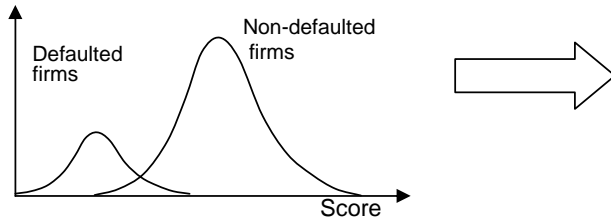
- How to set the time horizon of assessing the creditworthiness of borrowers in assigning ratings → Point-in-time (PIT) and Through-the-cycle (TTC) systems.
- It is important for FIs to understand the nature of their own approaches for properly validating their internal rating systems.



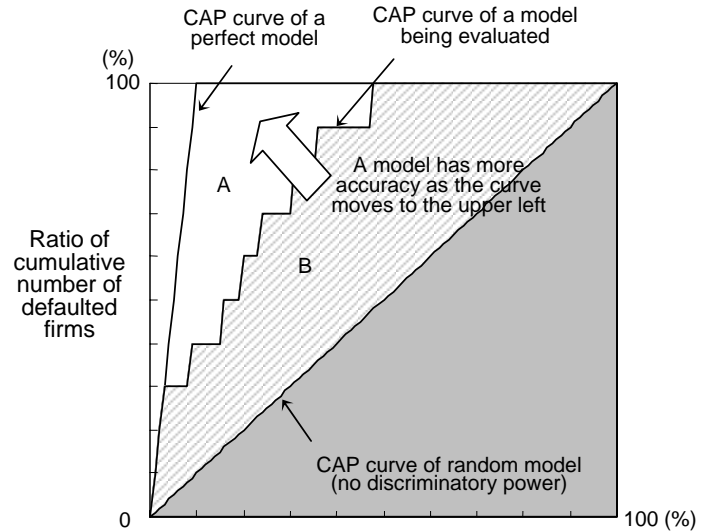
How to Validate Rating Model?

(Example 1)

Number of firms



$$AR = \frac{\text{Area (B)}}{\text{Area (A) + Area (B)}}$$



(Example 2)

Check the order of migration rate from rating 1 to other ratings

Rating at the end of the year

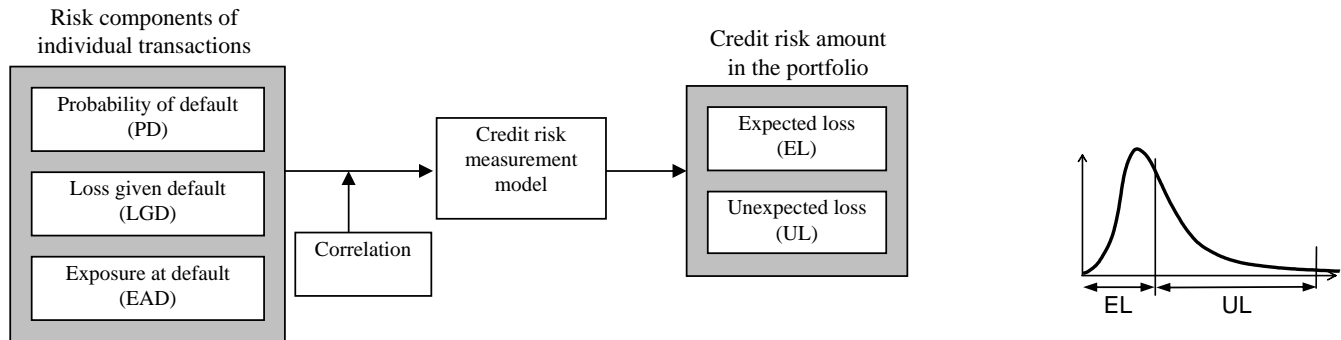
Check the order of migration rate to rating 7 from other ratings

Check the order of default rates

Rating at the beginning of the year	1	2	3	4	5	6	7	8	Default
1	83.1	12.8	2.1	0.3	0.4	0.3	0.5	0.5	0.0
2	4.7	75.4	15.1	3.3	0.7	0.3	0.2	0.2	0.1
3	0.2	11.9	66.5	13.9	4.2	1.5	1.0	0.8	0.0
4	0.0	1.4	13.3	63.1	13.1	4.4	2.5	1.9	0.3
5	0.0	0.4	4.4	24.5	44.0	15.7	6.0	4.5	0.5
6	0.0	0.1	1.5	7.5	20.4	43.9	16.0	9.5	1.1
7	0.0	0.0	0.5	2.8	6.8	18.9	47.8	20.0	3.2
8	0.0	0.0	0.4	1.6	2.1	2.6	3.8	74.7	14.8

Risk Components of Credit Risk

- Probability of Default (PD)
 - PD is the likelihood of a borrower defaulting within a certain period in the future.
- Loss Given Default (LGD)
 - LGD refers to the ratio of expected loss relative to credit exposures at the time of default. (LGD=1 – recovery rate)
- Exposure at Default (EAD)
 - EAD is the amount outstanding of credit at the time of default.



Use of Internal Rating Systems

➤ Use of Internal rating systems

(Loan Origination)

- Setting upper credit limits based on rating grades
- Setting authority ranks for loan approval by rating grade
- Simplifying the loan review process for higher-graded borrowers

(Monitoring)

- Monitoring individual borrowers based on rating grades
- Monitoring the overall loan portfolio

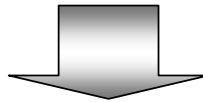
➤ Uses of PD for each rating grade

- Quantification of credit risk and allocation of capital
- Pricing of loan rates reflecting credit risk
- Evaluating the economic value of loans

II. Advancing Operational Risk

Advancing Op. Risk --- Why Now?

- Changes in the environment surrounding FIs' operations
 - Business diversification, more sophisticated financial technologies, widely used IT and outsourcing.
 - The introduction of Basel II (allocation of capital for op. risk)
 - Major disaster such as earthquakes, terrorist attacks and uncovering of serious corporate scandals (society is increasingly aware of the need for the firms' management of op. risk).

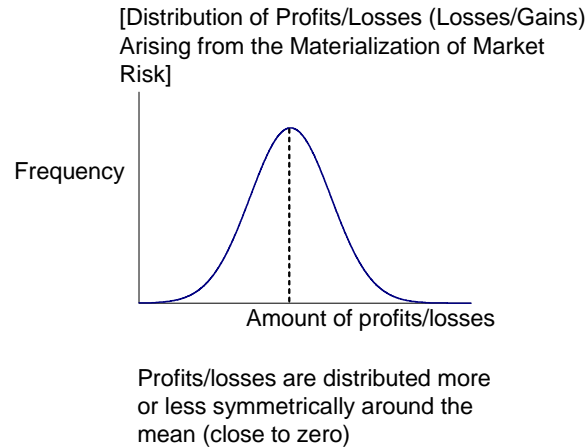
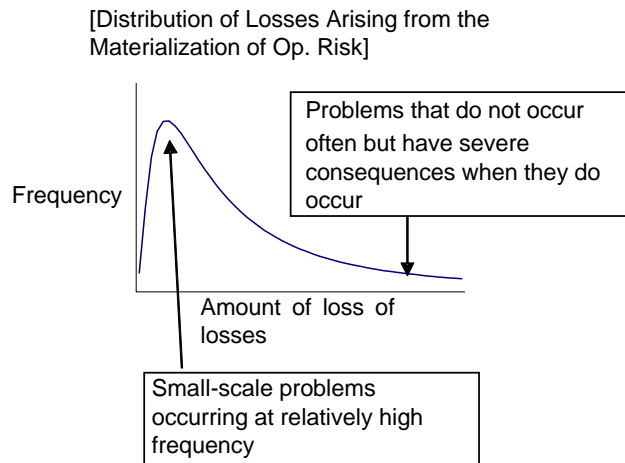


- New challenges
 - Need to manage op. risk more efficiently by identifying op. risk profile in a firm-wide manner and thereby putting some priority on their management.
 - Need to establish structures that can quickly detect heightened risk and respond appropriately before the risk materializes.
 - Need to create mechanisms for autonomous risk management in all sections of their operations.

Characteristic of Op. Risk

➤ Forms of risk materialization

- Direct loss, indirect loss or impact incurred to third parties
- High frequency and low severity or low frequency and high severity



➤ Causes of risk materialization

- It is normally difficult to narrow down the factors causing such risk to materialize, and quite often, it only emerges when several factors come into play simultaneously.

Some Examples of Op. Risk Materialization

<p>Direct impact on profits/losses and capital of the financial institution</p>	<ul style="list-style-type: none"> - Coverage of shortfalls following cash shortages - Payments of damages/settlements/penalties following lost lawsuits, arbitrations, supervisory actions, etc. - Payments of overtime wages to employees as required to repair system malfunctions, etc. - Postal charges required for mailing letters of apology to customers, etc. - Lawyers' expenses necessary to deal with problems - Reduction or exemption of commissions as a result of clerical error - Loss of earnings caused by business interruptions, delays in starting operation hours, etc.
<p>Indirect impact on profits/losses and capital of the financial institution</p>	<ul style="list-style-type: none"> - Deterioration of reputation caused by clerical error triggers a reduction in customers, leading to a fall in earnings
<p>Impact that goes beyond the financial institution</p>	<ul style="list-style-type: none"> - Cases where interruptions to the business of the financial institution arising from system malfunctions lead to a deterioration in customers' financial positions or delay in interbank payment and settlement.

Considerations of Op. Risk Management

- The need to cover a wide range of events and activities
 - It is difficult to break down risk into the categories of exposure and risk factors.
- The need for risk control in all sections within the institution
 - Op. risk exists in all sections throughout the institution.
- The importance of risk management based on qualitative information
 - It is not always easy to manage them in a quantitative manner.
- Reputational and systemic risk
 - It is necessary to take into consideration of the indirect loss and the effect on financial system.

Conventional Operational Risk Management Methods

Category	Method
Multilevel checks and balances system	Reexamination and multiple signatory system Segregation of duties In-house inspections Insistence on record-keeping
Standardization and streamlining of business procedures	Establishment of P&P Institution-wide guidance on business operations Strengthening systems support
Discipline and motivation	Human resource (HR) management and performance evaluations
Response to accidents and other problems	Implementation of measures to prevent recurrences
Internal audits	Auditor section audits

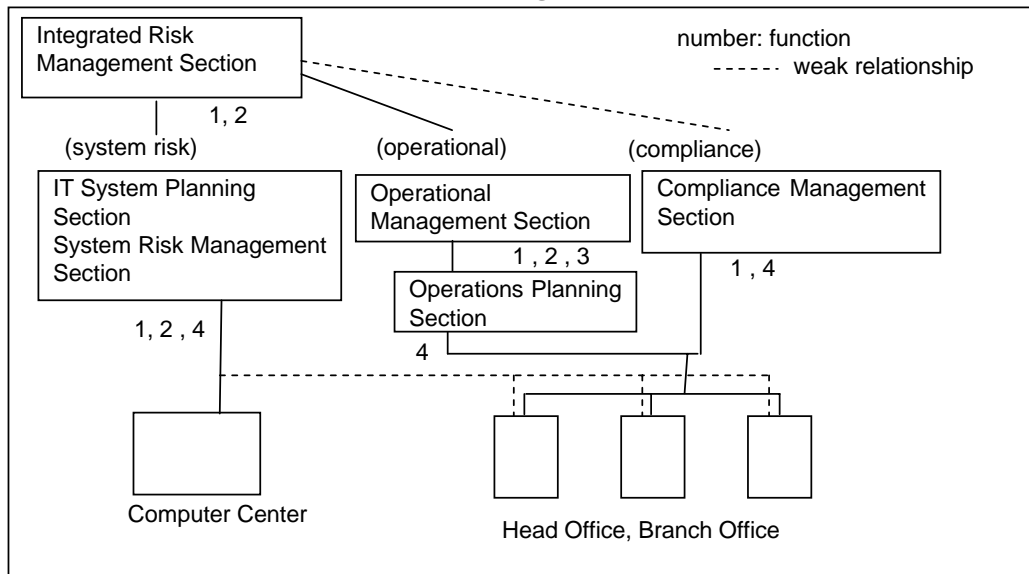
Efforts to Advance Op. Risk Management(1)

<Establishment of an Operational Management Section>

➤ Functions of Operational Management Section

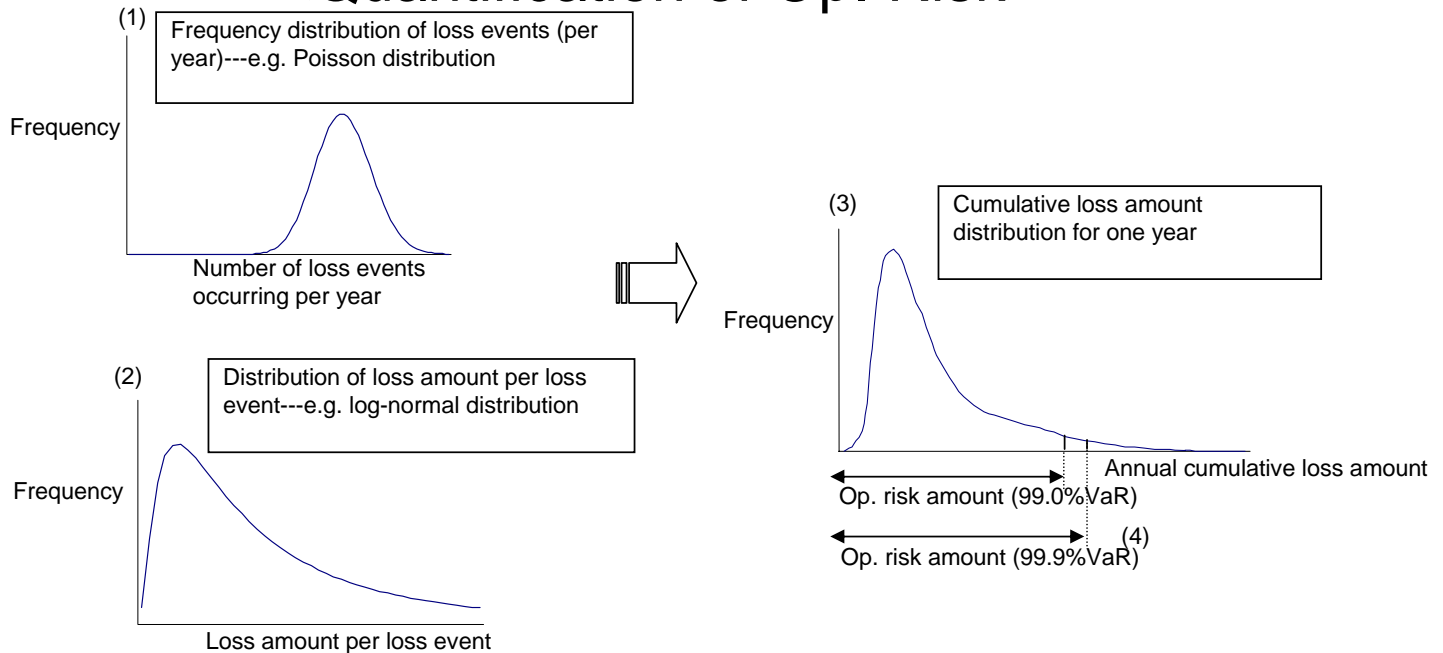
- 1 Plan the op. risk management framework for the entire institution.
- 2 Collect and analyze information on accidents and other problems, computer system malfunctions, and clerical errors arising in each section, then report to the management.
- 3 Examine the adequacy and consistency of processes and procedures (P&P).
- 4 Evaluate and guide the operational risk management situation.

➤ Structure of Operational Management Section



Efforts to Advance Op. Risk Management(2)

<Quantification of Op. Risk>



➤ Considerations

- Appropriate collection, classification and update of loss data.
- Selection of model which is able to identify cases of losses with low frequency but high severity.
- Setting group units for quantification.
- Introducing hypothetical data based on external data or scenario analyses into quantitative models.
- Using qualitative data to revise the quantification results.

Efforts to Advance Op. Risk Management(3)

<Control of Self-Assessments and Key Risk Indicators>

➤ Control of Self-Assessments

- Individual sections or business lines within a financial institution evaluate inherent risk and internal control conditions on their own
 - Results are coordinated and shared within the entire organization

➤ Key Risk Indicators

- Selecting multiple indicators that contribute to early detection of heightened risk
 - Monitoring of their movements, and reacting preemptively as necessary

<Example of indicator>

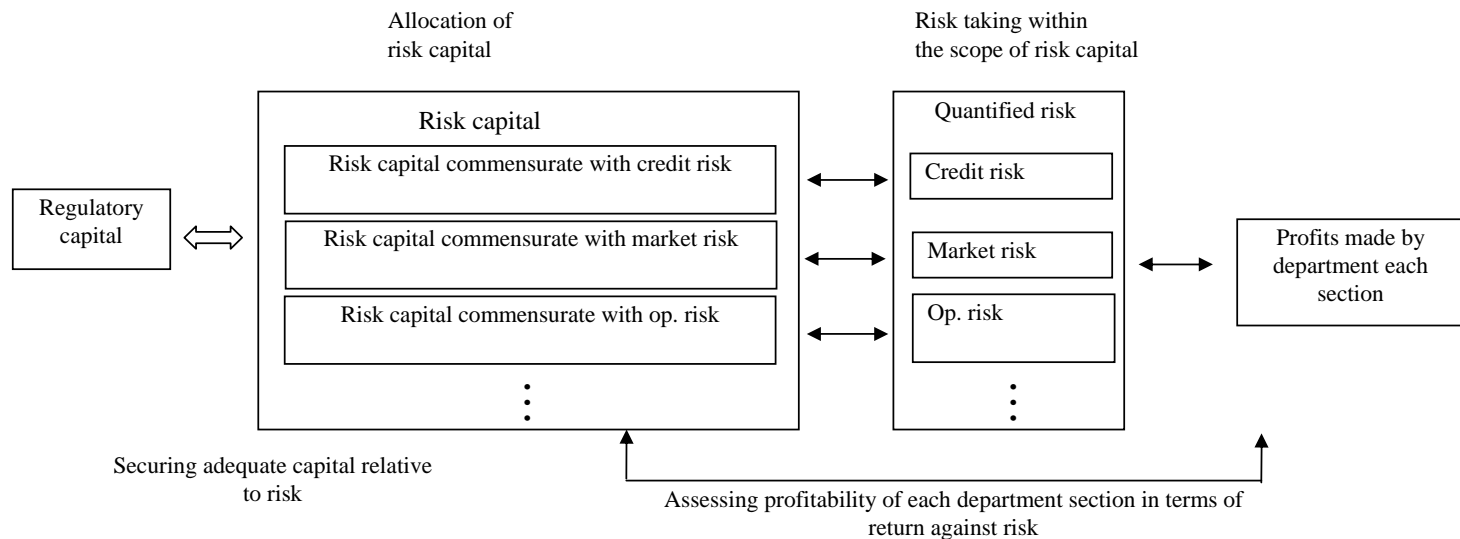
Operations :Business volumes, customers' waiting time, number of clerical errors, number of complaints received, etc.

Computer systems :Number of malfunctions, number of steps in developing programs, utilization ratio of system devices such as CPUs, storages, network traffics, etc.

III. Advancing Integrated Risk Management

Framework of Integrated Risk Management

- Risk is quantified using the statistical method based on the past data such as VaR.
- Allocating hypothetical capital for internal control purposes to each section within the scope of total capital. Each section then manages the risk so that it does not exceed the allocated capital.
- The profitability of each section is assessed in terms of return against risk.

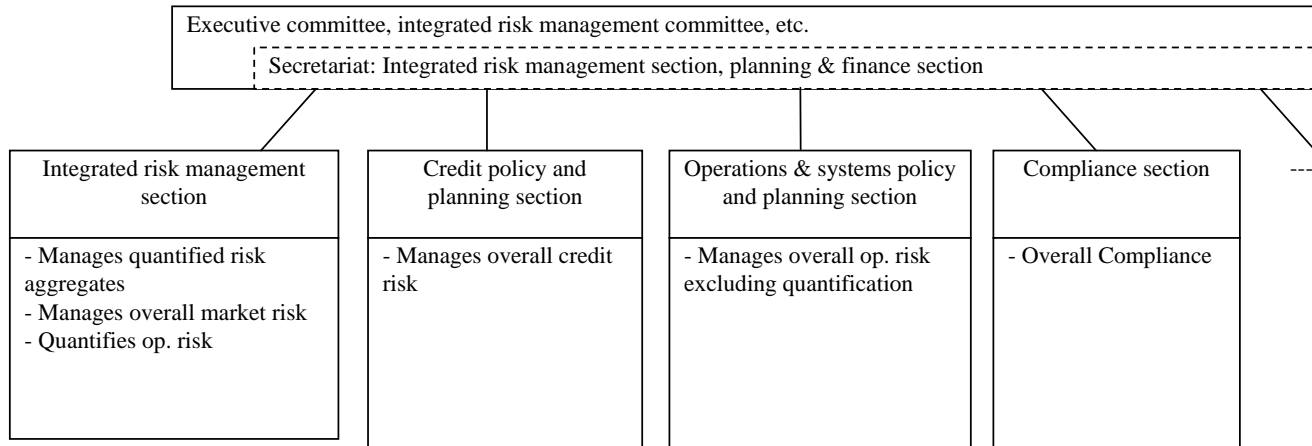


Issues of Integrated Risk Management (1)

<Organizational Frameworks>

- Risk management section and treasury section have co-jurisdiction over integrated risk management.
- It is desirable that risk management section is independent from the front line.
- If difficult, it is essential to ensure that such risk management functions in the front line are subject to proper checks and balances through regular assessments by third-party, that is, internal audits.

<Example of an Integrated Risk Management System Using Cross-Organizational Forums>

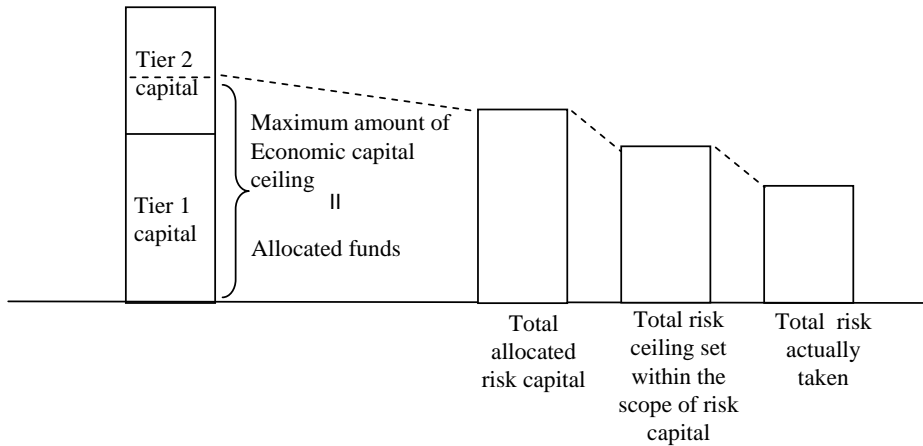


Issues of Integrated Risk Management (2)

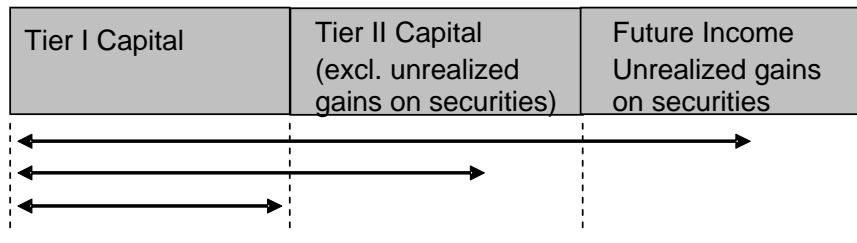
<Allocation of Risk Capital>

- The key point is how to set the ceiling for economic capital, that is, the funds to be allocated as risk capital.

<The Relationship between Economic Capital, Allocated Funds, and Risk Capital >



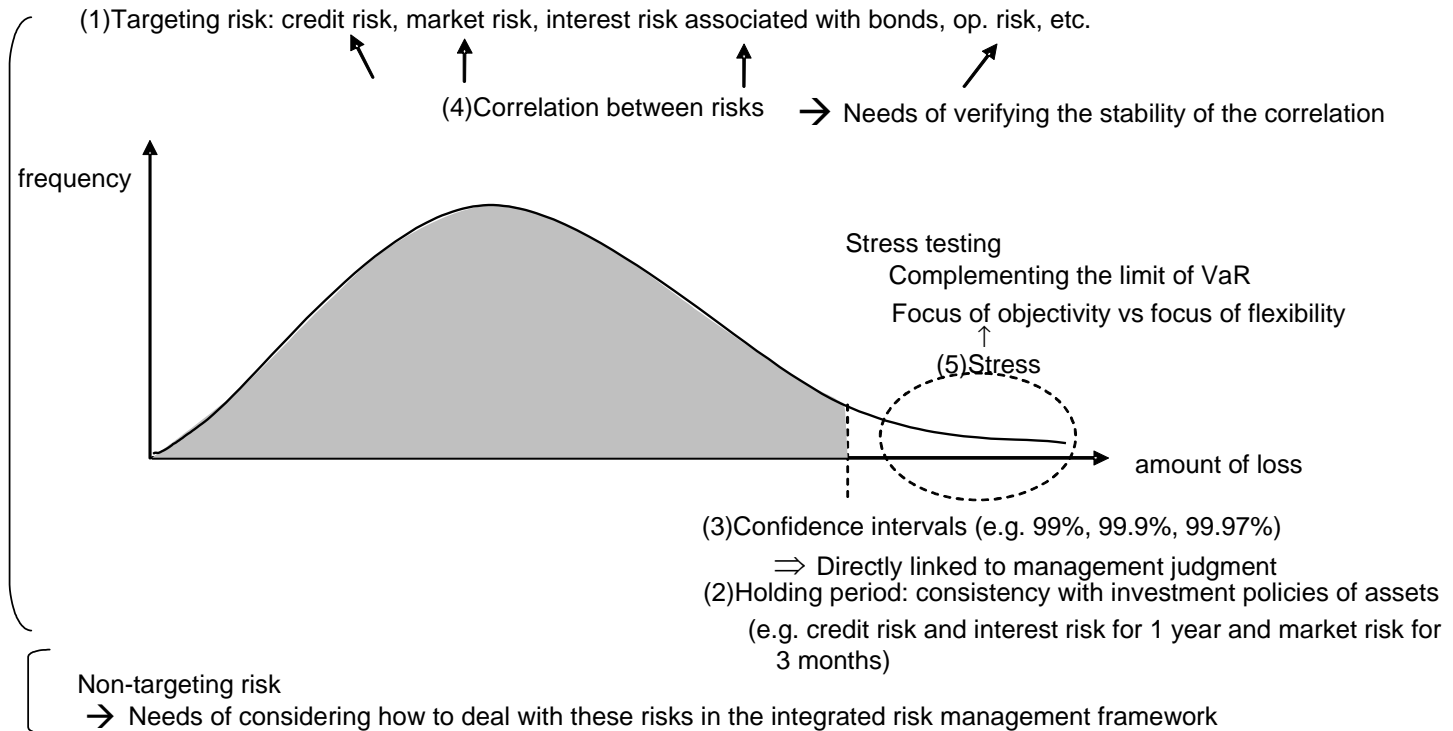
<Component elements of allocated funds>



Issues of Integrated Risk Management (3)

<Identifying Risk>

- When identifying risk and risk amounts, it is important to consider the scope of risk to be covered, holding period, confidence interval, correlation between risks, and stress testing.



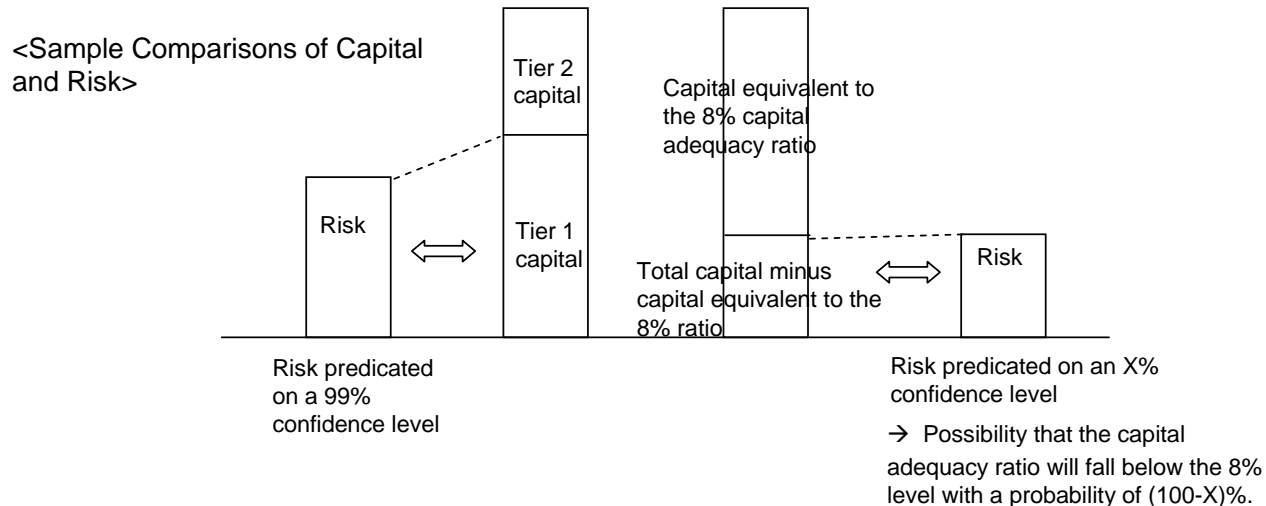
Issues of Integrated Risk Management(4)

<Comparing Allocated Capital and Risk>

- Reaction to the situation where the risk taken exceeds allocated risk capital is a litmus test of effectiveness of integrated risk management system

(Possible reactions)

- Simply reducing risk, or
 - Identifying the extent of capital inadequacy to be corrected, and drawing up (and implementing) a concrete plan to eliminate it.
- When the capital adequacy ratio falls to the regulatory minimum level, it is important to compare the part which exceeds minimum level and risk, and thereby identify statistically the probability of capital falling below 8%.

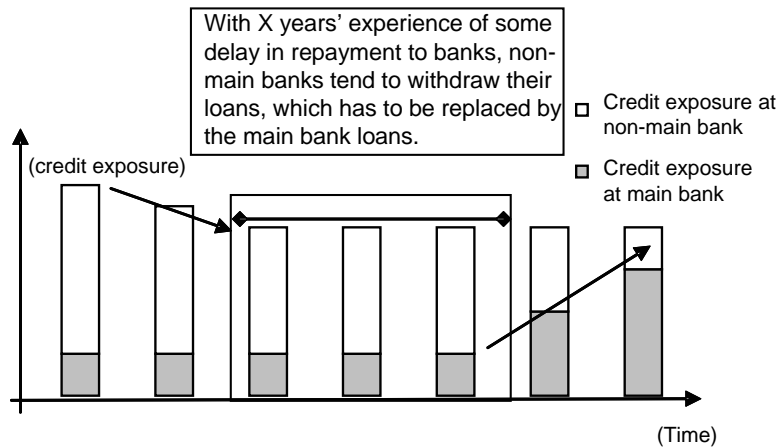


Issues for Further Enhancing the Integrated Risk Management

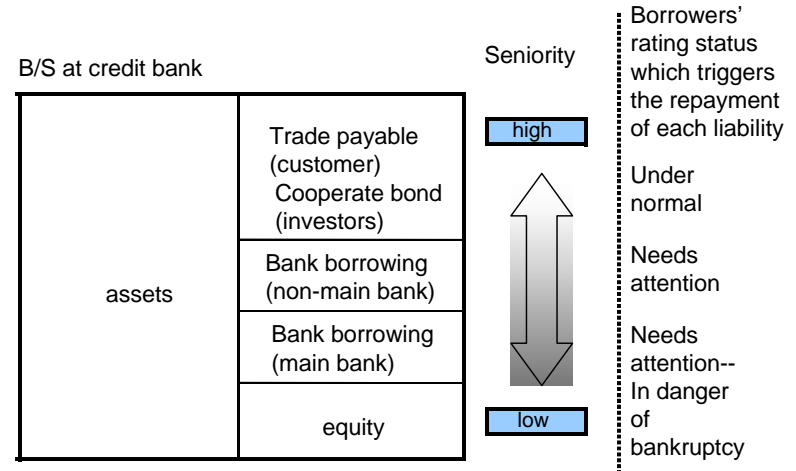
<Risk Associated with Loans to Borrowers with Strong Relationship>

- The issue is how to assess the risk of loan shifting from non-main to main bank at the time of the borrowers' default due to special relationships between financial institutions and borrowers.

Timing of occurring risk associated with loans to borrowers with strong relationship (Image chart)



Seniority and timing of repayment



Use of Integrated Risk Management for Business Strategy

- Objective identification of risk-return
 - Estimating and monitoring risk-adjusted profit indicators at major banks.
 - Using the profit ratios after credit costs as a part of evaluating performance.

Risk-adjusted profit indicators Profit after credit cost = net operating profit - credit cost. Profit ratio after credit cost = profits after credit cost ÷ risk capital. Profit after capital cost = profit after credit cost - risk capital x capital cost ratio.
--

- Disclosure
 - Some major banks disclose qualitative information such as overviews of their integrated risk management schemes, but none goes so far as to disclose quantitative information such as specific risk capital amounts or risk-return results.
 - The basic idea of Pillar 3 is to encourage the reinforcement of market discipline by accurately conveying the actual condition of the business to the market, thereby further increasing the incentive to advance risk management.