

# On Japanese solvency standards: current situation and discussions for further reform

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## Abstract

Solvency margin standards for Insurers were introduced to Japan for application from the end of fiscal 1996, referring to the Risk-based capital system already used in the United States, etc. However, during the financial crisis period, 1997-2000, 7 life insurance companies became bankrupt in spite of their sufficient level of solvency margin ratios, the criticism has been growing that the present solvency standards incomplete and unreliable, should be reviewed and improved.

The "Program for Further Financial Reform," published by the Financial Services Agency (FSA) in December 2004, claimed the need to review the calculation standard for the solvency margin ratio in order to improve insurers' financial soundness and further optimize their risk management. The FSA will conduct deliberations in order to implement specific revisions of the calculation standard for the solvency margin ratio and realize solvency evaluation based on economic value, and pay careful attention to EU Solvency II project.

This article deals with these problems and the discussions for reform about the Japanese solvency margin system.

**Keywords:** Solvency margin standards, Early remedial measures, Assumed Interest Risk, Asset-Liability Management

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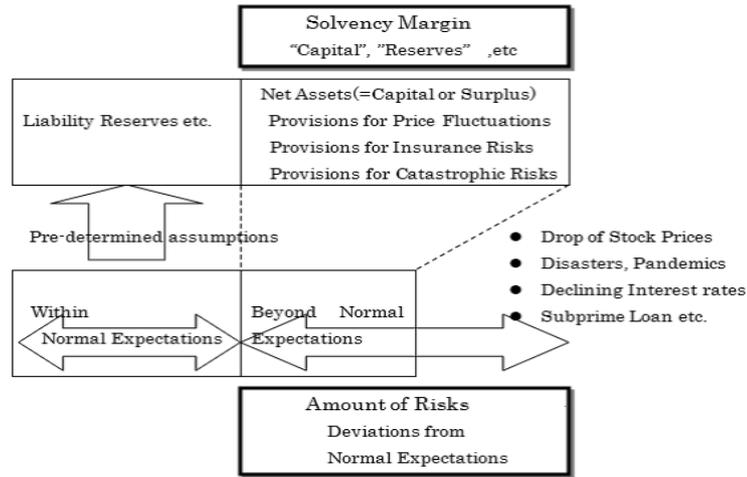
# 1 Introduction

With the increase in risks arising from the liberalization of insurance products and premium rates and the deregulation of insurance business, solvency margin criteria were introduced to Japan for application from the end of fiscal 1996. Their purpose was to serve as indexes required to show the level of solvency for higher risks than normally expected for insurance companies, thereby confirming a sound basis for the insurance business, by referring to the system used in the United States, etc.

Under the condition in which investment environments were relatively stable in the past, it was considered that the unrealized gains resulted from a continuous rise in stock prices, the policy reserve of the net level premium type of life insurance companies and the catastrophe loss reserve of non-life insurance companies were sufficient as buffers for a majority of the risks confronting insurance companies.

However, investment methods began to diversify from around this time. Therefore, asset management risks increased markedly, including market risk for derivative transactions and foreign exchange risk for foreign currency denominated investment, in addition to the credit risk that always remained. Furthermore, each insurance company was expected to be more responsible for

Figure 1: Solvency margin vs. Amounts of Risks



setting up its own basic rates because of the deregulation of insurance products and premium rates and insurance underwriting risk was expected to increase in each insurance company as a result. Meanwhile, in Japan, banks already had Tier I and II capital rule but insurance companies didn't have such a rule.

Accordingly, it was necessary to deal with increased risks by improving sol-

vency margins held in excess of reserves, appropriately assessing the unexpected high level of risks.

From the perspective of supervision of insurance companies, one major purpose was to clarify problems from the viewpoints of sound management and the protection of policyholders, with overall consideration given as in the past to solvency margin ratios as well as the quality of the assets of insurance companies.

Another major purpose was to require quick actions of management, by requesting some tools for supervisions such as sound management plans.

## 2 Current Japanese regulation on Insurance Solvency

In Japan, the Financial Services Agency (FSA) is responsible for the administration of the financial sector, including policy planning and coordination of financial systems, international affairs, supervision and inspection of such financial institutions as banks, securities companies and insurance companies, as well as surveillance and investigation of securities and exchanges.

### 2.1 Solvency Requirements for Insurance Companies in Japan

There are two solvency requirements for insurers.

1. Basic Framework;the solvency margin standard, is introduced for both life and general insurance companies in FY1996. It has been improved since then.
2. Other capital requirements;  
Net asset requirement: Liquidation value=0

\* Initial capital requirement is 1 billion yen

### 2.2 Early Warning Measures

Early remedial action based on solvency margin ratio is provided in paragraph 2, Article 132 of the Insurance Business Law as a measure to secure the soundness of an insurance company's management. Even an insurance company which does not fall under the scope of early remedial action shall be required to make continuous efforts to maintain and improve the soundness of its business. To that end, the FSA will take the following preventive measures to assure an early remedy of the management.

- a. Remedial Measure for Profitability
- b. Remedial Measure for Credit Risk
- c. Remedial Measure for Stability
- d. Remedial Measure for Cash Flow

The FSA, when necessary, may issue an administrative order for business improvement according to Article 132 of the Insurance Business Law, so that the company can be guaranteed to carry out the above remedial measures.

### 2.3 Early Remedial Action

Early remedial action based on the solvency margin ratio was introduced in April 1999, as one of the key factors in the new insurance supervisory and regulatory framework. The objective of early remedial action is to ensure the sound and proper business operation of an insurance company and the protection of policyholders by enabling the supervisory authority to urge insurance companies to maintain sound management with regard to their solvency margin ratios.

Table 1: Early Remedial Action corresponding to Solvency Margin Ratio

Category	Solvency Margin Ratio	Directive
None	200 % and over	None
Category 1	100 % to less than 200 %	Submission and implementation of a business improvement plan
Category 2	0 % to less than 100 %	a. Submission and implementation of a plan for adequate solvency of insurers b. Prohibition or limitation of dividends c. Prohibition or limitation of policy dividends or distribution of surplus to policyholders d. Change in calculation method of premium for policies to be newly underwritten e. Prohibition or limitation of directors' bonuses, limitation of other operating costs, etc.
Category 3	Less than 0 %	Partial or total suspension of operation for a limited period

The Enforcement Ordinance requests that early remedial action be divided into 3 categories in accordance with the level of the solvency margin ratio. An outline of each category and actions are shown in the table above. In addition to the actions mentioned above, the Enforcement Ordinance includes the following measures:

a. If an insurance company finds that its solvency margin ratio falls to category 2 or 3, and if the insurance company promptly submits a business improvement plan that the supervisory authority judges to be appropriate to

restore the company's solvency margin ratio, then the category of the order issued by the supervisory authority shall be applied to the category corresponding to the expected result of the implementation of the business improvement plan. However, if the supervisory authority does not deem the plan appropriate, the category of the order shall correspond to the decreased solvency margin ratio.

b. Even when an insurance company falls within category 3, the supervisory authority shall be able to issue an order that includes category 2 measures, when the difference between the assets and the liability of the insurance company shows a positive amount, or when it is obviously expected to become a positive amount.

c. Even though an insurance company does not fall within category 3, the supervisory authority shall be able to issue an order that includes category 3 measures; when the difference between the assets and the liability of the insurance company shows a negative amount or when it is obviously expected to become a negative amount.

d. The early warning measure shall not apply to the Japan Earthquake Reinsurance Company whose insurance contracts are reinsured by the government under the Law concerning Earthquake Insurance.

## 2.4 Off-site monitoring

On August 22, 2003, the FSA revised its administrative guidelines and introduced off-site monitoring and early warning measures in addition to the early remedial actions introduced in April 1999. An insurance company will be considered in sound condition if the solvency margin ratio is 200% or more. However, if the ratio falls below 200%, the supervisory authority shall take early remedial action on the basis of the provisions of the Insurance Business Law and its Enforcement Ordinance.

Prior to the early remedial action, off-site monitoring and early warning measures will be taken when the Commissioner deems it necessary in order to improve the management of an ailing company which still maintains its solvency margin ratio at more than 200%.

Early detection and early remedy of managerial problems are the key to rehabilitating unhealthy insurance companies. The FSA has introduced off-site monitoring in order to grasp the insurance company's management condition by collecting a continuous flow of financial statements and risk information reports from insurance companies. The collected data is stored and analyzed quickly and effectively. Giving feedback on the results of the analysis and having interviews with the management of the company, the FSA urges the insurance company to carry out remedial plans independently.

## 2.5 Solvency Margin Ratio

In addition to the reserves to cover claims payments and payments for maturity-refunds of savings type insurance policies, etc., it is necessary for insurance companies to maintain sufficient solvency in order to provide against risks which may exceed their usual estimates. The solvency margin ratio means the ratio of “ solvency margin of general insurance companies by means of their capital, reserves, etc. ” to “ risks which will exceed their usual estimates ”, as calculated below.

The solvency margin ratio is one of the indices which the supervisory authority utilizes in order to judge the management soundness of an insurance company. It is understood that problems concerning the management soundness of a general insurance company will not arise if the ratio is 200% or more.

The formula of the calculation of the solvency margin ratio is as follows, and the detailed items of the numerator and the denominator are described in the subsequent subsections :

$$\text{Solvency margin ratio}(\%) = \frac{\text{Total amount of solvency margin}}{\text{Total amounts of risks} \times 1/2} \times 100$$

### 2.5.1 Basic Concept

Solvency margin is a buffer in a company’s assets covering its liabilities, and in other word, the difference between assets,A, and liabilities,L: S=A-L. The supervisors’ mission is not only to protect the policyholders’ rights to receive the promised benefits, but also to ensure the insurers’ financial strength against the volatile capital markets. So it is important to maintain the solvency margin above the certain level.

Solvency margin stipulated by the FSA is calculated as the total sum of the company’s balance-sheet items as follows:

### 2.5.2 Calculation of ”Total Amounts of Risks”

Solvency margin for risks is defined as the risks which will exceed their usual estimates such as the risk of catastrophic loss or a sharp reduction in the value of their assets. The “ Total Amounts of Risks ” (denominator) is calculated differently for life insurers and non-life insurers.

#### Life Insurance

The “ Total Amounts of Risks is calculated as follows:

$$\sqrt{(R_1 + R_8)^2 + (R_2 + R_3 + R_7)^2} + R_4$$

The above “ R ”s represent the following risks respectively:

$R_1$ (Insurance Risk[life]): Risk of massive insurance payouts following a disaster or catastrophe.

$R_2$ (Assumed Interest Rate Risk): Risk that investment return falls below the

Table 2: Items of Solvency Margin

No.	Sign	Item
1	+	Total Equities
2	+	Reserves for Fluctuation in Value of Investment
3	+	Reserves for Catastrophic Risk
4	+	Allowance for Bad Debts
5	+	90% of Latent Profit on Stock (100% of Latent Loss on Stock)
6	+	85% of Latent Profit on Land (100% of Latent Loss on Land)
7	+	Reserves for Dividend to Policyholders of Mutual Insurance
8	+	Underwriting Reserves (excess amount)
9	+	Reserves for Loss of Commodity and Securities Transactions
10	+	The sum total of Deposit, Carried in Capital and Surplus.
11	+	The Equivalent Amount of Tax Effect of Taxable Reserves
12	−	Differed Assets

assumed interest rate.

$R_3$ (Asset Management Risk): Risk of a drastic devaluation of assets because of a crash in stock prices or sharp fluctuation in the currency market, and risk of a sharp increase in irrecoverable loans due to failures of borrowing companies.

$R_4$ (Business Management Risk): Business risk in excess of normal expectations.

$R_7$ (Minimum Guarantee Risk): Risk related to the minimum guarantee for benefits of variable insurance and variable annuity products.

$R_8$ (The 3rd sector Insurance Risk): To the 3rd sector insurance(Japanese generic term for medical,injury and care-giving insurance products), other criteria is applied because the experience rates are scarce and uncertain.

### Non-life Insurance

The “ Total Amounts of Risks ” (denominator) is calculated as follows:

$$\sqrt{(R_5 + R_8)^2 + (R_2 + R_3)^2} + R_4 + R_6$$

$R_2, R_3, R_4,$  and  $R_8$  are common for non -life insurance, but  $R_5$  and  $R_6$  is unique to non-life risk category.

$R_5$ (Ordinary Insurance Risks[non-life]):Risks of the payment of insurance claims in excess of normal expectations

$R_6$ (Major catastrophe risks): A natural disaster strikes. Amount of damage caused by the largest earthquake or typhoon

### 2.5.3 Insurance Risks [life] ( $R_1$ )

Insurance risks of Life Insurance are divided by 3 types of risks, which are unable to cover the assumed mortality or other occurrence rates. The “Total

Table 3: Insurance Risk [life]

Type of Risk	Amount at Risk	Risk Coefficient
A.Ordinary Mortality Risk	Amount of claims payable at death	6/1000
B.Survivor's Risk	Amount of Reserves through term-end for individual annuity insurance	10/1000
C.Other Risks	Amount of risk reserve	1

Amounts of Risks" is calculated as follows:

$$\sqrt{A^2 + B^2 + C}$$

#### 2.5.4 Assumed Interest Rate Risks( $R_2$ )

Risks of invested assets failing to secure required yields corresponding to assumed rates of interest. The risks shall be calculated by applying the amount of underwriting reserves in each category of interest to the probability of assumed rates of interest causing a back spread considering the past development of indexes. (Formula)

Table 4: Assumed Interest Rate Risks

Life Insurance Companies		Non-Life Insurance Companies	
Assumed Intgerest Rate	Risk Coefficient	Assumed Interest Rate	Risk Coefficient
0.0%-2.0%	0.01	0.0%-1.0%	0.01
2.0%-2.0%	0.2	1.0%-3.0%	0.1
3.0%-4.0%	0.4	3.0%-4.0%	0.2
4.0%-5.0%	0.6	4.0%-5.0%	0.35
5.0%-6.0%	0.8	5.0%-6.0%	0.5
6.0%-	1.0	6.0%-	0.7

Assumed interest risk amount = Sum of (reserves for the category of the assumed interest rate  $\times$  corresponding assumed interest rate coefficient)

#### 2.5.5 Asset Management Risks( $R_3$ )

Risk of a drastic devaluation of assets because of a crash in stock prices or sharp fluctuation in the currency market, and risk of a sharp increase in irrecoverable loans due to failures of borrowing companies.

(Formula)

Asset management risk amount = Price fluctuation risk amount + Credit risk

amount + Subsidiaries, etc. risk amount + Derivative transaction risk amount + Reinsurance risk amount + Reinsurance recoverable risk amount

**Price Fluctuation, etc. Risks**

Risks of retained securities and other assets fluctuating in prices in excess of normal expectations. Risks arise from yields in each type of investment being lower than normal expectations (with a 90 % probability) on the basis of indexes in the past 10 years and more.

(Formula)

Price fluctuation risk amount = Sum of (assets at risk\* × corresponding risk coefficient) × coefficient for the effectiveness of investment diversification

\* Domestic stock, foreign stock, yen-denominated bonds, foreign currency-denominated bonds, foreign currency loans, real estate (domestic land) , gold bullion, trading securities

Table 5: Price fluctuation risk

Assets at Risk	Risk Coefficient
Domestic(Japanese) Equity	10%
Foreign Equity	10%
Yen-dominated Bonds	1%
Foreign Currency Bonds, Foreign Currency Loans	5%
Real Estate	5%
Gold Bullion	20%
Trading Securities	1%

**Credit Risks**

Risks arising from the default, etc. of other parties to the transactions of retained stocks, loans, and other assets. Risks are classified according to the creditworthiness of other parties.

(Formula)

Credit Risk Amount = Sum of (assets at risk\* × corresponding risk coefficient)

\* Loans, bonds, and deposits

Other asset management risks include "Subsidiaries, etc. Risks" and "Derivative Transaction Risks", "Reinsurance Risk and Reinsurance Recoverable Risks". These risks are quantified by similar calculation formulas such as (amount at risk) × (risk coefficient).

**2.5.6 Business Management Risks( $R_4$ )**

Risks arising in excess of normal expectations in connection with the management of business and not falling under any of the above categories The risks

Table 6: Credit Risks

Assets at Risk		Risk Coefficient
Loans	Rank1	0%
Bonds	Rank2	1%
Deposits	Rank3	4%
	Rank4	30%
Short-term Lending Transactions		0.1%

shall be calculated at a certain percentage of the total of all other risks.

(Formula)

Business Management Risk Amount = amount at risk\* × risk coefficient according to the category of insurance company

\* Amount at general insurance risk + amount at assumed interest rate risk + amount at asset management risk + amount risk due to major catastrophe risk.

Table 7: Business Management Risks

Type of Company	Risk Coefficient
Companies reporting a loss at the end of the current accounting period	1%
Companies other than the above	2%

### 2.5.7 Ordinary Insurance risks [non-life] ( $R_5$ )

Risks of the payment of insurance claims in excess of normal expectations. The risks shall be deemed to arise from differences between the maximum probable losses and the average loss ratios obtainable with a certain probability according to the statistics of past loss ratios by types of business. Probability calculation on the amount of damage expected to occur 10% per annum, say once in 10 years (excluding catastrophe loss risks and assumed rate of interest risks) Specifically, the amount at risk should be calculated by the type of insurance, considering the correlation for each type of insurance by using amount of the insurance premium at risk that was subject to the risk coefficient corresponding to the net earned premium, or amount of insurance coverage at risk for which the risk coefficient was applied to the average net accrued insurance claims for the past three years after deducting amounts for catastrophes, whichever is higher.

The "Total Amounts of Risks" is calculated as follows:

$$\sqrt{(1 - \rho) \times (a^2 + b^2 + c^2 + d^2 + e^2 + f^2) + \rho \times (a + b + c + d + e + f)^2}$$

\*Correlation coefficient of risk for each type of insurance (=0.05), In aggregating risks, diminishing effects because of a correlation between risks are considered.

Table 8: Ordinary Insurance risks [non-life]

Type of Insurance	Insurance Premium		Insurance Coverage		
	Amount at Risk	Risk Co-efficient	Amount at Risk	Risk Co-efficient	
a. Fire Insurance (excluding homeowner's earthquake insurance)	Net earned premium	12%	Net	33%	
b. Personal Accident Insurance		9%		26%	
c. Auto Insurance		8%		Incurred Insurance claims	14%
d. Hull Insurance		56%			62%
e. Cargo Insurance		21%			39%
f. Other Insurance (excluding auto liability insurance)		17%			34%

(Correlative coefficients in general insurance risks, the calculation of the total amount of risks, etc.)

### 2.5.8 Major Catastrophe Risks ( $R_6$ )

Risks of the occurrence of major catastrophes as a result of natural disasters like earthquakes, windstorms, floods, etc. The amount of damage caused by an earthquake similar to the Great Kanto Earthquake in scale or a typhoon similar to Typhoon Mireille in 1991 in gravity. Shall be deemed to be the risk.

Major catastrophe risk amount = Earthquake damage risk amount\* or flood damage risk amount\*\*, whichever is the higher

\*The earthquake damage risk amount means the total amount calculated according to the net insured amounts and loss frequencies on the subject matters of insurance located in regions prone to earthquakes and covered under fire insurance (excluding homeowners' earthquake insurance), personal accident, automobile insurance, hull insurance, marine cargo insurance and other insurance (excluding automobile liability insurance) which are inclusive of earthquake coverage; plus the limits of liability under homeowners' earthquake insurance.

\*\*The windstorm and flood damage risk amount means the total amount calculated according to the net insured amounts and loss frequencies on the subject matters of insurance located in regions prone to windstorms and floods and covered under fire insurance (excluding homeowners' earthquake insurance), personal accident insurance, hull insurance, marine cargo insurance and other insurance (excluding Compulsory Automobile Liability Insurance) which are inclusive of coverage against windstorms and floods.

### 2.5.9 Minimum Guarantee Risk ( $R_7$ )

Minimum Guarantee Risk is related to the minimum guarantee for benefits of variable insurance and variable annuity products. The FSA's view is "a risk equivalent value corresponding to the minimum guarantee risks should be established consistently with the funding rules for policy reserves." and "the additional amount that needs to be funded to cover the risks that arise due to potential price fluctuations in excess of what are currently projected as normal (to cover approximately 90% of events when combined with a policy reserve relating to minimum guarantees) should be set at 2 under the standard method; or computed by risk evaluations that are based on multiple scenarios, etc. under the alternative method.

### 2.5.10 Insurance Risks [3rd sector insurance] ( $R_8$ )

Insurance risks of 3rd sector insurance are divided by the following 5 types of risks, which are unable to cover the assumed mortality or other occurrence rates. Life insurance companies own all types of risks, but non-life insurance companies own type D risk. The "Total Amounts of Risks" is simply the total

Table 9: Insurance Risks [3rd sector insurance]

Type of Risk	Amount at Risk	Risk Coefficient
E.Stress Risk	Amount of risk reserve	0.1
F.Accident Mortality Risk	Amount of claims payable at accidental death	0.06/1000
G.Injury Hospitalization Risk	Per diem amount for injury hospitalization × Expected average number of benefit days	3/1000
H.Sickness Hospitalization Risk	Per diem amount for sickness hospitalization × Expected average number of benefit days	7.5/1000
D.Other Risks	Amount of risk reserve	1

sum of all risk amounts.

## 3 Report of the FSA study group

The "Program for Further Financial Reform" published by the Financial Services Agency (FSA) in December 2004, claimed the need to review the calculation standard for the solvency margin ratio in order to improve insurers' financial soundness and further optimize their risk management.

In response, a group comprised of academicians and others as members, began deliberations in November of last year and published a report "Regarding Solvency Margin Ratio Calculation Standards" on April 3, 2006.

These deliberations represented the first opportunity for conducting comprehensive discussions on the solvency margin ratio since this ratio was introduced to Japan in 1996. The study group not only deliberated on the method for calculating the solvency margin ratio but also held comprehensive discussions on a wide range of issues such as how to evaluate solvency, how to further optimize insurance companies' risk management and how to communicate the solvency margin ratio to policyholders.

The following are the major points that were discussed by the study group. In light of these points, the FSA will conduct deliberations in order to implement specific revisions of the calculation standard for the solvency margin ratio and realize solvency evaluation based on economic value.

### 3.1 Outline

The outline of the report is as follows. It consists of "Objective of Solvency Margin Ratio," "Approach to Implementing Specific Revisions" and "Efforts to Establish Solvency Evaluation Based on Economic Value".

#### 3.1.1 Objectives for reform of Solvency Margin Ratio

1. Concerning insurance companies: to encourage change in the mindset of the management team by providing incentives for implementing measures to make their risk measurement and management techniques more advanced, particularly an implementation of ALM (asset liability management).

2. Concerning policyholders: To communicate the meaning of the solvency margin ratio through public disclosure by insurance companies in order to enhance consumers' understanding regarding the ratio.

#### 3.1.2 Improvements in credibility

It is widely recognized of great importance to improve the credibility of the solvency margin ratio of 200% as a trigger point for early corrective action by reflecting the actual status of financial markets and enhancing confidence levels.

#### 3.1.3 Direction of solvency evaluation

To aim to realize the solvency regime that recognizes the volatility of the net asset, the difference between the value of assets and the value of liabilities (net assets) on an economic value basis<sup>1</sup> as the risk quantity and manages the volatility appropriately.

### 3.2 Approach to Implementing Specific Revisions

To continue the use of existing evaluation techniques while improving them up until the introduction of an solvency evaluation based on economic value.

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<sup>1</sup>Evaluation based on economic value means evaluation of the asset-liability cash flow that is consistent with market value.

### 3.2.1 Approach to specific revisions

#### General Instructions

1. To update data used as a basis for calculation of the risk coefficients so as to reflect the most recent actual conditions of the market. It is necessary not only to replace old data with new but also to ensure the accountability of the new method so as to obtain public understanding.
2. To consider raise the confidence levels of the risk coefficients so as to improve the credibility of the solvency margin ratio. As a first step, it would be appropriate to raise the confidence level to around 95%.<sup>2</sup>

#### Specific revisions needed

Revisions are considered to be necessary for evaluations of both risks and margin.

#### Risks

1. Assumed interest rate risk: To revise the risk coefficients based on the most up-to-date data, etc.
2. Price volatility risk: To examine the risk based on the most up-to-date data after reviewing the confidence level and the measurement period.
3. Effects of diversified investment: To consider a method for calculating the effects based on the asset composition ratios of each company.

#### Margin (excess ability to make payments)

Tax deferred assets/tax effect equivalent amount/future profits: It is necessary to consider a certain degree of correction in relation to these items.

### 3.3 Efforts to Establish Solvency Evaluation Based on Economic Value

To make constant efforts with a view to realizing solvency evaluations based on economic value by 2010.<sup>3</sup>

#### Specific measures

1. Measure for liability evaluation based on economic value  
To start work on making the best estimates of the technical provisions.
2. Measure for sophisticating standard approaches  
To aim to develop a standard approach for measuring interest rate risk, etc. in ways that reflect the ALM of the companies concerned.

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<sup>2</sup>With regard to the price volatility risk, the current confidence level stands at 90%.

<sup>3</sup>The year 2010 is regarded as a watershed point for implementing solvency regime based on economic value in Europe.

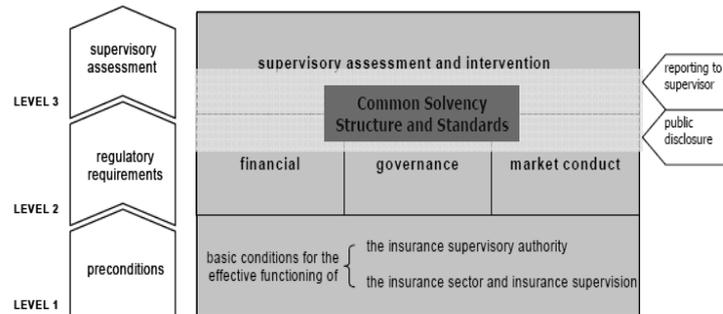
## 4 Major discussion points for further reform

In this section, we will go further to comment on the major discussion points of solvency regulation.

### 4.1 Regulation Structure

1) In the international framework, it is widely recognized that only the solvency margin ratio is inadequate to maintain the company's overall solvency level. BaselIII for banking business consists of 3 pillars: minimum capital requirements, a supervisory review process, and effective use of market discipline. IAIS proposed the new framework for Insurer solvency. There are 3 levels, and in the 2nd level "Regulatory Requirements" consists of 3 blocks; the financial block, the governance block and the market conduct block.

Figure 2: Outline of the framework for Insurance Supervision(IAIS)



2) The FSA of Japan also fundamentally adopted 3 pillar approach for banking and insurance business. But, in terms of the solvency regulation, there still exists weakness in linkage of the financial block with the governance block and the market conduct block, borrowing the terminology of IAIS. It is awaited of the new methodology to combine the solvency margin ratio with the corporate governance and the market discipline.

### 4.2 Assumed Interest Risk and Economic Value based evaluation

1) The current method for quantifying "Assumed Interest Rate Risk" as the difference between the forecast rates" and "assumed interest rates" is inappropriate, because "Interest rate risk" should be considered in light of "asset-liability" interaction. The current method quantifies "expected loss", not "unexpected loss", which should be regarded as expense.

2) In consideration of the Standard on Asset Liability Management published by IAIS in October 2006 and the report published by the study team on solvency

margin ratio calculation standards in April 2007, it is necessary to investigate the current state, as well as future policies, of asset-liability management and risk management of all insurance companies.

3) With respect to economic value-based solvency assessment (i.e., evaluation method for insurance liabilities and interest rate risks based on the methods which are consistent with financial markets), all insurance companies and the Institute of Actuaries of Japan are expected to make efforts to exploit and develop internal management practices.

4) Achieving a solvency regime that recognizes changes in net asset value, (i.e. the difference between asset value and liability value based on economic value) as risk volume, and manages such changes properly, the FSA should develop a regime which will provide incentive to insurance companies to further sophisticate their risk measurement and risk management.

### 4.3 Solvency Margin

1) Tax deferred assets, tax effect equivalent amount, future profits can be taken into account in the calculation of the solvency margin. Some argue that their treatments are too generous, and more strict criteria for inclusion is necessary.

2) Subordinate debts are also admitted as an item of solvency margin, but effective to the extent that Core capital is not exhausted. Some argue more strict inclusion criteria is necessary.

### 4.4 To increase the confidence level concerning quantifying risk amounts

1) The current risk measurement is based on the confidence level of 90% in a year for price fluctuation risk, but 99% for insurance risks. There is a strong agreement that this discrepancy should be corrected as soon as possible, and higher level of confidence should be applied. The US RBC uses 99%, and EU Solvency II does 99.5%, which means triple B of the bond rating. It is recommended that the new regime should use at least 99% level, possibly 99.5%.

2) The current risk measurement considers diversification effect to some extent. For example, the correlation coefficient between the domestic equity returns and domestic bond returns is 30% for life insurance, 20% for non-life insurance. But, in particular for life insurance, the development status of investment risk managements, in consideration of the increasing diversity and complexity of the invested assets is rapidly changing, it is necessary to take more detailed asset classes and mutual diversification effects into account, and to review the risk categories and structure more frequently.

### 4.5 Major Catastrophe Risks

1) The current measurement method of major catastrophe risks is the greater of the risk amount of earthquakes and that of windstorms and floods. There

are a strong consensus for improvement that the criteria should consider both the earthquake risk and the windstorms and flood risks simultaneously. In the meantime, the risk measurement period should be set the same 70 years, which is now 200 years for earthquake risks.

2) The current earthquake risks assume only the Great Kanto Earthquake. In Japan's history, the large earthquakes occurred in other than Kanto area, the historical data in other areas should be collected and analysed, and applied to the earthquake risk measurement.

#### 4.6 More Sophistication and Internal Model

1) From international supervisory perspective, the risk management should be carried out by insurance companies at their own risk and responsibility, and the supervisors examine whether the management process goes well or not. Ideally, they carry out the framework building, system design and implementation for overall risk management. In reality, it is difficult for many companies to do so because of shortage of money and human resources.

2) Generally speaking, Japanese solvency margin system is too simplistic for the present risks situation surrounding the insurance companies. More sophisticated risk management is needed for better business decisions, too. The supervisors should provide them with good incentives for exploiting and introducing advanced risk management system, internal models. EU Solvency II recommends the wide use of internal models, and this is the way ahead of the ideal supervision.

#### 4.7 Disclosure and Public Informations

1) It is important to convey reliable and easy-to-understand informations to the consumers to select insurance companies and products. The current disclosure items are the meaning of solvency margin ratio, the total amount and breakdown of solvency margins, the significance, total amounts and breakdowns of risks in the solvency margin ratio. These informations should be shown properly disclosed about the enhancement of the ability to pay insurance claims.

2) Other disclosed informations include the changes in the total amounts of solvency margins, the revenue sources for solvency margins in the balance sheet, and their features are described such as being permanent. It is also important to check whether solvency margins are properly compared with risks, and whether the numerical values of solvency margins ratio itself are overemphasized.

### 5 Concluding Remarks

Due to the increasingly diversified and complex needs of consumers and changes in the market environment, insurance companies are required to maintain financial soundness with the sophisticated risk management and disclose

their financial information appropriately to policyholders based with voluntary and continuous efforts by their management team, in order to properly identify various risks and fulfill their responsibility to policyholders in an appropriate manner.

Japanese supervision on Insurance is changing for the direction that each company will adopt risk management practices that recognize the valuation of assets and liabilities consistently based on their economic values, in consideration of international trends. During the process, the FSA of Japan seems to identify the current state and issues of the each insurers' risk management through dialogues.

The FSA of Japan is of utmost interest in the EU solvency II project, and wonders whether this project will end successfully or not. The culture of Japanese insurance industry is very complex and diversified which has been influenced by many origins, so the regulatory framework necessary for the next decade will be universal and internationally acceptable. European project is a useful yardstick for Japanese new supervision.

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