RBC [solvency] regulation and practices

Risk Management and Beyond

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Contents

Solvency II overview

Key Objectives

The key objectives of Solvency II are as follows:

- **Improved consumer protection:** It will ensure a uniform and enhanced level of policyholder protection across the EU. A more robust system will give policyholders greater confidence in the products of insurers.
- **Modernised supervision:** The "Supervisory Review Process" will shift supervisors' focus from compliance monitoring and capital to evaluating insurers' risk profiles and the quality of their risk management and governance systems.
- **Deepened EU market integration:** Through the harmonisation of supervisory regimes.
- **Increased international competitiveness of EU insurers.**

The Three Pillars

Solvency II is not just about capital. It is a comprehensive programme of regulatory requirements for insurers, covering authorisation, corporate governance, supervisory reporting, public disclosure and risk assessment and management, as well as solvency and reserving.

The Solvency II programme is divided into three areas, known as *pillars*:

Quoted from the HP of Lloyd's

Solvency II overview

PILLAR 1
Financial Requirements

- Two thresholds:
  - Solvency Capital Requirement (SCR)
  - Minimum Capital Requirement (MCR)
- SCR is calculated using either a standard formula or, with regulatory approval, an internal model.
- MCR is calculated as a linear function of specified variables: it cannot fall below 25%, or exceed 45% of an insurer's SCR.
- There are also harmonised standards for the valuation of assets and liabilities.

PILLAR 2
Governance & Supervision

- Effective risk management system.
- Own Risk & Solvency Assessment (ORSA)
- Supervisory review & intervention.

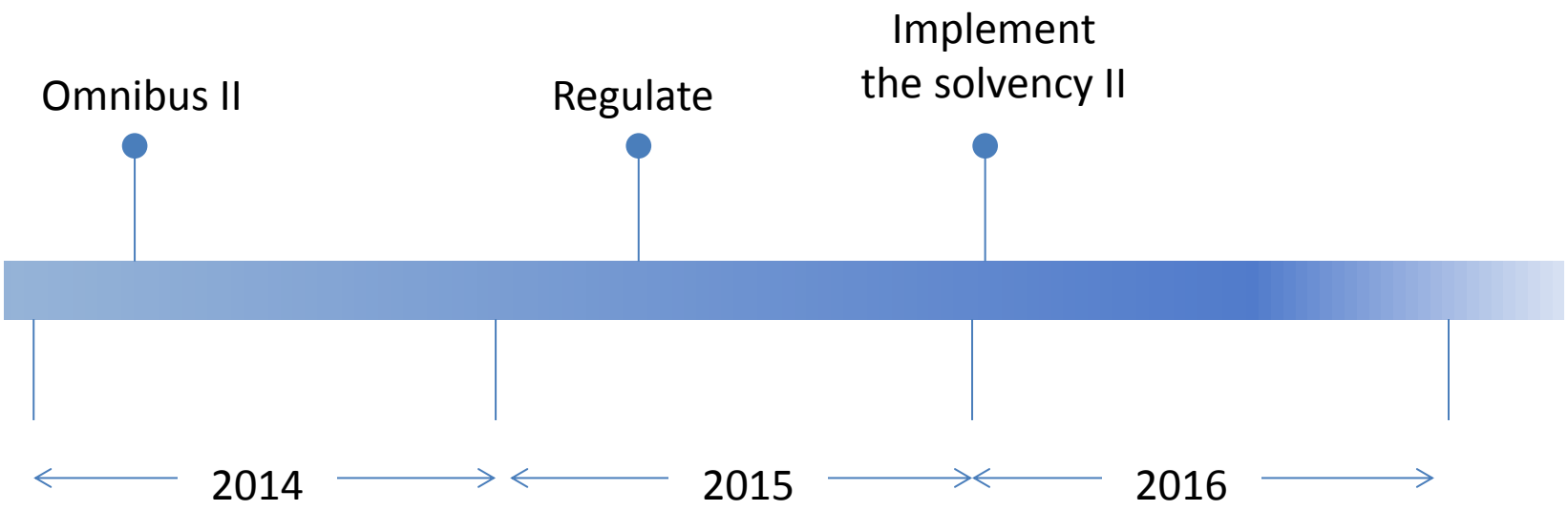
PILLAR 3
Reporting & Disclosure

- Insurers required to publish details of the risks facing them, capital adequacy and risk management.
- Transparency and open information are intended to assist market forces in imposing greater discipline on the industry.

Quoted from the HP of Lloyd's

Solvency II overview

March 2014, European Parliament adopted the Omnibus II, this suggested the commencement of Solvency II from 2016.



ORSA overview

ICP	Contents
16.11	**The supervisor requires the insurer to perform its own risk and solvency assessment (ORSA) regularly to assess the adequacy of its risk management and current, and likely future, solvency position.**
16.12	**The supervisor requires the insurer's Board and Senior Management to be responsible for the ORSA.**
16.13 Risk Appraisal	**The supervisor requires the insurer's ORSA to encompass all reasonably foreseeable and relevant material risks including, as a minimum, underwriting, credit, market, operational and liquidity risks and additional risks arising due to membership of a group. The assessment is required to identify the relationship between risk management and the level and quality of financial resources needed and available.**
16.14 Capital Adequacy	**determine, as part of its ORSA, the overall financial resources it needs to manage its business given its own risk tolerance and business plans, and to demonstrate that supervisory requirements are met;** **base its risk management actions on consideration of its economic capital, regulatory capital requirements and financial resources, including its ORSA; and** **assess the quality and adequacy of its capital resources to meet regulatory capital requirements and any additional capital needs.**
16.15 Ability to continue	**the insurer, as part of its ORSA, to analyse its ability to continue in business, and the risk management and financial resources required to do so over a longer time horizon than typically used to determine regulatory capital requirements;**
16.16	**The supervisor undertakes reviews of an insurer's risk management processes and its financial condition**

ORSA overview

Implement status of each region

EU	**Pillar 2 of Solvency II** **ORSA final report (EIOPA) was published in July 2012. "The guideline focus on what is to achieved by ORSA rather than on how it is to be performed"**
US	**2013: NAIC issued "ORSA guidance manual"** **2015: implementation of ORSA**
Netherland	**2012: Vision on ORSA Good Practice** **Sample report was also issued. For the integrated risk management, it is recommended that the volume of paper should at most 10 pages.** "Most of the ORSA elements and preconditions already exist in some form … Integration of these elements and the transition towards a formal ORSA process should start from a gap analysis"
CANADA	**2012: Life insurance Regulatory Framework; "** **2013: Final Guideline (E19)** **2014: Implementation**
Singapole	**2013: "Enterprise risk management for insurers"** Two separate section "mandatory requirement", "non-mandatory requirement" ORSA template was issued

ORSA overview

Items	Consultation Paper on the proposal for Guidelines
Guideline 1 Proportionality	The undertaking should develop for the ORSA its own processes with appropriate and adequate techniques, tailored to fit into its organisational structure and risk-management system and taking into consideration the nature, scale and complexity of the risks inherent to the business.
Guideline 2:Role of the AMSB: top-down approach	The AMSB of the undertaking should take an active part in the ORSA, including steering, how the assessment is to be performed and challenging the results. (AMSB=The administrative, management or supervisory body)
Guideline 3: Documentation	The undertaking should have at least the following documentation on the ORSA: a) the policy for the ORSA; b) record of each ORSA; c) an internal report on each ORSA; d) a supervisory report of the ORSA
Guideline 4:Policy for the ORSA	The AMSB of the undertaking should approve the policy for the ORSA Details are in the next page
Guideline 5:Record of each ORSA	The undertaking should evidence and document each ORSA and its outcome
Guideline 6:Internal reporting on the ORSA	The undertaking should communicate to all relevant staff at least the results and conclusions of the ORSA, once the process and the results have been approved by the AMSB.

Consultation Paper on the proposal for Guidelines on system of governance and own risks and solvency assessment

ORSA overview

Policy for the ORSA	The AMSB of the undertaking should approve the policy for the ORSA

a) a description of the processes and procedures in place to conduct the ORSA;
b) a consideration of the link between the risk profile, the approved risk tolerance limits and the overall solvency needs;
c) a description of the methods and methodologies including information on:
   i. how and how often stress tests, sensitivity analyses, reverse stress tests or other relevant analyses are to be performed;
   ii. data quality standards;
   iii. the frequency of the assessment itself and the justification of its adequacy particularly taking into account the undertaking's risk profile and the volatility of its overall solvency needs relative to its capital position ;
   iv. the timing for the performance of the ORSA and the circumstances which would trigger the need for an ORSA outside of the regular time-scales.

Consultation Paper on the proposal for Guidelines on system of governance and own risks and solvency assessment

ORSA overview

Items	Consultation Paper on the proposal for Guidelines
Guideline 7 Assessment of the overall solvency needs	• The undertaking should provide a quantification of the capital needs and a description of other means needed to address all material risks irrespective of whether the risks are quantifiable or not. • Where appropriate, the undertaking should subject the identified material risks to a sufficiently wide range of stress test or scenario analyses in order to provide an adequate basis for the assessment of the overall solvency needs.
Guideline 8: Forward-looking perspective of the overall solvency needs assessment	The undertaking should ensure that its assessment of the overall solvency needs is forward-looking, including a medium term or long term perspective as appropriate.

Consultation Paper on the proposal for Guidelines on system of governance and own risks and solvency assessment

ORSA overview

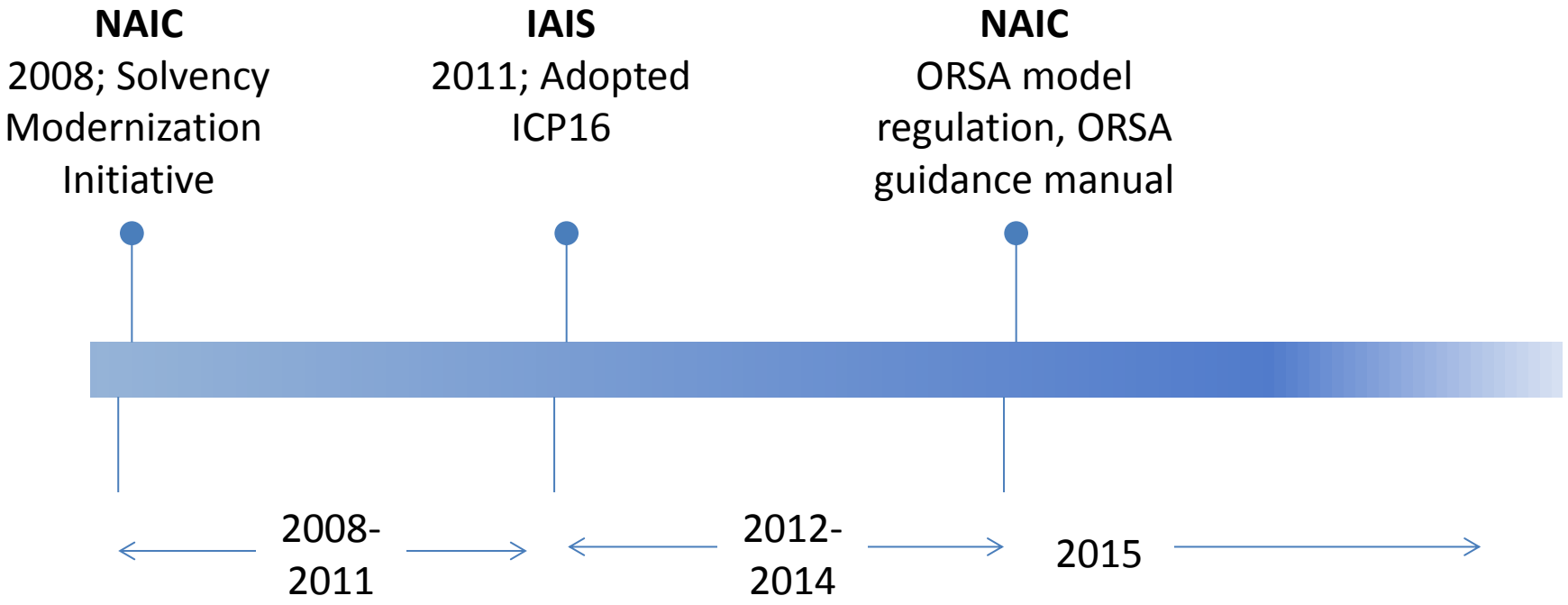
Guideline 9: Valuation and recognition bases of the overall solvency needs	• The undertaking should, if it uses recognition and valuation bases that are different from the Solvency II bases in the assessment of its overall solvency needs, explain how the use of such different recognition and valuation bases ensures better consideration of the specific risk profile, approved risk tolerance limits and business strategy of the undertaking, while complying with the requirement for a sound and prudent management of the business. • The undertaking should quantitatively estimate the impact on the overall solvency needs assessment of the different recognition and valuation bases in those cases where recognition and valuation bases that are different from the Solvency II bases have been used in the assessment of its overall solvency needs.
Guideline 10: Continuous compliance with regulatory capital requirements	The undertaking should analyse whether it complies on a continuous basis with the Solvency II regulatory capital requirements and as part of this assessment it should include at least: a) the potential future material changes in its risk profile; b) the quantity and quality of its own funds over the whole of its business planning period; c) the composition of own funds across tiers and how this composition may change as a result of redemption, repayment and maturity dates during its business planning period.

ORSA overview

Guideline 11 Continuous compliance with technical provisions	The undertaking should require the actuarial function of the undertaking to: a) provide input as to whether the undertaking would comply continuously with the requirements regarding the calculation of technical provisions; b) identify potential risks arising from the uncertainties connected to this calculation.
Guideline 12: Deviations from assumptions underlying the Solvency Capital Requirement calculation	The undertaking should assess whether its risk profile deviates from the assumptions underlying the Solvency Capital Requirement calculation and whether these deviations are significant. The undertaking may as a first step perform a qualitative analysis and if that indicates that the deviation is not significant, a quantitative assessment is not required.
Guideline 13:Link to the strategic management process and decision-making framework	The undertaking should take into account the results of the ORSA and the insights gained during the process of this assessment in at least: a) its capital management; b) its business planning; c) its product development and design.
Guideline 14: Frequency	The undertaking should perform the ORSA at least annually

ORSA in U.S.

The introduction of concept of ORSA to U.S.



ORSA in U.S.

http://www.naic.org/store/free/ORSA_manual.pdf

NAIC OWN RISK ABD SOLVENCY ASSESSMENT (ORSA) GUIDANCE MANUAL
as of July 2014

ORSA in U.S.

- Out line of the ORSA feedback pilot project

- From 2015, NAIC implements the ORSA feedback pilot project = ORSA trial

	1st trial	2nd trial
	2012	2016
Number of states	12	16
Number of ORSA submit	134	167
Number of the company or group	14	22

ORSA practice (an example)

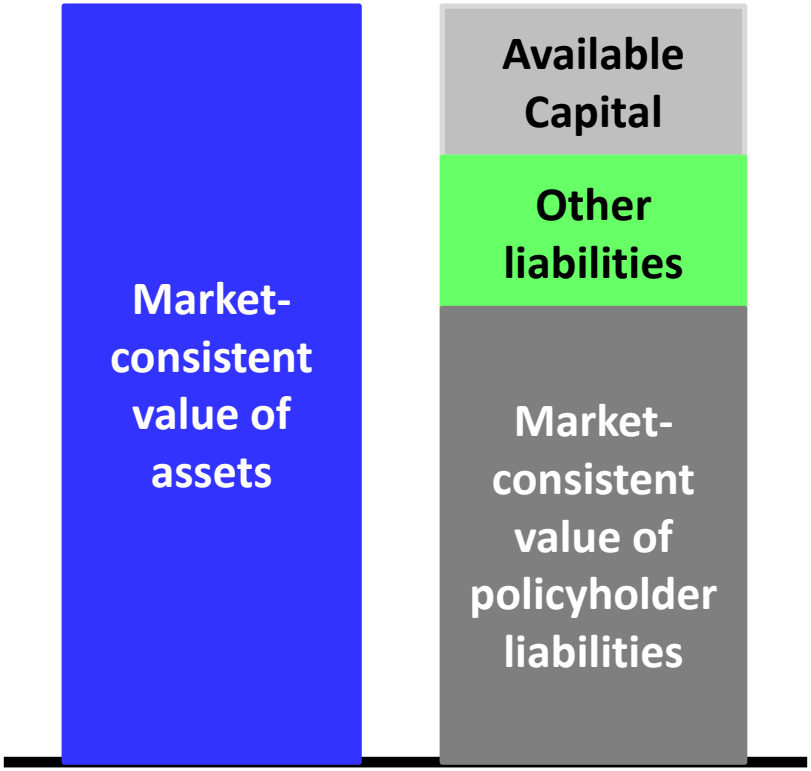
Contents of Document

items	Contents
Executive Summary	Purpose of the report / Conclusion / Domain / Risk appetite
Solvency 2 appraisal	Conclusion / Margin Increase and decrease of Risks during the last year Other specific topics (Variable Annuity / Diversification / Shock scenario)
Statutory Solvency Appraisal	Governance Appraisal of current status
Stress Tests	Liquidity risk Sensitivity analysis / compound shock scenario / reverse stress scenario Event stress test (big earthquacke)
Future Capital Projection	Future capital projection under the solvency 2 (3 years)
ORSA	Process / Role of each dividend
Appendix	Framework of the integrated risk management Overview of the internal model Other important risks

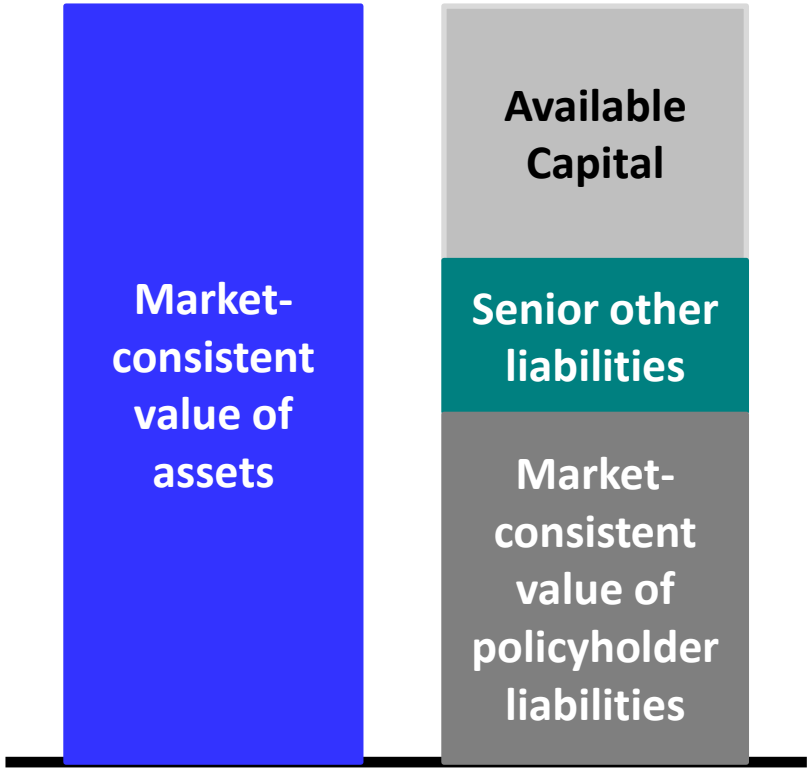
ORSA practice (an example)

Question	Answer
Workload	1. 27 - 30 man-day (total divisions concerned) 2. 13 - 15 man-day (charged division) 3. Total periods for the document = 12 months (group level) 4. 10 months (each local entity)
Report / Approval	1. CRO and CFO confirm the ORSA report of the local entity 2. Holding company review it 3. Risk management committee approves the ORSA report 4. Report to the Board Meeting
Support from the parent company	1. Template was developed 2. Parent company recommended to use the template 3. [but using template, in some case, restricts the presentation of the autonomy of each company]
Indicator	1. 4 indicators – capital, value, Earnings and Liquidity 2. Risk adjusted return – IRR and NBV
Risk classification	1. Required capital related risks = financial risks (excl. liquidity risk), insurance risk, operational risk, intangible asset risk 2. Risks not include to the required capital = liquidity risk, strategic risk, regulation risk, reputation risk and emerging risk

Market-consistent Balance Sheet



Market-consistent Balance Sheet Solvency / policyholder perspective



Senior other liabilities = Only liabilities that rank higher than or equal to policyholders

CEA Working Paper on the Total Balance Sheet Approach: page 2

1 Determining available capital

1.1 Insurance companies can have different stakeholders (for example policyholders, secured bondholders, unsecured bondholders and shareholders) all with different perspectives on, for example, the balance to be struck between expected return and associated risk.

1.2 It is recognised that an insurance balance sheet will include liabilities other than policyholder liabilities. However, in keeping with the intended framework, the main focus of Solvency II should be the ability to meet policyholder claims in adverse circumstances developing over a one year time horizon and hence in principle, the liabilities for solvency purposes should focus on obligations that rank equal or higher than policyholder claims.

1.3 We noted above that a main focus of Solvency II is policyholder protection. In keeping with this, the economic balance sheet (market-consistent, total balance sheet) should be based on the policyholder perspective. This means that for solvency purposes only other liabilities that rank equal to or above policyholder liabilities in the event of the company winding up need to be taken into account. This is because liabilities ranking below policyholder liabilities would not be paid until higher ranking liabilities (i.e. policyholders) had been met in full.

1.4 The other liabilities shown above in the left hand figure could include such items as subordinated debt, general creditors, deferred tax, etc. In the event of a company being wound up it is likely that most of these other liabilities would not be “senior”, i.e. they would rank below policyholder liabilities in the event of the company being wound up and therefore would be able to absorb losses in the first instance.

1.5 From a policyholder perspective these other liabilities are effectively available capital. The other liabilities that rank equal to or above policyholders (referred to as "senior other liabilities" in the right hand figure above) would often be relatively small and be, for example, in respect of tax and possibly outstanding salaries to employees, although could include debt, e.g. with first call on specific (secured) future cashflows and/or collateral. Technically, liabilities in respect of reinsurance accepted would rank below (direct) policyholder liabilities in the event of a company wind up, however, for solvency purposes we think it would be appropriate to assume that they rank equal to (direct) policyholder liabilities.

1.6 Under a total balance sheet approach, assets and liabilities are to be valued on a market-consistent basis, although as noted above, for solvency purposes, liabilities that rank below policyholders will be excluded. We recognise that in certain circumstances, market values of assets and liabilities may not be readily observable and in such cases approximations may be required. The market consistent value of policyholder liabilities has been discussed extensively in other CEA papers (for example see the joint submission 'Solutions to Major Issues for Solvency II' by the CRO Forum and the CEA).

1.7 An implication of the total balance sheet approach is that the available capital is based on the difference between the market consistent value of assets and liabilities (excluding those ranking below policyholders). Under this approach all capital elements on the liability side of balance sheet which are not liabilities from solvency/policyholder perspective are treated as part of the available capital. This would include items such as subordinated debt, surplus funds and existing equalisation reserves.

Total balance sheet approach to solvency assessment ICP 17

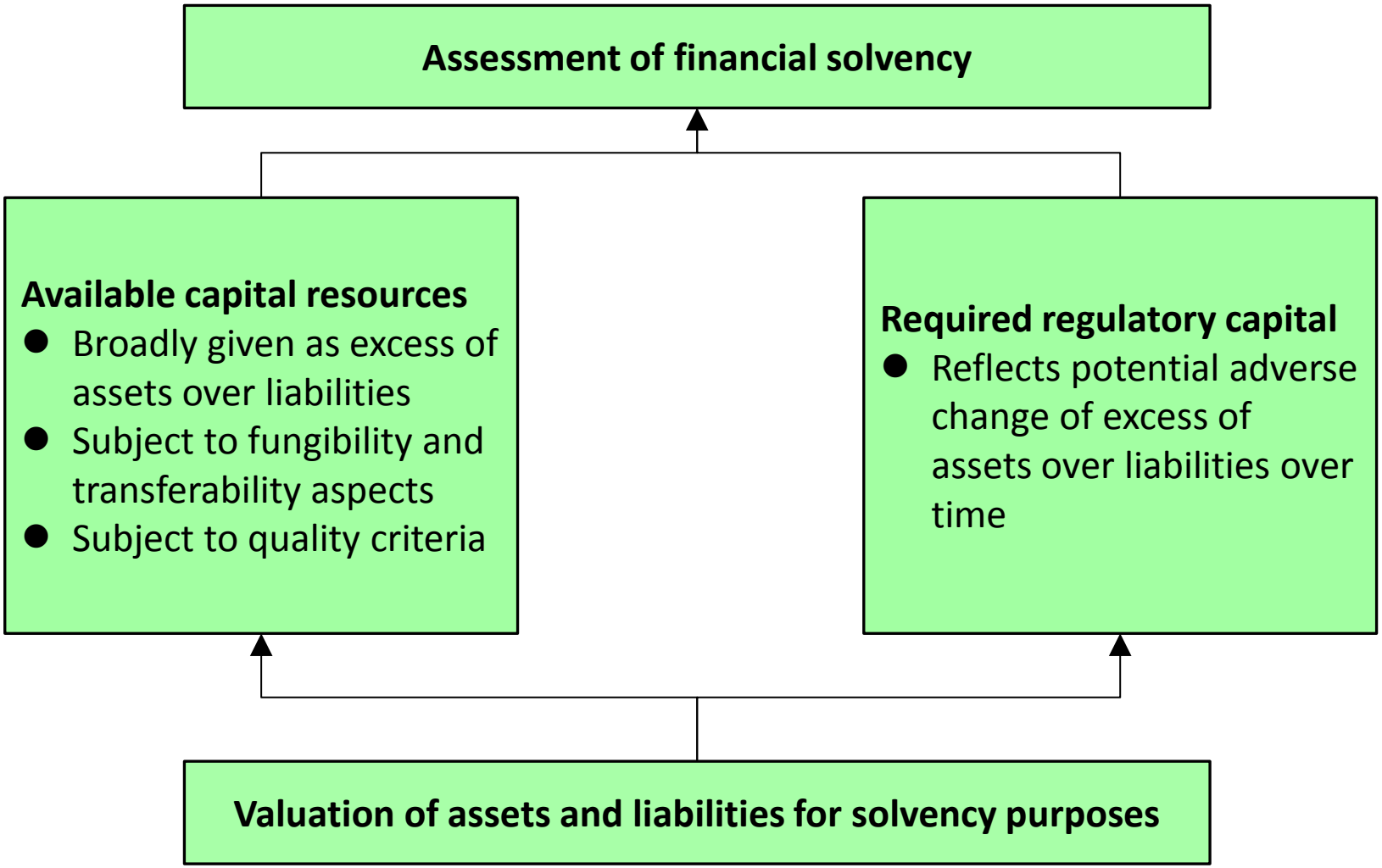


Figure 17.4

Digest from "The underlying assumptions in the standard formula for the Solvency Capital Requirement Calculation"(EIOPA 2014)

1. The overall structure of the standard formula

The underlying assumptions for the overall structure of the standard formula can be summarised as follows:

- Diversification effects are taken into account when capital requirements are aggregated by using correlation matrices. For aggregating the individual risk sub-modules and modules to obtain the overall SCR, linear correlation techniques are applied. The setting of the correlation coefficients is intended to reflect potential dependencies in the tail of the distributions, as well as the stability of any correlation assumption under stress conditions.
- The SCR covers all quantifiable risk for existing business and also new business expected to be written in the following 12 months. However, in the scenario-based calculations, the changes in the value of assets and liabilities over the 12 months following the scenario stress are not taken into account, given the instantaneous nature of the stresses. Therefore, in such cases the capital requirements do not take into account the profit or loss of the business expected to be written during the following months. The formula-based calculations allow capturing risks associated with new business expected to be written in the following 12 months.
- The SCR is calibrated using the Value at Risk (VaR) of the basic own funds of an insurance or reinsurance undertaking subject to a confidence level of 99.5 % over a one-year period. This calibration objective is applied to each individual risk module and sub-module.

Digest from "The underlying assumptions in the standard formula for the Solvency Capital Requirement Calculation"(EIOPA 2014)

1.1 Correlations in the standard formula

The underlying assumptions for the correlations in the standard formula can be summarised as follows:

- The dependence between risks can be fully captured by using a linear correlation coefficient approach.
- Due to imperfections that are identified with this aggregation formula (e.g. cases of tail dependencies and skewed distributions) the correlation parameters are chosen in such a way as to achieve the best approximation of the 99.5 % VaR for the overall (aggregated) capital requirement.

In the standard formula, correlation parameters should be chosen in such a way as to achieve the best approximation of the 99.5% VaR for the aggregated capital requirement. In mathematical terms, this approach can be described as follows: For two risks X and Y with $\mathrm{E}(\mathrm{X}) = \mathrm{E}(\mathrm{Y}) = 0$, the correlation parameter ρ should minimize the following aggregation error:

$$|Var(X+Y)^2 - Var(X)^2 - Var(Y)^2 - 2\rho \cdot Var(X) \cdot Var(Y)|$$

$$\underset{\rho}{\operatorname{argmin}}\{|(Var(X+Y) - Var(X) - Var(Y))^2 - 4\rho^2 \cdot Var(X) \cdot Var(Y)|\}$$

Digest from "The underlying assumptions in the standard formula for the Solvency Capital Requirement Calculation"(EIOPA 2014)

1.3 Risks not explicitly formulated in the standard formula calculation

The underlying assumptions for risks not explicitly formulated in the standard formula calculation can be summarized as follows:

- **Not all quantifiable risks have been explicitly formulated in the standard formula. As a consequence some risks which are not explicitly included in the standard formula may be relevant for a particular undertaking. Some risks whose nature and calibration strongly depend on the single undertaking specificity may not be explicitly covered in the framework of the standard formula.**
- **The standard formula was designed from a solo perspective and applied mutatis mutandis for groups. Therefore, some risks which are relevant only for entities belonging to a group may not be covered by the standard formula.**
- **Certain risks are implicitly considered in other risk modules or sub-modules or in even multiple risk modules or sub-modules simultaneously. These risks are therefore considered to be implicitly formulated in the standard formula design and calibration.**

- **Inflation risk**
- **Reputation risk**
- **Liquidity risk**
- **Contagion risk**
- **Legal environment risk**

Digest from "The underlying assumptions in the standard formula for the Solvency Capital Requirement Calculation"(EIOPA 2014)

2. Market risk

The underlying assumption for the market risk module can be summarised as follows:

- The sensitivity of assets and liabilities to changes in the volatility of the market parameters is not material.

- Market risk arises from the level or volatility of market prices of financial instruments. In the market risk module, exposure to market risk is measured by the impact of movements in the level of financial variables, such as equity prices, interest rates, yield spreads, property prices, and exchange rates. It is assumed that the sensitivity of assets and liabilities to changes in the volatility of the market parameters is not material. An assumption in the market risk module is that assets that are allocated to policies where the policyholder bears the investment risk are excluded from the module only to the extent that the risk is passed on to policyholders.

Digest from "The underlying assumptions in the standard formula for the Solvency Capital Requirement Calculation"(EIOPA 2014)

2.1 Interest rate risk

The underlying assumptions for the interest rate risk sub-module can be summarised as follows:

- Only interest rate risk that arises from changes in the level of the basic risk free interest rates is captured.
- Volatility and changes in the shape of the yield curve are not covered explicitly in the interest risk sub- module.
- The undertaking is not exposed to material inflation or deflation risk.
- For the use of a simplified calculation of the capital requirement for interest rate risk for captives it is assumed that all assets and liabilities sensitive to interest rate movements held by captives can be considered materially less diversified in terms of duration of maturity intervals and of lines of business compared to the portfolio used in the calibration of the standard formula.

Digest from "The underlying assumptions in the standard formula for the Solvency Capital Requirement Calculation"(EIOPA 2014)

2.2 Equity risk

The underlying assumptions for the equity risk sub-module can be summarised as follows:

- Assets and liabilities subject equity risk are only exposed to a fall in the level of equity prices and not to a rise in those prices.
- The value of equity investments cannot fall below zero.
- For the split between type 1 and type 2 equities it is assumed that type 2 equities consist of more risky equities than the equities covered in the type 1 category. For this reason, the stress factor for type 2 equities is higher than for type 1 equities.
- The undertaking holds a type 1 equity portfolio that is well diversified with respect to geography (developed market countries), stock size (large, mid, small, micro cap), sectors and investment style (growth, value, income etc.).

Digest from "The underlying assumptions in the standard formula for the Solvency Capital Requirement Calculation"(EIOPA 2014)

2.2 Equity risk

- The undertaking holds a type 1 equity portfolio that is well diversified with respect to geography (developed market countries), stock size (large, mid, small, micro cap), sectors and investment style (growth, value, income etc.).
- The undertaking owns a private equity portfolio, as part of its type 2 equity portfolio, of mainly large private equity companies. The portfolio is assumed to be well-diversified with respect to geography, stock size, investment and financing style as well as vintage years.
- The undertaking owns a commodity portfolio of liquid commodities as part of its type 2 equity portfolio. The portfolio is assumed to be well-diversified with respect to the composition (proportion according to the world-wide production).
- The undertaking owns a hedge funds portfolio of medium and large size hedge funds trading on a transparent basis. It is assumed that the portfolio is well-diversified with respect to fund strategies and geographic location.
- The undertaking owns a portfolio of equities in emerging markets that is well-diversified with respect to geography, stock size (large, mid, small, micro cap), sectors and investment style (growth, value, income etc.).

Digest from "The underlying assumptions in the standard formula for the Solvency Capital Requirement Calculation"(EIOPA 2014)

2.2 Equity risk

- For the symmetric adjustment mechanism in the standard approach in the equity risk sub- module it is assumed that equity prices have a mean reverting behaviour. Therefore, in times of rising equity markets the symmetric adjustment mechanism will increase the capital charge, and in times of falling equity indices the symmetric adjustment mechanism will reduce the capital charge. This is an assumption that is made about the behaviour of equity markets.
- For the duration-based approach in the equity risk sub- module it is assumed that a lower stress can be applied if the undertaking is exposed to a lower level of volatility of equities in the long-term compared to the short-term, consistent with the assumption of mean reverting behaviour of stock markets. It is assumed that for the business where the duration-based approach is used, the typical holding period of equity investments is consistent with the average duration of such liabilities.
- The equity risk charge applies to all equity investments including those in related undertakings and participations in financial and credit institutions in respect of the value not deducted from own funds in accordance with [Article 71 POF1]. While equity investments in related undertakings are also categorised as type 1 or type 2 exposures, a reduced risk charge of 22% applies to both types where the investments are of a strategic nature as set out in [Article 152 ER4].

Digest from "The underlying assumptions in the standard formula for the Solvency Capital Requirement Calculation"(EIOPA 2014)

2.3 Currency risk

The underlying assumptions for the currency risk sub-module can be summarised as follows:

- The sub-module takes into account currency risk arising from all possible sources, and the underlying assumption of the market risk module design is that currency effects only appears in this sub-module, i.e. currency effects have been stripped out in the calibration of the other market risk sub- modules.
- For currencies pegged to the Euro, either by way of currencies participating in the European Exchange Rate Mechanism, or where a decision from the Council recognizes pegging arrangements to the Euro or where a pegging arrangement is established by law of the country establishing the country's currency, a reduced shock factor in the currency risk sub- module is used. The underlying assumption is that for these currencies, the rate against the Euro will fluctuate within a limited band, and therefore the currency risk shocks against the Euro should be limited as well. The same reduced shock factors will apply between pairs of currencies pegged to the Euro, based on the same underlying assumption.

Digest from "The underlying assumptions in the standard formula for the Solvency Capital Requirement Calculation"(EIOPA 2014)

2.4 Property risk

The underlying assumptions for the property risk sub-module can be summarised as follows:

- The risk-profile of any of the undertaking's exposures to property located in third countries is not materially different from the risk profile of European property markets.
- The distributions of property returns are characterised by long left- fat tails and excess kurtosis (signifying disparity from normal distribution).

2.5 Spread risk
2.6 Market risk concentration risk

Digest from "The underlying assumptions in the standard formula for the Solvency Capital Requirement Calculation"(EIOPA 2014)

3. Life underwriting risk

The underlying assumptions for the Life underwriting risk module can be summarised as follows:

- The calibration of the Life underwriting risk parameters captures changes in the level and trend of the parameter. It is assumed that the volatility risk component is implicitly covered by the level, trend and catastrophe risk components. This is considered to be acceptable, since volatility risk is thought to be considerably lower than the trend risk.
- The dependence of benefit payments on inflation is not material.
- The insurance portfolios is well-diversified with respect to: age, gender, smoker status, socio- economic class, level of life insurance cover, type of insurance cover, degree of underwriting applied at inception of the cover and geographical location.

Digest from "The underlying assumptions in the standard formula for the Solvency Capital Requirement Calculation"(EIOPA 2014)

3. Life underwriting risk

An underlying assumption in the life underwriting risk module is the diversification in the insurance portfolios. The reference population underlying all calibration work is an insured population that is well diversified with respect to:

1. age
2. gender
3. smoker status
4. socio- economic class
5. level of life insurance cover
6. type of insurance cover
7. degree of underwriting applied at inception of the cover
8. geographic location

Digest from "The underlying assumptions in the standard formula for the Solvency Capital Requirement Calculation"(EIOPA 2014)

3.1 Mortality

The stress factor for mortality risk reflects the uncertainty in mortality parameters as a result of mis-estimation and/or changes in the level, trend and volatility of mortality rates and captures the risk that more policyholders than anticipated die during the policy term.

The underlying assumptions for the mortality risk sub-module can be summarised as follows:

- The undertaking has established a system to restrict adverse selection.
- The probability distribution for mortality is skewed, with a current trend towards improving mortality.
- For the simplified calculation of the capital requirement for mortality risk it is assumed that there is no material decrease in the respective sum of capital at risk in the next n years, where n is the modified duration (in years) of payments payable on death included in the best estimate projection. It is furthermore assumed, that the average mortality rate of the insured persons (weighted by sum insured) will not increase materially over the next n years.

Digest from "The underlying assumptions in the standard formula for the Solvency Capital Requirement Calculation"(EIOPA 2014)

3.2 Longevity

The stress factor for longevity risk is intended to reflect the uncertainty in mortality parameters as a result of mis-estimation and/or changes in the level, trend and volatility of mortality rates and captures the risk of policyholders living longer than anticipated.

The underlying assumptions for the longevity risk sub-module can be summarised as follows:

- The annual mortality improvements follow a normal distribution.
- For the simplified calculation of the capital requirement for longevity risk it is assumed that the average age of policyholders within the portfolio is 60 years or more.
- It is furthermore assumed that the average mortality rate of the respective insured persons does not increase by more than 10% each year.

Digest from "The underlying assumptions in the standard formula for the Solvency Capital Requirement Calculation"(EIOPA 2014)

3.3 Disability-morbidity risk

The stress factors for disability-morbidity risk reflect the risk that more policyholders than anticipated become disabled or sick during the policy term (inception risk), and that disabled people recover less than expected (recovery risk).

The underlying assumptions for the disability-morbidity risk sub-module can be summarised as follows:

- The insurance portfolio is well diversified in terms of likelihood of disability or sickness (inception rates) or change in the severity of disability or sickness (recovery rate).
- For the simplified calculation of the capital requirement for disability-morbidity risk it is assumed that there is no material decrease in the respective sum of capital at risk in the next n-1 years after the following year, where n is the modified duration (in years) of payments payable on disability-morbidity included in the best estimate projection. It is furthermore assumed, that the expected average disability-morbidity rate of insured persons (weighted by the sum insured) will not increase materially during that period. Finally, it is also assumed that the expected average disability-morbidity rate and the expected termination rates do not increase by more than 10% each year.

Digest from "The underlying assumptions in the standard formula for the Solvency Capital Requirement Calculation"(EIOPA 2014)

3.4 Expenses

The underlying assumptions for the expense risk sub-module can be summarised as follows:

- Undertakings are exposed to the risk of the change of expenses arising predominantly from: staff costs, cost of commissions to sales intermediaries (on the basis of the contractual terms of the arrangements), cost of IT infrastructure, cost of land and buildings occupied.
- The undertaking operates in a macroeconomic environment where inflation, though subject to fluctuations, is broadly under control (i.e. inflation targeting).
- For the simplified calculation of the capital requirement for expense risk it is assumed that there is no material increase due to other sources than inflation in the expenses incurred in servicing life insurance obligations, and where the projected cash-flows follow a certain pattern.

Digest from "The underlying assumptions in the standard formula for the Solvency Capital Requirement Calculation"(EIOPA 2014)

3.5 Revision risk

The underlying assumptions for the revision risk sub-module can be summarised as follows:

- All annuities are independent and their annual amount is assumed to be constant.
- The average sized portfolio comprising annuities at different legal stages is in 'average' proportions.

Digest from "The underlying assumptions in the standard formula for the Solvency Capital Requirement Calculation"(EIOPA 2014)

3.6 Lapse risk

The lapse risk sub-module captures the adverse change in the value of insurance liabilities, resulting from changes in the level or volatility of the rates of policy lapses, terminations, renewals, and surrenders.

The underlying assumptions for the lapse risk sub-module can be summarised as follows:

- The increase and the decrease of lapse rates, is a symmetrical stress for the scenarios of increase and decrease of lapse rates (not the mass lapse event).
- The risk relating to the options that a ceding insurance or reinsurance undertaking of a reinsurance contract can exercise is not material.
- A split between insurance policies falling or not within the scope of management of group pension funds in the mass lapse event shock is assumed appropriate. This is due to the fact that for management of group pension funds, the risk of a mass lapse is deemed to be substantially greater because there are generally no surrender penalties, and institutional investors tend to be better informed and therefore would be quick to withdraw funds if there was any question over the solvency of a firm.
- For the simplified calculation of the capital requirement for life lapse risk the following is assumed: the simplified calculation is done at an appropriate granularity, such that the group of policies to which the method is applied is homogeneous in terms of lapse rate; the lapse rates are not significantly sensitive to trends in economic variables; the lapse rates do not vary significantly with the age of the policyholder; and the capital requirement for life lapse risk determined with the simplification is not material compared to the overall capital requirement.

Digest from "The underlying assumptions in the standard formula for the Solvency Capital Requirement Calculation"(EIOPA 2014)

5. Health underwriting risk

The underlying assumptions for the health underwriting risk module can be summarised as follows:

- It is assumed that the volatility risk component is implicitly covered by the level, trend and catastrophe risk components. This is considered to be acceptable, since volatility risk is thought to be considerably lower than the trend risk.
- The design of the health underwriting risk module has been kept simple by including only the level, trend and catastrophe risk components.
- The underlying assumptions for the SLT Health underwriting risk module as well as for the SLT Health underwriting risk simplified calculations are assumed to be the same as for the life underwriting risk module, with the exception of disability risk for medical expense insurance, SLT Health lapse risk, SLT Health revision risk and the health catastrophe risk modules.
- The underlying assumptions in the Non-SLT Health underwriting risk module are the same as for the non-life underwriting risk module, with the exception of the health catastrophe risk module.

Digest from "The underlying assumptions in the standard formula for the Solvency Capital Requirement Calculation"(EIOPA 2014)

6. Operational risk

Operational risk increases together with the activity size as it stems from inadequate or failed internal processes, personnel or systems, or from external events, unless the undertaking is well diversified and managed which corresponds to a low value of the BSCR.

The underlying assumptions for the operational risk module can be summarized as follows:

- The overall assumption in the operational risk module is that a standardized level of risk management is present.
- For unit-linked businesses the characteristics are similar to those of other life products. Therefore, the parameters will evolve in line with the life parameter.
- In relation to the expense volume measure for unit-linked business, it is assumed that acquisition expenses are exclusively relating to insurance intermediaries, which do not give rise to any operational risk.

4. Non- Life underwriting risk
7. Counterparty default risk

Main Risks of the financial sector and Life Insurance

Bank

- **Credit Risk**
- **Market Risk**
- **Liquidity Risk**
- **Operational Risk**

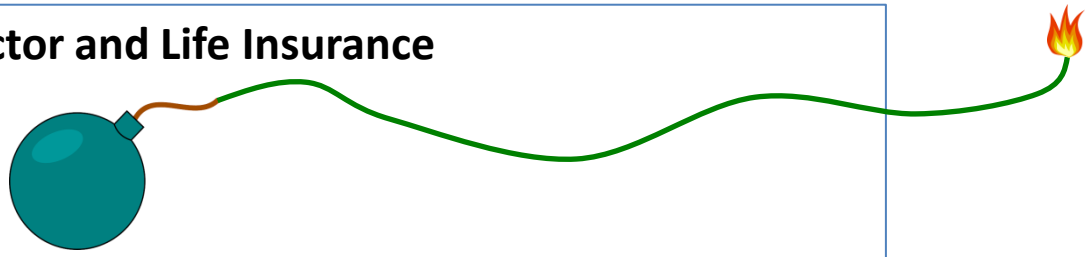
Life Insurance

- **Market Risk (fail of ALM)**
- **Insurance Risk**
- **Liquidity Risk**
- **Operational Risk**

Main Risks of the financial sector and Life Insurance

Financial Vehicles

- **Market decides the price**
- **Easy for risk transfer**



Life Insurance

- **Market dose not decide the price**
- **Risk transfer is not easy**
- **A Policyholder has to keep his contract.**

Law of large Numbers

- **The fundamental principle of insurance**

This principle is most essential for the understanding the concept of insurance.

Random variables $\{X_k\}_{k=1,2,3,\cdots,n}$, i.i.d. represent X with value

$$\mathrm{X} = \begin{cases} 1 & death \\ 0 & alive \end{cases}$$

Then $E(\sum_{k=1}^{n} X_k/n) = E(X)$, $Var(\sum_{k=1}^{n} X_k/n) = Var(X)/n$

This means more insureds more stable situation.

- **But, for the life insurance products, discount rates Y (this is a random variable, independent with X) are essential.**

If we see the one year term insurance,

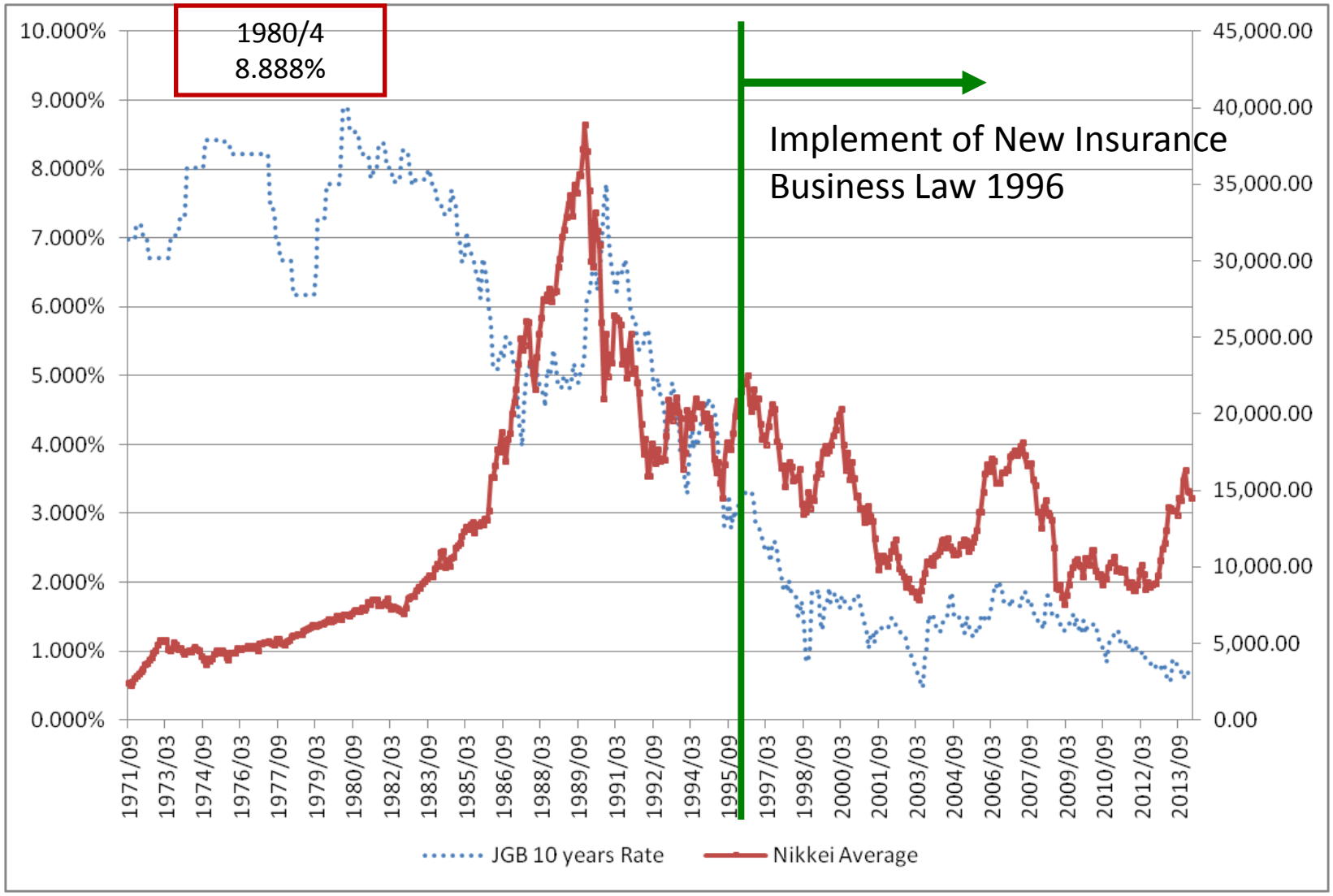
Premium =$E(Y\sum_{k=1}^{n} X_k/n) = E(Y)E(X)$,

$$Ver(Y\sum_{k=1}^{n} X_k/n) = E(Y^2)Ver(X)/n + \big(E(X)\big)^2 Var(Y)$$

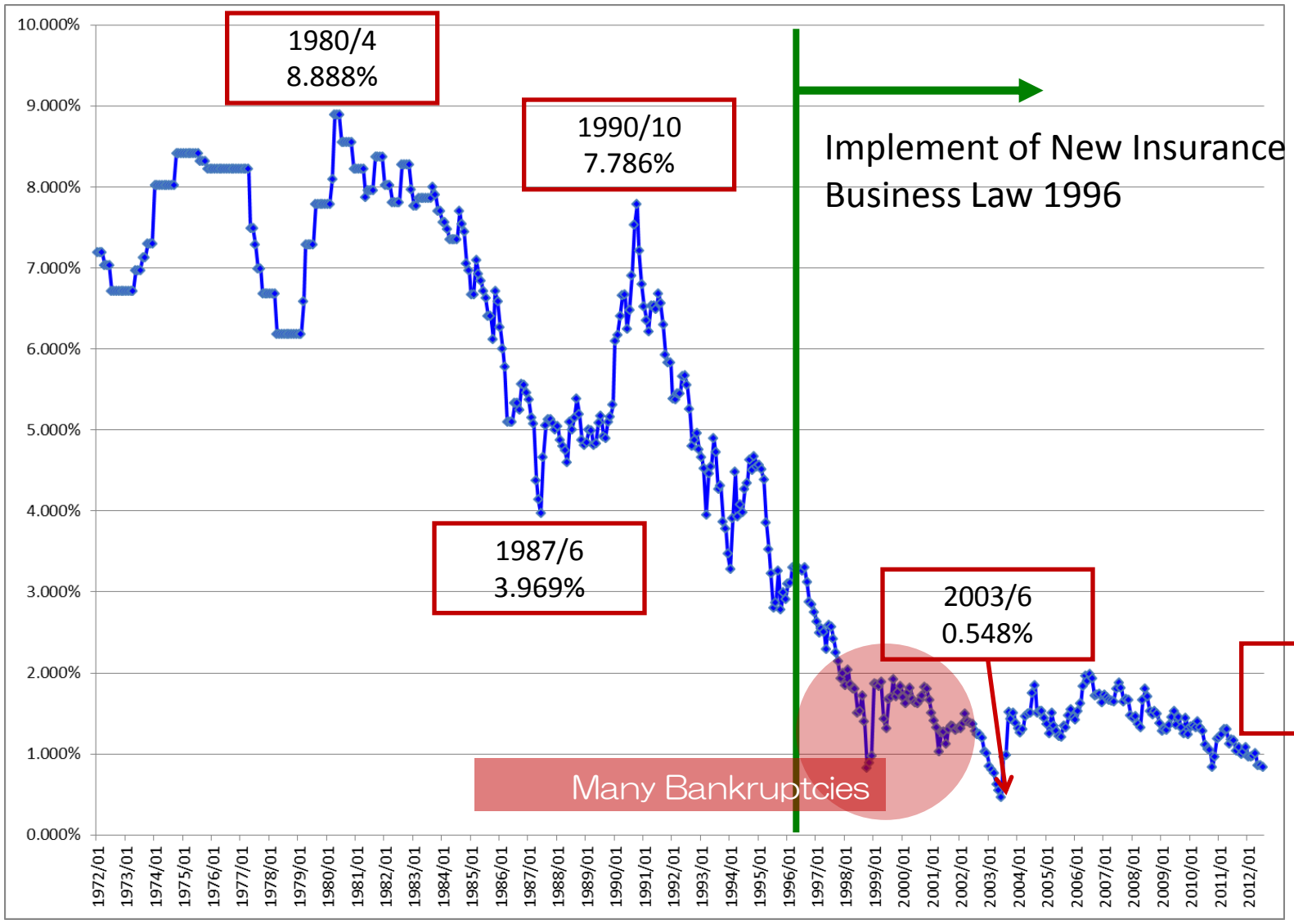
The first term will be vanished as $n \to \infty$.

But the second term will not vanished. In the classic text, Y is not a random variable. But currently, Y is a random variable, therefore $Var(Y)$ is not vanished.

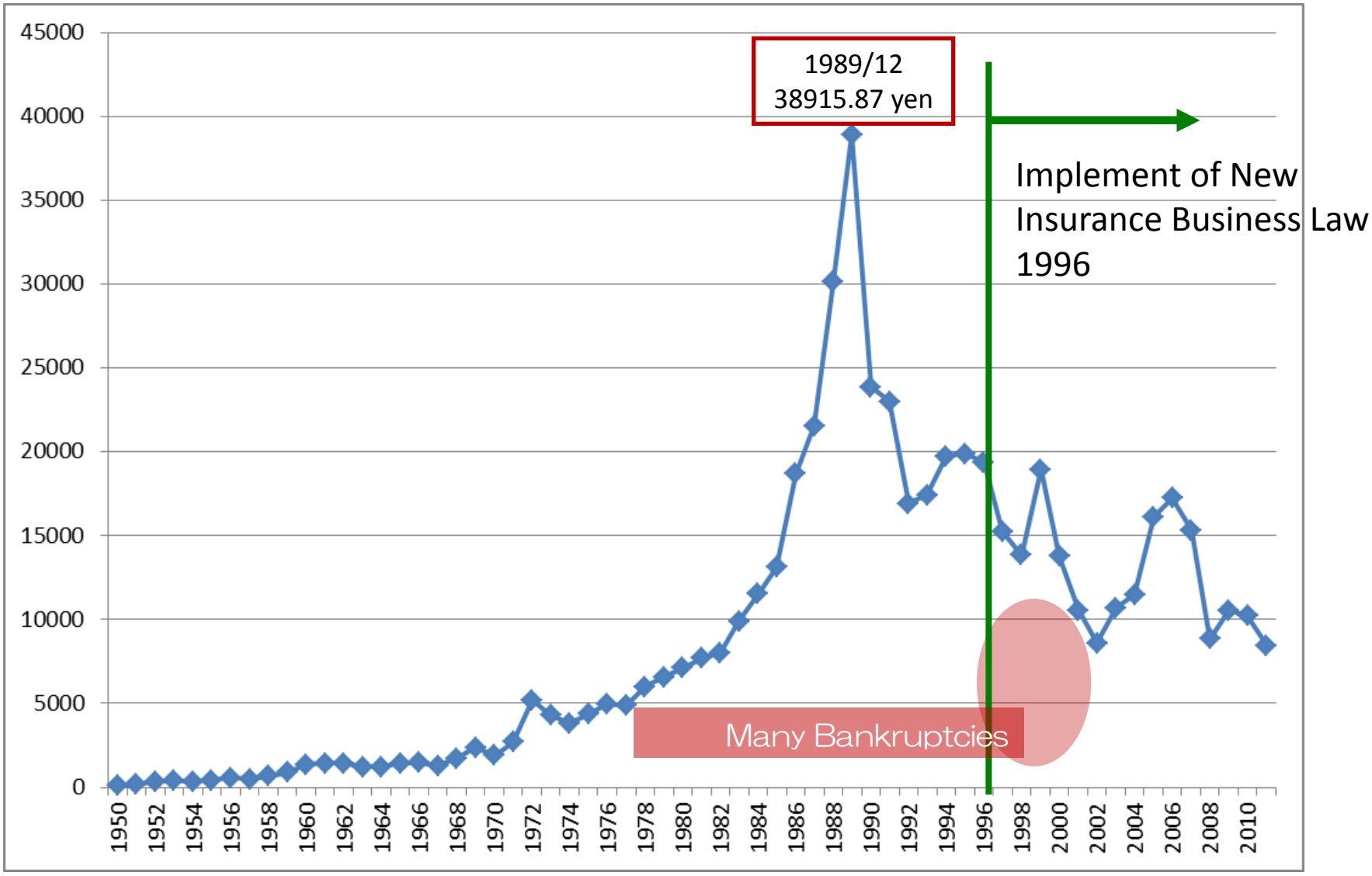
10 years JGB & Nikkei Average



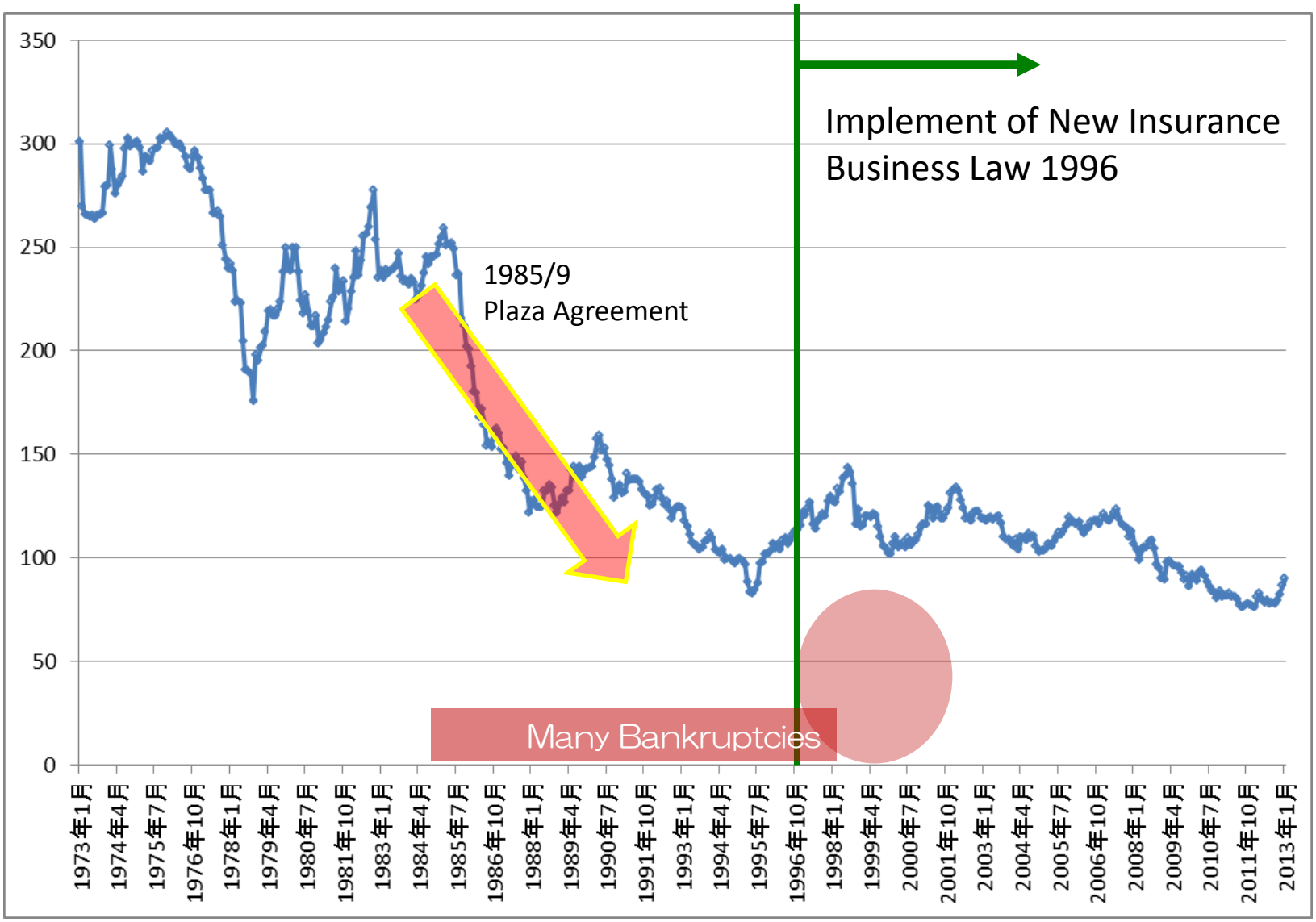
10 years JGB Earning rate past 40 years



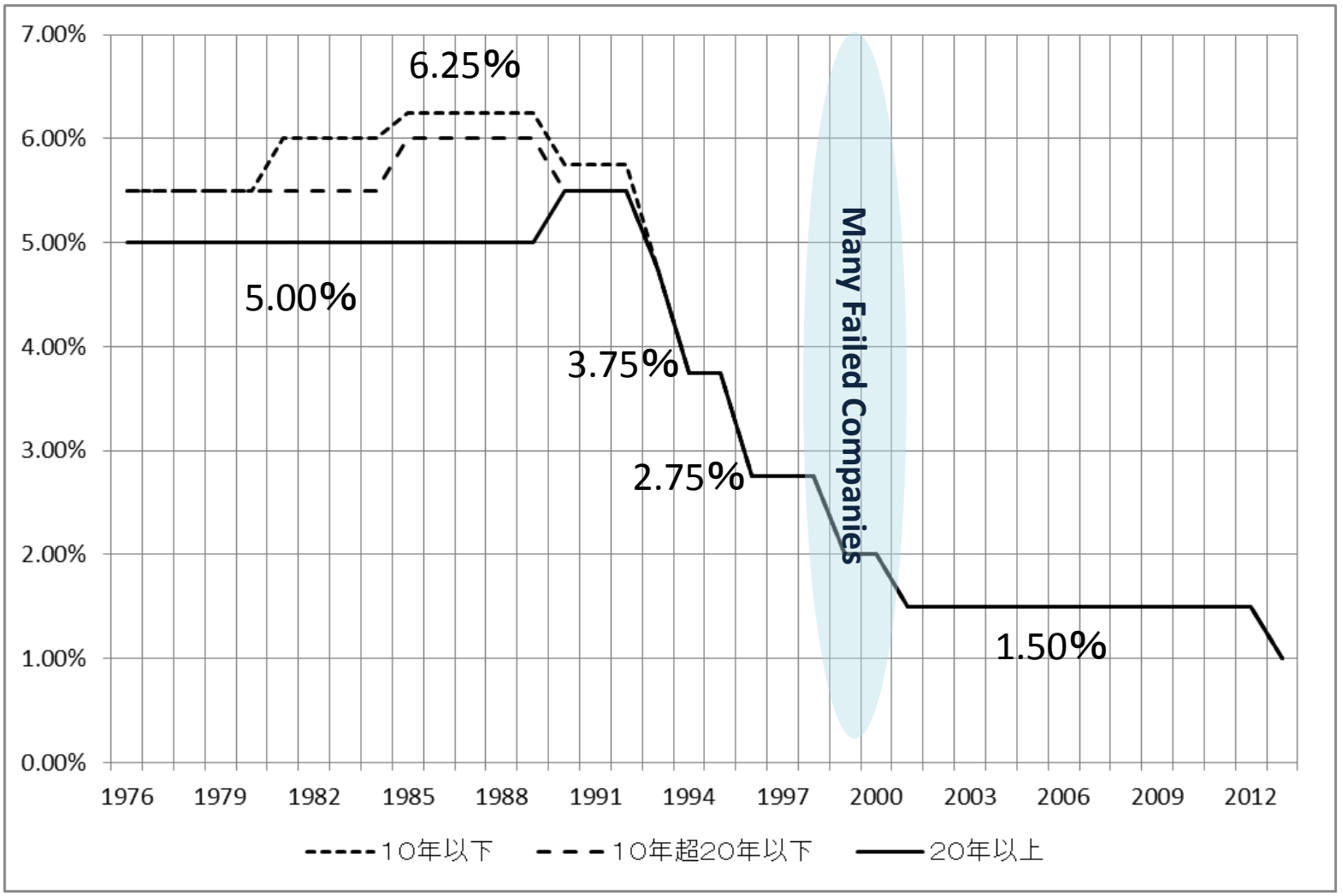
Year end values of stock (Nikkei Average) 1950～



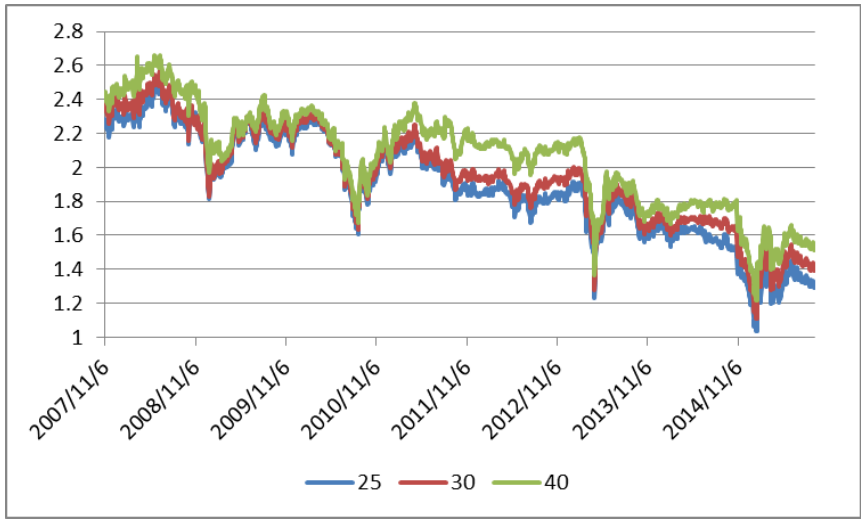
Yen Dollar exchange rate

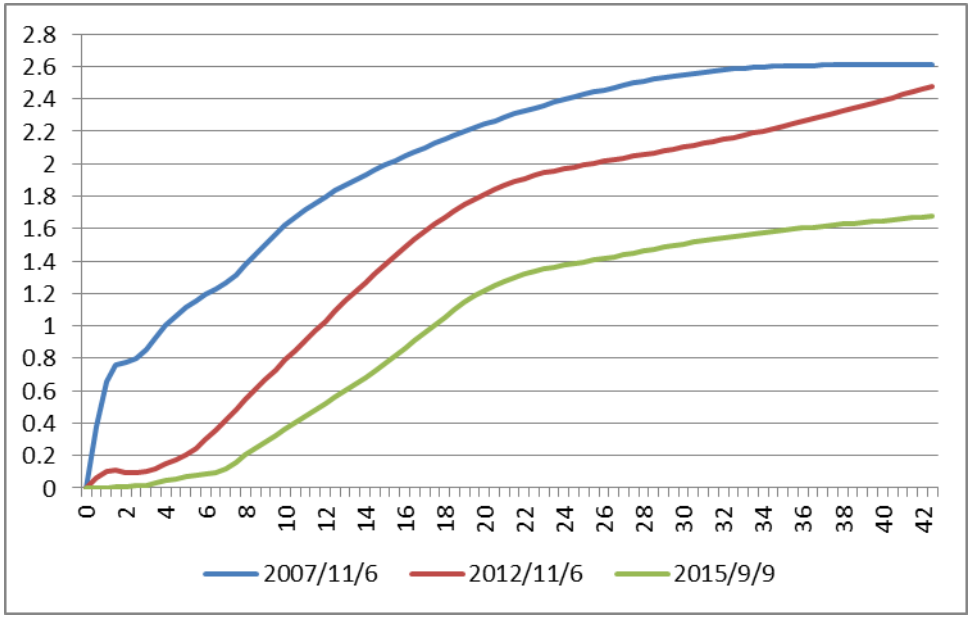


Assumed Interest Rate for Premium and Valuation



Recent Interest Rate Trend of JGB





These table shows that the protection type policies are dominating Japanese insurance market

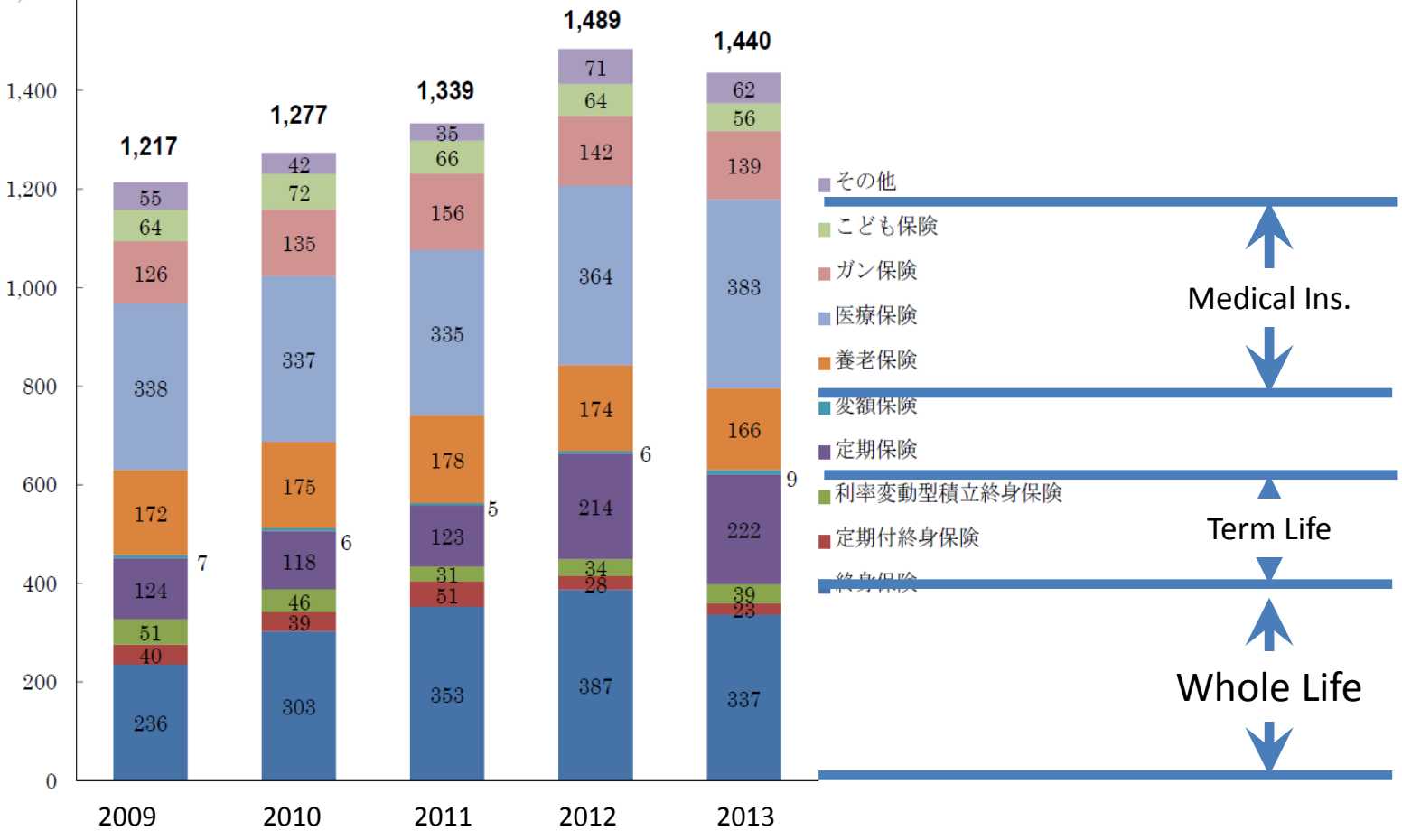
Individual Life Annuity (incl. Variable Annuity)

	New Business		Inforce Business	
	No. of policies Million	Amount Billion	No. of policies Million	Amount Billion
2012	1.65	8,563	20.42	103,518
2013	1.50	8,003	20.47	103,789

Individual Life Insurance (Protection)

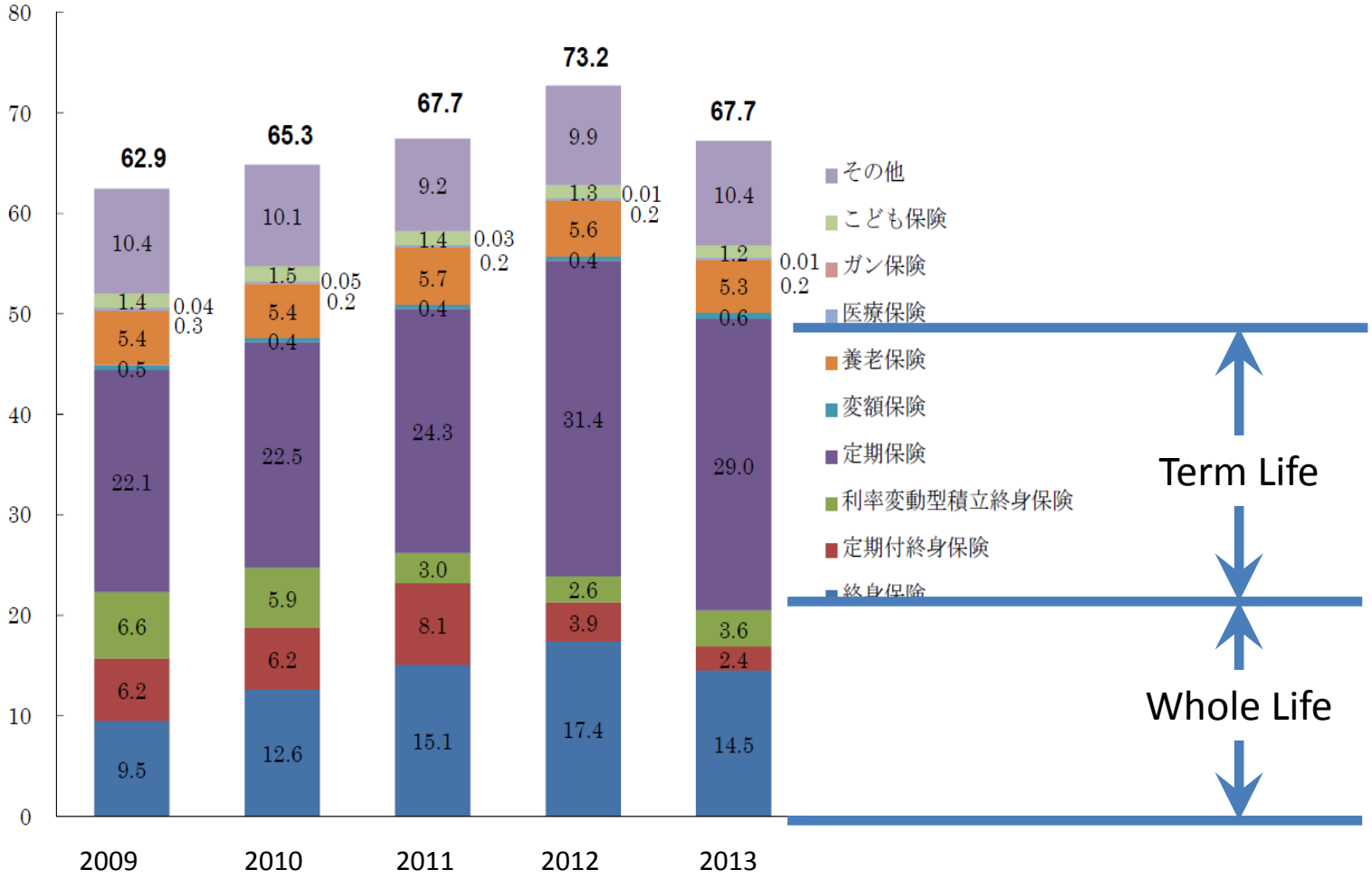
	New Business		Inforce Business	
	No. of policies Million	Amount Billion	No. of policies Million	Amount Billion
2012	19.67	71,346	136.01	861,651
2013	18.99	66,837	143.88	857,540

The number of the new business policies by type



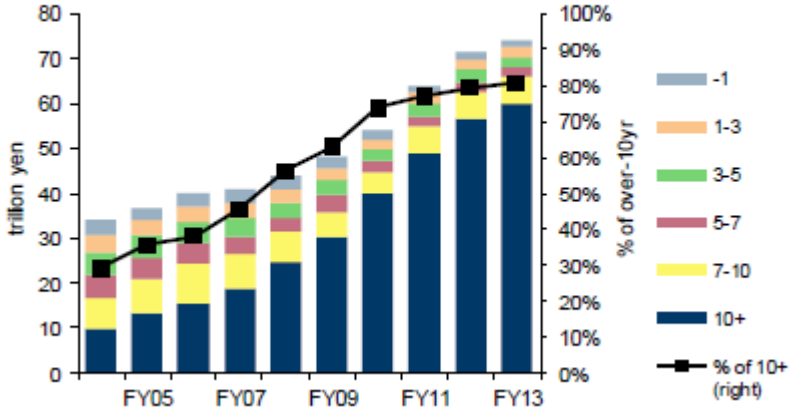
The Amount of the new business policies by type

Trillion Yen

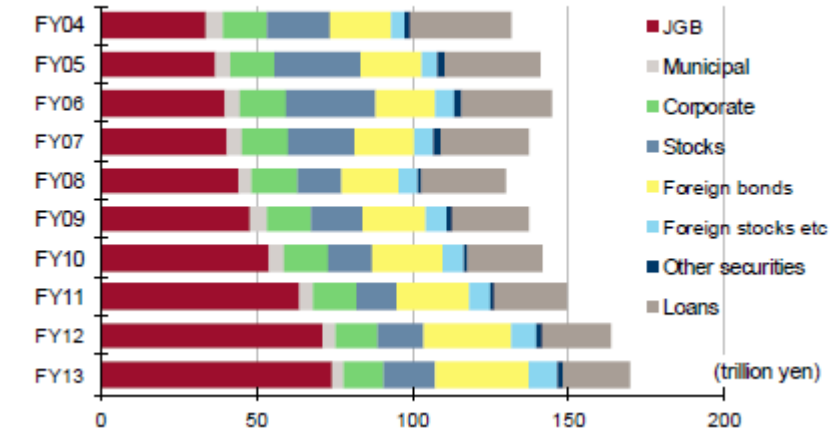


Investment instrument (Japan)

JGB holdings by maturities



Asset allocation



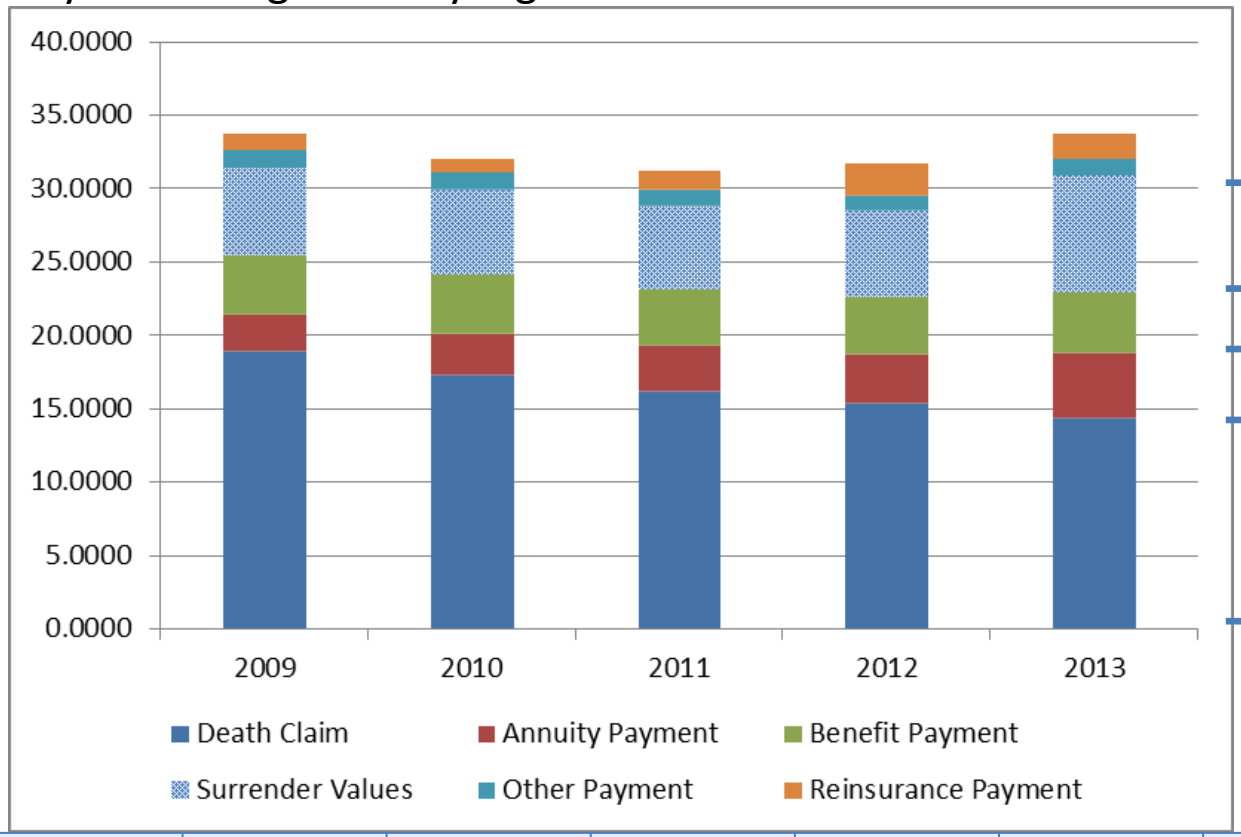
Solvency margin ratio

billion yen	FY11	FY12	FY13
Solvency margin	18,924	24,830	28,078
unrealized P/L on securities	3,563	8,365	9,952
Risk	5,791	6,239	6,506
insurance risk	605	590	570
3rd sector insurance risk	379	386	395
Assumed investment yield	1,424	1,374	1,335
Investment risk	3,985	4,511	4,829
Business risk	135	142	147
Guaranteed minimum benefit	149	121	108
Solvency margin ratio	654%	796%	863%

Claim and Surrender Payments of Japanese Life Insurance

Surrender Payment is significantly big

Billion JPY



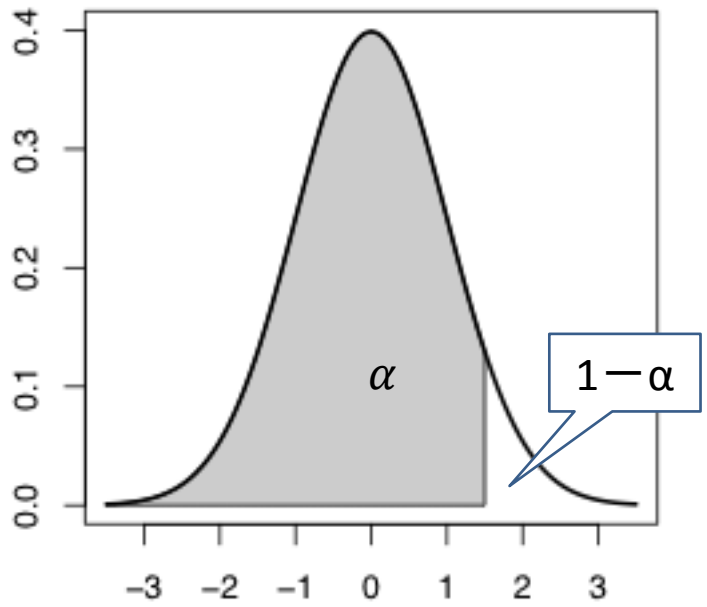
	Death Claim	Annuity Payment	Other Benefit Payment	Surrender Values	Other Payment	Reinsurance Payment	Total
2009	18.8297	2.5584	4.0259	5.9477	1.2646	1.0543	33.6811
2010	17.2438	2.8761	3.9758	5.7985	1.1725	0.9823	32.0494
2011	16.1433	3.1349	3.8048	5.6801	1.1220	1.3232	31.2087
2012	15.2964	3.3601	3.9369	5.8670	1.0361	2.1889	31.6857
2013	14.3078	4.4996	4.0539	7.9996	1.1368	1.7808	33.7787

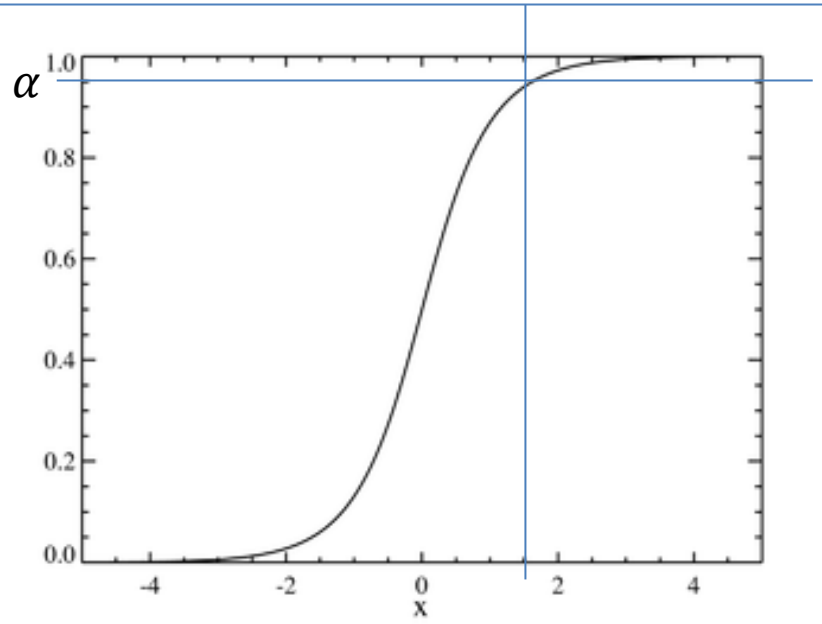
Japanese bankruptcy cases

	Going Bankrupt	Completing Liquidation	Amount of negative net worth (billion yen)	Assumed rate	
				before average	after upper
Nissan	97/04	97/10	302.9	Unknown	2.75%
Toho	99/06	00/03	650.0	4.79%	1.50%
Daihyaku	00/05	01/04	317.7	4.46%	1.00%
Taisho	00/08	01/03	36.5	4.05%	1.00%
Chioyda	00/10	01/04	595.0	3.70%	1.50%
Kyoei	00/10	01/04	689.5	4.00%	1.75%
Tokyo	01/03	01/10	73.1	4.20%	2.60%

In the following presentation, “The failure without management
Truths behind the Seiho crisis in the Heisei era” by Dr. Nobuyasu Uemura will be quoted in parts of this presentation. Hereinafter, I’ll call this book as [Uemura]

ALM is essential for insurance risk management.
VaR is one of the useful tools.





Definition VaR
Given some confidence level $\alpha \in (0,1)$, the value at risk of a portfolio with loss L at the confidence levelα is given by the smallest number x such that $VaR_\alpha = \inf\{x \in R: F(x) \geq \alpha\}$

Risk Measure

- Risk measures are defined as the amount of capital for taking in Risks (future losses)
- Standard deviation or variance defined in statistical theory are not fulfill the nature of the risk measure
- Risk measures have to defined based on probability of occurrence and financial damage

Coherent Axioms of Risk Measure

- For $\forall c \in R$, $\rho(X + c) = \rho(X) + c$ translation invariant
- For $\forall \lambda > 0$, $\rho(\lambda X) = \lambda \rho(X)$ positive homogeneity
- $X \leq Y \; a.e. then$, $\rho(X) \leq \rho(Y)$ monotonicity
- $\rho(X + Y) \leq \rho(X) + \rho(Y)$ subadditivity

About VaR

- VaR is one of prevailing techniques of Risk measures,
- However, VaR does not measure the magnitude of losses beyond the point of percentile of $1 - \alpha$, and
- VaR does not have nature of subadditivity and it does not measure the effect of diversification of risks

Risk Measure

Expected Shortfall

- Loss function L is random variable with distribution function F_L
- $E(|L|) < \infty$
- $ES_\alpha = \frac{1}{1-\alpha}\int_\alpha^1 q_u(F_L)du$, where $q_u(F_L) = \overleftarrow{F_L}(u)$
- Therefore $ES_\alpha = \frac{1}{1-\alpha}\int_\alpha^1 VaR_u(L)du$

About ES

- ES (Expected shortfall), TVaR (Tail Value at Risk), CVaR (Conditional Value at Risk), CTE (Conditional Tail Expectation), these are almost same concepts.
- Alternative expression of $\mathrm{ES} = E(L|\, L \geq VaR_u(L))$
- ES has the nature of subadditivity
- But it is not appropriate for the multi-period risk measure

ALM and Corporate Decisions on interest rate risks

Take a risk

Business strategy is needed.
We will be asked rational amount of expectation of rewards from that strategy of taking risks.
Otherwise, the strategy would not be justified.

Holistic ALM approach to manage the liabilities and assets is balance the “maintain the soundness” and “maintain the return”.

It is possible to take the position, between the following two extreme positions;

1. Under the decision of abandon the interest rate risks, setting off the interest rate risks of assets and liabilities,
2. Under the recognition of mismatch of interest rate risks of assets and liabilities, taking the interest rate risks as a business judgement.

Various types of Embedded Values

TEV (traditional embedded value)
EEV (European embedded value)
MCEV (market consistent embedded value)

TEV (traditional embedded value)

Discount rate $r(E)$: with the CAPM parameter$\beta(x)$, $r(E) = r(F) + \beta(x)(\mu - r(F))$

$r(E)$: hurdle rate; shareholder's requirement of rate of earnings

$r(F)$: risk free interest rate

μ : expected earning rate of market index

$\beta(x)$: corporate x's β in CAPM;$\beta = \sigma_{xm}/\sigma_m^2$; "m" means "market".

Discount rate: $RDF(t) = (1/(1 + r(E))^t$

Rate of returns of Investment earnings: $i(t)$

Required capital :$RC(t)$

Results

- TEV＝VIF（the value of in-force）+NAV（the net asset value）
- $VIF = \sum DE(t) \times RDF(t)$

Distributable earnings; $DE(t) = \big(CF(t) + I(t) - \Delta V(t)\big)(1 - TAX) - \Delta RC(t)$

Interest gain; $I(t) = (V(t) + RC(t)) \times i(t)$

Cash flow; $CF(t) = P(t) - S(t) - W(t) - E(t)$,here $E(t)$ is expense

- $NAV = RC + FS = \{Maeket\ value\ asset\} - V$, here FS is free surplus.

Appendix

Exercise of CAPM (original ref. from D. G. Luenberger “Investment Science” ver.2)

	Stock 1	Stock 2	Stock 3	Stock 4	Market	Risk free
Mean	15.00	14.34	10.90	15.09	13.83	5.84
Variance	90.28	107.24	162.19	68.27	72.12	
Covariance	65.08	73.62	100.78	48.99	72.12	
β	0.9024	1.0208	1.3974	0.6793	1.00	
CAPM	13.03	13.99	17.03	11.27		

- Calculation of beta

$$\beta(x) = \frac{cov(x, Market)}{var(Market)}$$

$$\beta(stock1) = \frac{65.08}{72.12} = 0.90238\cdots$$

- Calculation of hurdle rate

Formula : $r(E) = r(F) + \beta(x)(\mu - r(F))$

For stock 1; $r(F) = 5.84$, $\beta(x) = 0.90$, $\mu = 13.83$,

$r(E) = 5.84 + 0.90 \times (13.83 - 5.84) = 13.03$

Various types of Embedded Values

Discussion of TEV (traditional embedded value)

TEV (traditional embedded value)

1. It does not have the standardized rules.
2. Most of parameters have been defined by each company's own interpretations.
3. Hurdle rate does not have the term structure of yields.
4. By the above reasons, TEV does not serve the decision making for investors.

TEV (traditional embedded value)

1. But for the simplicity of calculation, many companies still use the TEV.
2. Even TEV does not have the market wide consistent definitions of the parameters, if we track a company, we can see the movement (increment or decrement) of the corporate values.

Various types of Embedded Values

MCEV Market Consistent Embedded Value Basis for Conclusions – October 2009

Basis for Conclusions on CFO Forum Market Consistent Embedded Value

Principles This Basis for Conclusions accompanies the proposed Market Consistent Embedded Value Principles for supplementary reporting on Embedded Value prepared by the CFO Forum.

Contents Introduction

General Approach & Philosophy

Principles, Guidance and Disclosures

Principle 1 – Introduction

Principle 2 – Coverage

Principle 3 – MCEV Definitions

Principle 4 – Free Surplus

Principle 5 – Required Capital

Principle 6 – Value of In-Force Covered Business

Principle 7 – Financial Options and Guarantees

Principle 8 – Frictional Costs of Required Capital

Principle 9 – Costs of Residual Non-Hedgeable Risks

Principle 10 – New Business and Renewals

Principle 11 – Non Economic Projection Assumptions

Principle 12 – Economic Assumptions

Principle 13 – Investment Returns and Discount Rates

Principle 14 – Reference Rates

Principle 15 – Stochastic Models

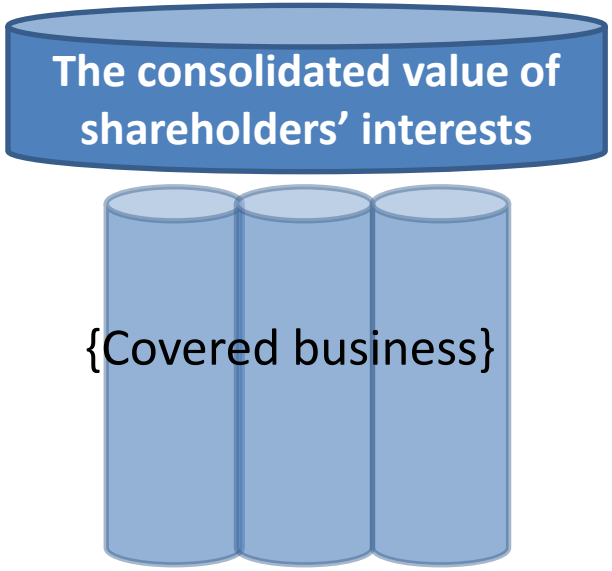
Principle 16 – Participating Business

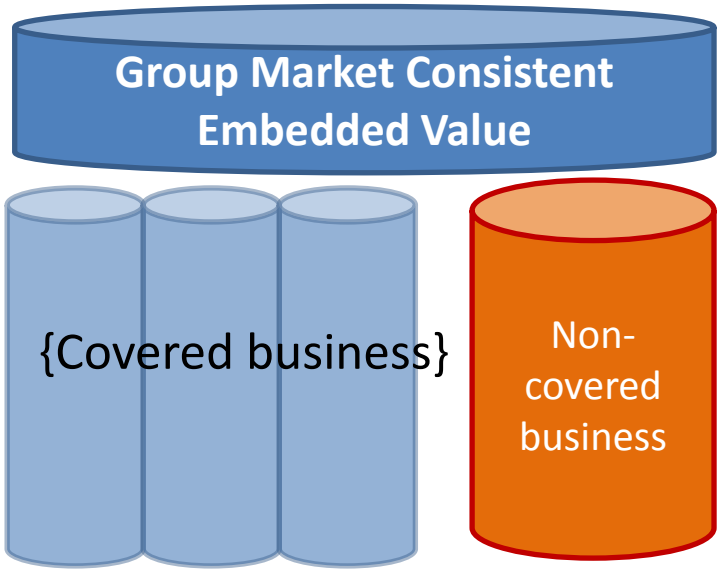
Principle 17 – Disclosures

Various types of Embedded Values

MCEV Market Consistent Embedded Value Principles – October 2009

Introduction
Principle 1: Market Consistent Embedded Value (MCEV) is a measure of the consolidated value of shareholders' interests in the covered business. Group Market Consistent Embedded Value (Group MCEV) is a measure of the consolidated value of shareholders' interests in covered and non-covered business.





Various types of Embedded Values

MCEV Market Consistent Embedded Value Principles – October 2009

G1.1 The MCEV Methodology (MCEVM) described here is applied to the calculation and reporting of the MCEV of the covered business.
G1.2 Adjustments must be made to ensure all covered business has been included appropriately. An example of such an adjustment might be in respect of a reinsurance or loan arrangement within the group to avoid distorting the MCEV.

MCEV methodology is only applied to covered businesses

MCEV methodology must be modified appropriately for covering the businesses (eg. Reinsurance , loan arrangement)

Various types of Embedded Values

MCEV Market Consistent Embedded Value Principles – October 2009

G1.3 Principles 1 to 17 relate only to covered business with the exception of reference to Group Market Consistent Embedded Value (Group MCEV) in Principle 17 which measures the consolidated value of shareholders' interests in covered and non-covered business.
G1.4 Except where they are not considered material, compliance with Principles (shown in bold) is compulsory and any non-compliance with underlying Guidance should be explicitly disclosed.
G1.5 A statement should be included to confirm that the methodology, assumptions and results have been subject to external review, stating the basis of the external review and by whom it has been performed.

Various types of Embedded Values

MCEV Market Consistent Embedded Value Principles – October 2009

Principle 2: The business covered by the MCEVM should be clearly identified and disclosed.
G2.1 The MCEVM should, where material, include, as a minimum, any contracts that are regarded by local insurance supervisors as long-term life insurance business.
G2.2 The MCEVM may cover short-term life insurance such as group risk business and long-term accident and health insurance business. Where mutual funds and short-term healthcare are regarded as part of or ancillary to a company's long-term life insurance business, then it may be regarded as covered business.
G2.3 The MCEVM may be applied by group companies that are not predominantly long term insurance companies. For example the MCEVM may be applied to covered business provided by non-insurance groups and operations such as banking groups and pension funds.

MCEVM should include minimum

1. Long term insurance (if the local supervisor regards a policy is "long term", then it is long term policy, and MCEV cover it)
2. Even short term (Group risk business), long-term accident and health care business are included
3. Mutual-fund and short-term healthcares are also the covered business of MCEV it the business are ancillary to long term business
4. Long term insurances provided by banking-group and pension funds are also applied MCEVM

Various types of Embedded Values

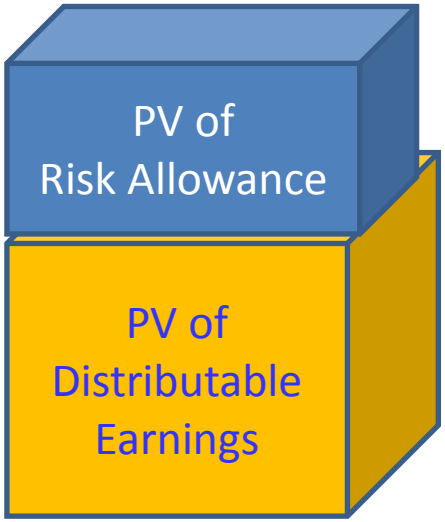
MCEV Market Consistent Embedded Value Principles – October 2009

MCEV Definitions

Principle 3: MCEV represents the present value of shareholders' interests in the earnings distributable from assets allocated to the covered business after sufficient allowance for the aggregate risks in the covered business. The allowance for risk should be calibrated to match the market price for risk where reliably observable. The MCEV consists of the following components:

- **Free surplus allocated to the covered business**
- **Required capital; and**
- **Value of in-force covered business (VIF).**

The value of future new business is excluded from the MCEV.



This part is calibrated by market price of risk where reliably observable

1. Free surplus
2. Required capital
3. Value of in-force

✓ **The value of future new business is excluded from the MCEV.**

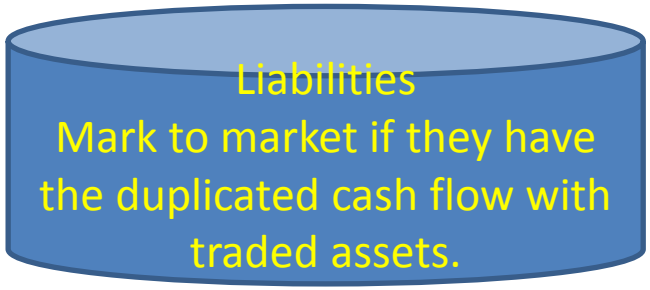
Various types of Embedded Values

MCEV Market Consistent Embedded Value Principles – October 2009

G3.1 MCEV represents the sum of the values of components defined in Principles 4, 5 and 6.
G3.2 The value of future new business should be excluded from the MCEV. Principle 10 defines new business and, by implication, existing business.
G3.3 **The concept of mark to market is to value insurance liabilities** and therefore the shareholders' interest in the earnings distributable from assets allocated to the covered business as if they are traded assets with equivalent cash flows. However, most insurance liabilities are not traded. As assets are generally traded with an observable market price, asset cash flows that most closely resemble the insurance cash flows (from the shareholders' perspective) are used.

MCEV is the sum of
1. Free surplus
2. Required capital
3. Value of in-force

of existing business (future new business are excluded).



Various types of Embedded Values

MCEV Market Consistent Embedded Value Principles – October 2009

G3.4 Financing types of reinsurance and debt, including subordinated and contingent debt can create a leveraging effect. Such debt should normally be deducted from the MCEV at a value consistent with that which markets would place on debt with similar characteristics. The deduction can be made to either the free surplus or the VIF and where material should be disclosed.
G3.5 Liabilities of the in-force covered business are dictated by local regulatory requirements.

Equity type of assets should be deducted from MCEV
Example;

- Financing types of reinsurance and debt
- subordinated and
- contingent debt

Liabilities of the in-force covered business are dictated by local regulatory requirements.

Various types of Embedded Values

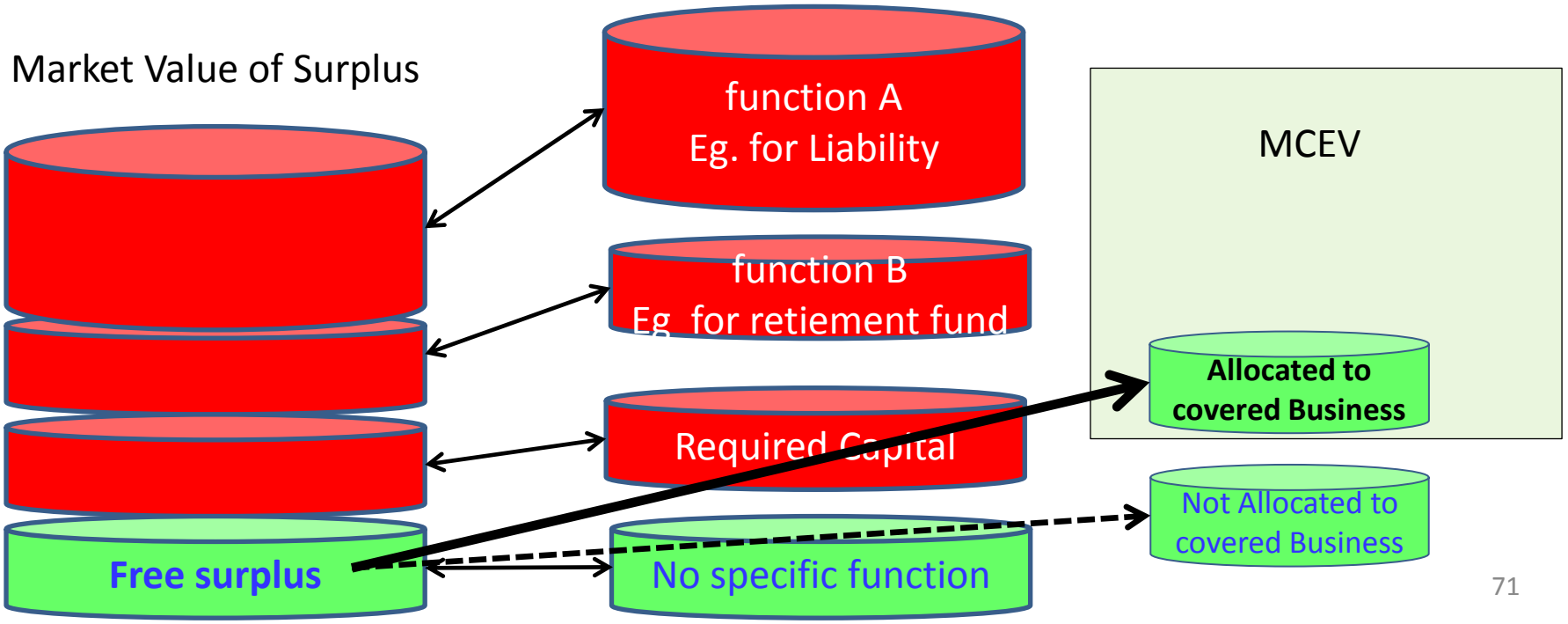
MCEV Market Consistent Embedded Value Principles – October 2009

FREE SURPLUS

Principle 4: The free surplus is the market value of any assets allocated to, but not required to support, the in-force covered business at the valuation date.

G4.1 Free surplus is determined as the market value of any excess of all assets attributed to the covered business but not backing liabilities over the required capital to support the covered business.

G4.2 Free surplus not formally allocated to covered business should not be included in the MCEV.



Various types of Embedded Values

MCEV Japanese interpretation ; a reference note published by a company

1.2 Covered business; Business of own company and its subsidiaries. On the net asset values of subsidiaries, their book values are adopted. But other businesses belongs to the parent company are not covered business.

1.5
Implementation of the MCEV principle; assumptions and calculation methods are based on the MCEV principle. But there are several modifications;

- MCEV principle says that the reference interest rates should be the swap rates, but the yields rates of government bonds were applied.
    1. In the nature of the swap rates, it contains credit risks derived from LIBOR. On the other hand, Japanese government bond and US treasury bond do not have credit risk.
    2. The yields rates of government bonds are applied in the basic assumptions of ALM. And actual investment transaction, these bonds are available and ample for the earnings of risk free rate.
    3. By the JP government bond and US treasury bond, consistent appraisal of assets and liabilities. And these bonds have sufficient liquidity.
- In the MCEV principle, 100bp is recommended for the interest rate sensitivity, however, because of the current Japanese low interest rates, 50bp was applied as sensitivity.
- For the calculation of the net asset values, MCEV recommends IFRS (International Financial Reporting Standards), but in Japan, local statutory accounting methods are applied.

Various types of Embedded Values

MCEV Japanese interpretation; a reference note published by a company

Required Capital

- The Required capital is a part of the net asset value.
- This amount does not distribute to shareholder.
- The level of the required capital is the greater amount of the corporate internal target and the minimum statutory requirement.
- The corporate internal target is the level of maintain the corporate credit rate for its risk management.
- The amount of the corporate internal target is net value of the sum of the economic value based debt and the economic value based risk amount, and the amount of the statutory technical reserves.
- For the calculation of the economic value based risk amount, VaR of 99.95% of the confidence level, 1 year study period are applied.
- On the parameters of the internal models, Solvency II and other solvency regulations are referred.

Various types of Embedded Values

MCEV Japanese interpretation ; a reference note published by a company

(Required Capital; continued)

Differences with QIS5

1. Implied volatility risk
   The fluctuation risk measured by the implied volatility from the past market datum, which is not explicitly mentioned in QIS5.
2. Interest rate risk
   As the weekly, we generate one year term interest rate scenario, reflecting the transactions based on the direction of the investment strategy endorsed by the executive meeting.
3. The Parameter risks of the insurance assumptions
   The insurance occurrence rates, these are parametrized by the past experiences. But these parameters are not always applicable in the future situation, we have to estimate the risks of this kind of mis-estimation. There are recommended parameters for this estimation in QIS5. However, these were not used them, but the credibility levels of the estimations were applied.
4. The trend risks of the insurance assumptions
   The products that have the unforeseen potential risks caused by the future medical development and other incidents, for these trend risks, available materials are applied to them.

Various types of Embedded Values

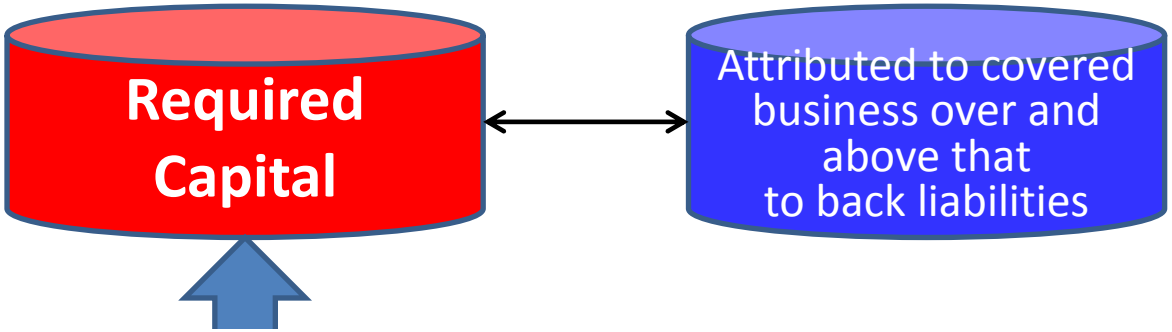
MCEV Market Consistent Embedded Value Principles – October 2009

REQUIRED CAPITAL

Principle 5: Required capital is the market value of assets, attributed to the covered business over and above that required to back liabilities for covered business, whose distribution to shareholders is restricted.

G5.1 The amount of required capital should be presented from a shareholders' perspective and so should be net of funding sources other than shareholder resources, for example subordinated debt or policyholder funds.

Market Value Assets



Distribution to SH is restricted

Various types of Embedded Values

MCEV Market Consistent Embedded Value Principles – October 2009

G5.2 The level of required capital allocated to each regulated entity should meet at least the shareholders' portion of the level of solvency capital at which the supervisor is empowered to take any action. It would also include any amount "encumbered" by local supervisory or legal restrictions that prevents its distribution or removal from supporting the covered business.
G5.3 The required capital should include amounts required to meet internal objectives. The internal objectives could be based on an internal risk assessment or that capital required to obtain a targeted credit rating.

- Each government decides the solvency capital to take any actions.
  Required capital > Shareholders' portion of the level of solvency capital
- For the running the business, if a local government decides "this part of amount shall stay in the business", then that part of amount is included in the required capital.

Internal objectives are also important. Targeted solvency margin and targeted credit ratings are part of objectives.

Various types of Embedded Values

MCEV Japanese interpretation; a reference note published by a company

Required Capital

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- This amount does not distribute to shareholder.
- The level of the required capital is the greater amount of the corporate internal target and the minimum statutory requirement.
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- The amount of the corporate internal target is net value of the sum of the economic value based debt and the economic value based risk amount, and the amount of the statutory technical reserves.
- For the calculation of the economic value based risk amount, VaR of 99.95% of the confidence level, 1 year study period are applied.
- On the parameters of the internal models, Solvency II and other solvency regulations are referred.

Various types of Embedded Values

MCEV Japanese interpretation ; a reference note published by a company

(Required Capital; continued)

Differences with QIS5

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   The fluctuation risk measured by the implied volatility from the past market datum, which is not explicitly mentioned in QIS5.
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   As the weekly, we generate one year term interest rate scenario, reflecting the transactions based on the direction of the investment strategy endorsed by the executive meeting.
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   The insurance occurrence rates, these are parametrized by the past experiences. But these parameters are not always applicable in the future situation, we have to estimate the risks of this kind of mis-estimation. There are recommended parameters for this estimation in QIS5. However, these were not used them, but the credibility levels of the estimations were applied.
4. The trend risks of the insurance assumptions
   The products that have the unforeseen potential risks caused by the future medical development and other incidents, for these trend risks, available materials are applied to them.

Various types of Embedded Values

MCEV Market Consistent Embedded Value Principles – October 2009

VALUE OF IN-FORCE *COVERED BUSINESS*

Principle 6: The value of in-force *covered business (VIF) consists of the following components:*

- ***Present value* of future profits (where profits are post taxation shareholder cash flows from the in-force covered business and the assets backing the associated liabilities) *(PVFP)***
- ***Time value of financial options and guarantees* as defined in *Principle* 7**
- ***Frictional costs of required capital* as defined in *Principle* 8**
- **Cost of residual *non hedgeable risks* as defined in *Principle* 9.**

Various types of Embedded Values

MCEV Market Consistent Embedded Value Principles – October 2009

VALUE OF IN-FORCE *COVERED BUSINESS*

G6.1 Projected liabilities and cash flows should be net of outward risk reinsurance.

G6.2 The *PVFP* should include the value of *renewals* of in-force business.

G6.3 The *PVFP* before allowance for the *time value of financial options and guarantees* should reflect the *intrinsic value of financial options and guarantees* on in-force *covered business*. The *time value* of financial *options and guarantees* is discussed under *Principle* 7. If the split of the VIF into PVFP and *time value of financial options and guarantees* is disclosed then consistent assumptions should be used for the *time value* of *financial options and guarantees* and the basic projection of *PVFP*.

Various types of Embedded Values

MCEV Market Consistent Embedded Value Principles – October 2009

FINANCIAL OPTIONS AND GUARANTEES

***Principle* 7: Allowance must be made in the *MCEV* for the potential impact on future shareholder cash flows of all *financial options and guarantees* within the in-force covered *business*. The allowance for the *time value of financial options and guarantees* must *be* based on *stochastic techniques* using methods and assumptions consistent with the underlying embedded value. All projected cash flows should be valued using economic assumptions such that they are valued in line with the price of similar cash flows that are traded in the capital markets.**

G7.1 The valuation of *financial options and guarantees* should take as a starting assumption the actual asset mix at the valuation date.

Various types of Embedded Values

MCEV Market Consistent Embedded Value Principles – October 2009

FINANCIAL OPTIONS AND GUARANTEES

G7.2 Where management discretion exists, has passed through an appropriate approval process and would be applied in ways that impact the *time value of financial options and guarantees*, the impact of such management discretion may be anticipated in the allowance for *financial options and guarantees* but should allow for market and policyholders' reaction to such action. The management discretion should assume that the shareholders pay out all claims even if the assets of the company are exhausted. Management discretion is subject to any contractual guarantees and regulatory or legal constraints. The application of such discretion must consider the environment arising in the future projection which will likely be different from the current environment, but any changes from current decision rules (for example regarding flexible crediting rates or policyholder bonuses) must be supported by appropriate approvals.

Various types of Embedded Values

MCEV Market Consistent Embedded Value Principles – October 2009

FINANCIAL OPTIONS AND GUARANTEES

G7.3 Dynamic policyholder behaviour should, where material, be in the allowance for the *time value of financial options and guarantees*.

G7.4 The techniques used to calculate the allowance for the time *value of financial options and guarantees* should incorporate an allowance for stochastic variation in future economic conditions consistent with *Principle* 15. The economic projection assumptions should be consistent with how the capital markets would value such cash flows and *Principles* 12, 13 and 14.

Various types of Embedded Values

MCEV Market Consistent Embedded Value Principles – October 2009

FRICTIONAL COSTS OF *REQUIRED CAPITAL*

***Principle* 8: An allowance should be made for the *frictional costs of required capital for covered business*. The allowance is independent of the allowance for *non hedgeable risks*.**

G8.1 *Frictional costs* should be applied to the *required capital* as defined in *Principle* 5.

G8.2 *Frictional costs* should reflect the taxation and investment costs on the assets backing *required capital*. The allowance for taxation should be based on the taxation rate(s) applicable to investment earnings on assets backing the *required capital*.

G8.3 The *required capital* should be projected appropriately over the lifetime of the underlying risks. Approximate projection methods such as the use of key capital drivers to determine the run off pattern of the *required capital* may be used.

Various types of Embedded Values

MCEV Market Consistent Embedded Value Principles – October 2009

COST OF RESIDUAL *NON HEDGEABLE RISKS*

***Principle* 9: An allowance should be made for the cost of *non hedgeable risks* not already allowed for in the *time value of options and guarantees* or the *PVFP*. This allowance should include the impact of *non hedgeable non financial risks* and *non hedgeable financial risks*. An appropriate method of determining the allowance for the cost of residual *non hedgeable risks* should be applied and sufficient disclosures provided to enable a comparison to a *cost of capital methodology*.**

Various types of Embedded Values

MCEV Market Consistent Embedded Value Principles – October 2009

COST OF RESIDUAL *NON HEDGEABLE RISKS*

G9.1 The *best estimate assumptions for non hedgeable risks* used in the calculation of the *time value of options and guarantees* and the *PVFP* should reflect at least the mean expectation of outcomes of that risk variable. The total *MCEV* should allow for the mean impact of all *non hedgeable risks* on shareholder value. The additional cost of residual *non hedgeable risks as* defined in *Principle* 9, should therefore take account of any additional cost that arises due to the difference between these two measures. This difference will result because of:

- Asymmetries in the impact of the risks on shareholder value; and
- Risks that are not allowed for in the *time value of options and guarantees* or the *PVFP* (e.g. operational risk).

Various types of Embedded Values

MCEV Market Consistent Embedded Value Principles – October 2009

COST OF RESIDUAL *NON HEDGEABLE RISKS*

G9.2 An allowance for uncertainty in the best estimate of shareholder cash flows as a result of the *non hedgeable risks* (both *symmetric and asymmetric risks*) should be considered.

G9.3 The cost of *non hedgeable financial risks* should allow for any areas where the calibration of the model to the market does not fully mitigate the market risk. This may occur when market assumptions are required where there is no market or where the market is not sufficiently deep and liquid.

G9.4 Regardless of the methodology used to determine the allowance for the cost of residual *non hedgeable risks*, it should be presented as an equivalent average cost of capital charge. A single average charge should be calculated across all residual *non hedgeable risks*, such that the *present value* of charges levied on the projected residual *non hedgeable risk based capital* equates to the cost of residual *non hedgeable risks*.

Various types of Embedded Values

MCEV Market Consistent Embedded Value Principles – October 2009

COST OF RESIDUAL *NON HEDGEABLE RISKS*

G9.5 The residual *non hedgeable risk based capital* should be determined using an internal economic capital model. The assessment of the economic capital can be performed using a variety of methods such as:

- The use of a model to project the distribution of profits and losses arising from the residual *non hedgeable risks*
- The use of reasonable approximations such as an approach of aggregation of standard capital charges for each residual *non hedgeable risk* based on appropriate shock scenarios.

The capital determined should be consistent with a 99.5% confidence level over a one year time horizon, to meet the associated risks. Allowance for management actions can be made where appropriate.

G9.6 The residual *non hedgeable risk based capital* should be projected appropriately over the lifetime of the underlying risks. Approximate projection methods such as the use of key capital drivers to determine the run off pattern of the residual *non hedgeable risk based capital* may be used.

Various types of Embedded Values

MCEV Market Consistent Embedded Value Principles – October 2009

COST OF RESIDUAL *NON HEDGEABLE RISKS*

G9.7 An allowance should be made for diversification in the cost of residual *non hedgeable risks*

and in determining the equivalent average charge on the *cost of capital methodology*:

- Diversification benefits within the *non hedgeable risks* of the *covered business* should be allowed for provided the benefit is identifiable and quantifiable
- Diversification benefits between hedgeable and *non hedgeable risks* of the *covered business* should not be allowed for
- Diversification benefits should not be allowed for between *covered* and non-*covered business*.

The allowance should reflect management's internal view of diversification benefits within portfolios of business and between portfolios and businesses at a group level. Management should monitor industry practice and ensure that the internal view is in line with the industry view.

G9.8 The method and basis on which allowance has been made for the cost of residual *non hedgeable risk* should be disclosed. The equivalent cost of capital charge, the definition, method of determining and amount of the associated capital on which the residual *non hedgeable risk* costs are applied should also be disclosed.

Various types of Embedded Values

MCEV Market Consistent Embedded Value Principles – October 2009

New Business and *Renewals*

***Principle* 10: New business is defined as that arising from the sale of new contracts and in some cases increases to existing contracts during the reporting period. The value of *new business* includes the value of expected *renewals* on those new contracts and expected future contractual alterations to those new contracts. The *MCEV* should only reflect in-force business, which excludes future new business. The *value of new business* should reflect the additional value to shareholders created through the activity of writing new business.**

G10.1 New business is defined as *covered business* arising from the sale of new contracts (and, as noted in G10.2, certain increases to existing contracts) during the reporting period, including cash flows arising from the projected *renewal* of those new contracts.

Various types of Embedded Values

MCEV Market Consistent Embedded Value Principles – October 2009

New Business and *Renewals*

G10.2 The *VIF* valued under *Principle* 6 should anticipate *renewal* of in-force business, including any *foreseeable* variations in the level of *renewal* premiums but excluding any value relating to future new business. New business should include recurring single premiums and changes to existing contracts where these are not variations in the *VIF*. To distinguish between new business and existing business, the following are examples of indications that premium represents new business:

- A new contract has been signed
- Underwriting has been performed
- A new policy or new policyholder details have been entered on administration systems
- Incremental remuneration has become due to the distributor/salesperson
- The pricing basis for the premium allows for the full cost of their marketing and distribution.

Various types of Embedded Values

MCEV Market Consistent Embedded Value Principles – October 2009

New Business and *Renewals*

G10.3 The presence of *renewal* premiums in pricing assumptions is an example of evidence that *renewals* would be included in the *value of new business*. *Renewals* should include expected levels of:

- Contractual *renewal* of premiums in accordance with the policy conditions at the valuation date, including any contractual variation in premiums
- Non-contractual variations in premiums where these are *foreseeable* ; for example, premiums expected to increase in line with salary or price inflation
- *Recurrent single premiums* where the level of premium is pre-defined and *foreseeable*.

Various types of Embedded Values

MCEV Market Consistent Embedded Value Principles – October 2009

New Business and *Renewals*

G10.4 Any variation in premium on *renewal* of in-force business from that anticipated, including deviations in non-contractual increases, deviations in *recurrent single premiums* and re-pricing of premiums for in-force business, should be treated as an experience variance on in-force business and not as new business.

G10.5 The projection assumptions used to value new business should be consistent with those used to value in force business.

G10.6 The contribution from new business ideally would be valued using point of sale assumptions. However, this is not practical in all cases and notably non economic assumptions tend to be updated less frequently than daily. Therefore assumptions can be chosen as of different dates with clear disclosure of the timing required.

G10.7 The *value of new business* should be calculated on a post tax basis, after *time value of financial options and guarantees, frictional costs of capital*, costs of *non hedgeable risks* and net of minority interests.

G10.8 Where new business margins are disclosed, these should be calculated as the ratio of the *value of new business (VNB)* to the *present value of new business premiums (PVNBP).* Alternative calculations of new business margins may be disclosed as further information.

Various types of Embedded Values

MCEV Market Consistent Embedded Value Principles – October 2009

New Business and *Renewals*

PVNBP should be calculated:

- By projecting the premiums expected in each future year, using assumptions and projection periods that are consistent with those used to calculate the *VNB*. The *PVNBP* may be calculated on a deterministic basis.
- Using premiums before reinsurance, unless there are specific situations where this approach would be misleading.
- Using the same definition of new business as is used in the calculation of *VNB* and, where appropriate, other reported sales figures.
- By discounting the projected premiums using the reference yield curve as defined in *Principle*14. Where the premium projection period is longer than the period for which reliable *reference rates* are available, adjustments should be made that are consistent with the equivalent adjustments used in calculating the *VNB.*
- At the point of sale. This does not require assumptions to be at the point of sale; rather these should be treated consistently with the timing used in the *VNB*.

Various types of Embedded Values

MCEV Market Consistent Embedded Value Principles – October 2009

Assessment of Appropriate Non Economic Projection Assumptions

***Principle* 11: The assessment of appropriate assumptions for future experience should have regard to past, current and expected future experience and to any other relevant data. The assumptions should be *best estimate* and *entity specific* rather than being based on the assumptions a market participant would use. Changes in future experience should be allowed for in the *VIF* when sufficient evidence exists. The assumptions should be *actively reviewed*.**

G11.1 The projection assumptions should be *best estimate assumptions* of each component of future cash flow for each policy group. Relevant data can be internal to the company or external, for example from experience analyses or inputs to pricing bases.

G11.2 *Best estimate assumptions* should be internally consistent. They should, where appropriate, be based on the *covered business* being part of a going concern.

G11.3 The assumptions should be *actively reviewed*, and updated as appropriate, at least annually.

G11.4 Projection assumptions should be considered separately for each *product group*.

Various types of Embedded Values

MCEV Market Consistent Embedded Value Principles – October 2009

DEMOGRAPHIC ASSUMPTIONS

G11.5 Appropriate allowance should be made in the *VIF* for demographic assumptions such as mortality, morbidity, *renewals* and future levels of withdrawals of in-force business. Such allowance
should be based on past evidence and expected future experience consistent with the assessment
of other projection assumptions.

G11.6 Dynamic policyholder behaviour should be considered in the allowance for the *time value of*
financial options and guarantees.

Various types of Embedded Values

MCEV Market Consistent Embedded Value Principles – October 2009

EXPENSES

G11.7 Future expenses such as *renewal* and other maintenance expenses should reflect the expected ongoing expense levels required to manage the in-force business, including investment in systems required to support that business and allowing for future inflation.

G11.8 Favourable changes in unit costs such as productivity gains should not normally be included beyond what has been achieved by the end of the reporting period. In certain circumstances such as start-up operations, it may be appropriate to assume that unit costs will reach their expected long-term levels within a defined period. For *clarity*, *the additional expenses before the long term level should be included in the VIF*. The extent to which such changes in unit costs have been anticipated should be separately disclosed.

G11.9 The nature and impact on shareholder value of any exceptional development and one-off costs excluded from the unit cost base should be separately disclosed.

G11.10 Overheads should be allocated between new business, existing business and development projects in an appropriate way consistent with past allocation, current business plans and future expectations.

Various types of Embedded Values

MCEV Market Consistent Embedded Value Principles – October 2009

EXPENSES

G11.11 *Holding companies'* operating expenses (including allocation of overhead expenses) relating to the operation of the existing *covered business* should be allocated to the expense assumptions.

G11.12 All expected expense overruns affecting existing *covered business*, including *holding company* operating expenses, overhead costs and development costs such as those incurred in start-up operations, in the current year must be allowed for.

G11.13 Where costs of managing the *covered business* are incurred within *service companies*, profits or losses to the *service companies* are to be valued on a *"look through" basis,* so as to give a *best estimate* of the impact on future shareholder cash flows of the expenses to the group of running the *covered business*. Actual and expected profit or loss to an internal group company on services provided to the *covered business* should be included in allowances for expenses in the *MCEV*. Where an external *service company* is used, the actual and future expected fees or charges should be allowed for in calculating the *MCEV*.

G11.14. Company pension scheme deficits should be allocated to the *covered business* expense assumptions in an appropriate way.

Various types of Embedded Values

MCEV Market Consistent Embedded Value Principles – October 2009

TAXATION AND LEGISLATION

G11.15 Allowance in the projection must be made for all taxes and regulations in the relevant jurisdiction affecting the *covered business*. These should follow the local treatment and be based on

best estimate assumptions, applying current legislation and practice together with known future

changes.

G11.16 The tax rates should consider the cash flows and tax position of the company.

Various types of Embedded Values

MCEV Market Consistent Embedded Value Principles – October 2009

Economic Assumptions

***Principle* 12: Economic assumptions must be internally consistent and should be determined such that projected cash flows are valued in line with the prices of similar cash flows that are traded on the capital market. No smoothing of market or account balance values or unrealised gains is permitted.**

G12.1 Economic assumptions should be updated for each reported calculation of *MCEV*.

Various types of Embedded Values

MCEV Market Consistent Embedded Value Principles – October 2009

INFLATION

G12.2 Where appropriate market instruments are available price inflation assumptions should be derived from them. In other markets, the price inflation assumption should be modelled considering a reasonable spread compared to the *reference rates*. Other types of inflation should be derived on a consistent basis.

Various types of Embedded Values

MCEV Market Consistent Embedded Value Principles – October 2009

SMOOTHING

G12.3 Asset values on which to base *MCEV* calculations must be consistent with values observable in investment markets and not be smoothed. Unrealised gains should be allowed for in the projections used to determine the projected shareholder cash flows. For the avoidance of doubt, this does not preclude the projection of book values according to local regulations if following a *distributable earnings* approach, in which case a portion of the unrealised gains are reflected in *VIF* rather than *free surplus*.

G12.4 Investment returns must be those actually earned on a market basis over the period.

Various types of Embedded Values

MCEV Market Consistent Embedded Value Principles – October 2009

INVESTMENT RETURNS AND DISCOUNT RATES

***Principle* 13: *VIF* should be discounted using discount rates consistent with those that would be used to value such cash flows in the capital markets.**

G13.1 Where cash flows do not depend on, or vary linearly with market movements, an alternative method can be used which assumes that assets earn, before tax and investment management expenses, *reference rates* as defined in *Principle* 14 and all the cash flows are discounted using *reference rates* which are gross of tax and investment management expenses.

G13.2 Where cash flows contain *financial options and guarantees* such that they do not move linearly with market movements, asset cash flows can be projected and all cash flows discounted using risk-neutral stochastic models. Alternative approaches, for example using deflators, may also be used. In either method, the *reference rates* should be used as risk free rates.

Various types of Embedded Values

MCEV Market Consistent Embedded Value Principles – October 2009

REFERENCE RATES

***Principle* 14: The *reference rate* is a proxy for a risk free rate appropriate to the currency, term and liquidity of the liability cash flows.**

- **Where the liabilities are *liquid* the *reference rate* should, wherever possible, be the swap yield curve appropriate to the currency of the cash flows.**
- **Where the liabilities are not *liquid* the reference rate should be the swap yield curve with the inclusion of a liquidity premium, where appropriate.**

G14.1 In evaluating the appropriateness of the inclusion of a liquidity premium (where liabilities are not *liquid)* consideration may be given to regulatory restrictions, internal constraints or investment policies which may limit the ability of a company to access the liquidity premium.

Various types of Embedded Values

MCEV Market Consistent Embedded Value Principles – October 2009

REFERENCE RATES

G14.2 Where the available financial market data used to set the *reference rate* is shorter than the projected liability cash flows, the data should be extended using an appropriate methodology, for example:

- Assuming that either spot or forward rates remain level at the longest available term; or
- If there exists a relevant government bond yield curve which is longer than the financial market data used to set the *reference rate*, this could be used to extend the data by maintaining a constant margin from the end of the available data and assuming it remains level thereafter.

G14.3 Where the financial market data used to set the *reference rate* is not available at all durations between the longest and shortest, the intermediate data points can be calculated by interpolation using an appropriate methodology. If the financial market data used to set the *reference rate* is not available at the very short end, other appropriate market information should be used instead.

Various types of Embedded Values

MCEV Market Consistent Embedded Value Principles – October 2009

REFERENCE RATES

G14.4 Where a company invests in fixed-income assets which have a yield different to the *reference rates*, the company should make appropriate adjustments to the projected asset cash flows to ensure that the asset cash flows, discounted at the *reference rates*, equal the market value of the assets.

G14.5 Where companies have businesses in territories and or currencies where swap curves do not exist or do not provide a robust basis for producing *reference rates* then a more appropriate alternative, such as the government bond yield curve, may be used.

Various types of Embedded Values

MCEV Market Consistent Embedded Value Principles – October 2009

STOCHASTIC MODELS

***Principle* 15: Stochastic models and the associated parameters should be appropriate for the *covered business* being valued, internally consistent and, where appropriate, based on the most recent market data. Volatility assumptions should, wherever possible, be based on those implied from derivative prices rather than the historical observed volatilities of the underlying instruments.**

G15.1 Stochastic models should cover all material asset classes.

G15.2 The calibration of the model should be based on market values such as equity option implied volatilities, swaption implied volatilities and the initial swap rate curve for market-traded contracts that are as similar as possible in nature to the option and guarantees contained within the liabilities. The model should reproduce these values to a high degree of accuracy.

G15.3 Volatility assumptions should be based on the most recently available information as at the valuation date. Where there are concerns over the depth or liquidity of the market or if the market displayed unusual characteristics as at the valuation date then less recently observed measures and expert opinion should be considered.

Various types of Embedded Values

MCEV Market Consistent Embedded Value Principles – October 2009

STOCHASTIC MODELS

G15.4 The duration to maturity and the "moneyness" effect on the market implied volatilities should be taken into account where material and practical.

G15.5 Correlations of asset returns and yields should be based on an analysis of data covering a sufficient number of years which is considered to be relevant for setting current expectations. The methodology used to derive the correlations should not normally change from year to year. Companies should, where possible, check the reasonableness of their correlations against externally available correlations.

G15.6 *Closed form solutions* can be used where such methods are sufficiently accurate.

Various types of Embedded Values

MCEV Market Consistent Embedded Value Principles – October 2009

PARTICIPATING BUSINESS

***Principle* 16: For *participating business* the method must make assumptions about future bonus rates and the determination of profit allocation between policyholders and shareholders. These assumptions should be made on a basis consistent with the projection assumptions, established company practice and local market practice.**

G16.1 Where regulatory/contractual restrictions or bonus participation rules are clear they should be applied to projections of *participating business*.

G16.2 Projected bonus rates should be consistent with the projected future investment returns used.

G16.3 Where the company has an established bonus philosophy, this should be applied to projections of *participating business*.

Various types of Embedded Values

MCEV Market Consistent Embedded Value Principles – October 2009

PARTICIPATING BUSINESS

G16.4 Where management has discretion over allocation of bonuses, including the realisation of unrealised gains, projection assumptions should have regard to the past application of discretion, past external communication, the influence of market practice regarding that discretion, any payout smoothing strategy in place and any guidance from the local supervisory.

G16.5 It is possible that some of the assets *(residual assets)* allocated to the *participating business* would remain at the end of the projection (after all bonuses have been allocated) as unallocated surplus. This surplus should not be negative. Acceptable valuation treatments are to assume that such unallocated surplus would be distributed over time via final bonus to existing business, or as bonuses to both existing and future new business, and to value any shareholders' participation in its distribution at discounted value. All assets backing *participating business* should be assumed to be realised within the projection period.

G16.6 Where investment income on assets backing *required capital* is subject to profit participation with policyholders, this may lead to an additional source of frictional cost of *required capital*, in addition to those mentioned in *Guidance* 8.2.

Various types of Embedded Values

MCEV Market Consistent Embedded Value Principles – October 2009

Disclosure

***Principle* 17: *MCEV* results should be disclosed at consolidated group level using a business classification consistent with the primary statements, with clear description of what business is covered by *MCEVM* and what is not. Except where they are not considered material, compliance with the *MCEV Principles* is compulsory and should be explicitly disclosed.**

Holding company

Covered Business

Strong Compliance with MCEVM

immaterial	⇒	Explicitly disclosed
material	⇒	Compulsory observance

Anyway Explicitly Disclose

Various types of Embedded Values

MCEV Market Consistent Embedded Value Principles – October 2009

Disclosure

G17.1 Compliance with the *MCEV Principles* is compulsory and should be explicitly disclosed. When the *MCEV* is referred to and *Principles* have been complied with but underlying Guidance has not been complied with in its entirety, the areas of material non-compliance and reasons for noncompliance should be specifically and separately disclosed.

G17.2 *MCEV* is to be calculated at least once a year. It is an option to disclose the *MCEV* or *VNB* more frequently.

G17.3 The following items should be disclosed as a minimum in the format shown. Additional disclosures to enable understanding of the reasons for movement in *MCEV*, and future sustainability of earnings on *MCEV*, are encouraged.

Various types of Embedded Values

MCEV Market Consistent Embedded Value Principles – October 2009

Disclosure

ASSUMPTIONS

17.3.1 How economic and other business assumptions (e.g. mortality, persistency, expenses and future asset allocation) are determined for each significant territory.

Sample of a Japanese company

1. Risk free rate
2. Interest rate model
3. Implied volatility of FX and stock
4. Correlation
5. Foreign Exchange rate
6. Future asset allocation

Various types of Embedded Values

MCEV Market Consistent Embedded Value Principles – October 2009

Disclosure

ASSUMPTIONS

17.3.1 How economic and other business assumptions (e.g. mortality, persistency, expenses and future asset allocation) are determined for each significant territory.

Sample of a Japanese company

1. Risk free rate

	JP Yen		US $	
Term	End of March 2014	End of March 2015	End of March 2014	End of March 2015
1 year	0.07%	0.02%	0.10%	0.28%
5 year	0.19%	0.13%	1.79%	1.46%
10 year	0.66%	0.42%	2.93%	2.11%
20 year	1.64%	1.23%	3.67%	2.57%
30 year	1.82%	1.45%	3.82%	2.69%
30 year	1.96%	1.62%	3.91%	2.73%

Various types of Embedded Values

MCEV Sample of a Japanese company

3. Implied volatility of FX rates and stocks

Implied volatility of FX option (samples from at the money)

Option Period	End of March 2014			End of March 2013		
	US $	Euro	UK Pond	US $	Euro	UK Pond
1 year	10.0%	11.1%	10.7%	9.9%	11.2%	11.7%
5 year	13.2%	15.1%	14.5%	11.7%	13.0%	13.7%
10 year	16.5%	17.2%	16.2%	14.2%	14.6%	15.8%
15 year	16.8%	18.3%	---	15.5%	15.5%	---
20 year	16.9%	18.8%	---	15.5%	15.5%	---

Implied volatility of stock option (samples from at the money)

Option Period	End of March 2014				End of March 2013			
	JP yen	US $	Euro	UK Pond	JP yen	US $	Euro	UK Pond
1 year	20.9%	14.8%	17.3%	13.5%	18.7%	16.6%	19.2%	15.4%
2 year	19.8%	16.4%	18.1%	15.6%	18.7%	18.3%	20.3%	16.6%
3 year	19.7%	17.4%	18.2%	15.9%	18.6%	19.5%	21.0%	17.9%
4 year	19.9%	18.5%	18.4%	16.7%	18.8%	21.2%	21.4%	18.8%
5 year	20.0%	19.2%	18.3%	17.2%	19.0%	22.1%	21.9%	19.4%
7 year	20.5%	21.0%	18.6%	18.6%	19.8%	24.3%	22.2%	20.3%
10 year	21.1%	23.7%	19.9%	20.4%	20.8%	27.3%	22.1%	21.2%

Various types of Embedded Values

MCEV Sample of a Japanese company

4. Correlation

The market consistent data was not available, therefore, it is calculated based on the past 10 years data.

	JP yen Int. 10 Y	US $ Int. 10 Y	Euro Int. 10 Y	UK P Int. 10 Y	US $/ JP yen	Euro/ JP yen	UK P/ JP yen	JP stock	US Stock	Euro Stock	UK Stock
JP yen Int. 10 Y	1.00	0.58	0.43	0.55	0.31	0.20	0.30	0.25	0.11	0.16	0.10
US $ Int. 10 Y	0.58	1.00	0.70	0.87	0.43	0.34	0.49	0.32	0.29	0.28	0.22
Euro Int. 10 Y	0.43	0.70	1.00	0.81	0.20	0.45	0.39	0.19	0.26	0.18	0.22
UK P Int. 10 Y	0.55	0.87	0.81	1.00	0.29	0.33	0.45	0.25	0.26	0.18	0.13
US $/ JP yen	0.31	0.43	0.20	0.29	1.00	0.61	0.71	0.59	0.20	0.17	0.13
Euro/ JP yen	0.20	0.34	0.45	0.33	0.61	1.00	0.79	0.63	0.26	0.28	0.21
UK P/ JP yen	0.30	0.49	0.39	0.45	0.71	0.79	1.00	0.66	0.60	0.50	0.49
JP stock	0.25	0.32	0.19	0.25	0.59	0.63	0.66	1.00	0.65	0.66	0.63
US Stock	0.11	0.29	0.26	0.20	0.26	0.60	0.49	0.65	1.00	0.84	0.86
Euro Stock	0.16	0.28	0.18	0.17	0.28	0.50	0.43	0.66	0.84	1.00	0.87
UK Stock	0.10	0.22	0.22	0.13	0.21	0.49	0.32	0.63	0.86	0.87	1.00

MCEV Sample of a Japanese company

5. Foreign Exchange rate

Currency	End of March 2014	End of March 2015
US $	102.92 Yen	120.17 Yen
Euro	---	130.32 Yen

6. Future asset allocation

1) General Account
In the general account, the company will continue the ALM and the company has the assumption to invest its assets to JBG.
2) Separate Account
In the separate account, the assumption of the asset allocation is same as the position of end of March 2015. The company does not make any adjustment to maintain the asset allocations.

Various types of Embedded Values

MCEV Market Consistent Embedded Value Principles – October 2009

Disclosure

ASSUMPTIONS

17.3.1 How economic and other business assumptions (e.g. mortality, persistency, expenses and future asset allocation) are determined for each significant territory.

Sample of Japanese company

item	Methods
Mortality and morbidity	Based on recent 3 years experiences: Segmented by; 1. Policy type, 2. Contract year and 3. Attained age etc.. If the company did not have sufficient datum, then it used the industry datum. The mortality rates reflected the improve trends. The morbidity rates reflected the improve or worsening trends Trend components are considered for 5 years study period.
Surrender and lapse	Based on 1 year experience Segmentation is same as above.

Various types of Embedded Values

MCEV Market Consistent Embedded Value Principles – October 2009

Disclosure

ASSUMPTIONS

17.3.1 How economic and other business assumptions (e.g. mortality, persistency, expenses and future asset allocation) are determined for each significant territory.

Sample of Japanese company

item	Methods
Renewal rate	The renewal assumption is based on the past renewal rates. Among the renewable products, the medical insurance of finite type has big affect on the financial statement, therefore, renewable rates are reflected only on this product type. For other renewable products, the assumption of renewal rates are zero.
Expense Rate	Unit cost methods are applied to the assumption of expense rates.
Efficient Tax rate	End of March 2014 MCEV : 30.7% End of March 2015 MCEV : 28.8%
Inflation rate	End of March 2014 MCEV : 0.6% End of March 2015 MCEV : 0.5%

Various types of Embedded Values

MCEV Market Consistent Embedded Value Principles – October 2009

Disclosure

ASSUMPTIONS

17.3.2 The market *reference rates* (for example rates at five year intervals) for each of the significant territories. The methods used to extend the curves where a sufficiently deep market does not exist should be described. Similarly if short duration rates are based on other market information then this should also be disclosed. Where the *reference rates* are not based on the swap curves (as they do not exist or do not provide a robust basis) this should be disclosed with the alternative method used. If the *reference rates* include a liquidity premium then the liquidity premium should be disclosed along with, as appropriate, the method to derive the premium and the liability classes where allowance is made.

Various types of Embedded Values

MCEV Market Consistent Embedded Value Principles – October 2009

Disclosure

ASSUMPTIONS

17.3.3 The methods used to derive volatilities and correlations should be disclosed. Changes in the methods used since the last reporting period should also be disclosed.

17.3.4 Where relevant, the foreign exchange rates used.

Various types of Embedded Values

MCEV Market Consistent Embedded Value Principles – October 2009

Disclosure

METHODOLOGY

17.3.5 A clear, brief description of the *covered business*. Where *covered business* includes business in several IFRS segments or where *covered business* does not constitute a full IFRS segment sufficient qualitative and quantitative disclosure should be made to ensure that a full understanding of:

- The IFRS value of the business included in *covered business*; and
- The *MCEV* value of the business

by IFRS segment is available.

17.3.6 Treatment of consolidation adjustments, including inter-company arrangements such as reinsurance or loans associated with *covered business* and allocation of *holding company* and overhead expenses to *covered business*.

Various types of Embedded Values

MCEV Market Consistent Embedded Value Principles – October 2009

Disclosure

METHODOLOGY

17.3.7 For companies *writing participating business*, the approach used to determine future bonuses and the treatment of any *residual assets*.

17.3.8 The method used to determine the level of *required capital*. For each significant geographical segment disclosed, the level of required capital expressed as a percentage of the level of solvency capital at which the supervisor is empowered to take action.

17.3.9 Where material, the management actions included in determining the *time value of financial options and guarantees*.

Various types of Embedded Values

MCEV Market Consistent Embedded Value Principles – October 2009

Disclosure

METHODOLOGY

17.3.10 The basis on which allowance has been made for *frictional costs*. The allowance for costs of investment expenses and taxation should be discussed. If any caps are applied to the costs incurred this should be disclosed. Where approximate methods have been used to project the required capital this should be disclosed together with a brief description of the basis of projection.

17.3.11 The method and basis on which allowance has been made for residual *non hedgeable risks*. The risks allowed for should be described including the nature of the risk and whether the impact on shareholder value is *symmetric or asymmetric*. The *non hedgeable risks* for which there is sufficient allowance in the *time value of options and guarantees* or the *PVFP* should be explicitly described. For the implied cost of capital charge, the definition, method of determining and amount of associated capital on which the residual *non hedgeable risk* costs are applied, including the allowance for management actions, should be disclosed. A description of the allowance for diversification should also be disclosed.

Various types of Embedded Values

MCEV Market Consistent Embedded Value Principles – October 2009

Disclosure

METHODOLOGY

17.3.12 The method used to determine the *value of new business* including:

- The definition of new business
- Any changes in the definition of new business and the impact of such changes on the *value of new business*
- The basis of the new business calculation with regard to timing of assumptions and valuation;
- Any changes in the timing of assumptions and valuation and impact of such changes on the *value of new business*; and
- Where there are material impacts on value related to interactions between new business and existing business, the basis for presenting impacts should be described.

Various types of Embedded Values

MCEV Market Consistent Embedded Value Principles – October 2009

Disclosure

METHODOLOGY

17.3.13 The published new business premium volume and whether it is consistent with the definition of new business. Where *PVNBP* values are disclosed, a description of how the underlying assumptions have been set should also be provided including details of where premiums before reinsurance have not been used. In addition, where *PVNBP* is being used to compare new business volumes from one period to another, offices should report separately:

- The total amount of single premiums
- The total annualised amount of annual premiums; and
- The average annual premium multiplier, being (*PVNBP* – total amount of single premiums) / total annualised amount of regular premiums.

[Following Items of MCEV are omitted]

INSURANCE CORE PRINCIPLES,
STANDARDS, GUIDANCE AND ASSESSMENT METHODOLOGY

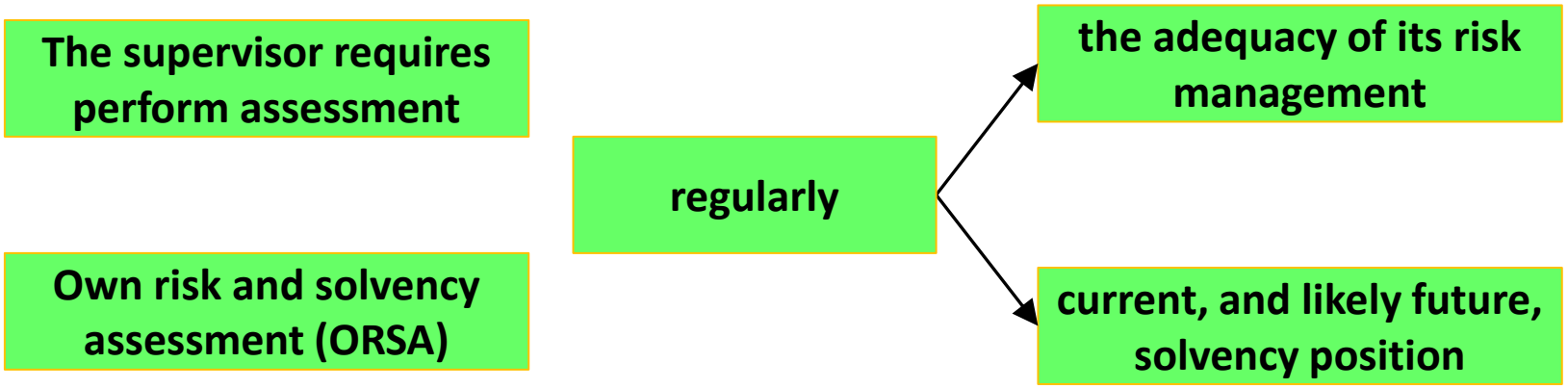
1 OCTOBER 2011

ICP 16 Enterprise Risk Management for Solvency Purposes

The supervisor establishes enterprise risk management requirements for solvency purposes that require insurers to address all relevant and material risks.

Own risk and solvency assessment (ORSA)

16.11 The supervisor requires the insurer to perform its own risk and solvency assessment (ORSA) regularly to assess the adequacy of its risk management and current, and likely future, solvency position.



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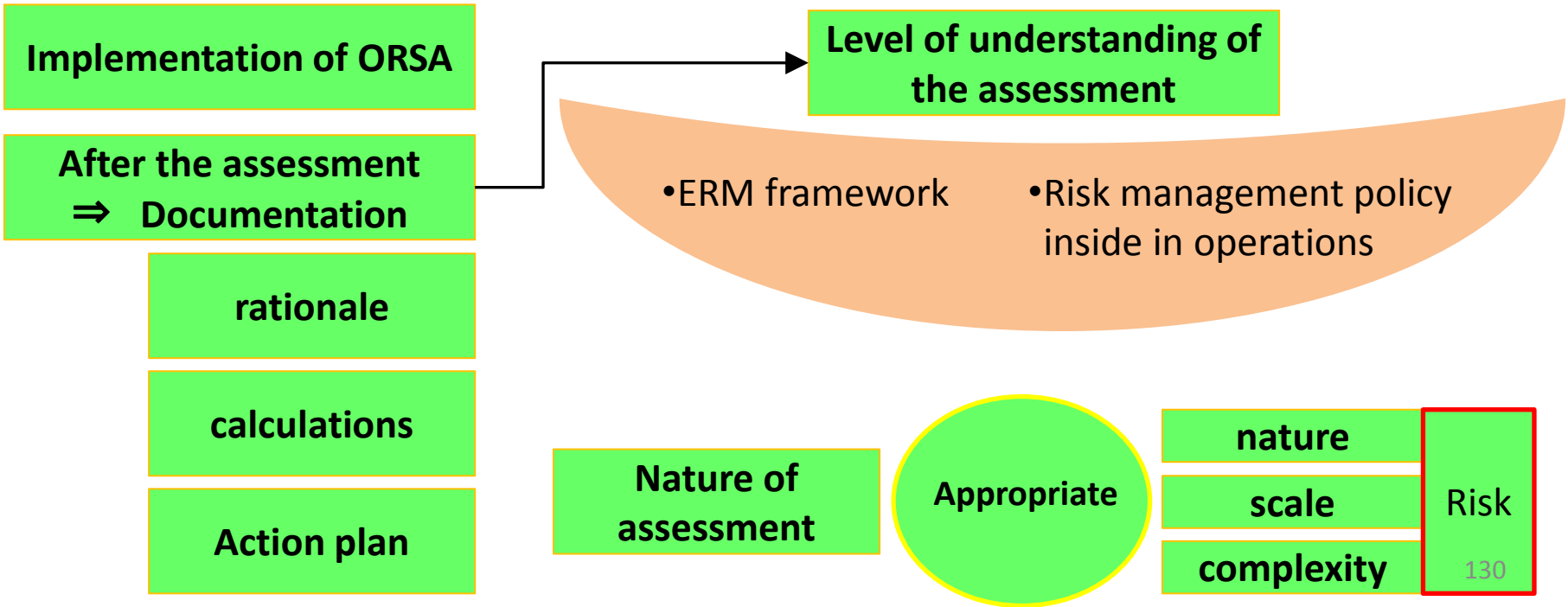
The supervisor establishes enterprise risk management requirements for solvency purposes that require insurers to address all relevant and material risks.

Own risk and solvency assessment (ORSA)

16.11 The supervisor requires the insurer to perform its own risk and solvency assessment (ORSA) regularly to assess the adequacy of its risk management and current, and likely future, solvency position.

16.11.1 Every insurer should undertake its own risk and solvency assessment (ORSA) and document the rationale, calculations and action plans arising from this assessment. The ability of an insurer to reflect risks in a robust manner in its own assessment of risk and solvency is supported by an effective overall ERM framework and by embedding its risk management policy in its operations. It is recognised that the nature of the assessment undertaken by a particular insurer should be appropriate to the nature, scale and complexity of its risks.

16.11.1 Every insurer should undertake its own risk and solvency assessment (ORSA) and document the rationale, calculations and action plans arising from this assessment. The ability of an insurer to reflect risks in a robust manner in its own assessment of risk and solvency is supported by an effective overall ERM framework and by embedding its risk management policy in its operations. It is recognised that the nature of the assessment undertaken by a particular insurer should be appropriate to the nature, scale and complexity of its risks.



16.12 The supervisor requires the insurer's Board and Senior Management to be responsible for the ORSA.

16.12.1 The prime purpose of the ORSA is to assess whether its risk management and solvency position is currently adequate and is likely to remain so in the future. Responsibility for the ORSA rests at the top level of the insurer's organisation, the insurer's Board and Senior Management. Where it is appropriate to the nature, scale and complexity to do so, the effectiveness of the ORSA should be assured through internal or external independent overall review by a suitably experienced individual, such as a Chief Risk Officer, who reports directly to or is a member of the Board.

Purpose of ORSA
Assess the appropriateness

Currently adequate → **So in the future**

- **Risk Management**
- **Solvency Position**

Responsibility of ORSA

- **Top of the organization**
- **Board and Senior Management**

16.12 The supervisor requires the insurer's Board and Senior Management to be responsible for the ORSA.

16.12.1 The prime purpose of the ORSA is to assess whether its risk management and solvency position is currently adequate and is likely to remain so in the future. Responsibility for the ORSA rests at the top level of the insurer's organisation, the insurer's Board and Senior Management. Where it is appropriate to the nature, scale and complexity to do so, the effectiveness of the ORSA should be assured through internal or external independent overall review by a suitably experienced individual, such as a Chief Risk Officer, who reports directly to or is a member of the Board.

Effectiveness of ORSA

Assured Through review

By Suitable Experienced Person Ex. CRO

Appropriately Assessed

Risk

nature

scale

complexity

Basically It is needed

16.13 The supervisor requires the insurer's ORSA to encompass all reasonably foreseeable and relevant material risks including, as a minimum, underwriting, credit, market, operational and liquidity risks and additional risks arising due to membership of a group. The assessment is required to identify the relationship between risk management and the level and quality of financial resources needed and available.

Insurer's ORSA

Encompass

all reasonably foreseeable risks

relevant material risks

Minimum following risks

- **underwriting**
- **credit**
- **market**
- **operational**
- **liquidity**

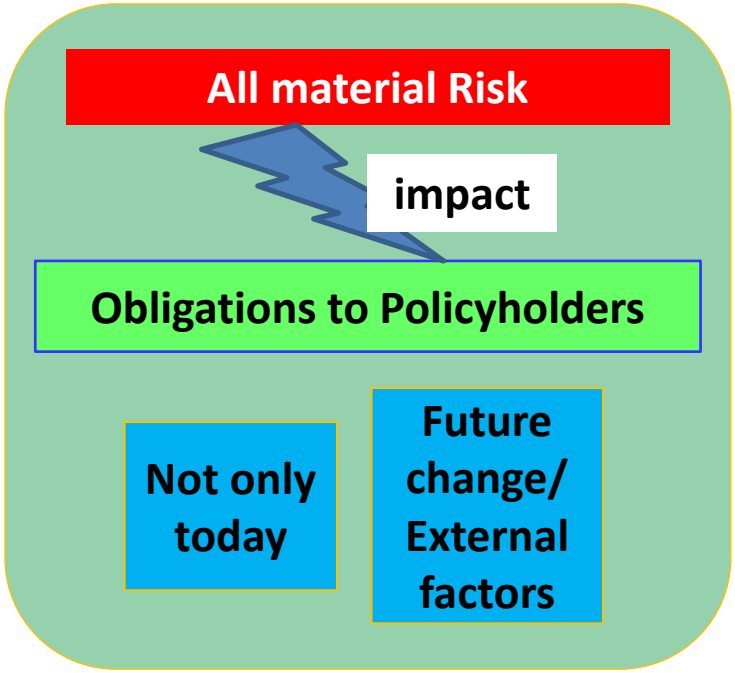
Financial Resources

For the risk management

needed

available

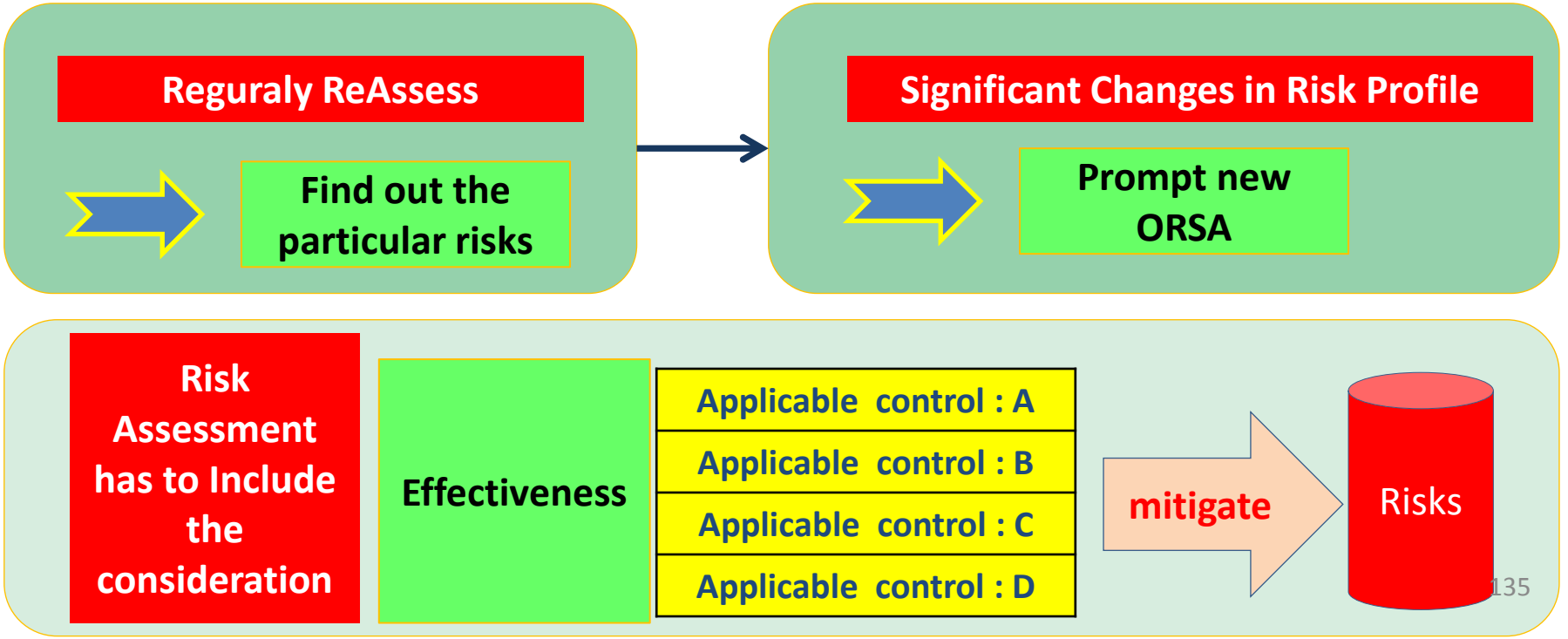
16.13.1 In its ORSA, an insurer should consider all material risks that may have an impact on its ability to meet its obligations to policyholders, including in that assessment a consideration of the impact of future changes in economic conditions or other external factors. An insurer should undertake an ORSA on a regular basis so that it continues to provide relevant information for its management and decision making processes. The insurer should regularly reassess the causes of risk and the extent to which particular risks are material. Significant changes in the risk profile of the insurer should prompt it to undertake a new ORSA. Risk assessment should be done in conjunction with consideration of the effectiveness of applicable controls to mitigate the risks.



ORSA:Regularly Report to (for)

- **Management**
- **Decision making process**

16.13.1 In its ORSA, an insurer should consider all material risks that may have an impact on its ability to meet its obligations to policyholders, including in that assessment a consideration of the impact of future changes in economic conditions or other external factors. An insurer should undertake an ORSA on a regular basis so that it continues to provide relevant information for its management and decision making processes. The insurer should regularly reassess the causes of risk and the extent to which particular risks are material. Significant changes in the risk profile of the insurer should prompt it to undertake a new ORSA. Risk assessment should be done in conjunction with consideration of the effectiveness of applicable controls to mitigate the risks.



Own risk and solvency assessment (ORSA) - economic and regulatory capital

16.14 The supervisor requires the insurer to:

- **determine, as part of its ORSA, the overall financial resources it needs to manage its business given its own risk tolerance and business plans, and to demonstrate that supervisory requirements are met;**
- **base its risk management actions on consideration of its economic capital, regulatory capital requirements and financial resources, including its ORSA; and**
- **assess the quality and adequacy of its capital resources to meet regulatory capital requirements and any additional capital needs.**

Followings are included or considered in ORSA

Financial Resources

- ☐ Manage its Business under the given
  - own risk tolerance
  - Business plan
- ☐ Verify fulfillment of supervisory requirement

Risk Management Actions

- ☐ Based on
- ● Economic Capital
- ● Regulatory Capital
- ● Financial Resources

Capital Resources

- ☐ Assess the quality and adequacy of Capital Resources
- ● Regulatory Capital Requirement
- ● Additional Capital Need

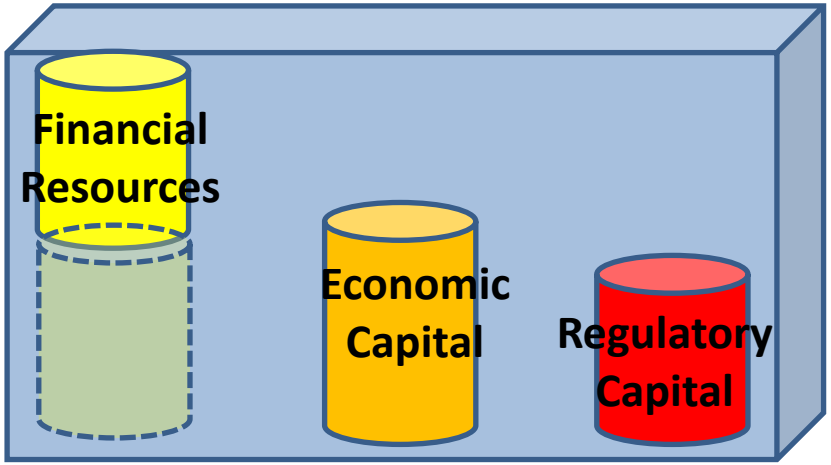
16.14.1	In the context of its overall ERM framework, an insurer should perform its ORSA and have risk and capital management processes in place to monitor the level of its financial resources relative to its economic capital and the regulatory capital requirements set by the supervisor.
16.14.2	In the context of its own assessment, an insurer should clearly distinguish between current capital needs and its projected future financial position, having regard for its longer-term business strategy and, in particular, new business plans.

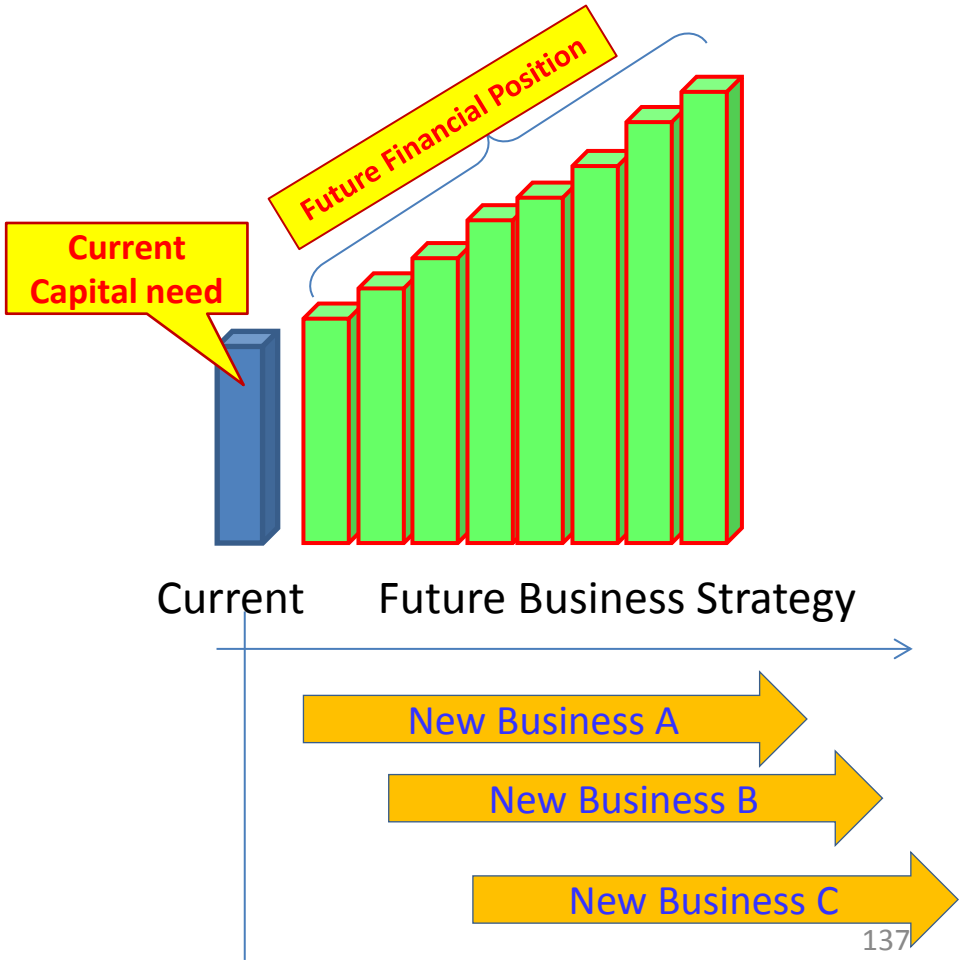
Perform or Examine

ORSA

Risk vs. Capital Management

In the occasion of monitor





16.14.3 While holding capital is not necessarily the most effective way of managing risk, it is important that an insurer has regard for how risk management and capital management relate to and interact with each other. Therefore, an insurer should determine the overall financial resources it needs, taking into account its risk tolerance and business plans, based on an assessment of its risks, the relationship between them and the risk mitigation in place. Determining economic capital helps an insurer to assess how best to optimise its capital base, whether to retain or transfer risk and how to allow for risks in its pricing. It also helps to give the supervisor confidence that risks are being well managed.

determine the overall financial resources

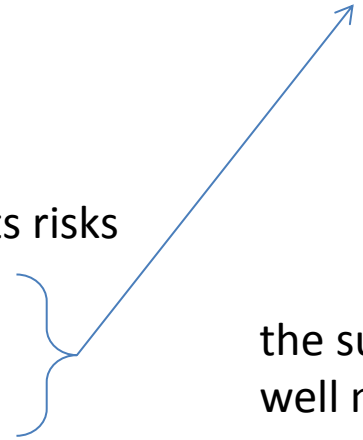
its risk tolerance

business plans

based on an assessment of its risks

relationship between risks

the risk mitigation in place



Economic Capital

how best to optimise its capital base

whether to retain or transfer risk

how to allow for risks in its pricing

the supervisor confidence that risks are being well managed

Own risk and solvency assessment (ORSA) - continuity analysis

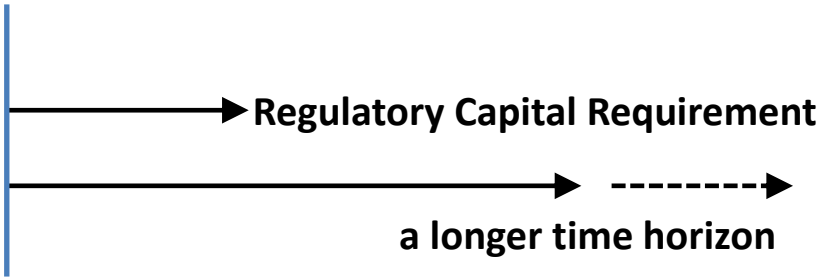
16.15 The supervisor requires:

- **the insurer, as part of its ORSA, to analyse its ability to continue in business, and the risk management and financial resources required to do so over a longer time horizon than typically used to determine regulatory capital requirements;**
- **the insurer's continuity analysis to address a combination of quantitative and qualitative elements in the medium and longer-term business strategy of the insurer and include projections of its future financial position and analysis of its ability to meet future regulatory capital requirements.**

Ability to continue in business

Study period; time horizon

- **the risk management**
- **financial resources**



Insurer's continuity analysis

Elements	Business strategy
quantitative	medium-term
qualitative	longer-term

include projections of

- its future financial position
- analysis of its ability to meet future regulatory capital requirements

Role of supervision in risk management

16.16 The supervisor undertakes reviews of an insurer's risk management processes and its financial condition, including the ORSA. Where necessary, the supervisor requires strengthening of the insurer's risk management, solvency assessment and capital management processes.

The supervisor undertakes reviews

risk management processes

financial condition , including the ORSA

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ORSA Report

Item

1. Summary
2. Management strategy and the recognition of risks
3. Organizational platform for ERM
4. Risk Management Principle (Risk Appetite)
5. Risk Profile and Risk Measure
6. Own Risk and Solvency Assessment
7. Application to Real Management
8. Estimation and Assessment of ORSA
9. Others

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ORSA Report

1. Details of Items

1) Paper has to contain the important items listed as follows

- ☐ Management strategy and the recognition of risks
- ☐ Organizational platform for ERM
- ☐ Risk Management Principle (Risk Appetite)
- ☐ Risk Profile and Risk Measure
- ☐ Own Risk and Solvency Assessment
- ☐ Application to Real Management
- ☐ Estimation and Assessment of ORSA

2) Future direction of ERM and ORSA; Risk management principle (Risk appetite), capital allocation and risk measure etc., are contained.

3) Reporting situations of ORSA; approval by Risk Management Executive and reporting to Board meeting; frequency, quality etc.

JFSA
ORSA Report

2. Management strategy and the recognition of risks
1) Positioning of ERM and ORSA among the management strategy
2) Directors' recognition, action, direction and immediate planning toward the formation and empowerment of ERM arrangement
3) Actions for ERM arrangement; directions and authorization to the person in charge, and human resource planning

JFSA
ORSA Report

3. Organizational platform for ERM

1) In the organization chart, it must be contained the position of the company among the corporate group.
2) On account of materiality, it is possible to issue the ORSA report for the single company or restricted domain of the consolidated companies. It is requested to show the reason of the restriction of the domain for considering ERM and ORSA.
3) In the case of implementation of EAM in the group base, it is requested to show the role of each company to implement ERM.
4) The functions (functions, committees, directors, divisions, sections and so on) and their roles, including the responsibilities and authorities, must be documented.
5) The reporting systems also must be documented; addresses contents and frequencies of report. The document should separate clearly the group related part and parent subsidiary relation part.

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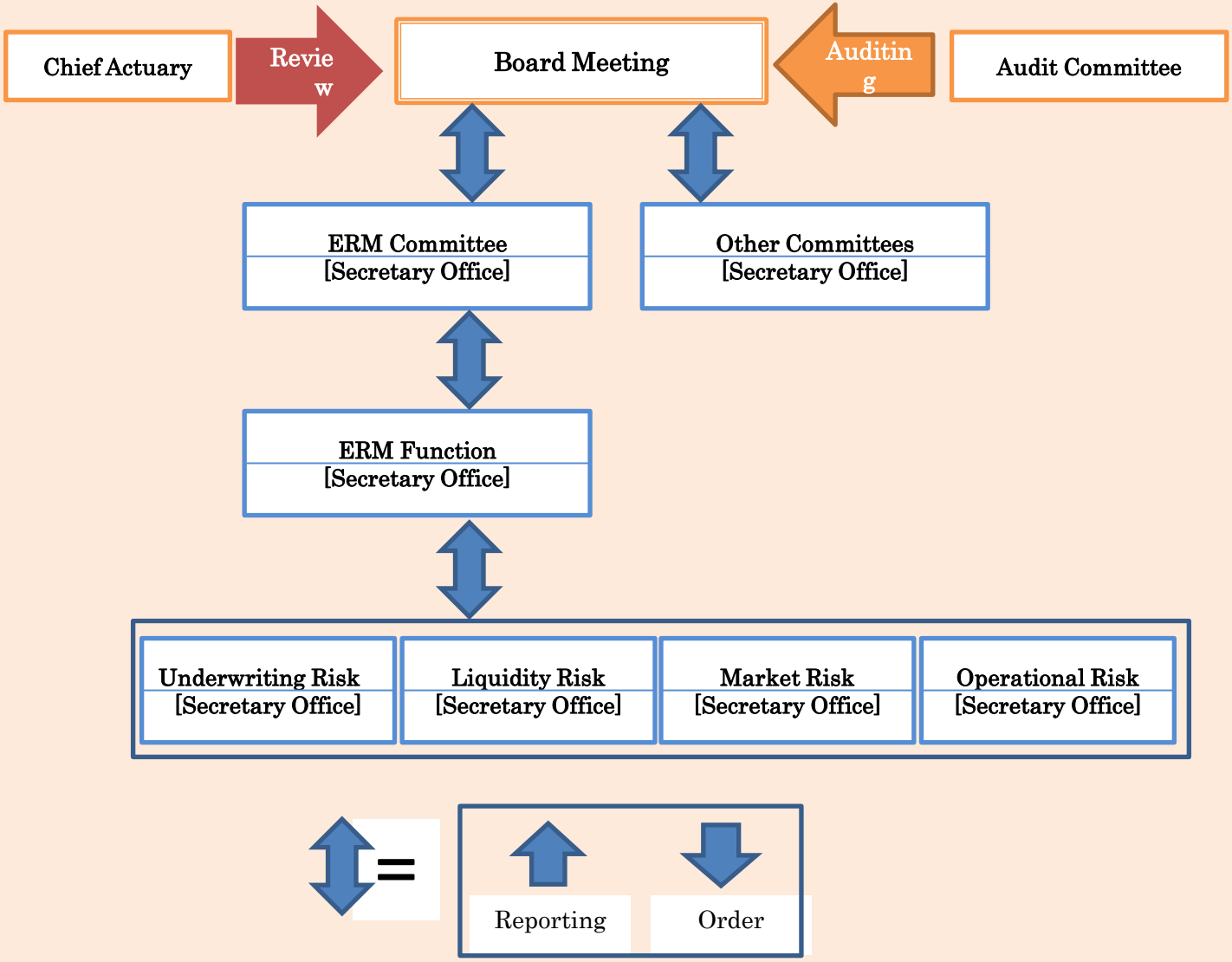

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ORSA Report

4. Risk Management Principle (Risk Appetite)

1) Risk Management Policy : Systematic Diagram of Integrated Risk Management Policy, Underwriting Risk management Policy, Investment Risk management Policy and Market Risk Management Policy. It shall contain the purposes of these policies.
2) Risk Appetite :
   - ☐ Amount of the apportionable capital among the group
     - Focused items of Risk appetite among the risk categories
     - Relation of the targeted Credit rates and risk appetite
     - The relationship of risk limit, risk tolerance, risk appetite, risk buffer, apportionable capital. The background of these indicators
     - If the risk appetite contains targeted ROE or targeted risk adjusted earnings, these are contained in the ORSA
     - The action plans in the case of the risk indicators reach the risk limits or almost reach the risk limits, or happening of big losses by natural disasters or market confusions

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ORSA Report

4. Risk Management Principle (Risk Appetite)

☐ Description of the capital allocation, risk tolerances, risk appetite, risk limit by the business lines or risk categories: refer the following items

- If the company decides the capital allocation, risk limits etc. by the business lines and risk categories, the descriptions are required.
- Policies and rules relating to entering the new business or withdrawal from existing businesses, related to risk appetite, if there are actual cases that made the specific entry and withdrawal in accordance with the basis of the policies and rules should be described.
- The policies and rules relating to on insurance premium making, considering with Risk assessment and risk & return evaluation, etc., if specifically there is a case that was to take advantage of the insurance premium making using the ERM and ORSA should be described.
- The description of the action plans, in the case of the risk indicators reaching to the risk limits or almost reaching to the risk limits, or big loss occasions by natural disasters or market confusions

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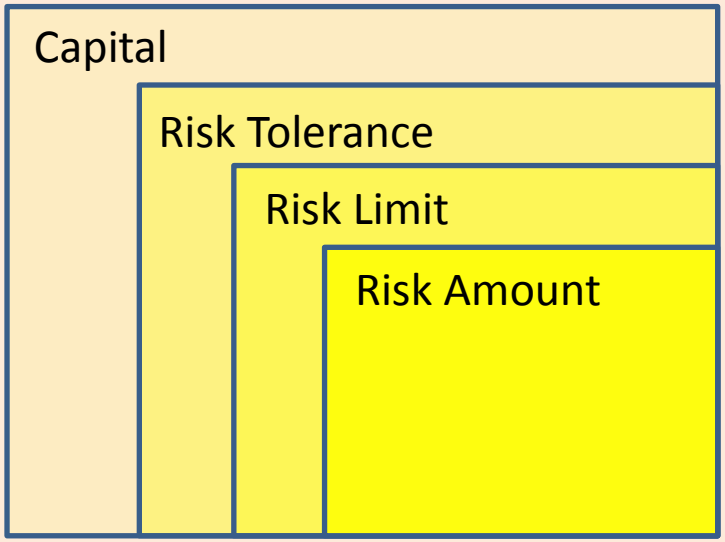
4. Risk Management Principle (Risk Appetite)
image



Capital	Risk tolerance		Risk limit	
				Portion based on risk tolerance
230	Underwriting Risk	100	90	90.0%
	Market Risk	80	70	87.5%
	Credit Risk	20	10	50.0%
	(Buffer)	30	---	---

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5. Risk Profile and Risk Measure
Summary of the risk amount of underwriting risk, interest rate risk, stock risk, FX risk, property risk, credit risk, counterparty risk, operational risk and integrated risk
If each business line has the own risk categories, then description of the subtotal of the risk amount by each risk category

Life Insurance	
Risk Categories	Risk Amount
Underwriting Risk	
Minimum guarantee risk	
Market Risk	
Interest Rate Risk	
Stock Price Risk	
FX Risk	
Property Risk	
Credit Risk	
Counter Party Risk	
Operational Risk	
Risk Total	

Non-Life Insurance	
Risk Categories	Risk Amount
Underwriting Risk	
General Insurance Risk	
Domestic natural disaster risk	
Over see natural disaster risk	
Market Risk	
Interest Rate Risk	
Stock Price Risk	
FX Risk	
Property Risk	
Credit Risk	
Counter Party Risk	
Operational Risk	
Risk Total	

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5. Risk Profile and Risk Measure

1) The interpretation and analysis are required
2) Description of risk categories, confidence levels, method of risk measure(variance covariance method, monte Carlo method, study period)
3) Consolidate method of risks (correlation method, copula, mixing the both methods, etc.)
4) Mitigation method of liquidity risk, reputational risk, diffusion of risk and trading between group entities.
5) About the emerging risks, awareness of the emerging risks and figure on frequencies
6) The heat map explanation about the risk profile of above 5 items. The frequency and contents of presentation to Board meeting are also contained in the ORSA report.

Frequency

1 -- 10 yr	Risk A				
10 – 20 yr		Risk B	Risk C		
20 – 100yr				Risk E	
100—250 yr					Risk F
250 yr --			Risk D		Risk G
	1 billion	1 – 2 billion	2– 5 billion	5 – 10 billion	10 -- billion

Damage

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6. Own Risk and Solvency Assessment

(1) Total ORSA

- ORSA and required capital shall be contained
- Fulfilment level toward the regulation of solvency
- The definition of the capital and the qualities of capital
- The past actual cases of reaching to the risk limits or almostreaching to the limits. And the examples of actions to such cases shall be described.

(2) ORSA for the business line and Risk Categories

Required capitals by risk categories should be described. And the comparison with the risk tolerances are also described

The past actual cases of reaching to the risk limits or almost reaching to the limits and big losses by the natural disasters and market turbulence must be described. And the examples of actions to such cases shall be described

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6. Own Risk and Solvency Assessment
() Stress Test

- ORSA and required capital shall be contained
- Fulfilment level toward the regulation of solvency
- The definition of the capital and the qualities of capital
- The past actual cases of reaching to the risk limits or almostreaching to the limits. And the examples of actions to such cases shall be described.

Capital	Risk Tolerance		Risk Limit		Risk Amount		Appraisal	Maximum Risk Amount during the last period	
				Vs. Risk tolerance		Vs. Risk Limit			Vs. Risk tolerance
230	Underwriting Risk	100	90	90.0%	80	88.9%		80	88.9%
	Market Risk	80	70	87.5%	35	50.0%		60	85.7%
	Credit Risk	20	10	50.0%	5	50.0%		8	80.0%
	(Buffer)	30	---	---	---	---		---	---

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6. Own Risk and Solvency Assessment

(2) ORSA for a business line and Risk Categories

- Required capital by risk categories should be described. And the comparison with the risk tolerances are also described
- The past actual cases of reaching to the risk limits or almost reaching to the limits and big losses by the natural disasters and market turbulence must be described. And the examples of actions to such cases shall be described.
- If the reallocation of capital among the group was considered, describe the situation.

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6. Own Risk and Solvency Assessment
(3) Stress Test

- Integrated Stress test: implementation purpose, application (application to risk limit, application to reinsurance strategy etc.), frequency of implementation, frequency of reporting
- Reverse Stress Test: implementation purpose, application (application to risk limit, application to reinsurance strategy etc.), frequency of implementation, frequency of reporting
- Integrated Stress test: results by the historical scenario and mockup scenario. Considering with risk limit, sufficiency of solvency must be discussed
- Reverse Stress Test: results by the historical scenario and mockup scenario. Considering with risk limit, sufficiency of solvency must be discussed

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7. Application to Real Management
   - Report of analysis on the improvement of the fulfilment of the solvency regulation of future 3 - 5 years.
   - Report of analysis on the improvement of required capital of future 3 - 5 years.
   - With the analysis of the above 2 items, in the previous year, if the event of the reaching to the risk limit or almost reaching to the risk limit had happened, describe the situations.
   - With the ERM or ORSA appraisal of last year, if some action had been taken i.e. management plan, business plan, investment plan, reinsurance strategy, dividend policy (to shareholders or policyholders), then these are reported.
   - If the targets of solvency status, ROE, risk adjusted earnings were set up in the middle term business plan, then these targets must be described.

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8. Estimation and Assessment of ORSA
   - Relating to the methods of calculations and credibility of the internal models, following items must be mentioned
     - ✓ Data quality
     - ✓ Implementation of back test and its result
     - ✓ Implementation of the test of the parameters' justification
   - If the ORSA Report was examined and assessed by the internal division, then the document on the human resources of the division, frequency of the assessment, method of assessment ,and the reporting system of the result, must be described.

Conclusion of ORSA and Risk Management

☐ Relation of risk management and ORSA

- "Enjoy the life" = "The target of the company"
- "Keeping the good physical condition" = "ERM"
- Recent thought of the risk management = for "Enjoy the life", "Keeping the good physical condition" is requested.
- "For the healthy life, we are requested to write a health diary" = ORSA

☐ The role of ORSA

- But writing the diary does not imply maintaining the good health conditions.
- We have to keep the document, holistically and appropriately about risk management. We can reflect the past experiences or failures .

☐ Clear definition of the corporate purpose

- The first step of ERM or ORSA is the establishment of the corporate purpose (target and constraints).
- We are requested to make the list of the purposes and the limits of the nature of the company before onset the ORSA

Thank you for your attention