



IAIS

INTERNATIONAL ASSOCIATION OF
INSURANCE SUPERVISORS

ICS Development

Academic Forum on the IAIS Insurance Capital Standard

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Content

1. Global Insurance Capital Standard (ICS)
2. ICS construction and approach to measuring risks
3. Valuation
4. Capital resources
5. ICS Standard method structure
6. Conclusions

THE INSURANCE CAPITAL STANDARD (ICS)

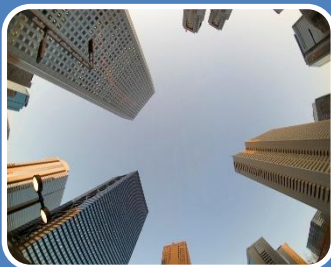
Objectives of ICS

- Supports IAIS Mission
 - Policyholder protection
 - Financial stability
- Comparability of outcomes across jurisdictions
 - Increased mutual understanding
 - Greater confidence in cross-border analysis of IAIGs
- ICS implemented as “Prescribed Capital Requirement “ (ICP 17)

ULTIMATE GOAL

A single ICS with a common methodology that achieves comparable, i.e. substantially the same, outcomes across jurisdictions

Key Elements of the ICS



Group-wide, consolidated standard for IAIGs

- Minimum standard – all IAIS members should propose for adoption in their jurisdictions
- Measure of capital adequacy for IAIGs
- **Not** legal entity requirement



Main Components

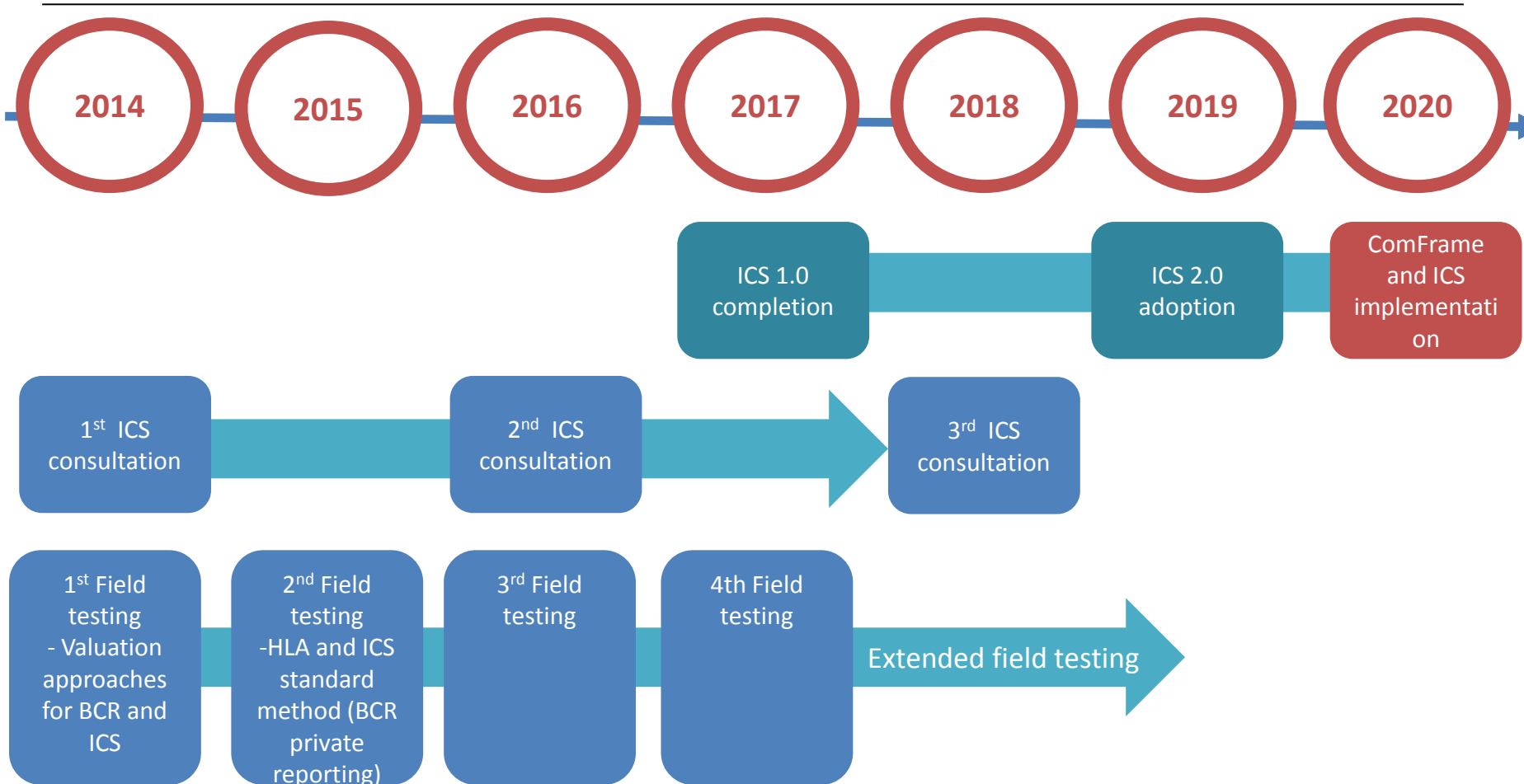
- Valuation
- Qualifying capital resources
- Capital requirement



Risk Coverage

- Takes account of all material risks (insurance, market, credit, operational) – does not explicitly cover group and liquidity risks
- More risk sensitive than the Basic Capital Requirements (for G-SIIs) – ICS will replace the BCR as basis for Higher Loss Absorbency requirements

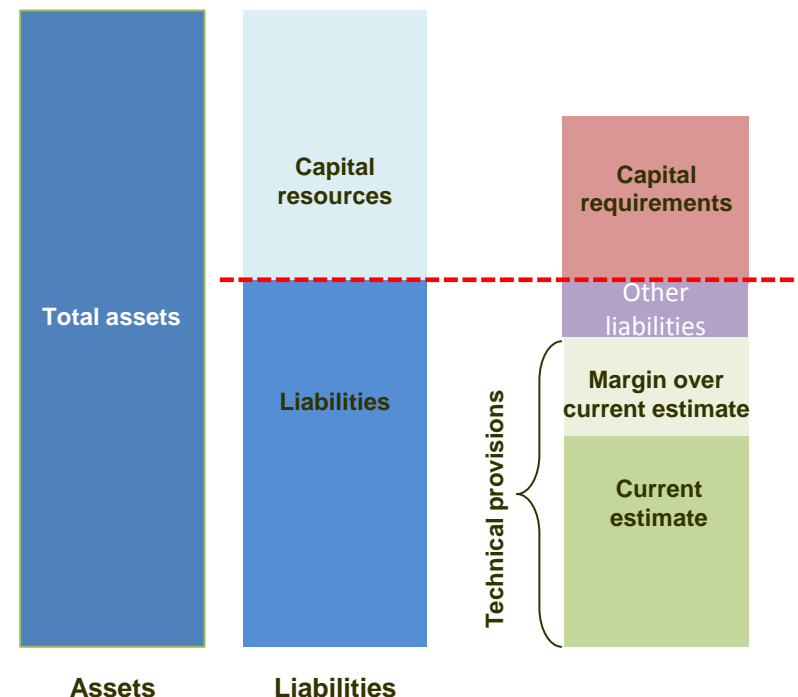
ICS Development



ICS – VALUATION BASES

Valuation

- Overall design of ICS - **total balance sheet approach** – ie all assets and liabilities needs to be valued on a consistent basis
- ICS Principles – complementary goals for valuation
 - **Comparability** – ICS Principles 1 and 5
 - Promote **prudentially sound behaviour** while minimising inappropriate procyclical behaviour – ICS Principle 7
- Two approaches currently being tested:
 - **Market-adjusted valuation** and
 - **GAAP with adjustments**



Market-adjusted valuation (MAV)

Assets

- Fair value of invested assets
- Reinsurance recoverables: consistent basis as insurance liabilities

Technical Provisions

- Current estimate:
 - probability-weighted average of present values of future cash flows
 - based on up-to-date, credible, realistic assumptions
 - IAIS-specified discount curves
- Recognition and derecognition of insurance contracts
- Multiple field-testing to refine discount curve:
 - Reflect long-term nature of insurance liabilities
 - Test design under current and stressed market conditions

GAAP with adjustments (GAAP+)

GAAP/IFRS
balance sheet

- IAIG starts with audited, consolidated balance sheet
- Based on GAAP or IFRS

Adjustments
for GAAP+

- Address only the most significant and material items on insurance liabilities and invested assets
- Adjustments based on amounts from GAAP financial reports; or audited processes/systems

? How to ensure comparability across jurisdictions,
given the different GAAPs/IFRS?

Margin Over Current Estimate (MOCE)

- The development of a comparable and consistent MOCE requires a few iterations of field testing.

Cost of Capital Approach

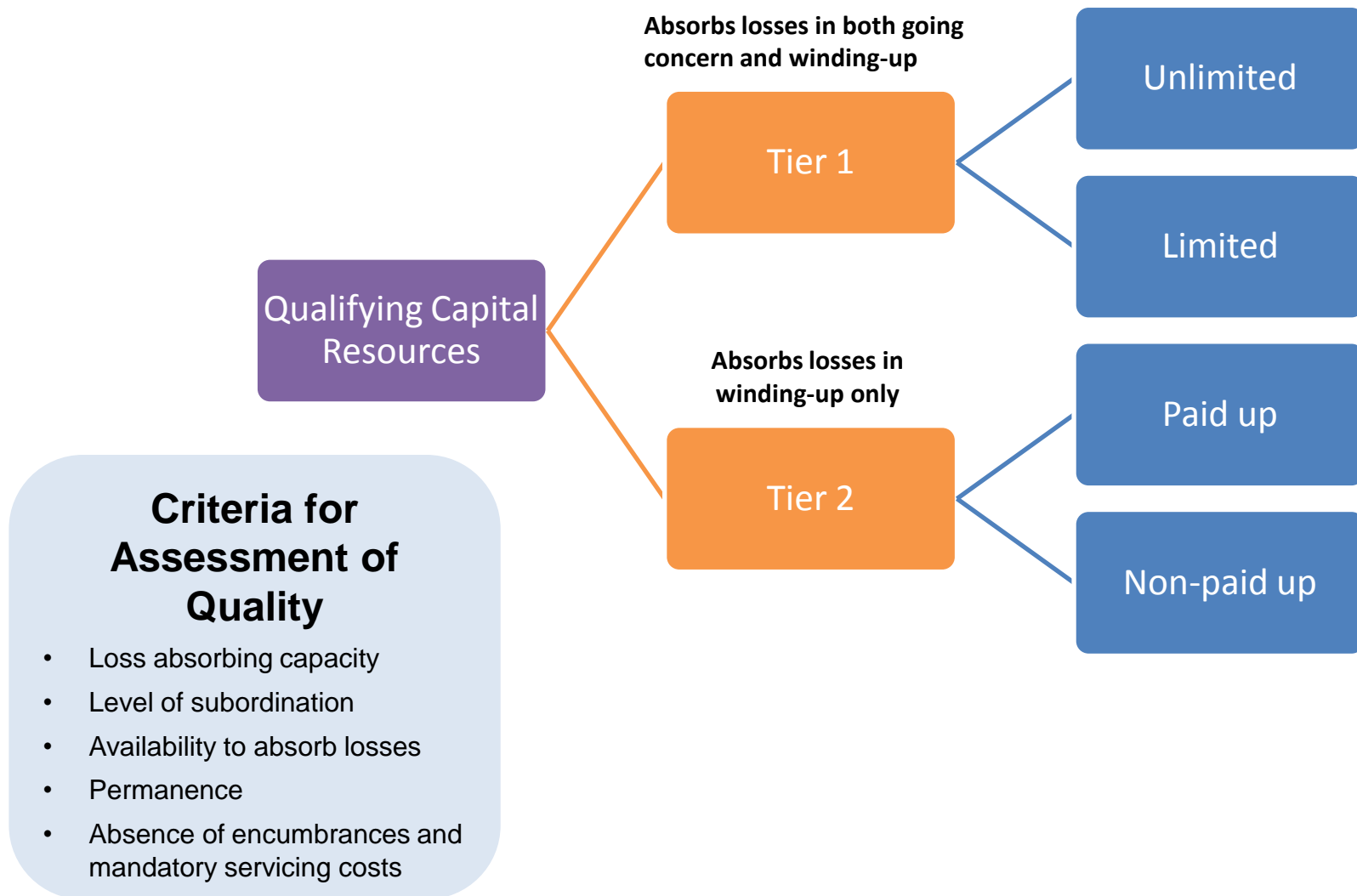
- Based on 'arms-length' transfer of liabilities (market value)
- Implemented as measure of cost of capital

Prudence Approach

- Life: percentile of insurance liabilities
- Non-life: avoid recognition of future profits

CAPITAL RESOURCES

Capital Resources



ICS CAPITAL REQUIREMENT: THE STANDARD METHOD

Capital Requirement – Overview of Standard Method

	Factor-based	Stress	Other
Insurance risks			
• Mortality		✓	
• Longevity		✓	
• Morbidity/disability		✓	
• Lapse		✓	
• Expense Risk		✓	
• Premium and Claims Reserve	✓		
• Catastrophe			✓ (Models)
Market risks			
• Interest rate		✓	
• Equity		✓	
• Real estate		✓	
• Currency		✓	
• Asset concentration	✓		
Credit risk	✓		
Operational Risk	✓		

Calibration target
= 99.5% 1-year
VaR
+ supervisory
judgement

Field Testing

- **2015:** interim calibration – more supervisory judgement
- **2016:** refined calibration based on more data
- **2017:** refine design and calibration based on data + volunteer feedback + improved methodology

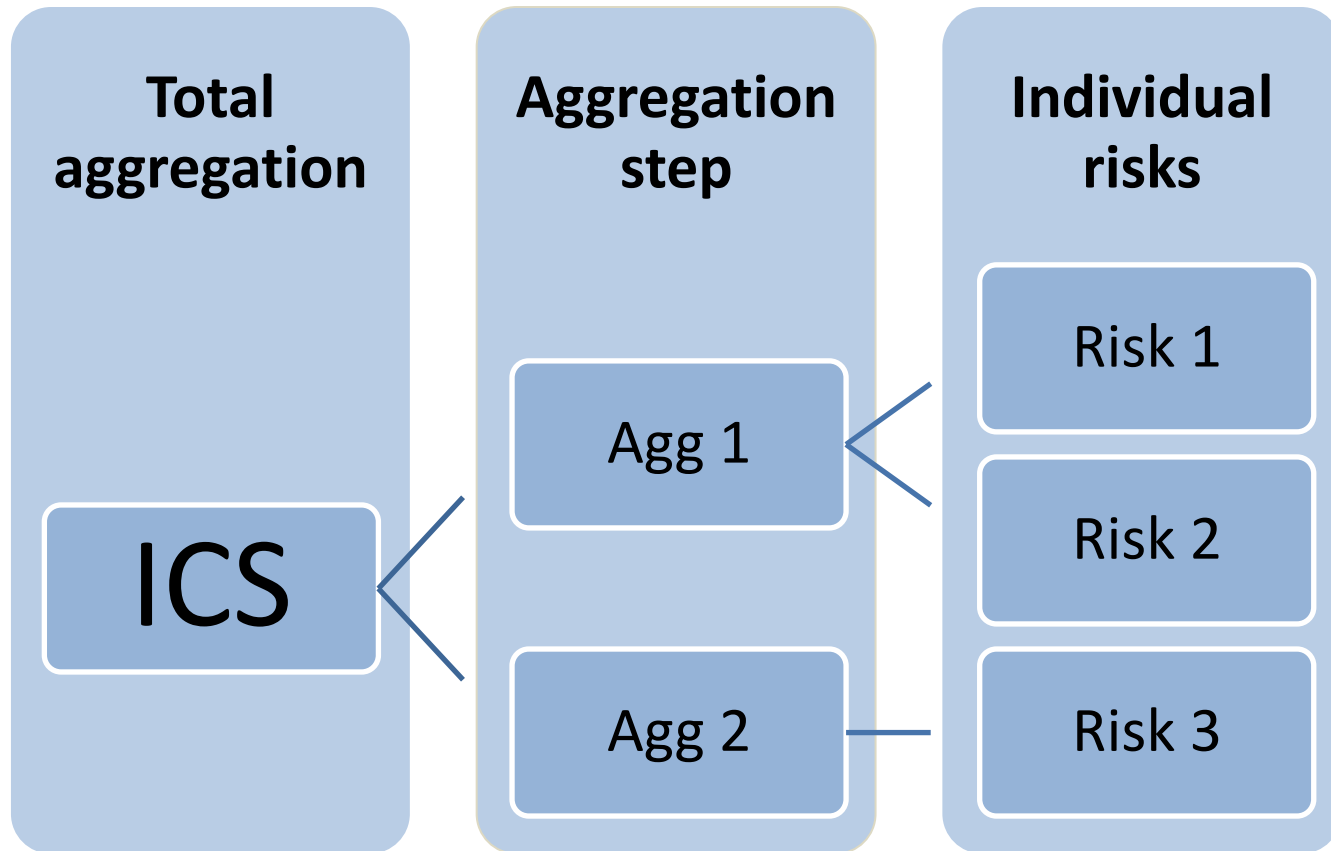
Risk
knowledge/
development

Insurance
product
characteristics

Practicality vs.
materiality

Risk aggregation / Diversification

Multiple-step: through different sets of variance/covariance matrices



Other Methods for calculating ICS

- ICS version 1.0 is developed as a standard method
- ICS version 2.0 may provide a range of options for determining the ICS capital requirement for IAIGs.
- All of such methods must meet the ICS Principles; ICP 17
- Possible other methods:
 - Variation in factors or parameters (leading to more prudent outcomes / better risk sensitivity)
 - Use of internal (and/or external) models

Conclusion

- Unique and opportune time to contribute to shaping the **global** insurance regime
- Important for the global regulatory and supervisory community to get up to speed with recent developments and, where possible, to provide technical support during the development of the ICS through:
 - Ongoing engagement with the IAIS followed-up with ad-hoc requests
 - Responses to consultations
 - Research on ICS related issues
 - Participation in Stakeholder sessions

Input from experts/companies from a wide range of jurisdictions and business profiles is necessary for the successful development of globally relevant and meaningful capital standards.

Technical input on calibration of risks for Asian business is especially pertinent

[Appendix] Contributions from FSS Korea

- Instrument to drive KRW risk free yield curve
 - Using Government Bond instead of Swaps rate
- Defining hedgeable risks
 - Classifying Interest rate risk as a hedgeable risk
- Design and calibration of Equity Risks
 - Using FTSE Index to classify Korean market as an advance country
- Qualifying criterion that requires prior supervisory approval for the discretionary repurchase of Tier 1 Unlimited instruments
 - Solve issue in jurisdictions where supervisory approval requirement it is not a feature within regulation
- Methodology to calculate Interest rate risk
 - Solve issue aroused to jurisdiction with rapid drop in interest rate



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Thank you



Market Adjusted Valuation의 이해:

Insurance Capital Standards의 Market Adjusted Valuations

2017.6.13.

숭실대학교
김 범

연구의 의의

관련주체	IAIG가 존재하는가?	존재하지 않는다면?
보험감독기관		IAIG계열사는?
업계실무자	IAIG 보험사	IAIG가 아닌 경우

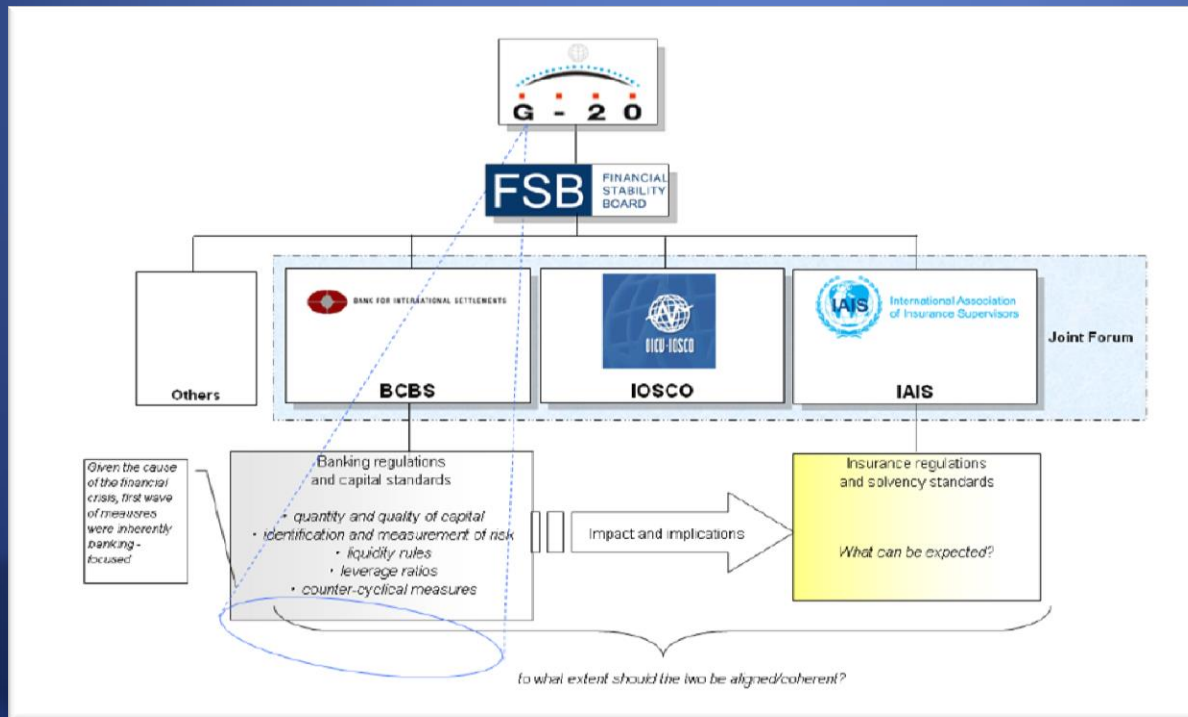
주요 내용

최근 강화되는 규제수준의 이해
감독변화에 대한 사전적 이해
자본요구조건
가치평가방식
Systemic Activities
상품설계
규제 준수 전략
신용등급평가사 관련 업무

키워드를 통해 본
규제/감독의
주요 이슈

Introduction: IAIS

- International Association of Insurance Supervisors(IAIS)
 - Established in 1994, Voluntary membership organization of insurance supervisors and regulators
 - Mission: (1) promote effective and globally consistent supervision of the insurance industry in order to develop and maintain fair, safe and stable insurance markets for the benefit and protection of policyholders and (2) contribute to global financial stability



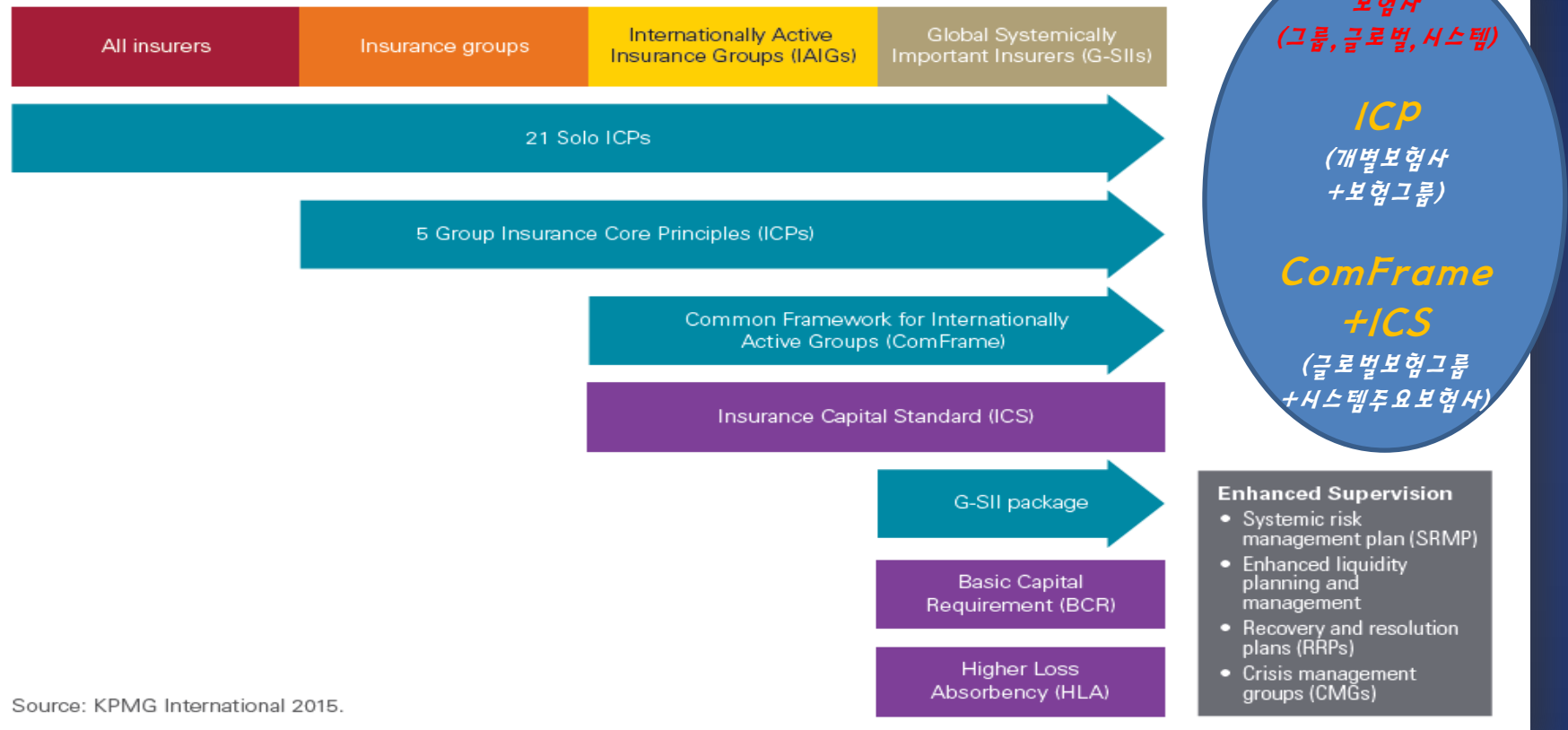
목표
계약자보호+글로벌
금융시장 안정

수단
공정/안전/안정적
보험시장

실행
효과적/일관성 있는
글로벌감독

Introduction: IAIS

Figure 1: Application of ComFrame and IAIS capital initiatives to different types of firms/groups



- 세계적으로 9개 보험사가 G-SII로 지정 (미국 3개, 아시아 1개, 5개 유럽)
- 약 50개 (잠재적) G-SII 대상
- 약 50개 IAIG 중에 36개 보험사가 Field testing 참여

Introduction: ICP

- Insurance Core Principles (ICP)
 - An internationally developed set of principles, standards and guidance applicable to supervisors/regulators
 - Seek to foster convergence towards a globally consistent supervisory framework
 - Used in the evaluation of supervisory regimes under the Financial Sector Assessment Program (FSAP) conducted by the World Bank and the International Monetary Fund (IMF)
 - Concern with findings and recommendations because several of them are more bank-like resolution system
 - Some ICPs are apply to ALL insurers !!!

Introduction: ComFrame and ICS

- ComFrame
 - A set of international supervisory requirements focusing on the effective group-wide supervision of IAIGs
- Insurance Capital Standard (ICS)
 - The risk-based global Capital Standard within ComFrame
 - Goals of the ICS : A single ICS that includes a common methodology by which one ICS achieves comparable
 - Convergence over time on the key elements
 - Valuation, Capital resources and Capital requirements
- ICS versions
 - V1.0 (confidential reporting) : MAV and local GAAP with adjustment
 - V2.0 (implementation) : compatibility , reduction of differences in valuation

ICS and ComFrame Timeline

PAST

- Oct, 2013 : IAIS announced the beginning of the ICS project
- Dec, 2014: First ICS consultation document (CD)
- May, 2015: Field testing of ICS began with full calculation on MAV basis
- May, 2016: Launch of 2016 Quantitative Fields Testing-Field testing of ICS with full calculation on both MAV and GAAP+ basis
- July, 2016: Publication of second ICS CD

FUTURE

- Mid-2017: Adoption of ICS Version1.0 for confidential reporting and launch of confidential reporting process
- Mid-2018: Publication of comprehensive ComFrame consultation including ICS Version2.0
- IAIS 2019 General Meeting: Adoption of ComFrame including ICS Version2.0

ICS Principles

1. A consolidated group-wide standard with a globally comparable risk-based measure of capital adequacy for IAIGs and G-SIIs
2. Protection of policyholders and to contribute to financial stability
3. Foundation for HLA for G-SIIs
4. Reflects all material risks to which an IAIG is exposed
5. Comparability of outcomes across jurisdictions and therefore provides increased mutual understanding and greater confidence in cross-border analysis of IAIGs among group-wide and host supervisors
6. Sound risk management by IAIGs and G-SIIs
7. Prudentially sound behavior while minimizing inappropriate pro-cyclical behavior by supervisors and IAIGs
8. Appropriate balance between risk sensitivity and simplicity
9. Transparent, particularly with regard to the disclosure of final results
10. The capital requirement in the ICS is based on appropriate target criteria, which underlie the calibration

해당 보험사
(글로벌보험그룹(IAIGs)
+
시스템주요보험사(G-SIIs))

- 지급여력기준 제시
- 소비자보호/금융안정
 - 추가자본기준
 - 주요위험반영
- 국가별 분석 호환성
 - 위험관리
- 경기순행성의 문제
- 위험민감도와 간결성
 - 공시투명성
- 자본기준목표적합성

Objectives of ICS valuation

- 위험성격에 따른 자산과 부채의 매칭 (Incentivize and reinforce insurer's long-established discipline of matching liabilities with assets that have similar risk characteristics)
- 위험신호체계 구축 (Support an ICS ratio that provides appropriate risk signaling across market cycles)
- 보험사의 가치평가 및 위험관리 부합 (Align with prudent insurance industry valuation and risk management practices)
- 투명성과 용이성 (Provide reasonable transparency and tractability)
- 국제기준 비교가능성 (Support comparability in standards across internationally-active insurance groups (IAIGs))

3 Primary Components of ICS

- A valuation component of which two methods are being considered
(본 발표의 주제)
 - Market Adjusted Valuation (MAV)
 - Generally Accepted Accounting Principles with adjustments (GAAP+) method
- Capital Resources
- The Capital Requirement

금융산업의 불확실성

은행산업

- 자산과 관련된 불확실성
- 예금자로부터의 수신업무와 대출을 통한 여신업무로 수익창출에 있어 예금자에 대한 유동성 위험과 대출자산의 신용위험
- 위험을 통한 성장 모델

보험산업

- 부채와 관련된 불확실성
- 보험계약자의 보험료를 관리하여 보험금을 지급해야 하는 지급책임 규모에 관한 보험위험
- 안전을 추구하는 모델

증권산업

- 가격변동 및 투기와 관련된 불확실성

2 Valuation Approaches: MAV and GAAP+

- 시장조정가치평가방식과 수정일반회계원칙방식을 field testing 시에 고려

Market Adjusted Valuation (시장조정가치평가방식?)

- MAV는 기존의 IFRS나 GAAP에 근거한 대조대차표에 시장가치를 감안하여 보험부채, 재보험을 조정하고 자산의 공정(적정,시장)가치를 반영하는 방식 (BCR에 사용)
- IAIS는 Market Adjusted Valuation (MAV) 를 제안하고 개별 국가와 법 체제 하에 존재하는 차별화된 가치평가제도의 격차를 축소하려고 노력하고 있음
- 위험에 민감한 (위험이 반영된) 방식을 구축하기 위해 ICS는 “경제적(economic)” 대차대조표에 기반.
 - 경제기반부채평가(economically-drive liabilities valuation)은 ICS의 기반을 이루게 되며 자본자원(capital resources)의 결정은 물론 ICS의 요구자본산출에 있어서 필요한 위험추정치(exposure measures)에도 영향을 미칠 것으로 판단함
- MAV는 “최적추정방식(best estimate basis)”의 의해 부채를 재평가하도록 요구
 - 최적추정방식(best estimate basis)은 IAIS가 제안하는 수익률곡선에 기반하여 보험사의 부채와 관련된 미래현금흐름의 확률가중평균현가를 산출하는 것을 의미함

MAV GAAP+ and OAG

GAAP+(수정일반회계원칙방식?)

- MAV의 대체방식으로, 최적추정방식을 요구하지 않고 일부의 부채에 대한 재평가를 제외하고는 기존의 GAAP/IFRS방식을 따르도록 하는 방식도 고려하고 있음
- 미국의 사례 (IAIS, 2015)
 - 생명보험의 경우에 손실인식 검증에 총수입보험료를 사용
 - 보증이나 옵션 가치평가에 US GAAP과 동일하게 기존의 확률모형을 사용
 - 손해보험의 경우에 단순할인방식을 사용
 - 투자자산에 GAAP 공시방식을 준용
 - 자산과 부채 간 가치평가결과의 일관성을 위한 Adjustment는 Field Testing의 결과에 근거하여 반영

MAV, GAAP+ and OAG

Own Assets with Guardrails (지침기준자기자산방식?)

- MAV와 GAAP+방식의 장점을 고려하여 단일통합방식으로 고려하고 있는 것이 Own Assets with Guardrails (OAG) 로써 보험사 자산의 시장가격으로 부터 부채할인율을 도출하는 방식임
- OAG는 MAV와 대체로 유사하나 보험사의 자산을 고려한 할인율을 고려한다는 측면에서는 GAAP+와도 유사한 면이 존재함
- OAG는 보험사의 영업정책과 위험관리 현황이 반영되기 때문에 보험사감독의 도구로 사용되는 측면이 존재한다. 즉 보험사의 건전한 자산부채관리를 도모하고 경기순행성 (부정적 측면)을 감소시키는 순기능이 존재할 것으로 판단함

Challenges in the GAAP+ Approach vs. MAV Approach

- 이자율 변화를 적절하게 반영하지 못한다
Insensitivity to changes in interest rates
- AOCI등 자본규제의 헛점으로 이용될 수 있다
Potential incentives for regulatory capital arbitrage through the AOCI approach
- 회계기준 간의 일관성과 유사성이 부족하다
Inconsistency and lack of comparability in GAAP/IFRS assumptions
- ALM과 위험감소에 적절하지 못하다
Potential disincentive for appropriate ALM and risk mitigation approach
- 개별국가 간의 회계기준 간의 유사성이 제한적이다
Comparability across local GAAP/IFRS approach
- 경제 외적 변동성 요인의 고려 Decouples the liability valuation from the earnings rate assumptions used in managing the liabilities in a way that could introduce non-economic volatility (an concomitant pro-cyclicality)
- 사회적으로 필요한 보험상품의 감소
Potentially impedes the provision and increases cost of socially-useful insurance product offerings over time
- 경제 외적 변동성으로 인해 규제당국의 위험에 인식에 장애 발생 Reduces informational value by increasing the risk of false positives and negatives for supervisors due to non-economic volatility(the "signal" versus "noise" problem)
- 특정자산과 지표에 치중하는 현상이 발생
Could drive herding behavior into the assets and indices chosen by supervisors as the benchmark

Issues on Discounting Rate

기본원칙

- 기본적으로 부채할인을 위해 국채와 연결된 무위험이자율을 사용하는 것이 원칙이나, 보험사 부채의 비유동성을 고려하여 회사채와 국채 간 spread를 고려하여야 한다는 의견도 존재
- US GAAP approach는 포트폴리오기반의 접근방식으로 포트폴리오의 파산위험감소를 수익률곡선에 반영하는 방식
- GAAP plus (포트폴리오 방식)와 MAV (risk free + illiquidity) 방식이 공존

할인율과 관련된 기본 문제

1. 할인율은 화폐의 시간가치를 반영하지 보험상품의 계리/투자 위험을 반영하지 않음
2. 개별보험사 고유의 신용위험을 반영하지 않음

할인율 적용 고려사항

1. 상위신용등급 회사채 (high-quality corporate bonds)란?
2. 채권시장의 유동성 (deep market)
3. 할인율 적용 국가의 선택
4. 장기보험계약의 부채 Duration Matching

Guardrails in OAGs

- Capping the adjusted spread of fixed income at the adjusted BBB spread (스프레트 고려 시에 수정BBB스프레드와 같은 상한선)
- Assigning a non-zero spread to equity investments and alternatives (주식투자자와 대체투자자에 스프레드)
- IAIS-prescribed adjustments for credit risk, reflecting only expected default (파산기대값을 고려한 신용위험 수정방식)
- IAIS reinvestment yield assumptions, reflecting an investment grade spread over risk free rates (무위험수익률 대비 투자등급자산의 스프레드를 고려하여 재투자수익률과 관련된 가정)
- Stochastic methods should be used where the time value of guarantees (TVOG) is material; where TVOG is immaterial, deterministic approaches could be used as a practical expedient (“보증”이 존재하는 경우의 확률적 현재가치산출 방식)
- IAIS-principles on stochastic modeling scenarios (확률모형시나리오의 원칙)

Field Tests: A case in Japan (1)

Background

- Financial Services Agency
- All insurance companies in June 2010 and June 2014
- Based on the technical specifications for the ICS field tests (as of June 2016)

Contents

- Items : Assets and other liabilities / Current estimate of insurance liabilities / Qualifying capital resource / MOCE / Capital requirement for individual risk
- Insurance companies covered : All life (41) and non-life (51) companies
- Method: MVA approach as March 31, 2016 (base date)
- Scenarios : Change of economic assumptions to those on March 31, 2015 / 50bps upward parallel shift of JPY yield curve / 50bps downward parallel shift of JPY yield curve / 10% downward stress for equity and real estate value / 10% JPY appreciation
- Different extrapolation methods of discount rates for insurance liabilities : the forward rate converges to Ultimate Forward Rate / the forward rate of the final year for the subsequent years remains constant
- Major changes : Hyper-long-term rates spread adjustments applied to risk-free rates / Capital requirement for mass lapse risk, catastrophe risks such as terrorist attacks, pandemics and latent liability scenarios, and asset concentration risk / evaluations of assets and qualifying capital resources, calculations on a consolidated basis

일본 사례: ICS기준에 의한 필드테스트 내용

- 테스트 항목
- 참여 보험사
 - 방법론
 - 시나리오
- 상이한 장기할인
산출 방식 고려
- 변화/추가 사항

Field Tests: A case in Japan (2)

Results

- Average Economic Solvency Rates exceeded capital requirements
- ESR for life insurance companies was sensitive to economic assumptions (esp. interest rates) due to the unrealized gains on investment assets
- Non-life insurers were less sensitive

Remaining Issues

- Different extrapolation method such as the last liquid point, the UFR, etc.
- What spread is added to discount rates for insurance liabilities
- How to reflect the impact of increasing investments in foreign bonds
- How to consider counter-cyclical measures during an economic downturn

일본 사례: 필드테스트 결과

- 지급여력기준을 상회함
- 생명보험사는 가정에 민감도 높음 (포괄손익관련)
- 손해보험사는 민감도 낮음

일본 사례: 관련이슈

- 장기수익률 산출방식
 - 스프레드 선정
- 외국채권투자 영향
- 경기불황 시 경기역행성

Common Comments 1

자본적정성을 충족하는 것으로 충분한가?

비용감가상각

- 내재보증옵션의 비용을 고려하는가?
- 과거 자료에 근거한 미래가치에 대한 전망의 제한

시장가치

- 현존하는 위험에 대한 이해를 통해 미래의 위험을 추정
- 위험에 대한 헷지 비용을 추산할 수 있지만 변동성 증가

산술적 접근에 제약은 없는가?

- 모든 산술적 수치는 근사치라는 제한을 내포
- 부채가치평가 방식의 내재적 불확실성

Common Comments 2

자본적정성 외에 무엇을 고려해야 하는가?

1. 계리 전문가 의견 감안
2. 보험그룹의 장점은 존재하는가?
3. 재보험의 위험감소 기능과 자본으로서의 재보험 인식
4. Hedging and ALM techniques
5. Enterprise Risk Management
6. 제도상의 대차대조표 요건을 초과하는 자본
7. 외부모형과 내부모형의 고려
8. 내부모형 통제 및 관리
9. 주주와 보험계약자에 대한 정보의 투명성 제고
10. 전통적 방식의 기업위험관리의 고려

Common Comments 3

Global Insurance Capital Standards

단일 기준의 도입

- 상품설계/수익성 평가, 보험사 위험평가, 다양한 시장에서의 자본관리의 일관성 확보 할 수 있는가?
- 위험 및 자본에 대한 통합적이고 체계적인 접근방식이 가능한가?
- 단순히 제도를 추가하여 규제의 복잡성만 증가하는 것은 아닌가?

추가 우려사항

- ICS를 개별 국가에 어떠한 형식으로 도입할 것인가에 대한 불확실성
- ICS 기준 이외에 추가적인 요구사항이 있을 것인가?
- 필요한 경우에 통제를 위해 누가 개입할 것인가?
- 자본의 시장에 대한 민감도가 증가하면서 변동성이 증대되는 현상이 발생한다면? (experience from Solvency II)
- 별개의 시장에서의 제도도입의 효과가 다르게 발생하는 현상?
- 감독제도의 효율성의 측면에서 결국에는 개별보험사에도 보험그룹의 기준이 적용되게 되는 문제?

향후 연구과제

연구과제

1. Field Testing 결과 공유 및 개선
2. Calibration Methods 탐색
3. Global Relevance and Implementation Process에 관한 연구 확대
4. Diversification/Correlations

충분조건???

Relevant Data Resources

보험회사 지급여력평가와 가용자본 인정기준

- ICS(v1.0) 공개초안에 대한 코멘트 분석

김해식 연구위원
Risk-based Global ICS 학술세미나
2017.06.13(화)

목차

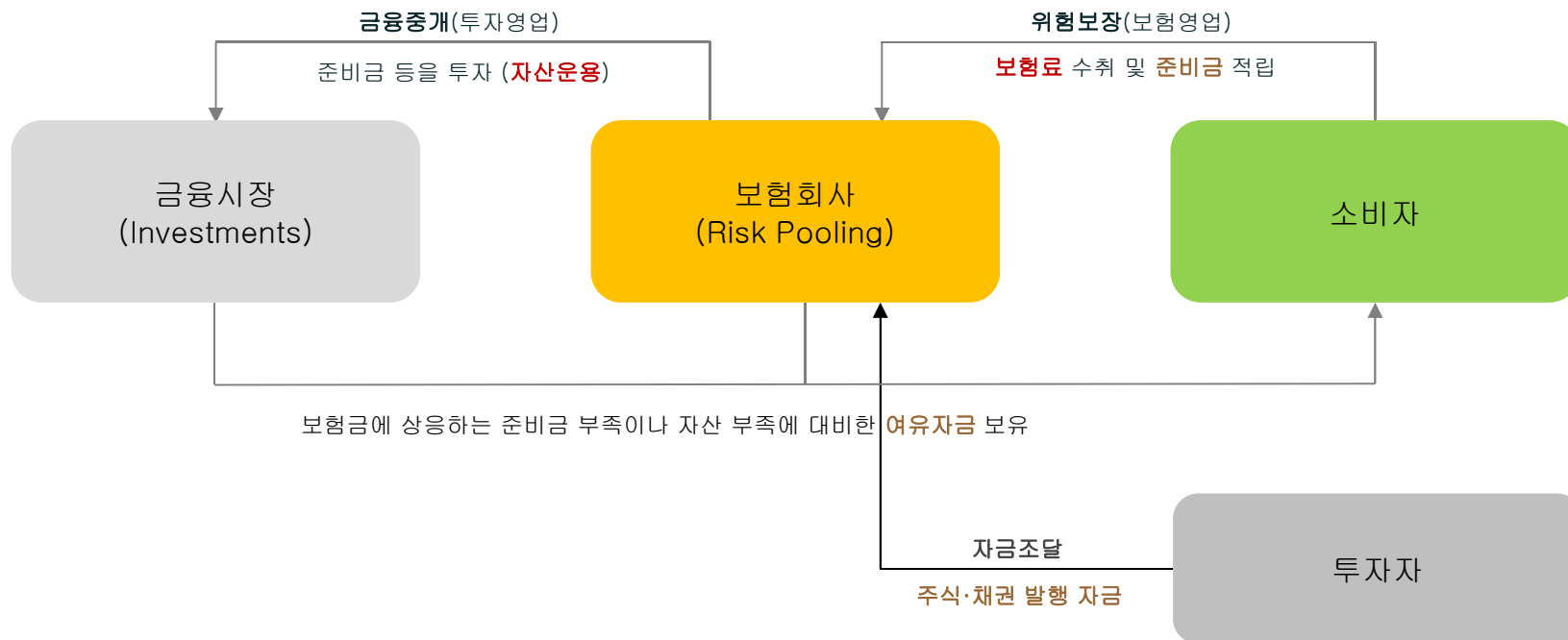
- I. 지급보험금 재원
- II. ICS의 가용자본 인정기준
- III. 가용자본 인정기준 이슈

I. 지급보험금 자원

1. 보험업 사업모형
2. 보험금의 원천

1. 보험업 사업모형

- 보험회사는 소비자에게 위험보장서비스 등을 제공할 것을 약속하고 그 대가로 보험료를 수취
 - 소비자가 낸 보험료의 대부분을 보험금 지급을 위한 **책임준비금으로 적립**하고,
 - 보험료 납부와 보험금 지급의 시차를 이용하여 주로 **금융시장에서 투자 활동**
- 보험금 지급에 대한 **신뢰성**을 높이고자 **주식이나 채권 발행을 통해 여유자금을 추가로 보유**



2. 보험금의 원천

- 책임준비금(insurance liabilities)
 - 현행 추정치(current estimate)와 마진(MOCE: margin over current estimate)
- 가용자본(capital resources)
 - 예상치 못한 손실 보전에 쓸 수 있는 자금



II. ICS의 가용자본 인정기준

1. 가용자본의 경계
2. 가용자본의 구분

1. 가용자본의 경계

- 가용자본 인정 기준 : 자본의 질을 결정하는 **다섯 가지** 기준 (ICS* 문단233)

- 언제나 손실 보전에 사용할 수 있는 자본인가?

손실흡수성

- 보험계약자보다 나중에 상환해도 될 자본인가?

후순위성

- 손실 보전에 사용되기 위해 현금 유입이 완료되었거나 완료될 것이 확실한 자본인가?

가용성

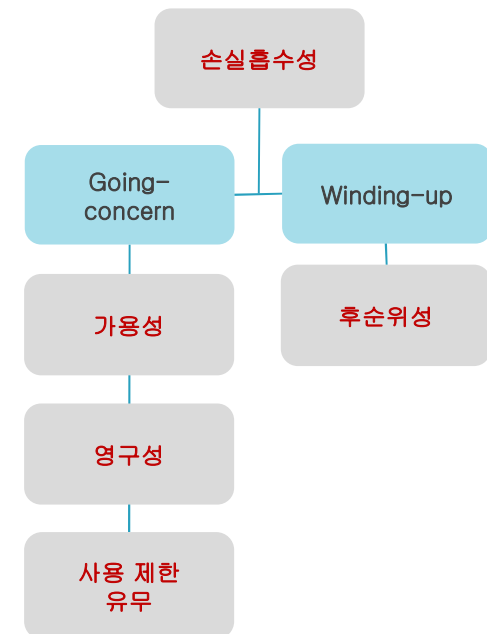
- 상환 기한(만기)이 있는가?

영구성

- 모든 손실 보전에 쓸 수 있는가?

사용 제한 유무

ICP 17** (문단17.11.9)



* ICS: Risk-based Global Insurance Capital Standard (Version 1.0)

** ICP 17: Insurance Core Principle 17 Capital Adequacy

2. 가용자본의 구분

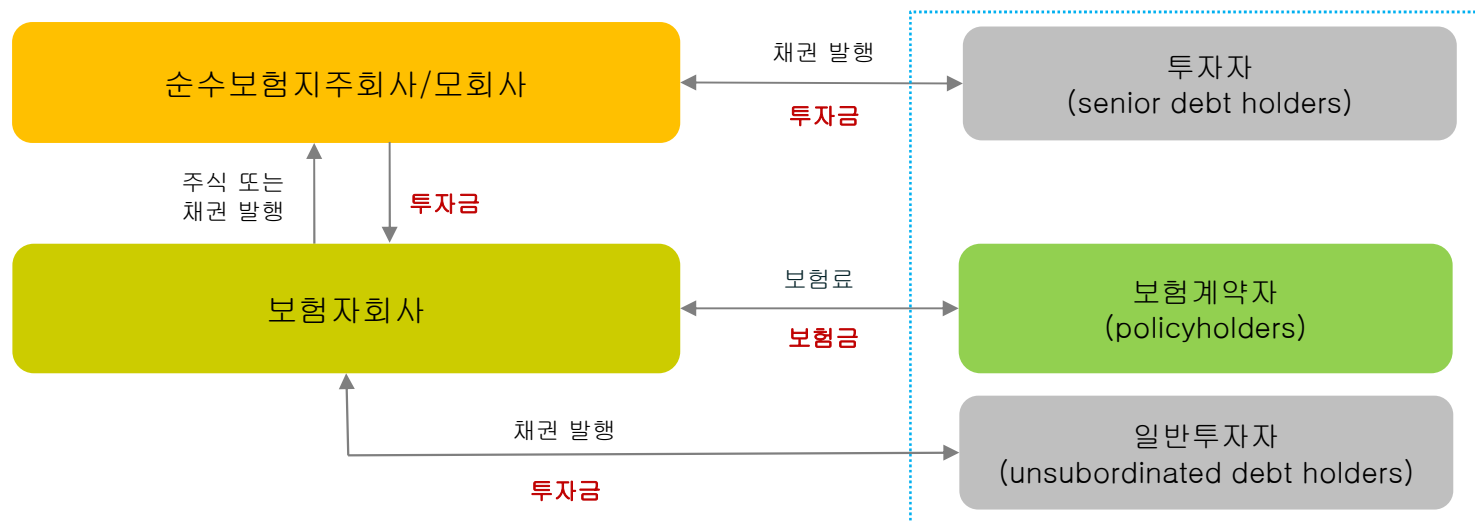
- 가용자본은 'Tier 1'과 'Tier 2'로 구분 (ICS 문단233)
- 일부 가용자본에 대해서는 **인정 한도**를 설정; **한도 설정 기준**은 요구자본 또는 가용자본

	Tier 1	Tier 2
손실흡수성	언제나 (going-concern or run-off)	청산 시 (winding-up or insolvency)
후순위성	Tier 2 자본보유자보다도 후순위	보험계약자와 일반채권자보다 후순위
가용성	현금 유입 완료	현금 유입 완료 또는 확실
영구성	만기가 없거나 기간/상환 제약(감독당국 승인)	최초 5년 이내 상환 없음
제한 유무	모든 손실에 사용, 이자/배당 취소 재량	손실 범위 제한

Ⅲ. 가용자본 인정기준 이슈

1. 후순위성 (subordination)

- (ICS 문단254-259) 그룹감독에서 지주회사(모회사)의 선순위채권자로부터 조달한 자금
 - 지주회사의 선순위채권자는 보험자회사의 보험계약자와 일반채권자보다 후순위인가?
 - 계약상 후순위라고 규정하지 않은 경우에도 가용자본으로 볼 수 있나? (**structural subordination**)
 - (1) 지주회사 투자자는 보험자회사 일반투자자와 동등한 지위? (투자 형태 - 주식/채권, 신용평가)
 - (2) 지주회사 선순위채권의 원리금 상환 재원은 보험자회사의 배당에 크게 의존
 - (3) 보험자회사의 지급불능에 관계없이 지주회사의 건전성이 유지되는 한 투자자에게 이자/배당 지급은 가능



2. 가용성 (availability)

- (ICS 문단251-253, 265-267) 가용자본 산출 시 차감항목과 미납입 항목

- 소프트웨어, 이연법인세자산, 확정급여연금순자산 등을 가용자본(Tier 2)로 인정?

- (1) 청산 시 현금유입의 실현가능성 불확실

- (2) 향후 수 년 이내 회수(현금유입) 가능

- (3) 장기사업(long-dated liabilities under going concern)과 느린 정리(slow resolution); 회수가능성 높아

- 현금유입이 이루어지지 않은 항목을 가용자본 (Tier 2)으로 인정할 수 있나?

- (1) 현금유입은 자본의 기본 요건; 글로벌 금융위기에서 나타난 거래상대방위험의 존재

- (2) 필요 시 자본유입을 보장하는 강력한 안전장치를 전제로 인정 가능; 개별 한도 설정?

[차감항목] Tier 1 자본 = 자산 - 부채 - 차감항목

- 소프트웨어 (무형자산)
- 이연법인세자산(Deferred Tax Assets)
- 확정급여연금 순자산 (DB Pension Plan Surplus Assets)

[재무약정] non-paid-up items

3. 영구성 (Perpetuality)

- (ICS 문단233, 263) Tier 1 자본의 영구성 조건

- 청산 시를 제외하고는 상환의무가 원천적으로 없어야 영구성이 있음?

- (1) 만기가 있으면 Tier 1에서 제외

- (2) 만기가 충분히 길다면 Tier 1으로 인정

- * 만기 30년 이상

- (3) 감독당국의 사전승인 조건 있다면 Tier 1으로 인정

- * 상호보험회사(Mutual insurers)는 후순위채(surplus notes)가 주된 자본조달수단

- (ICS 문단269-273) 채권 상환과 감독당국의 사전승인 조건

- 감독당국의 사전승인 대신 만기 5년 미만에 대해서는 상각 적용하는 현행 방식 유지?

- (1) 상환이 지급여력에 미칠 영향을 평가하려면 언제나 사전승인 필요

- (2) 계약만기 시 상환에도 사전승인 적용 시 보험회사 재무상태에 대한 안 좋은 신호; Tier 1에만 요구

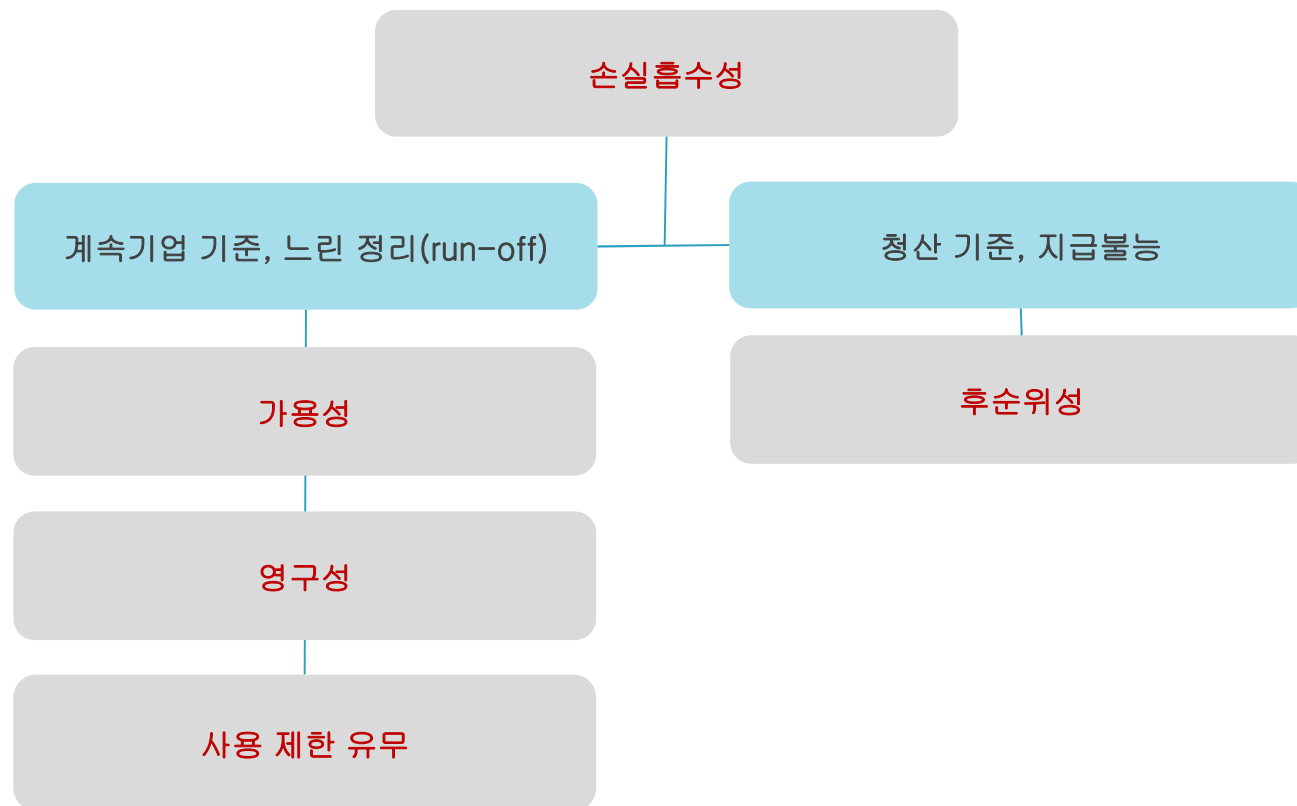
- (3) 계약만기 전 조기상환에도 사전승인 불필요; 만기 5년과 5년 콜옵션을 동일하게 처리

4. 기타 이슈

- (ICS 문단233) 사용제한
 - **담보자산(pledged assets)**의 가용자본 인정?
 - * 헤어컷 요구에 따른 담보자산의 시장가치는 파생상품 부채를 초과
- (ICS 문단274-275) 누적기타포괄손익(AOCI)의 가용자본 인정
 - **매도가능증권이나 고정자산의 평가차익**의 가용자본 인정?
- (ICS 문단233, 268) 가용자본 인정 한도의 근거와 설정 기준
 - 인정 한도: 이론적인 근거보다 관행; 느린 정리방식(**slow resolution or orderly run-off**)
 - 설정 기준: 경기순응성(**procyclicality**) 관점
- (ICS 문단15) ICS 시행 준비기간과 기존 가용자본 유예 (**grandfathering**)
 - 이행규정(Transition arrangement)은 ICS version 2.0에서 다루기로 함

5. 요약

- 어느 시점의 보험금 지급능력
- 예상치 못한 손실 v. 손실의 흡수



참고 문헌

- IAIS (2016), Risk-based Global Insurance Capital Standard Version 1.0 Public Consultation Document.
- IAIS (2016), “Capital Resources (Q70-90)”, Compiled Comments on Risk-based Global Insurance Capital Standard Version 1.0 Public Consultation Document.
- IAIS (2016), “Margin Over Current Estimates (Q60-66)”, Compiled Comments on Risk-based Global Insurance Capital Standard Version 1.0 Public Consultation Document.
- NAIC(2015), US State Insurance Regulator’s Views: International Capital Proposals.
- 금융감독원(2016), 신지급여력제도 기준 마련을 위한 1차 공개협의안.

감사합니다

Risk-based Global Insurance Capital Standard (ICS)

요구자본의 산출방식과 리스크 요인의 상관성

이 항 석

성균관대학교 보험계리학과

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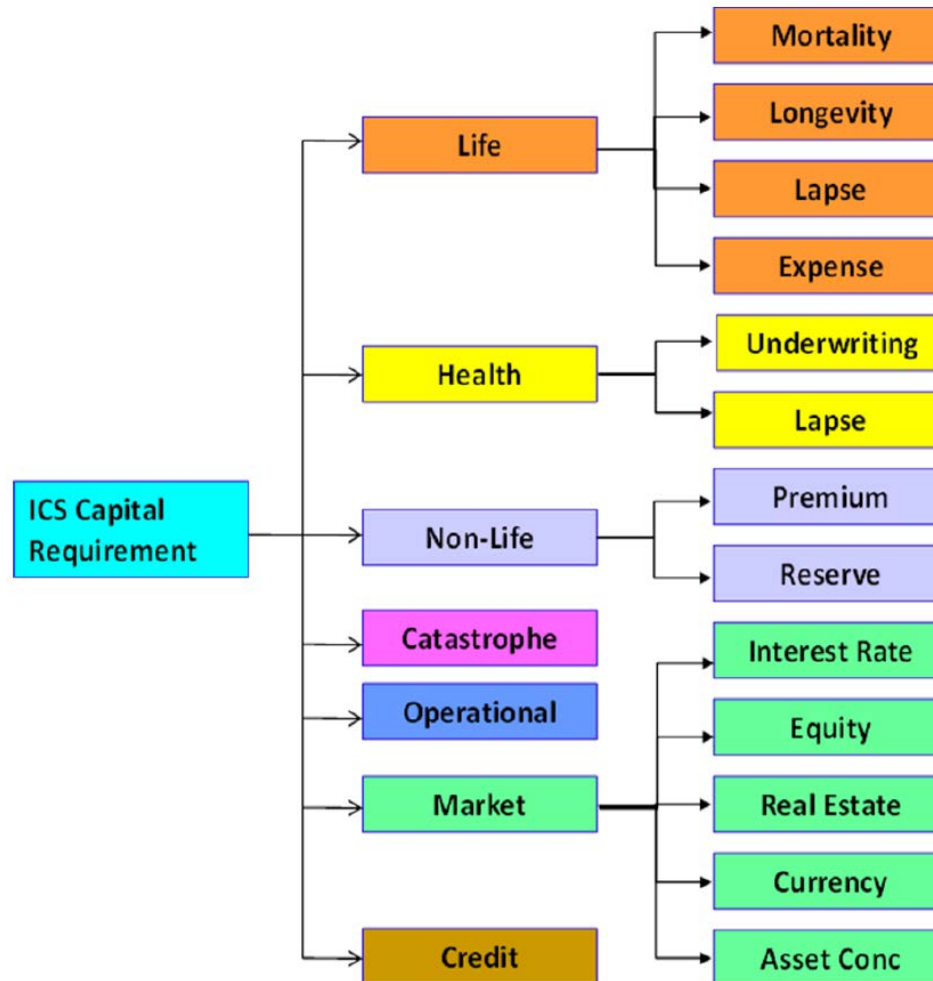
- Principles
- Risks
- Aggregation / Diversification
 - Life Risks
 - Market Risks
 - Non-Life Premium & Reserve Risks
 - Health Risks
- Reference

- **ICS Principle 4:** The ICS reflects all material risks to which an IAIG* is exposed. The ICS reflects all material risks of IAIGs' portfolios of activities taking into account assets, liabilities, non-insurance risks and off-balance sheet activities. To the extent that risks are not quantified in the ICS they are addressed in ComFrame.

*IAIG : Internationally Active Insurance Groups

- The ICS capital requirement is based on the potential adverse changes in capital resources resulting from unexpected changes, events or other manifestations of the specified risks.

- Overview of standard method for the purposes of 2016 Field Testing



- Risks and Definitions

Categories of risk	Key risk	Scope/definition: Risk of adverse change in the value of capital resources due to
Insurance risk	Mortality risk	Unexpected changes in the level, trend or volatility of mortality rates
	Longevity risk	Unexpected changes in the level, trend or volatility of mortality rates
	Health risk	Unexpected changes in the expected future payments for health claims and expenses and unexpected changes in the level of health policy lapses, terminations, renewals and surrenders
	Morbidity/Disability risk	Unexpected changes in the level, trend or volatility of disability, sickness and morbidity rates
	Expense risk	Unexpected changes in liability cash flows due to the incidence of expenses incurred
	Lapse risk	Unexpected changes in the level or volatility of rates of policy lapses, terminations, renewals and surrenders
	Premium risk (non-life)	Unexpected changes in the timing, frequency and severity of future insured events (to the extent not already captured in health or Morbidity/Disability risk)
	Claim reserve risk (non-life)	Unexpected changes in the expected future payments for claims (to the extent not already captured in health or Morbidity/Disability risk)
	Catastrophe risk	Unexpected changes in the occurrence of low frequency and high severity events

- Risks and Definitions

Categories of risk	Key risk	Scope/definition: Risk of adverse change in the value of capital resources due to
Market risk	Interest Rate risk	Unexpected changes in the level or volatility of interest rates
	Equity risk	Unexpected changes in the level or volatility of market prices of equities
	Real Estate risk	Unexpected changes in the level or volatility of market prices of real estate or from the amount and timing of cash-flows from investments in real estate
	Currency risk	Unexpected changes in the level or volatility of currency exchange rates
	Asset Concentration risk	The lack of diversification in the asset portfolio
Credit risk		Unexpected changes in the actual default as well as in the deterioration of an obligor's creditworthiness short of default, including migration and spread risks.
Operational risk		Operational events including inadequate or failed internal processes, people and systems, or from external events. Operational risk includes legal risk, but excludes strategic and reputational risk

- **Stress approach**

In a stress approach, the calculation of the capital requirement for a particular risk follows a dynamic approach looking at the balance sheet at two points in time: the IAIG's current balance sheet pre-stress(CR0) and the IAIG's balance sheet post-stress(CR1). Stresses can be applied individually with individual stressed balance sheets being calculated (CR0 - CR1) to determine the capital requirement with respect to each individual stress.

- **Factor-based approach**

Under a factor-based approach, the calculation of the ICS capital requirement for a particular risk, or a number of risks, is determined by applying factors to specific exposure measures. It should be noted that a factor-based approach would be simpler to implement than a stress approach. However, it would need to include additional measures to allow for the IAIG-specific recognition of loss absorbing effects of mechanisms such as risk mitigation techniques and profit sharing. An example of a factor-based approach is represented by the BCR.

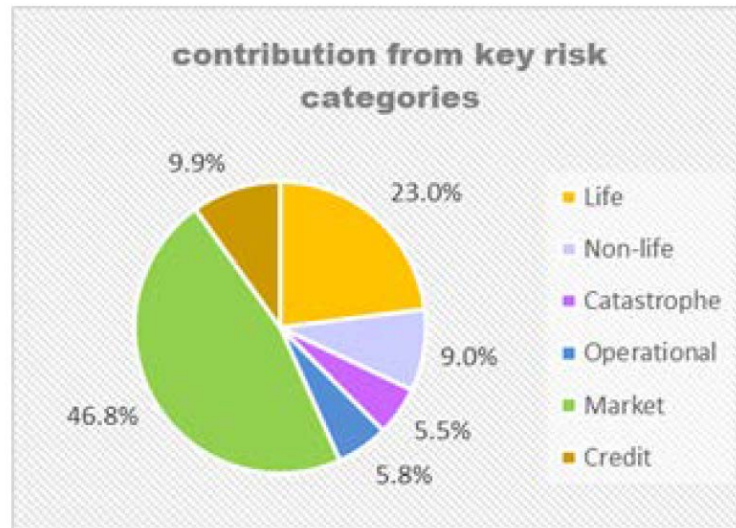
RISKS

- Risk measurement methods proposed in the standard method

Risk/Sub-risk Approach	Factor-based	Stress	Other
<u>Insurance risks</u>			
• Mortality		✓	
• Longevity		✓	
• Health or Morbidity/Disability		✓	
• Lapse		✓	
• Expense Risk		✓	
• Premium	✓		
• Claims reserve	✓		
• Catastrophe			✓
<u>Market risks</u>			
• Interest rate		✓	
• Equity		✓	
• Real estate		✓	
• Currency/FX		✓	
• Asset concentration	✓		
<u>Credit risk</u>	✓		
<u>Operational Risk</u>	✓		

- **2015 Field Testing results**

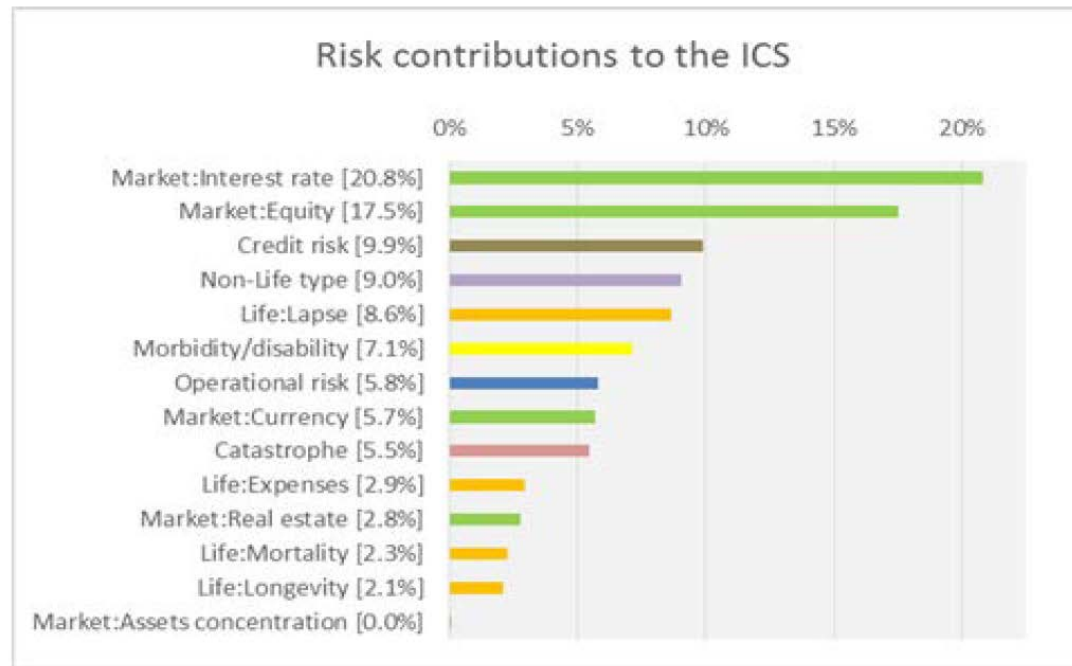
- Contribution of key risk categories to ICS capital requirement



- ✓ The contribution of Catastrophe risk appears to be low because of the smaller number of participating non-life Volunteer IAIGs.

- **2015 Field Testing results**

- Contributions of various risks to ICS Capital Requirement in 2015 Field Testing

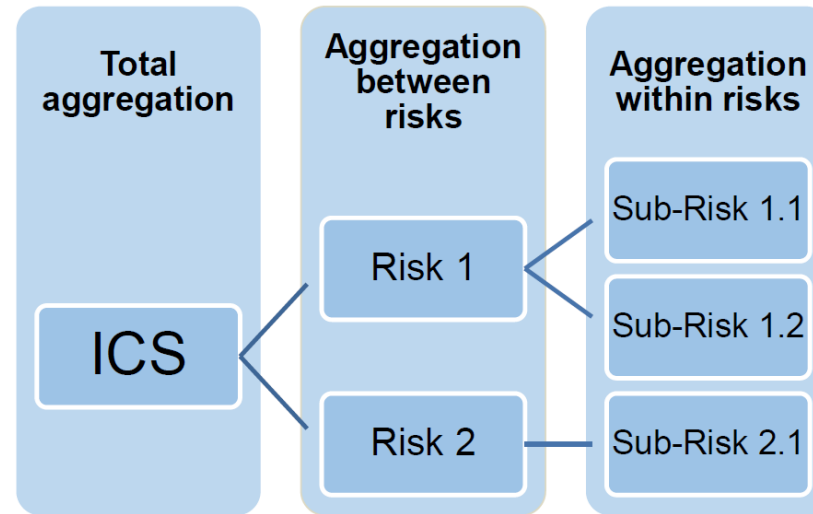


- ✓ Health risk were included in Life risks (predominantly Morbidity/Disability risk) and Non-life risks.

AGGREGATION / DIVERSIFICATION

- **Total Aggregation**

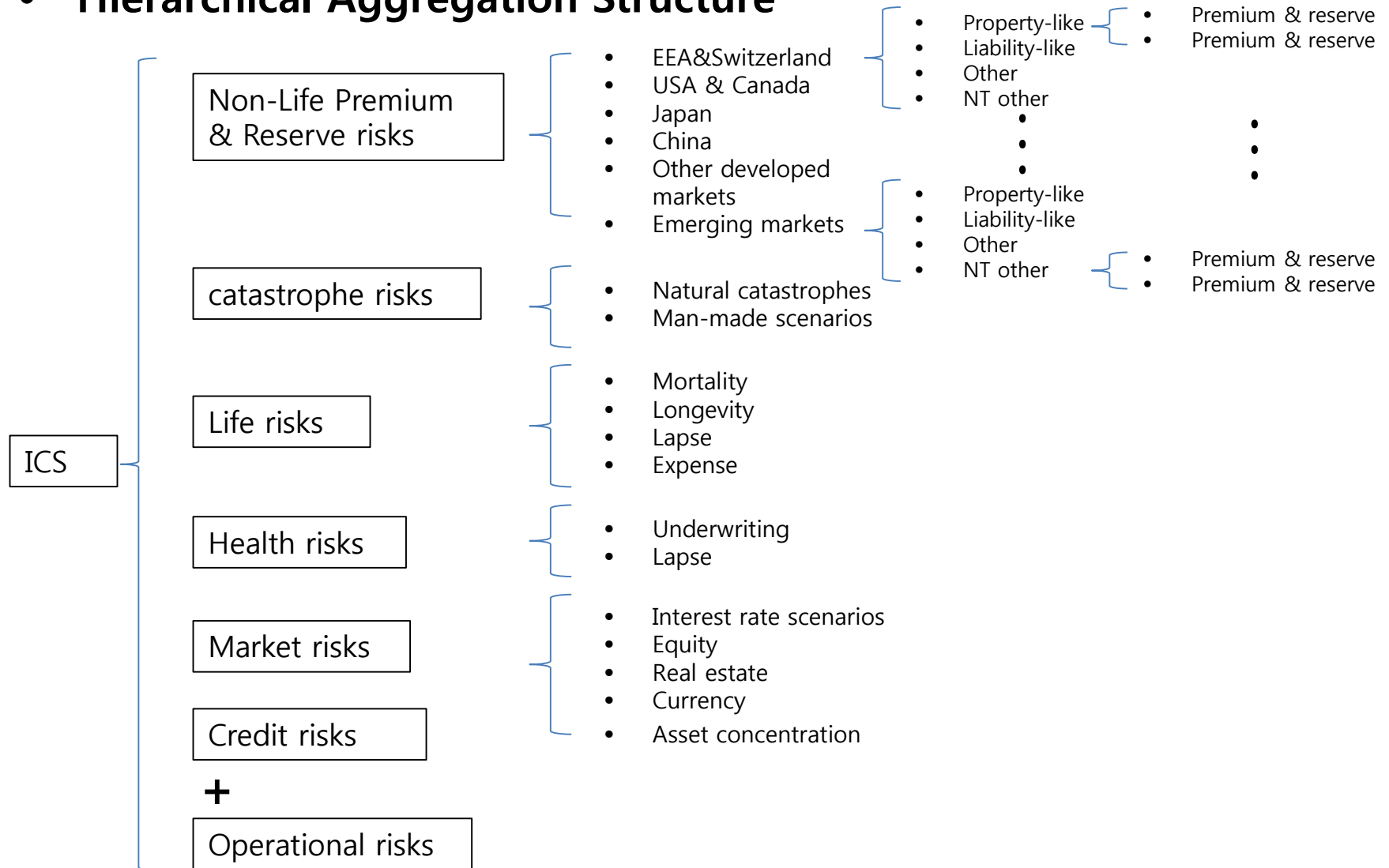
- Multiple-step aggregation approach through different sets of variance/covariance matrices



- ✓ Risks have been aggregated in multiple steps using correlation matrices.
- ✓ The structure of correlation matrices set out in 2016 FT represents a trade-off between simplicity and risk sensitivity.

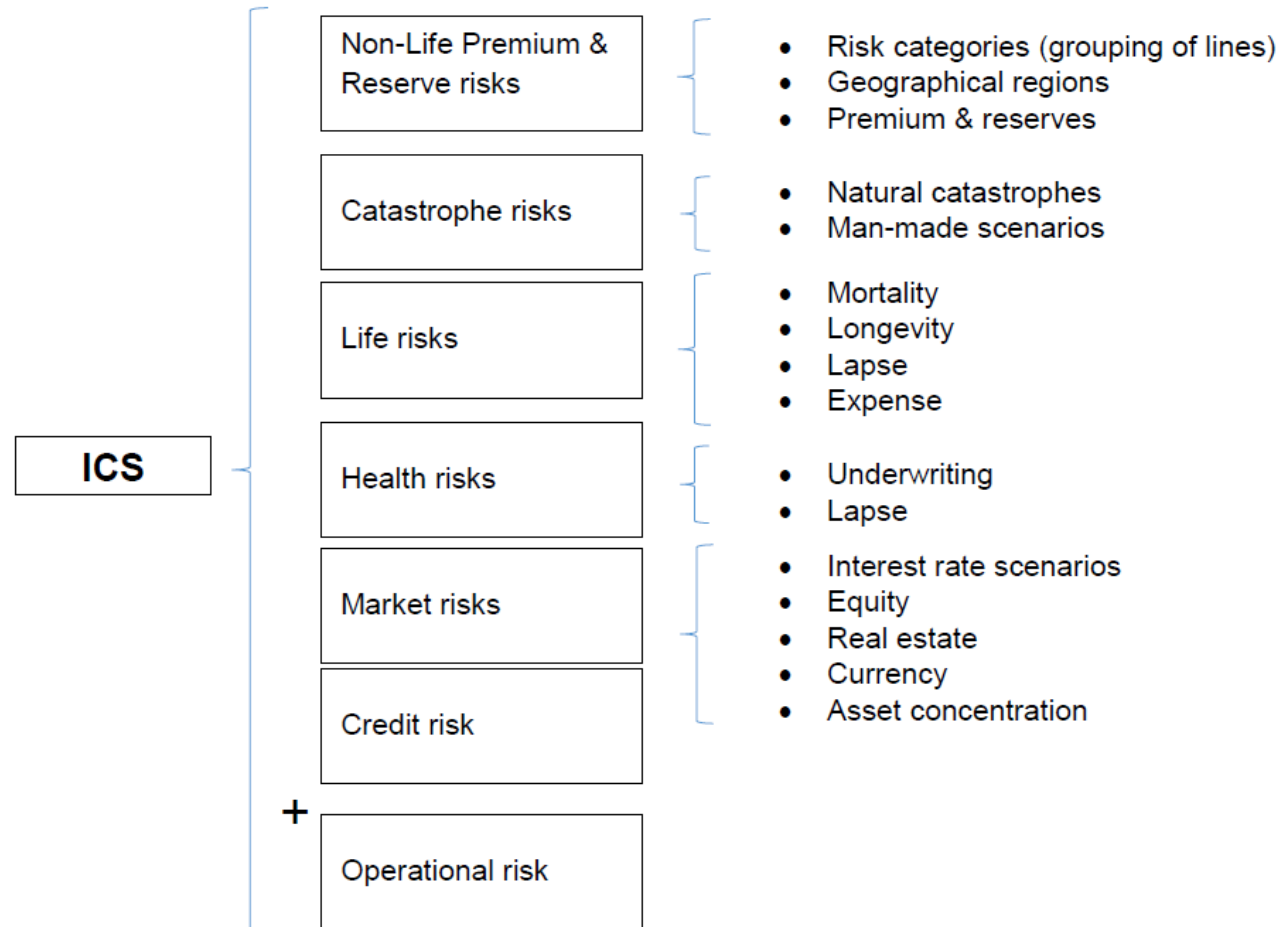
AGGREGATION / DIVERSIFICATION

• Hierarchical Aggregation Structure



AGGREGATION / DIVERSIFICATION

- Standard Method Aggregation Structure



AGGREGATION BETWEEN RISKS

- Formula

Diversified ICS

$$= \left(\begin{array}{c} \text{Non-Life} \\ \text{Catastrophe} \\ \text{Life type} \\ \text{Health risk} \\ \text{Market risks} \\ \text{Credit risk} \end{array} \right)^T \left\{ \begin{array}{c} \text{Correlation matrix} \\ \text{at ICS level} \end{array} \right\} \left(\begin{array}{c} \text{Non-Life} \\ \text{Catastrophe} \\ \text{Life type} \\ \text{Health risk} \\ \text{Market risks} \\ \text{Credit risk} \end{array} \right) + \text{operational risk}$$

AGGREGATION BETWEEN RISKS

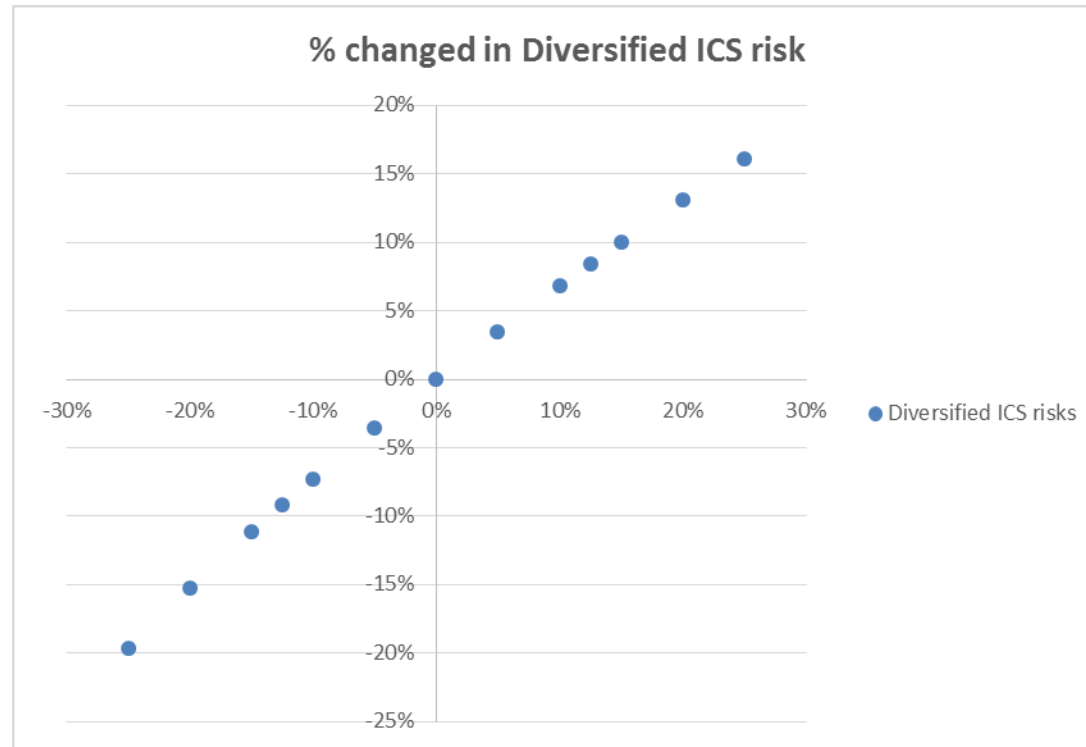
- Correlation factors & related comments

Correlation factors for ICS standard method						
	Non-life	Catastrophe	Life	Health	Market	Credit
Non-life	100%	25%	0%	0%	25%	25%
Catastrophe	25%	100%	25%	25%	25%	25%
Life	0%	25%	100%	25%	25%	25%
Health	0%	25%	25%	100%	25%	25%
Market	25%	25%	25%	25%	100%	25%
Credit	25%	25%	25%	25%	25%	100%

- ✓ Actuarial Association of Europe (EU) : There are several inconsistencies in the suggested factors.
- ✓ IFA (UK) : Market risk should have a 0% factor with non-life and cat risk, but 50% with life risk.
- ✓ EIOPA , Ageas (Belgium): Correlation factor between non-life and credit should be set at 0.5, given lines of business such as marine, aviation.
- ✓ Allianz (Germany) : Life risks are not correlated to market or credit risks.
- ✓ AIA (Hong Kong) : Correlation factor between life/health risk and market risk looks too high.
- ✓ American Council of Life Insurers (US) : Life risks and market risks should be 0 correlation .

AGGREGATION BETWEEN RISKS

- Sensitivity Graph



- x-axis : % added or subtracted to correlation factors except for zero factors.

AGGREGATION WITHIN LIFE RISKS

- Formula

Diversified ICS Life risks

$$= \begin{pmatrix} \text{mortality risk} \\ \text{Longevity risk} \\ \text{Lapse risk} \\ \text{Expense risk} \end{pmatrix}^T \left\{ \begin{pmatrix} & & & \\ & & & \\ & & & \\ & & & \end{pmatrix} \begin{pmatrix} \text{mortality risk} \\ \text{Longevity risk} \\ \text{Lapse risk} \\ \text{Expense risk} \end{pmatrix} \right\}$$

Correlation matrix
for life risks

AGGREGATION WITHIN LIFE RISKS

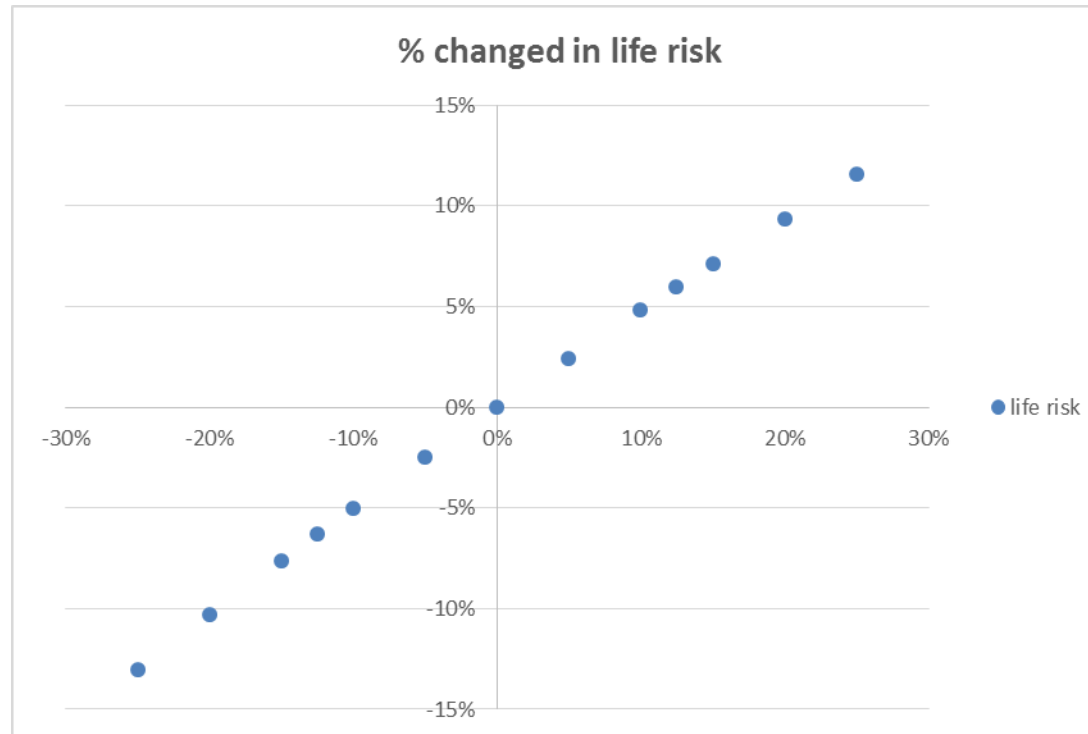
- Correlation factors & related comments

Life risk – correlation factors for ICS standard method				
	Mortality	Longevity	Lapse	Expense
Mortality	100%	-25%	0%	25%
Longevity	-25%	100%	25%	25%
Lapse	0%	25%	100%	50%
Expenses	25%	25%	50%	100%

- ✓ Bermuda Monetary Authority (Bermuda) : Correlation btw mortality and longevity appears to be over calibrated. -0.5 seems reasonable.
- ✓ FSS (Korea) : Correlation btw mortality and longevity is too low. -50% or -75% are suggested.
- ✓ Allianz (Germany) : Correlation between mortality and longevity is too low.
- ✓ Swiss Re (Switzerland) : Standard method is overestimating life risks.
- ✓ IAA (International) : A strong correlation btw lapse and mortality risk is recommended.
- ✓ General Insurance Association of Japan (Japan) : All of these correlation factors should be 0%.
- ✓ Munich Re (Germany) : We suggest to avoid negative correlation.
- ✓ American Council of Life insurers (US) : Longevity level and trend risks should be considered independent risk factors.

AGGREGATION WITHIN LIFE RISKS

- Sensitivity Graph



- x-axis : % added or subtracted to correlation factors except for zero factors.

AGGREGATION WITHIN MARKET RISKS

- Formula

Diversified ICS market risks

$$= \begin{pmatrix} \text{i.r upward} \\ \text{i.r downward} \\ \text{i.r flattening} \\ \text{Equity} \\ \text{Real estate} \\ \text{Currency} \\ \text{Assets concentration} \end{pmatrix}^T \left\{ \begin{array}{c} \text{Correlation matrix} \\ \text{for market risks} \end{array} \right\} \begin{pmatrix} \text{i.r upward} \\ \text{i.r downward} \\ \text{i.r flattening} \\ \text{Equity} \\ \text{Real estate} \\ \text{Currency} \\ \text{Assets concentration} \end{pmatrix}$$

AGGREGATION WITHIN MARKET RISKS

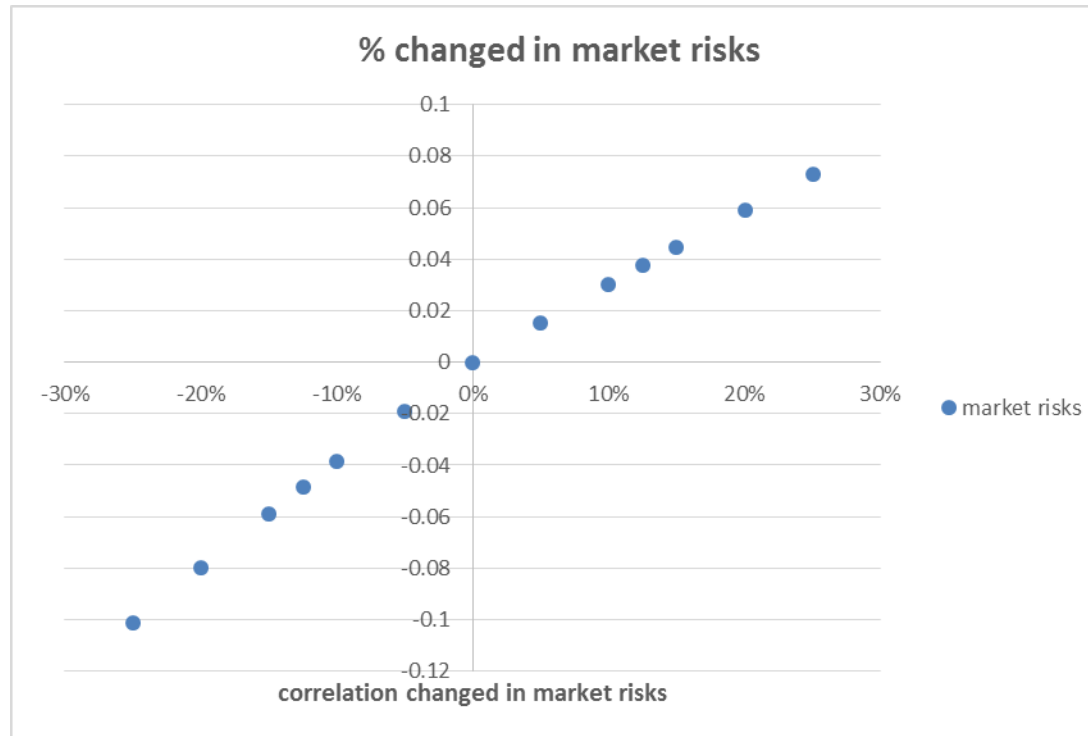
- Correlation factors & related comments

Market risk – correlation factors for ICS standard method							
	IRR Upw.	IRR Downw.	IRR Flat	Equity	Real Estate	Currency	Assets Concentr.
Interest rate upward	100%	100%	100%	25%	0%	25%	0%
Interest rate downward	100%	100%	100%	50%	25%	25%	0%
Interest rate flattening	100%	100%	100%	25%	25%	25%	0%
Equity	25%	50%	25%	100%	50%	25%	0%
Real Estate	0%	25%	25%	50%	100%	25%	0%
Currency long	25%	25%	25%	25%	25%	100%	0%
Assets Concentration	0%	0%	0%	0%	0%	0%	100%

- ✓ Bermuda Monetary Authority (Bermuda) : Correlation btw the interest rate risk upward scenario and equity risk appears to be over calibrated.
- ✓ Ageas (Belgium) : Given the interest rate shocks for parallel shifts and flattening should be based on PCA, we would assume a correlation of 0%.
- ✓ Swiss Re (Switzerland) : It seems to use that the standard method is underestimating.
- ✓ EIOPA : It is difficult to gather time series long enough to assess the correlation btw property and equity. That is why we would favour a more prudent approach and set the correlation parameter to 0.75..

AGGREGATION WITHIN MARKET RISKS

- Sensitivity Graph



- x-axis : % added or subtracted to correlation factors except for zero factors.

AGGREGATION WITHIN NON-LIFE RISKS

- **Formula**

1. Calculate non-life risks by correlation matrix for geographical diversification

Diversified ICS non-life risks

$$= \left\{ \begin{pmatrix} \text{EEA\&Switzerland} \\ \text{USA \& Canada} \\ \text{Japan} \\ \text{China} \\ \text{Other developed markets} \\ \text{emerging markets} \end{pmatrix} \begin{pmatrix} \text{Correlation matrix} \\ \text{for geographical regions} \end{pmatrix} \begin{pmatrix} \text{EEA\&Switzerland} \\ \text{USA \& Canada} \\ \text{Japan} \\ \text{China} \\ \text{Other developed markets} \\ \text{emerging markets} \end{pmatrix}^T \right\}$$

2. Calculate non-life risks for each geographical regions

Diversified ICS non-life risks for each geographical regions

$$= \left\{ \begin{pmatrix} \text{property-like} \\ \text{liability-like} \\ \text{Other} \\ \text{NT other} \end{pmatrix} \begin{pmatrix} \text{Correlation matrix} \\ \text{for risk categories} \end{pmatrix} \begin{pmatrix} \text{property-like} \\ \text{liability-like} \\ \text{Other} \\ \text{NT other} \end{pmatrix}^T \right\}$$

AGGREGATION WITHIN NON-LIFE RISKS (Categories)

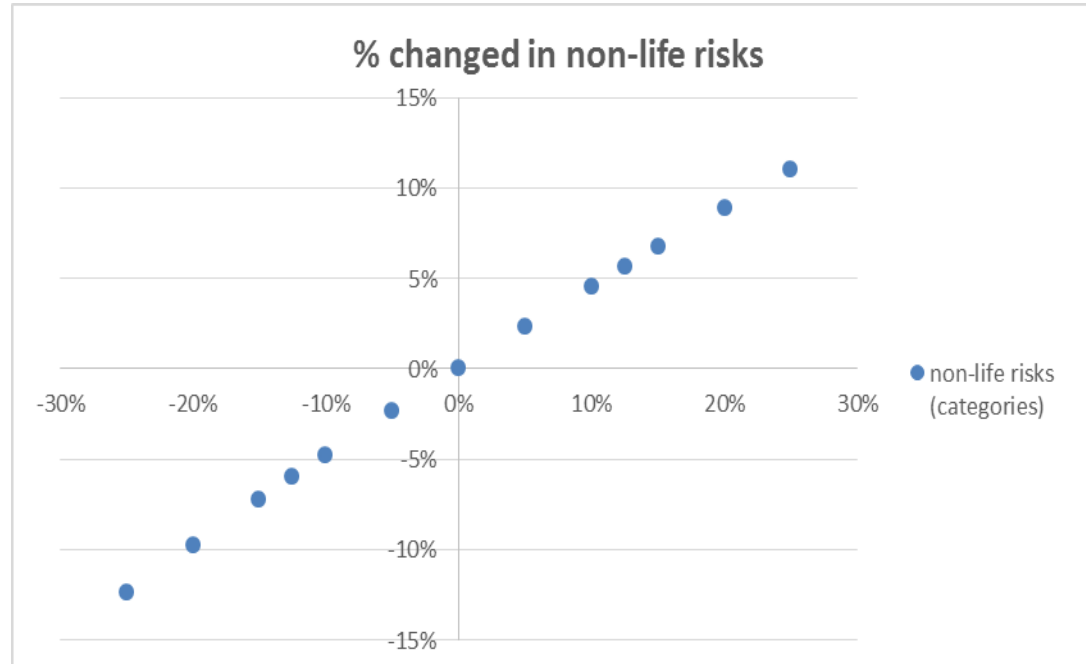
- Correlation factors & related comments

Non-Life premium and risk-correlation factor for ICS standard method				
	Property-like	Liability-like	Other	NT other
Property-like	100.0%	50.0%	50.0%	50.0%
Liability-like	50.0%	100.0%	50.0%	50.0%
Other	50.0%	50.0%	100.0%	50.0%
NT other	50.0%	50.0%	50.0%	100.0%

- ✓ Allianz (Germany) : Categories are considered to be too high. It is not clear why e.g. property like and liability like lines should have so strong common drivers.
- ✓ IAA (International) : The 50% correlation factor btw major lines of business categories is a reasonable starting point, but the value could be calibrated based on data collected in 2016 FT.
- ✓ RAA (US and many other jurisdictions) : The correlation factor appears high. The risk and correlation factors should be carefully selected and calibrated on empirical studies of available historical data and information collected in future FT.

AGGREGATION WITHIN NON-LIFE RISKS (Categories)

- Sensitivity Graph



- x-axis : % added or subtracted to correlation factors except for zero factors.

AGGREGATION WITHIN NON-LIFE RISKS (Regions)

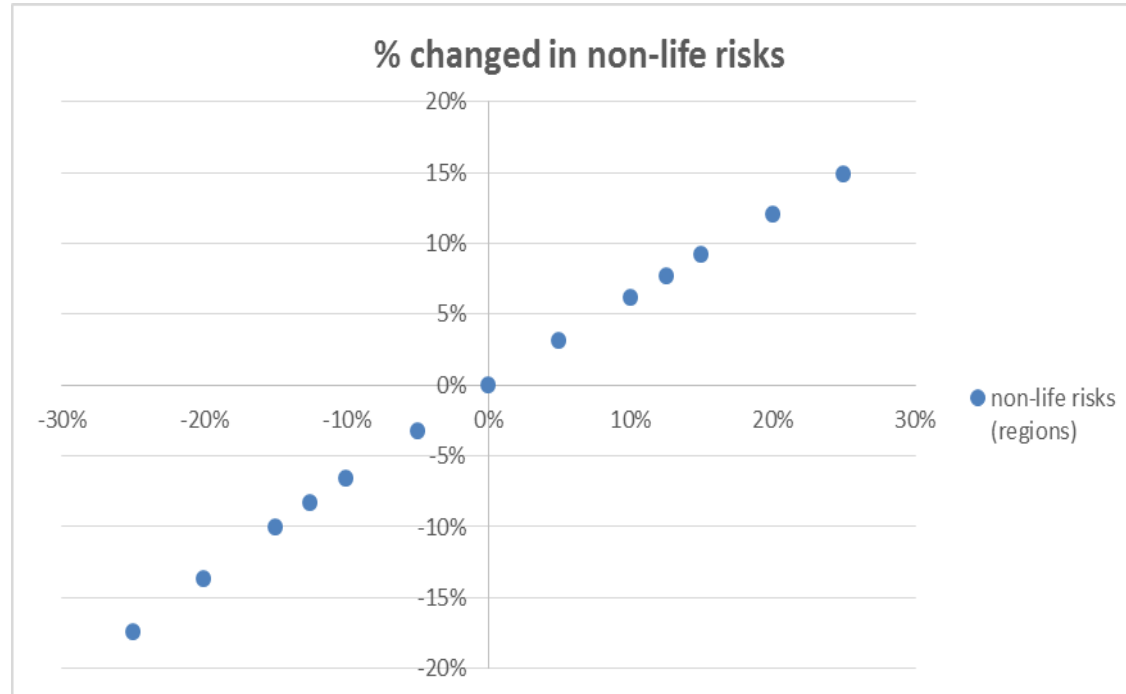
- Correlation factors & related comments

Non-Life premium and risk-correlation factor for ICS standard method						
	EEA & Switzerland	USA & Canada	Japan	China	Other developed markets	Emerging markets
EEA & Switzerland	100.0%	25.0%	25.0%	25.0%	25.0%	25.0%
USA & Canada	25.0%	100.0%	25.0%	25.0%	25.0%	25.0%
Japan	25.0%	25.0%	100.0%	25.0%	25.0%	25.0%
China	25.0%	25.0%	25.0%	100.0%	25.0%	25.0%
Other developed markets	25.0%	25.0%	25.0%	25.0%	100.0%	25.0%
Emerging markets	25.0%	25.0%	25.0%	25.0%	25.0%	100.0%

- ✓ GDV (Germany) : The correlation used for EU and US seems appropriate however the factors used for all other regions should be lower.
- ✓ General Insurance Association of Japan (Japan) : Risk and correlation factors should reflect economic reality. Correlation should be validated and adjusted based on 2016 FT.

AGGREGATION WITHIN NON-LIFE RISKS (Regions)

- Sensitivity Graph



- x-axis : % added or subtracted to correlation factors except for zero factors.

AGGREGATION WITHIN NON-LIFE RISKS

(Premium & Reserve)

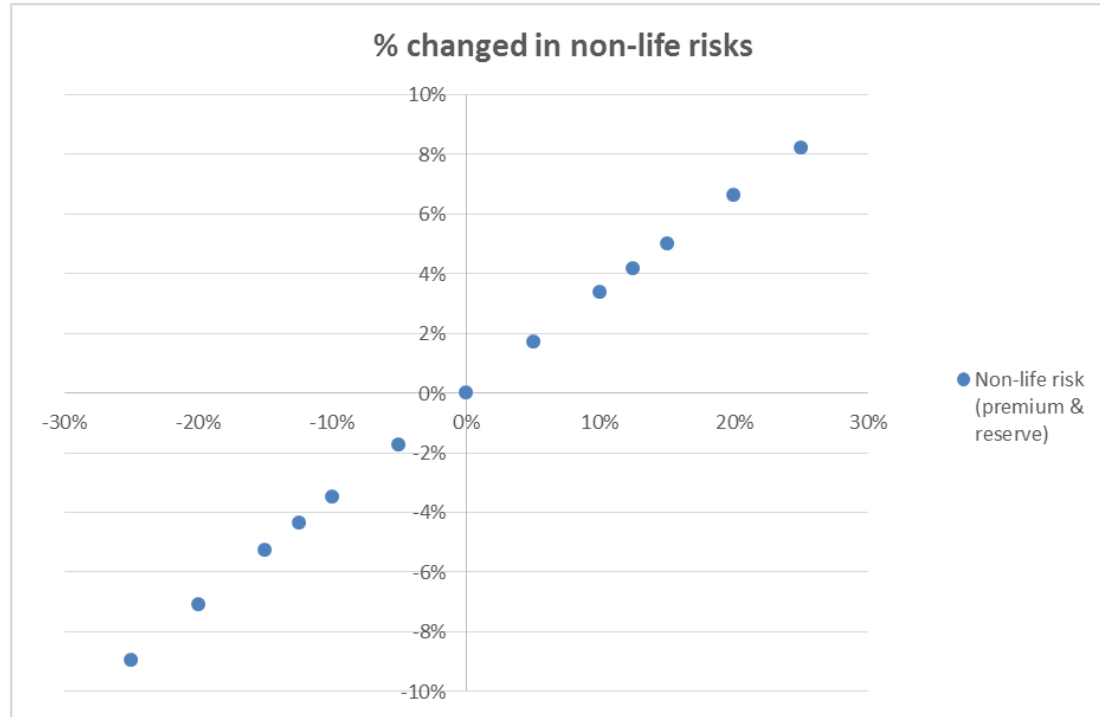
- Correlation factors & related comments

Non-Life premium and risk-correlation factor for ICS standard method	
Property-like	25.0%
Liability-like	75.0%
Other	50.0%
NT other	50.0%
Mortgage	75.0%
Credit	75.0%

- ✓ Ageas (Belgium) : A different correlation factor between premium & reserve risk per category is appropriate but the 75% for liability-like seems too high.
- ✓ Allianz (Germany) : Correlations between premium and reserves seem to be rather high. We would definitely expect lower correlations for Category Liability-like.
- ✓ National Association of Mutual Insurance Companies (US) : The proposed amounts are much too high especially for the liability- lines.

AGGREGATION WITHIN NON-LIFE RISKS (Premium & Reserve)

- Sensitivity Graph



- x-axis : % added or subtracted to correlation factors except for zero factors.

- **Aggregation within Health risks**

Diversified ICS Health risk

$$= \sqrt{(\text{Health underwriting})^2 + (\text{Lapse risk})^2}$$

- **Aggregation within Natural Catastrophe risks**

Nat Cat ICS risks

$$= \sqrt{(\text{Natural catastrophes})^2 + (\text{Terrorism})^2 + (\text{Liability})^2 + (\text{Pandemic})^2 + (\text{Marine})^2 + (\text{Aviation})^2 + (\text{Credit and surety})^2}$$

SENSITIVITY ANALYSIS

- Correlation factors

EIOPA	
① non-life & credit (25%→50%)	
② real estate & equity (50% → 75%)	
% changed in Diversified ICS (①,②)	2.94%
% changed in Market risks (②)	1.01%

Institute and Faculty of Actuaries (UK)	
① market & non-life(25%→0%)	
② market & Cat (25%→ 0%)	
③ market & life (25%→50%)	
% changed in Diversified ICS (①,②,③)	-1.19%

Bermuda Monetary Authority	
① i.r upward scenario & equity (25%→0%)	
② mortality & longevity (-25%→ -50%)	
③ regions (25% → 12.5%)	
% changed in Diversified ICS (①, ②, ③)	-2.05%
% changed in Non-Life type (③)	-8.33%
% changed in Life type (②)	-1.03%
% changed in Market risks (①)	-2.54%

American council of life insurer (US)	
① life & market (25%→ 0%)	
% changed in Diversified ICS (①)	-3.31%

SENSITIVITY ANALYSIS

- Correlation factors (Insurance companies)

Ageas (Belgium)	
① non-life & credit (25%-.50%)	
② i.r upward & i.r flatten (100%-> 0%)	
③ i.r downward & i.r flatten (100%-> 0%)	
④ premium & reserve liability-like(75%->50%)	
% changed in Diversified ICS (①,②,③,④)	-3.84%
% changed in Non-Life type (④)	-2.41%
% changed in Market risks (①,②,③)	-8.30%

Allianz	
(① life & market (25%-> 0%)	
② life & credit (25%0>0%)	
③ mortality & longevity (-25%-> -50%)	
④ expense & mortality (25%->0%)	
⑤ expense & longevity (25%->0%)	
⑥ expense & lapse (25%-> 0%)	
⑦ premium & reserve liability like(75%->50%)	
% changed in Diversified ICS (①,②,③,④,⑤,⑥, ⑦)	-5.22%
% changed in Non-Life type (⑦)	-2.41%
% changed in Life type (③,④,⑤,⑥)	-14.67%

AGGREGATION / DIVERSIFICATION

- The Technical Specifications for Aggregation and Diversification apply both to the MAV and GAAP Plus approach.
- The standard method will define methods to calculate risk charges for individual risks. The risk charges correspond to a specific measure, confidence level and time horizon, for instance 99.5% VaR over a one-year horizon.
- **The aggregation of these individual risk charges will then reflect some degree of diversification between the individual risks, as a consequence of the dependency specified between the risks.**
- The individual risk charges are aggregated using correlation matrices. The implicit assumptions and limitations of such approach are recognised, although not discussed here. Pair-wise correlations necessary to fully specify the aggregation, are proposed by the IAIS considering the ICS principles, and the supervisory experience. Following Field Testing the IAIS will consider if this needs to be refined.

AGGREGATION / DIVERSIFICATION

- Considering the feedback received during the ICS consultation, a multiple steps approach is adopted for 2016 Field Testing.
- This approach involves several relatively small matrices being defined and calibrated in order to aggregate several capital charges following the multi steps approach. This will be done automatically in the Template – Volunteer IAIGs do not have to enter any data with respect to aggregation and diversification in the Template.

Reference

- 2016 Field Testing
- 2016 Risk-based Global Insurance Capital Standard Version 1.0 Public Consultation
- Comments to 2016 ICS Consultation Document (Q144-146, Q209-216)
- All the materials available at <http://www.iaisweb.org/page/supervisory-material/insurance-capital-standard>