Society of Actuaries in Ireland

Concepts and methods of risk mitigation

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Agenda

- General concepts for risk mitigation decisions
- Fundamentals of market risk management
- Fundamentals of operational risk management
- Fundamentals of re-insurance
- Requirements for risk reporting

Section 1: General concepts for risk mitigation decisions

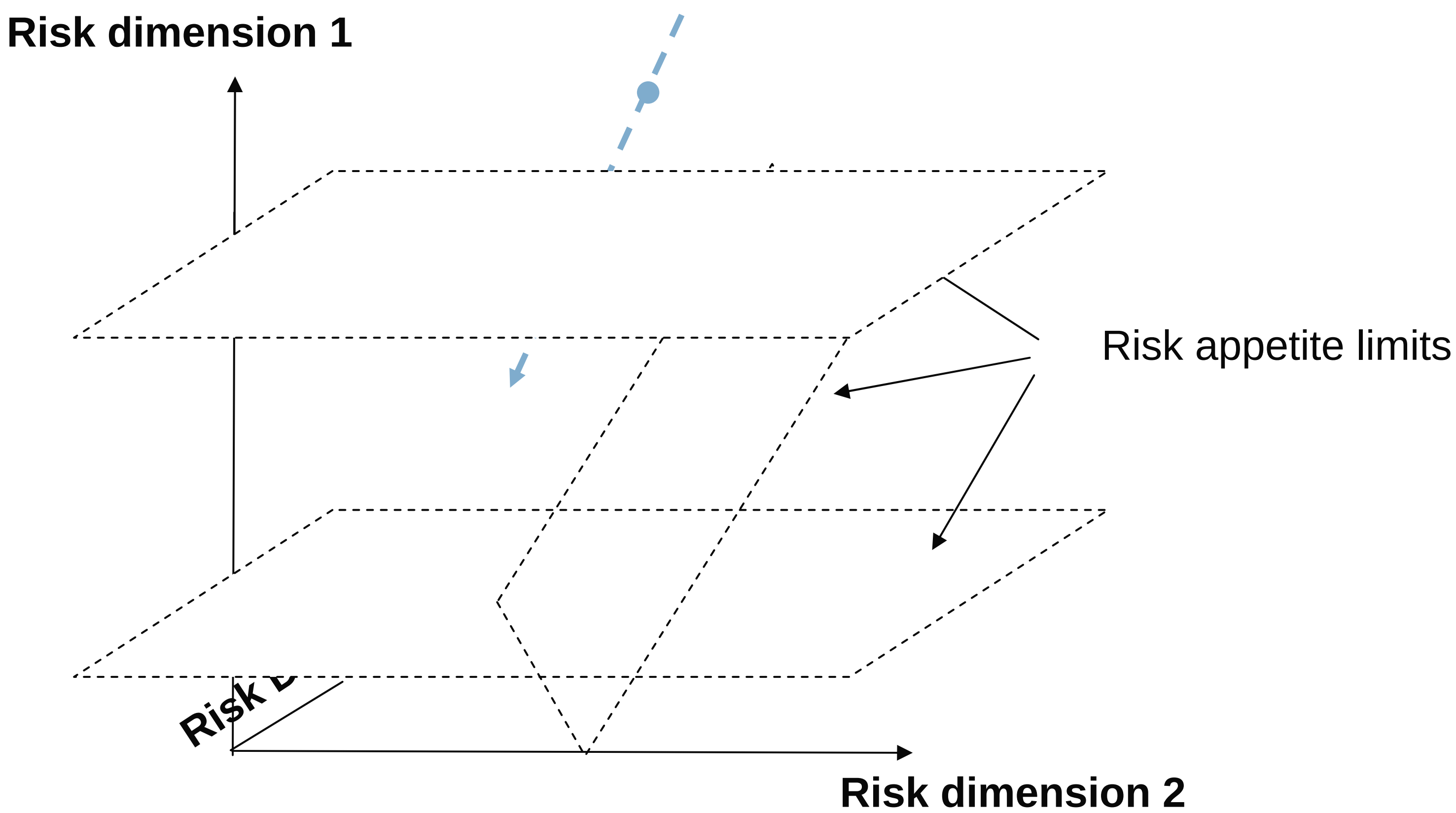
- Risk appetite fundamentals
- Risk return considerations etc.
- Overview available instruments
- The organization of risk mitigation

Companies typically manage within 4-dimension risk appetite

Dimension	Risk appetite elements
Adequate capital level	• Maintain regulatory requirements (e.g. FCD) • Maintain rating (e.g. S&P) • Meet target economic requirements (Risk capital)
Stable profitability and growth	• Keep up stable earnings • Keep up stable EV growth
Sufficient liquidity	• Maintain dividend cover • Maintain debt cover
Sound reputation	• Corporate governance and citizenship • Consistent deliverance on promises • Reputational risk

Source: Oliver Wyman benchmarking study

ERM supports management keep the risk profile within its appetite



Good ERM covers the risk cube fully with suitable instruments

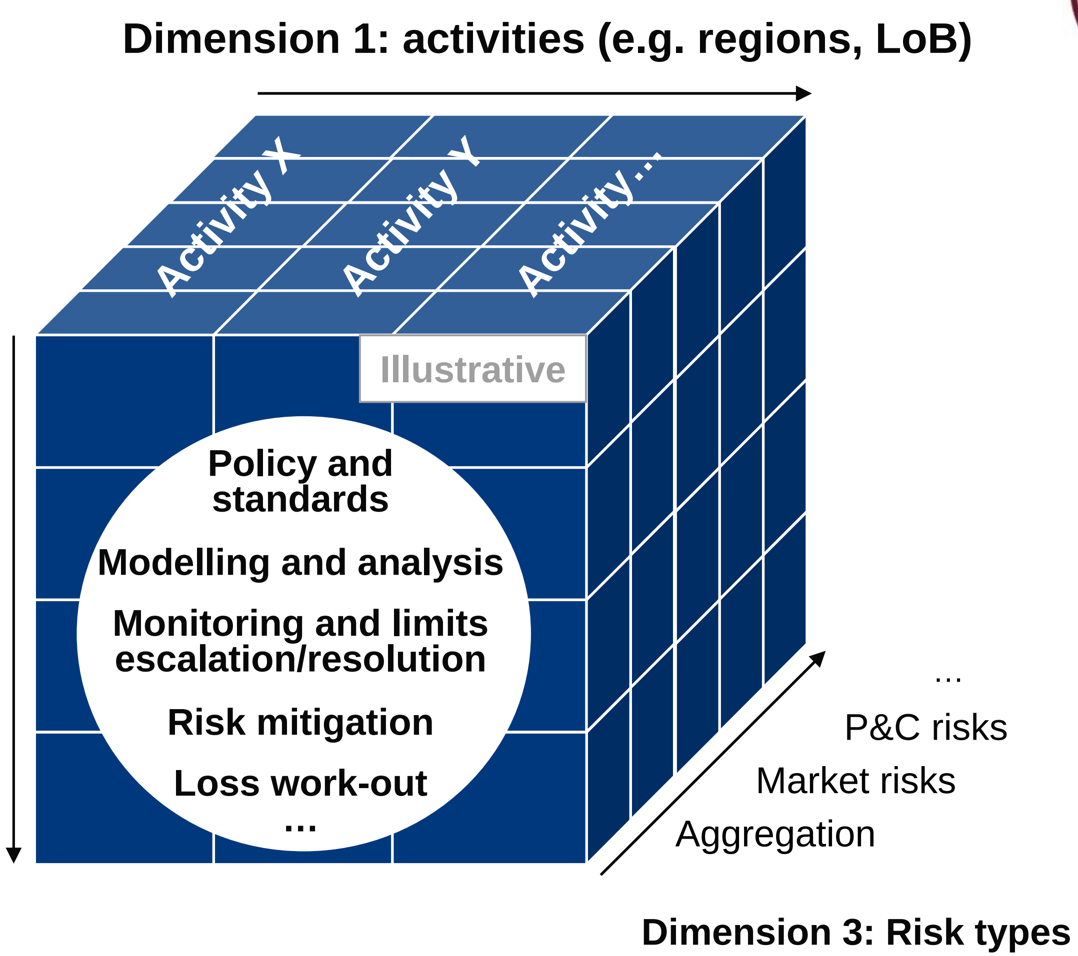
Dimension 2: Risk appetite

Adequate solvency

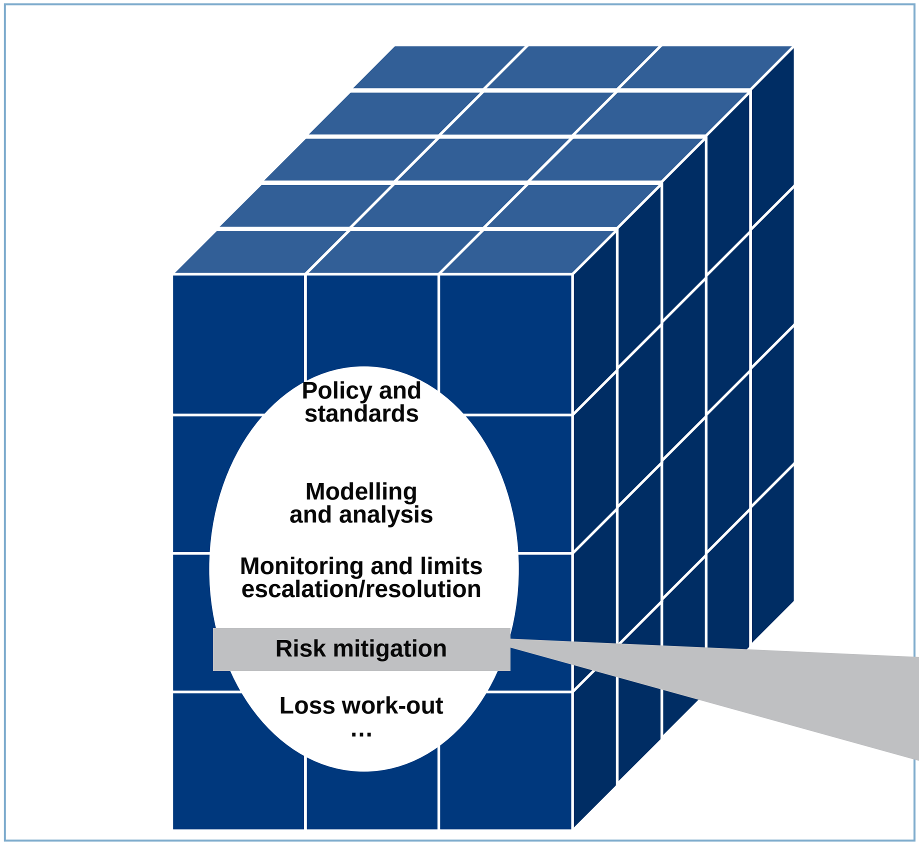
Stable profits

Sufficient liquidity

Sound reputation



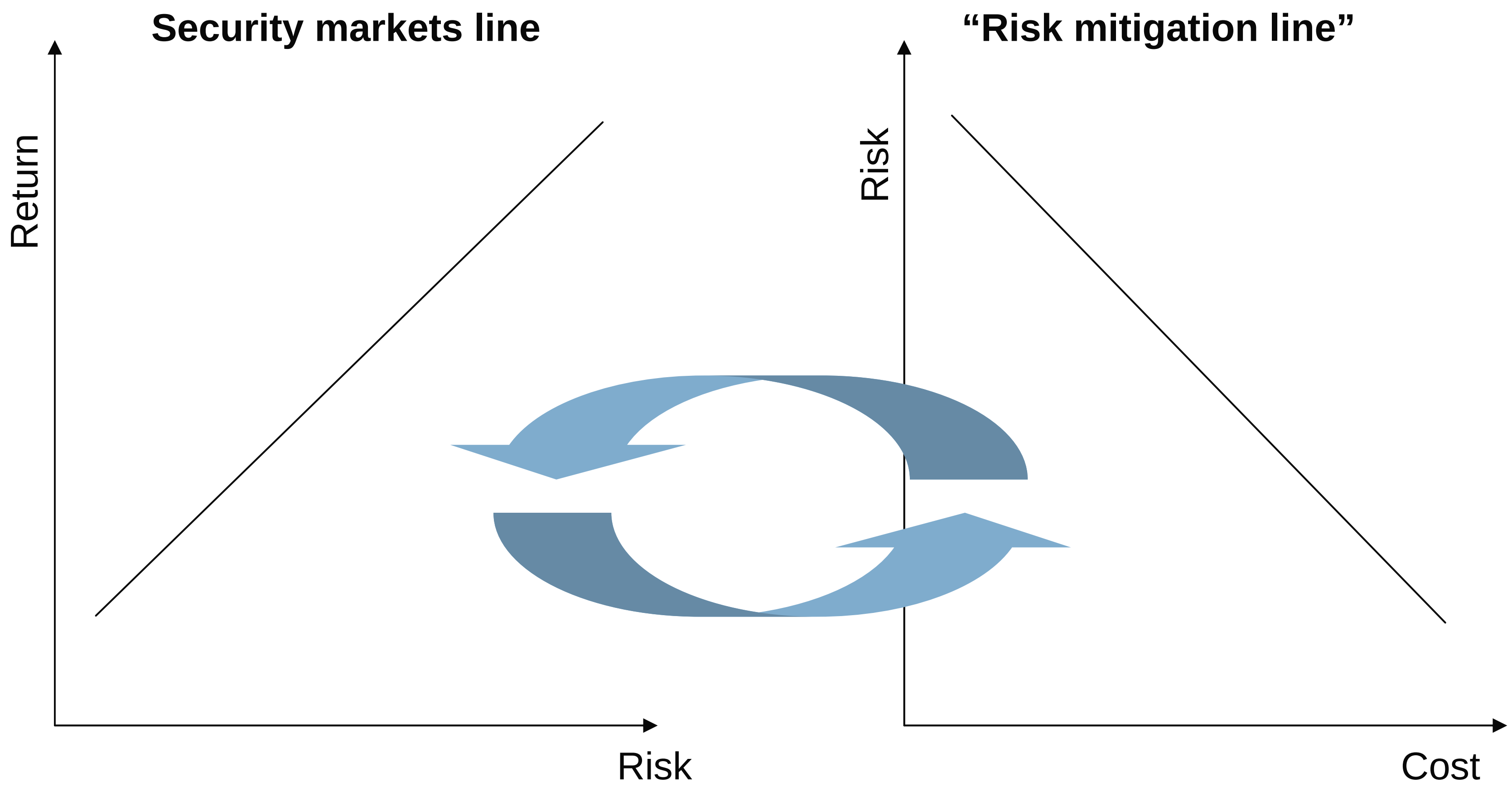
Risk managers can use a wide range of mitigation techniques



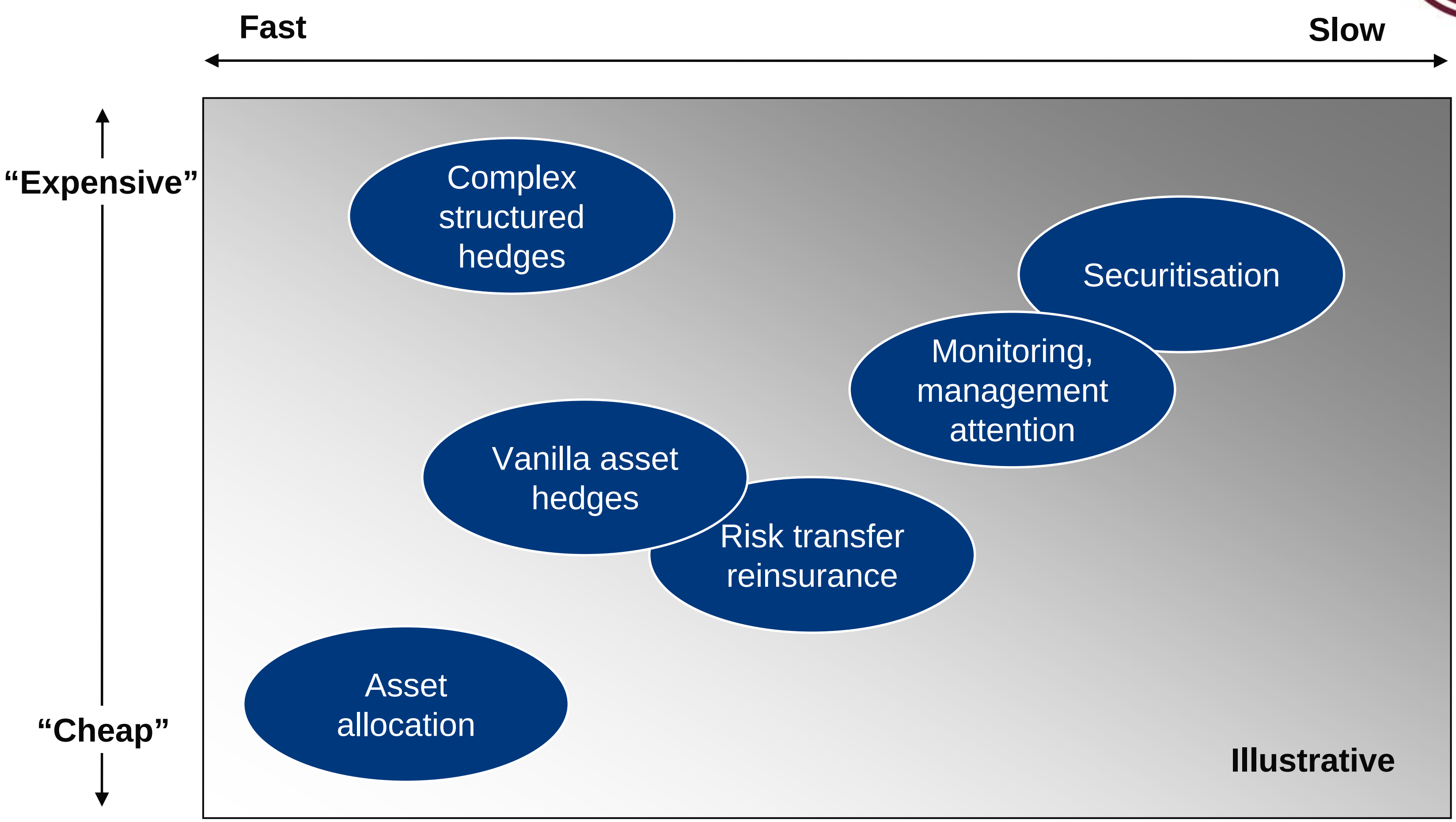
Risk mitigation techniques (examples)

- Re-insurance
- Hedging
- Sale of exposure
- (Close) monitoring
- Process excellence
- …

Risk mitigation scenarios are assessed on its costs/benefits



Also, the speed at which benefits emerge need to be considered



Who is responsible for risk mitigation?

1st line:
Risk taking

- Conduct business to meet group objectives (growth, return etc.)
- Seek best risk/return trade-offs
- In business units and at group level
- **Business, Financial Controlling**

2nd line:
Risk oversight

- Define mandates, guidelines and limits to keep business within risk appetite
- Monitor risk profile and identify potential breaches
- Initiate and track corrective actions
- **Risk Management, Corporate Actuarial, Compliance**

3rd line:
Independent assurance

- Independent review of adherence to risk and control standards, mandates and guidelines
- Ensure integrity of decisions and information
- Identify operational weaknesses
- **Audit, Appointed Actuary**

Section 2: Fundamentals and case studies in market risk management

- Investment Risk
- Counterparty Risk

Section 2: Fundamentals and case studies in market risk management

- Investment Risk
  - Types of Exposure
  - Mitigation Techniques
  - Investment impacts of the credit crisis
  - Recent risk mitigation successes
  - Investment risk mitigation post credit crisis
- Counterparty Risk

Types of exposure

- Interest rates (level and volatility)
- Equity returns
- Property returns
- Spreads (Credit and Liquidity)
- Currency
- Concentrations (lack of diversification)
- Asset-liability mismatches
- Reinvestment
- Model
- …and many more

Mitigating Techniques – some considerations

- Risk Appetite
- Tailor to the risk
- Proportionality
- Market Best Practice
- Constraints
- Secondary benefits
- Secondary (or new) risks

Techniques themselves…

- External
  - Hedging existing exposures (Dynamic, Static)
  - Pre-hedging
  - Reinsurance
  - Securitisation
  - …
- Internal
  - ALM
  - Matching (nature, timing, currency, etc)
  - Product design (e.g. “natural” hedges, CPPI)
  - Processes and controls
  - Tighter policy conditions
  - Diversification
  - Additional capital
  - Management actions
  - Understanding risks and model limitations
  - Develop self-reliance (cost/liquidity/availability)
  - …

The Credit Crisis – investment impacts in the insurance industry

- Some examples
  - AIG government bail-out
  - Swiss Re asset write-downs
  - Yamato Life Insurance insolvency
  - Old Mutual hedging losses
- Shortcomings in hedging techniques and processes
  - Insufficient exposures hedged
  - Lack of understanding
  - Liquidity and availability of suitable instruments
- Insurers hit by falling asset values
- Big difference from other crises – not just stock market impact

Investment Risk Mitigation – recent successes (VA examples)

- November 2008 Milliman survey of US variable annuity writer hedge programs over Sep-Oct 08 period
  - US VA hedge programs have been 93% effective in achieving their goals
  - Saved the US VA insurance industry $40 Billion due to hedge gains

- May 2009 Milliman survey of European VA hedge programs over the Sep-08 to Dec-08 period
  - Have been 94% effective in achieving their goals

- July 2009 Milliman survey of US VA writers from Nov-08 to Mar-09
  - Programs have been 94% effective in achieving their goals

Investment Risk Mitigation … in a post credit crisis world

- Thoughts from CRO Forum
  - *"Risk management is just as much about **preparing for what has not happened** as it is for understanding and preparing for what has been experienced in the past"*
  - *"Risk management is **much more than models**…risk models are indispensible for managing the business. However the risk models must be – and in many cases are already – complemented with Internal Controls…there is **no substitute for a deep understanding** of the risks involved in the business – and for **common sense**"*

  - Importance of asset stress and scenario testing
  - Market Consistent Valuation Approach
  - Need for appropriate liquidity risk management

Investment Risk Mitigation … in a post credit crisis world

- CEIOPS (Paper: "lessons learned from the financial crisis")
  - Basic expertise in credit products
  - Liquidity contingency plans under Pillar II of Solvency II
  - Stress and scenario testing (including reverse test testing)
  - Internal asset limits (under Prudent Person approach for Solvency II)
- CEIOPS' final advice on Governance (formerly CP33)
  - Detailed guidelines on investment strategy, liquidity management, ALM, reinsurance strategy, etc.
  - Lessons learned from financial crisis

Section 2: Fundamentals and case studies in market risk management

- Investment Risk
- Counterparty Risk
  - Understanding the Exposure
  - Mitigation Techniques
  - A view from CEIOPS

Understanding the Exposure

- Examine Direct and Indirect exposures
- Latest Solvency II thinking a good starting point
- Regular monitoring is essential
- Reliance placed on external credit ratings
- Estimation of Loss-Given-Default
- Risk Appetite Framework

Mitigating Techniques – some considerations

- Unfunded
  - Capital markets (e.g. CDS)
  - Guarantees
- Funded
  - Collateral
    - regular rebalancing
    - good quality
    - latest Solvency II thinking
  - On-balance sheet netting
- Avoid undue concentration of exposure where possible
- Ensure that any agreements worded tightly

A view from CEIOPS

- *“Insurers were **overrelying on the ratings and models of Credit Rating Agencies**, without an internal assessment of the underlying risks”*

- *“In many cases, due to credit risk, **risks thought to be transferred were not**”*

- *“further consideration is required in order to assess whether (the) risk has effectively been transferred, and **if such transfer implies additional risks**”*

- *“Insurers will also have to **build up basic expertise to understand, monitor and steer** credit products and their embedded risks, rather than relying only on external assessments”*

Section 3: Fundamentals in operational risk mitigation

- Operational risk in regulation
- Approaches to operational-risk mitigation

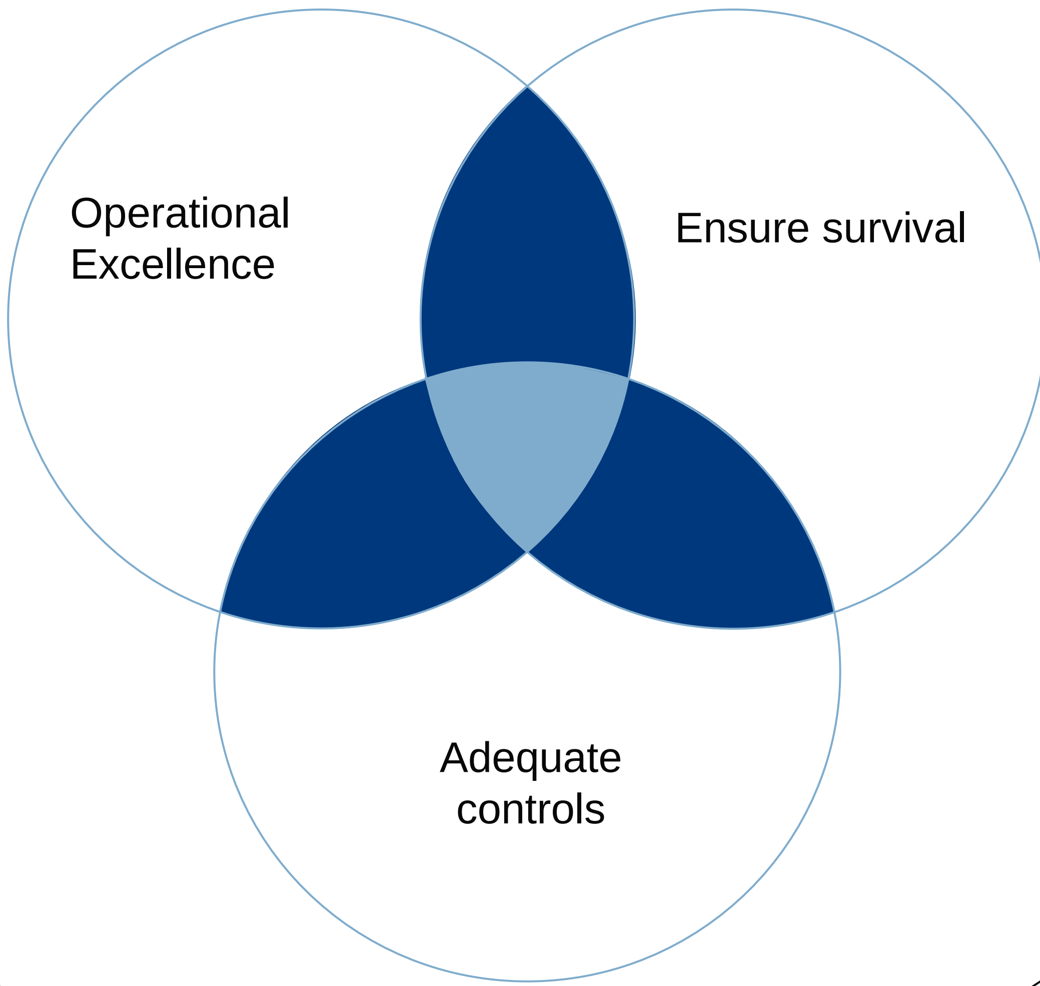
Operational risk is becoming a more prominent concern

- “Sharma Report” found operational risks (incl. strategic risks) as the main cause of past insurance failures in the EU

- FSA feedback from ICAS
  - “Firms should be able to demonstrate that operational risk assessments have been subject to robust and objective challenge and validation”
  - “We were concerned that some firms had not considered the effectiveness of controls under adverse conditions”
  - “Many assessments had neglected consideration of whether there was correlation or independence between individual operational risks”

Source: FSA Insurance Sector Briefing: ICAS – Lessons learned and looking ahead to Solvency 2 (Nov 07)

Op risk mitigation actions come from three perspectives



“Partner with the business to reduce losses”

“Mitigate the risks that keep the Board awake”

“Meet audit/legal requirements efficiently”

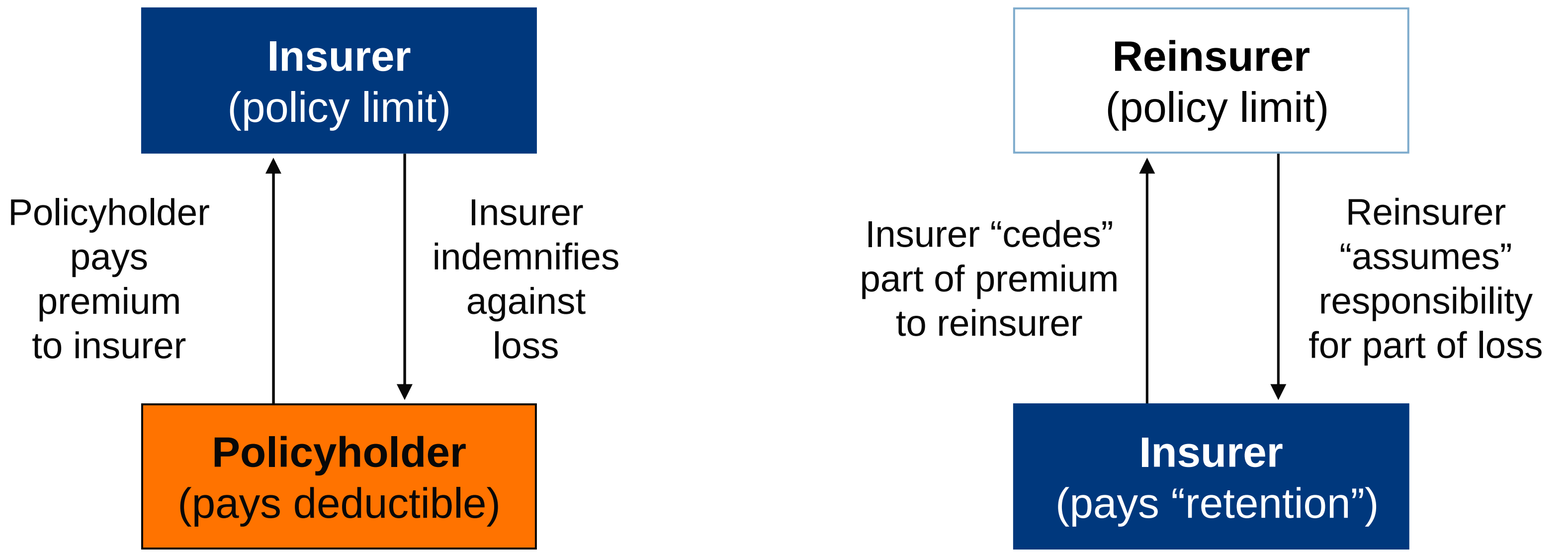
Emerging trends in operational-risk management

- Greater push into business units
  - Small Group function focussed on regulatory, quants and “Top X” risks
  - All other risks being managed “locally”
  - Link-ups with cost-reduction initiatives to help drive process efficiencies
- Formal extension of “Top X” specific scenario concept
  - Reputation risks
  - Multi-faceted strategic risk events (e.g. Bird Flu)
  - Risks which are a sequencing of cross-risk type events
- Broader realignment of Group Support functions
  - A “clean-up” of Compliance initiative overlaps
  - Definition of core risk mitigation processes drive the organisation structure (and not the other way around) to reflect main themes running across them
- Tailored insurance (or other risk transfer vehicles) for Operational Risks

Section 4: Fundamentals in re-insurance

- Types of reinsurance relationships and covers
- Emerging role of reinsurance between risk and capital

Insurance/Reinsurance parallels



There are two general types of reinsurance relationships

Facultative

Individual Risk

- Individual risk review, right to accept or reject each risk on its own merit
- Adapts to short-term U/W philosophy
- Can reinsure a risk that is otherwise excluded from a treaty
- Can protect a treaty from adverse underwriting results

Vs.

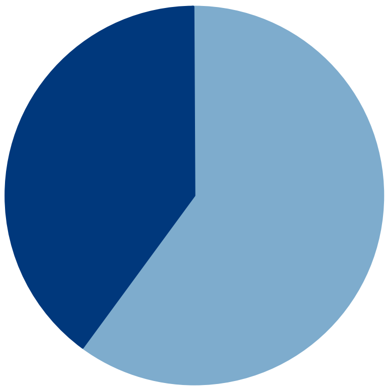
Treaty

Book of Business

- Obligatory acceptance by the reinsurer of covered business
- A long-term relationship in which the reinsurer's profitability is expected over an extended period of time
- One contract encompasses all subject risks

There are two general types of reinsurance covers

- **Proportional**: sharing of losses and premiums between insurer and reinsurer proportionally
  - Transparent pricing
  - Re-insurer’s support “follows the fortunes” of cedent for all losses



- **Non-Proportional**: only losses beyond a certain amount are paid by the reinsurer up to the limit
  - Allows a greater net premium retention
  - More economical in terms of premium and admin cost

Link between risk and capital

Risk transfer

- Optimise risk-carrying economics
- Reduce volatility
- Reduce “downside” risks
- Enhance underwriting capacity
- Support business and financial strategy

B/S management

- Minimise cost of risk-adjusted capital
- Optimise use of capital
- Stabilise after-tax earnings
- Improve financial ratios (e.g. ROE)
- Optimise cash management
- Bottom-line optimisation
- Regulatory, rating, accounting, tax

The re-insurance function is undergoing change

- Mandate is becoming more “strategic”
  - Traditional, providing capacity for individual lines/risks, or providing underwriters
    with “confidence”
  - Modern view is to use R/I to optimize aggregate Cost of Capital
  - Using internal re-insurance to optimize capital structure, taxes etc.
- Clear trend is to centralize internal and external re-insurance
  - For instance, Axa Céssions, Zurich Group Reinsurance etc
  - Typically within Business, but with strong links to Finance/Risk
- Groups retain more, and try to optimize aggregate risk transfer

Section 5: Requirements for risk reporting

- Elements of risk reports

Key Elements

- Identification of current and emerging risks
  - Risks constantly evolving and changing
  - Actively managed and residual risks
  - Trends
- Early warning signs
  - Changes in key risk indicators
- Review of available risk management techniques
- Tailored to stakeholder needs
  - Management
  - Shareholders
  - Audit
  - Others