



Analysis of an Insurance Company's Balance Sheet





Agenda

1. Introduction
2. Insurance and reinsurance overview
3. Assets and liabilities
4. Risk assessment
5. Economic risk capital
6. Summary



Introduction - Main questions

- What does ALM mean in an insurance and/or reinsurance company?
- What are the links between ALM and risk management?
- What are the links between ALM and capital adequacy?
- What are the main processes?



Introduction – Today's agenda

- Overview of insurance business
- Assets and liabilities
- Economic view vs. accounting view
- Risk management
- Economic risk capital
- Capital adequacy



Introduction – Tomorrow's agenda

- ALM as part of integrated risk management
- Strategic and tactical asset allocation
- ALM processes



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Insurance



■ Insured object → Trigger → Claim

- The insurer assumes risks
- The insurer is liable to the policyholder
- The insurer assumes the financial consequences of such risks

Insurance based on mathematical concepts

- Law of large numbers (Jakob Bernoulli)



Jakob Bernoulli (1655 –1705)

- Time value of money (Leonard Euler)



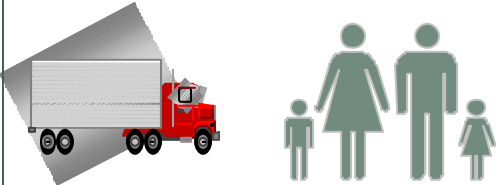
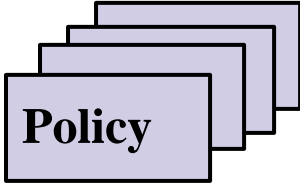

Leonard Euler (1707 –1783)

Basic principles of insurance

- Assessability
- Randomness
- Mutuality
- Economic feasibility
- Threats of the same kind



Market players in the insurance industry

<p>Policyholder</p>		<p>Individual risks are transferred to the insurer</p> <p>Premium is paid upfront</p>
<p>Insurer</p>		<p>Risk pooling</p> <p>Claims are paid as agreed in the policy</p>
<p>Reinsurer</p>		<p>Part of the risk and the premium is ceded to the reinsurer</p>



Reinsurance definition

- Reinsurance is spreading the negative financial impact of an accidental loss on single economic units to a community of units, thereby reducing the overall opportunity costs for an economic system
- Risk transfer is a core competence of a reinsurer
- Risk transfer comprises identifying, assessing, underwriting and diversifying risk in order to minimize the total capital cost of carrying such risk
- Main focus is on poolable or diversifiable risk



Reinsurance is not banking

- The banking system is intrinsically illiquid because clients can cash in short-term accounts
- In the (re)insurance sector, policyholders do not have access to cash without presenting a claim
- The policyholder has the obligation to reduce the amount of loss as compared to a holder of a pure financial instrument

Why reinsurance?

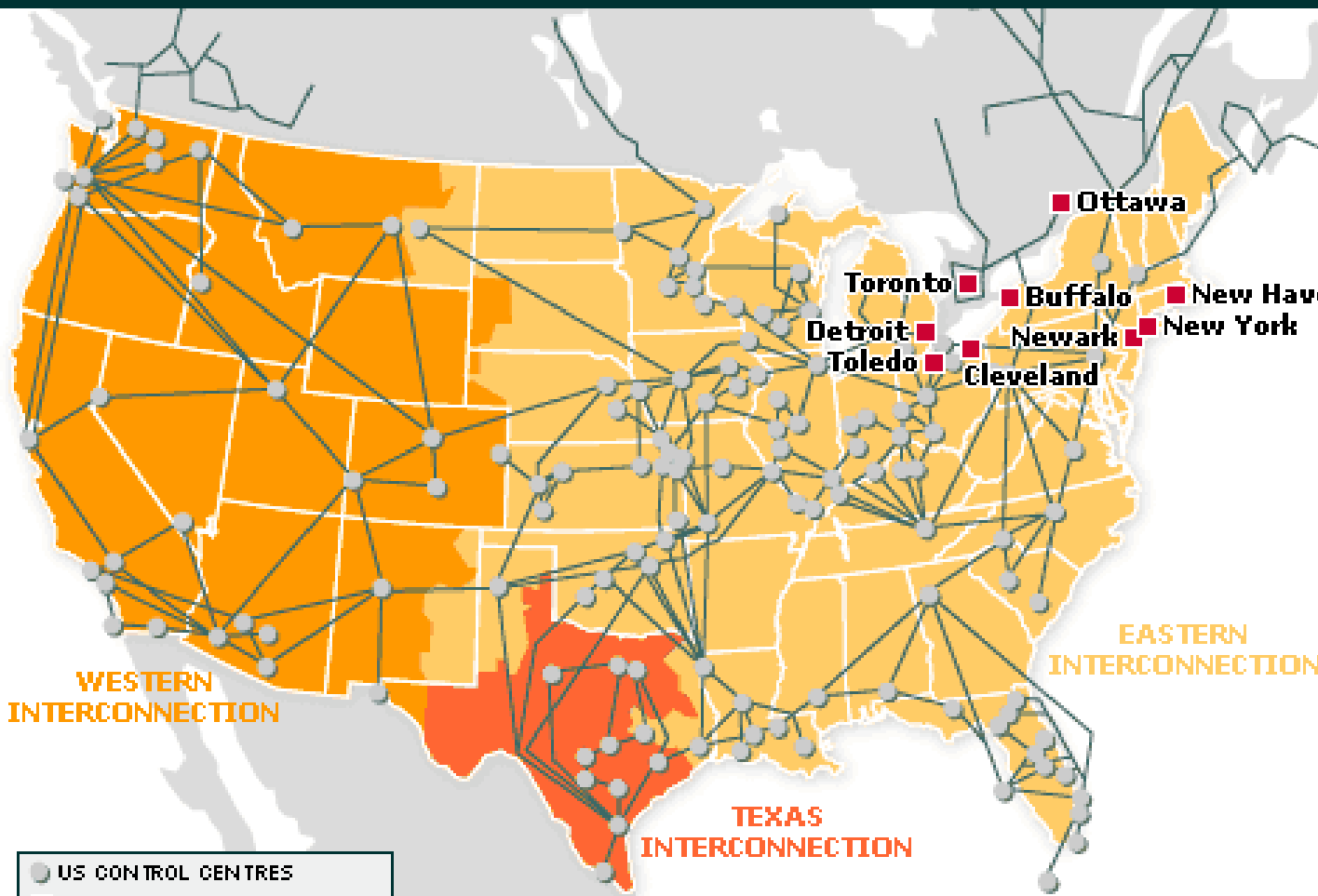
- To limit annual fluctuations
- To be protected in case of catastrophe and large claim





Example: NY blackout August 2003

NORTH AMERICAN ELECTRICITY GRID





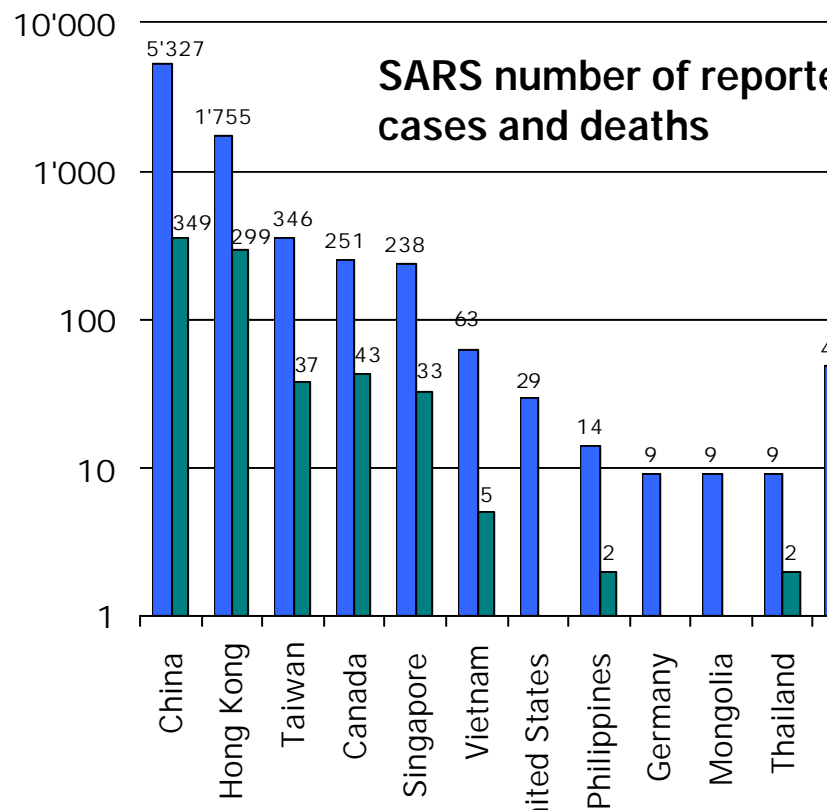
Example: Epidemics and insurability

Influenza pandemics 1918 / 19

- More than 20 m deaths caused by "Spanish Flue"
- US death toll 500 000; insurance claims of USD 125 m (0.5% of US GDP)

SARS

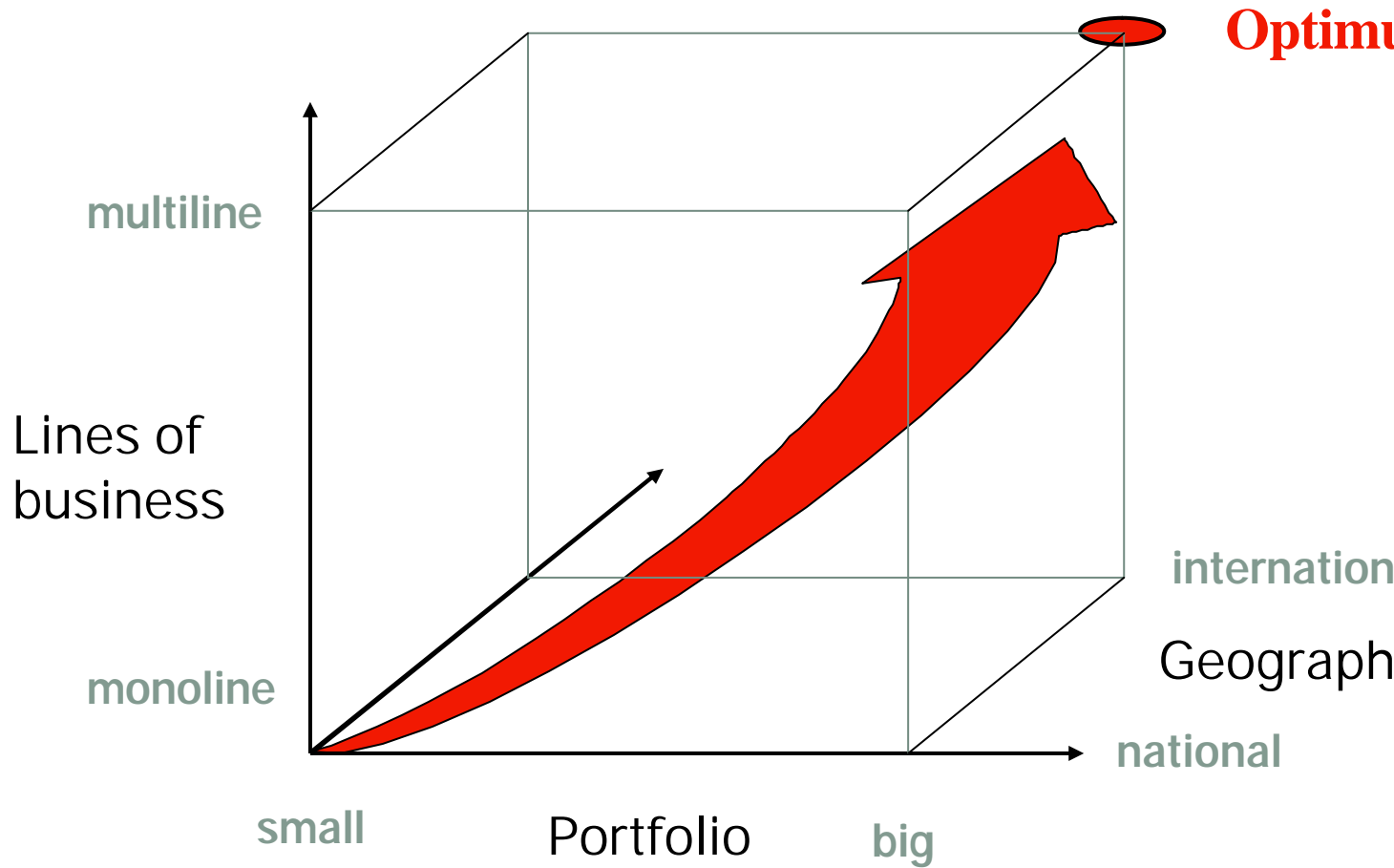
- 774 SARS deaths for period 1 November 2002 to 31 July 2003 (of a total of 8'099 cases in 30 countries)



Source: WHO, 23 September 2003



Value creation through diversification





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Financial statements of an insurance company

- Main income statement items

Revenues	Expenses
<ul style="list-style-type: none"> Premiums earned Investment income Realised capital gains 	<ul style="list-style-type: none"> Claims paid Increase in reserves Expenses incurred

- Main balance sheet items

Assets	Liabilities
<ul style="list-style-type: none"> Investments Receivables and recoverables Intangible assets Other tangible assets 	<ul style="list-style-type: none"> Reserves and unearned premiums Payables Debt Other liabilities



Accounting vs. economic view

- Accounting rules for insurance and reinsurance companies are not always in line with an economic view
- Premiums earned vs premiums written
- Realised capital gains vs. total investment return
- Nominal vs. discounted reserves
- Capital costs are not considered in accounting
- Treatment of intangible assets

Assets and liabilities of an insurance company

■ Assets

- Investments (fixed income and equity securities, mortgages loans, real estate, short term investments)
- Premium receivables and reinsurance recoverables
- Intangible assets
- Other assets

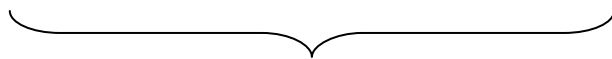
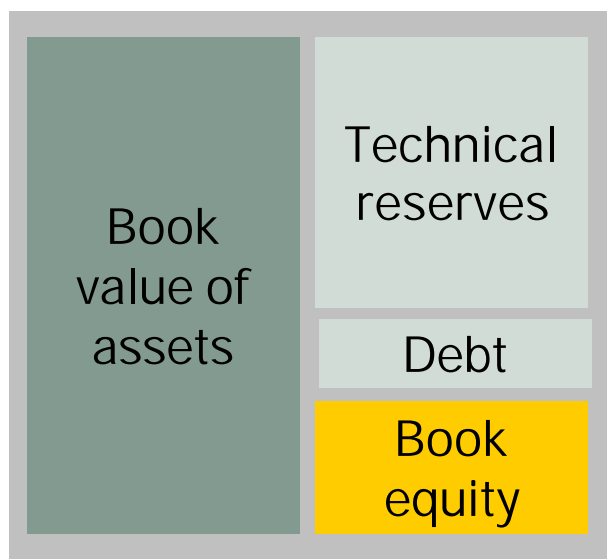
■ Liabilities

- Technical reserves and unearned premium reserves (life and non-life)
- Payables (reinsurance and other payables)
- Other liabilities
- Debt



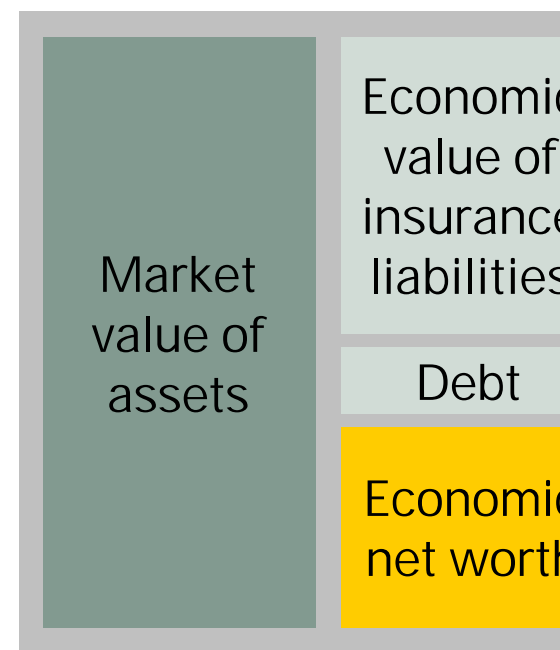
Economic net worth

Accounting balance sheet



Traditional accounting

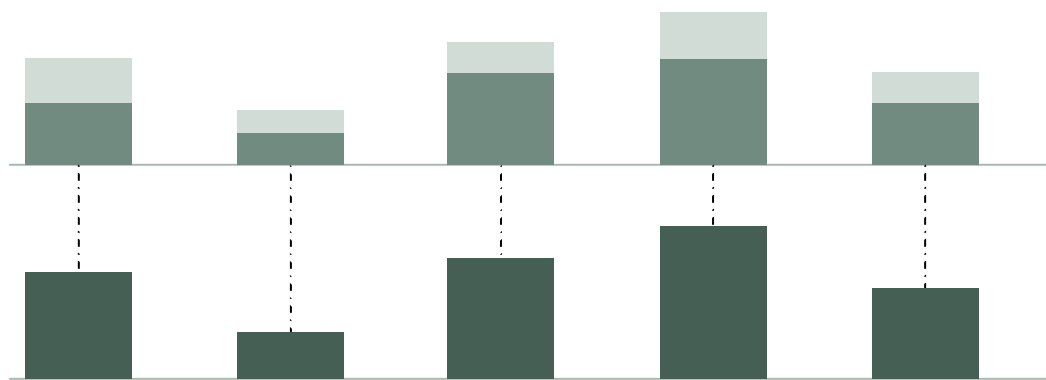
Economic balance sheet



Economic view



Economic value of liabilities



- Liability cash flow
- Expenses, taxes and capital costs
- Replicating portfolio cash flow

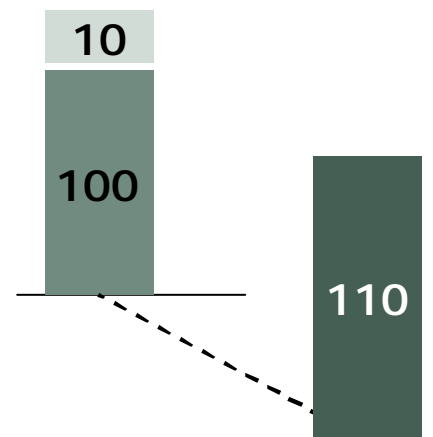
Replicating portfolio = combination of tradable instruments whose cash flows match best liability cash flows as well as expenses, taxes and capital costs

Economic value of liabilities = market value of replicating portfolio



Economic value of liabilities: simple example

- One-year contract with
 - expected claims: 100
 - expenses, taxes and capital costs: 10



- Replicated with risk free zero bonds paying 110 at maturity

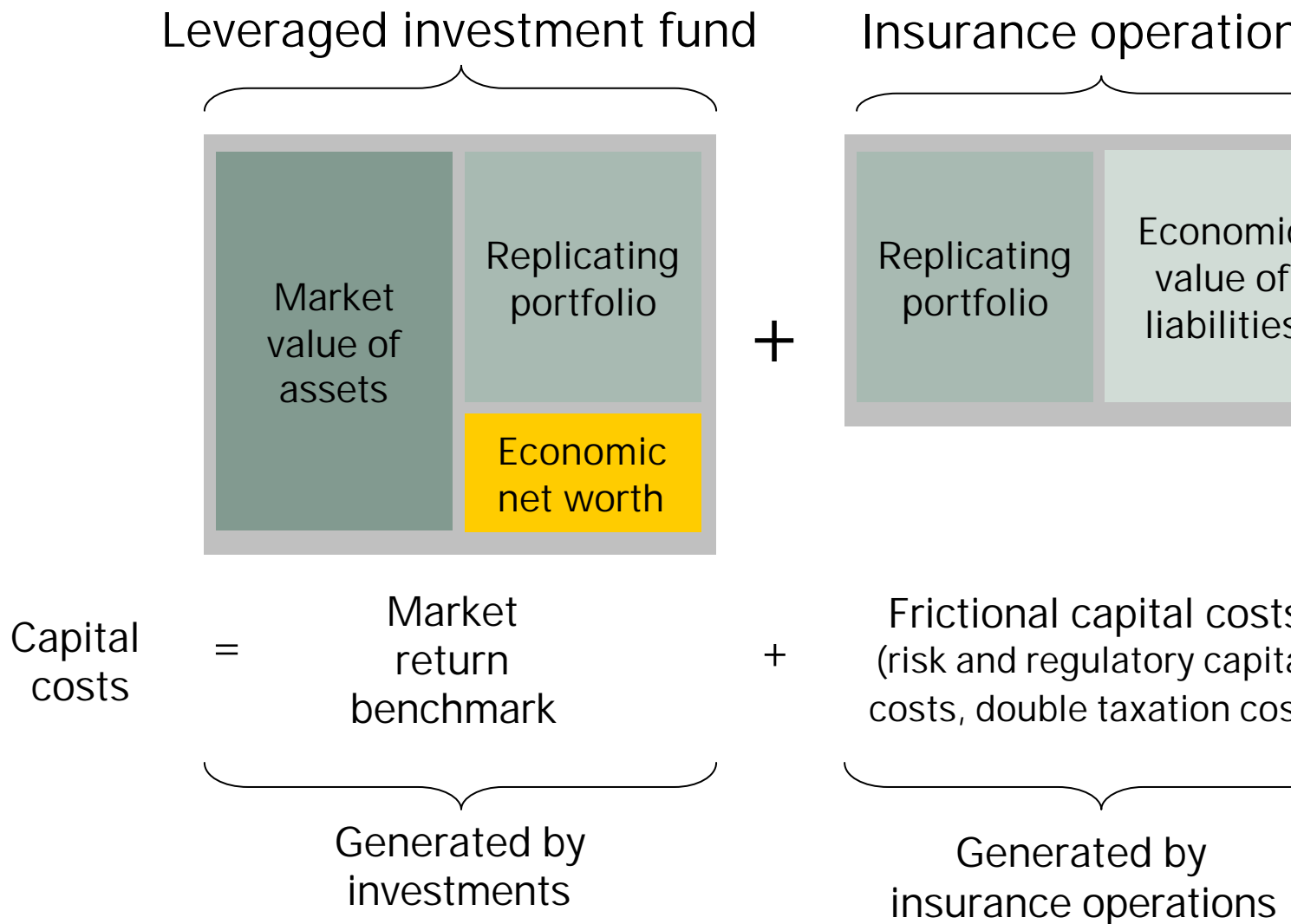
- Economic value = discounted value at risk free rate (eg 2%)
 $= 110 / (1 + 0.02) = 107.8$



Discount



Capital costs





Income statement (simplified)

Accounting view

- + Premiums earned
- + Investment income
- + Realised capital gains

- Claims paid
- Increase in reserves
- Expenses incurred

= Result before tax

- Taxes

= Profit after tax

Economic view

- + Premiums written
- + Total investment return

- Claims paid
- Increase in econ. reserves
- Expenses incurred

= Econ. result before tax

- Taxes

= Econ. result after tax

- Capital costs

= Economic profit



Agenda

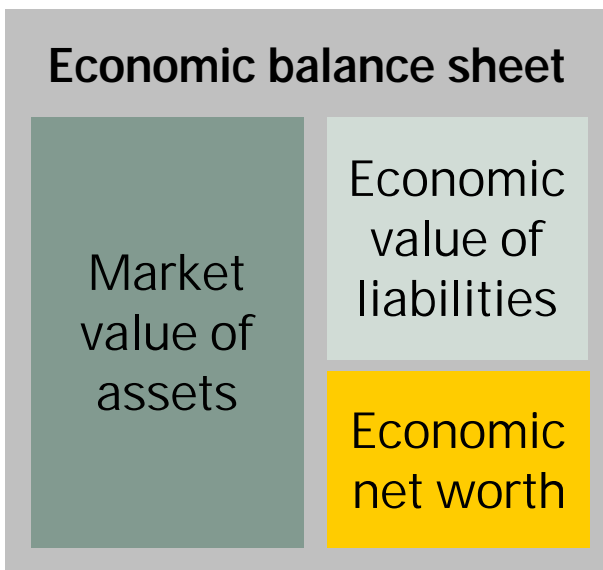
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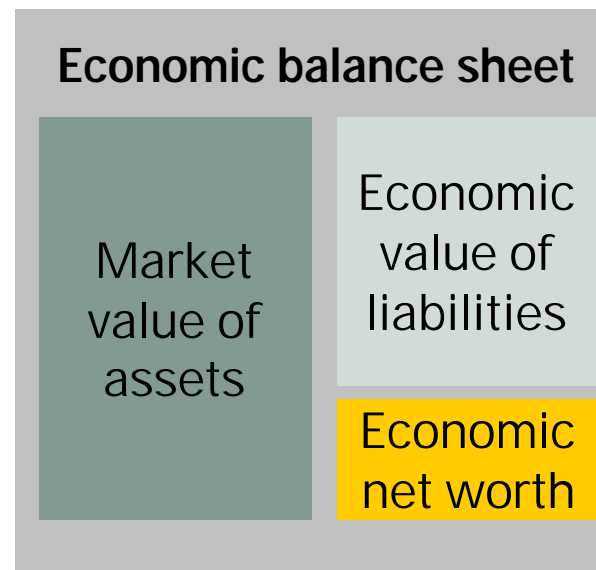
Risks and assessment of risks

- Assets and liabilities as well as the income statement are exposed to various risks
- The economic view is the basis for risk assessment

Today

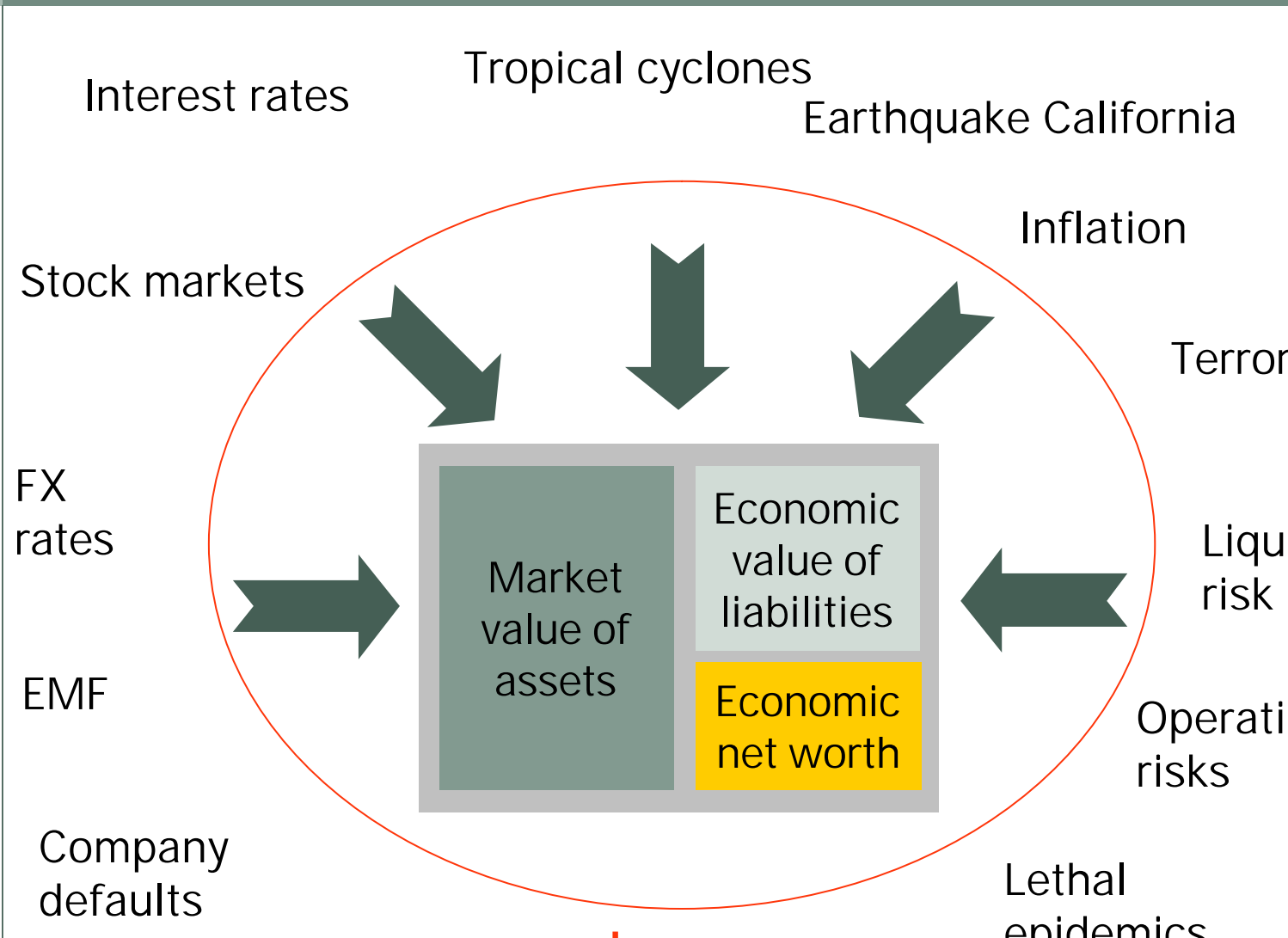


Tomorrow





Risk identification





Large risks for (re)insurers

- Catastrophic events
- Mistaken trends – misjudging price cycles
- Bad investments

Questions:

- Has the world changed?
- Are there new risks?
- Are the new risks comparable to risks we had in the past?



New risks for (re)insurers?

vJCD –Hospital Crisis

Nanotechnology

Pervasive Comp

BSE

Terrorism

EMF

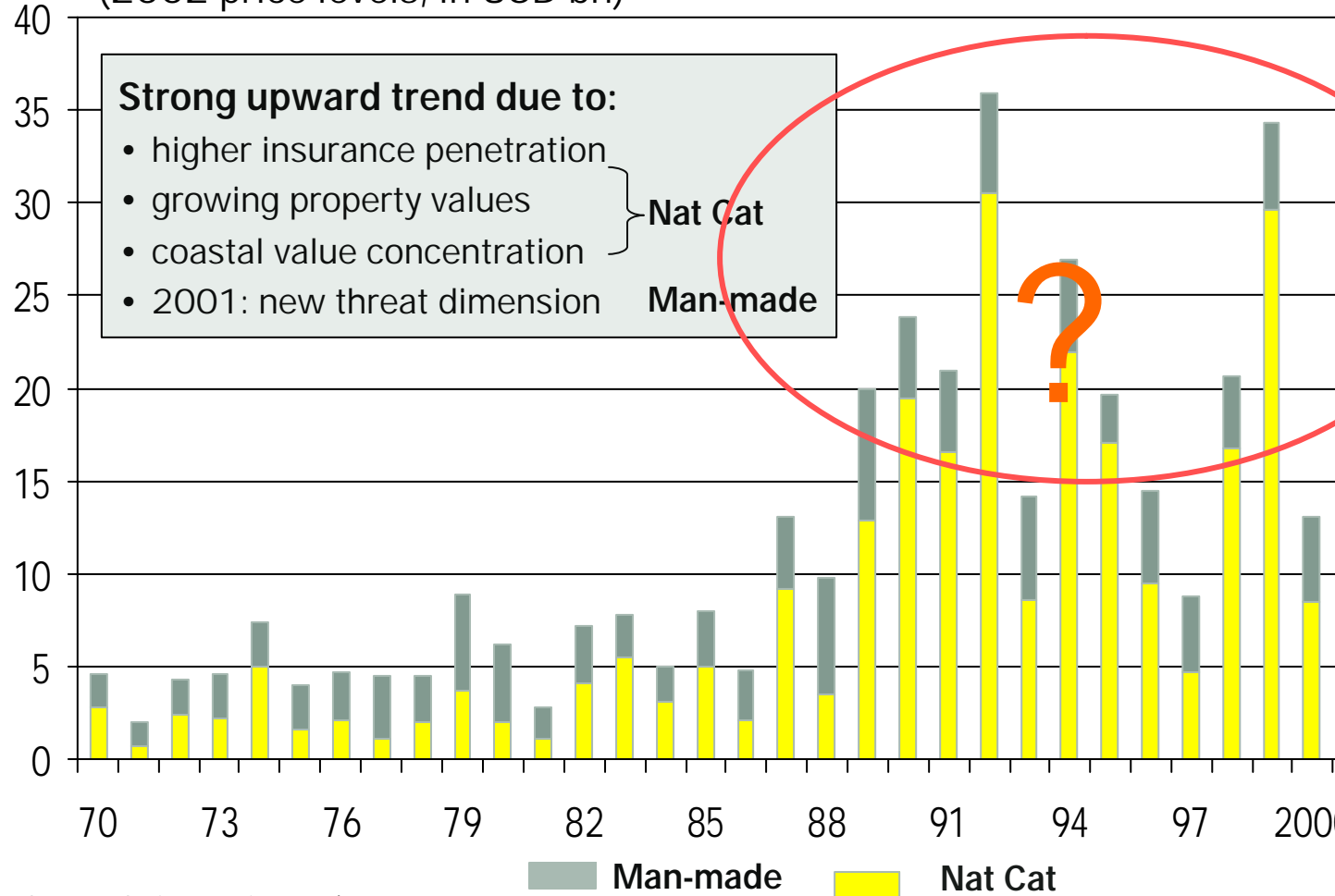
GMO



Losses caused by natural and man-made catastrophes

Trend?

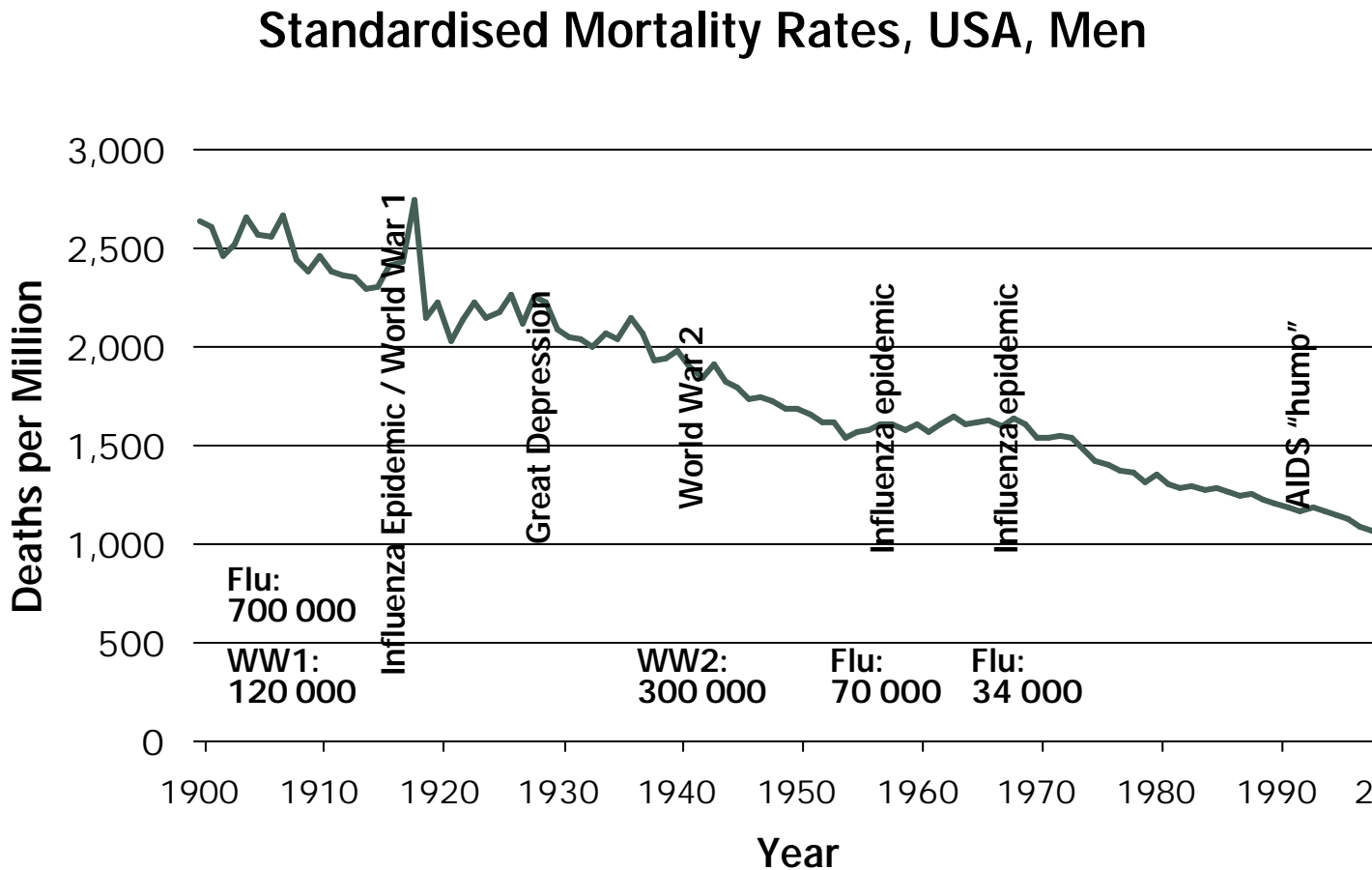
Annual insurance cat. losses 1970-02 (Property/BI) worldwide (2002 price levels, in USD bn)





Life & Health insurance: mortality trend in U.S.A.

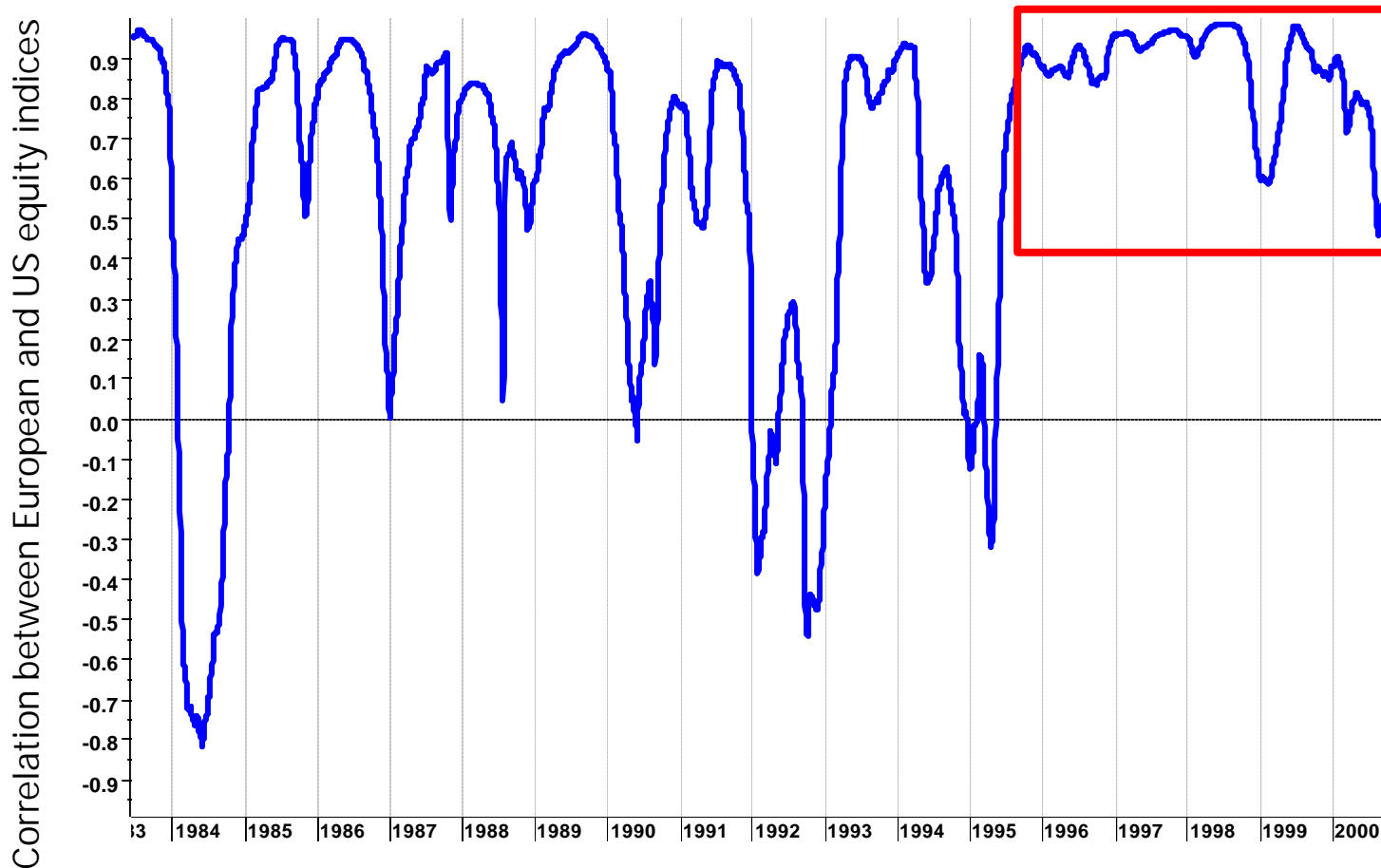
Trend?





Globalisation leads to increased correlation between financial markets

Example: correlation between US & Europe

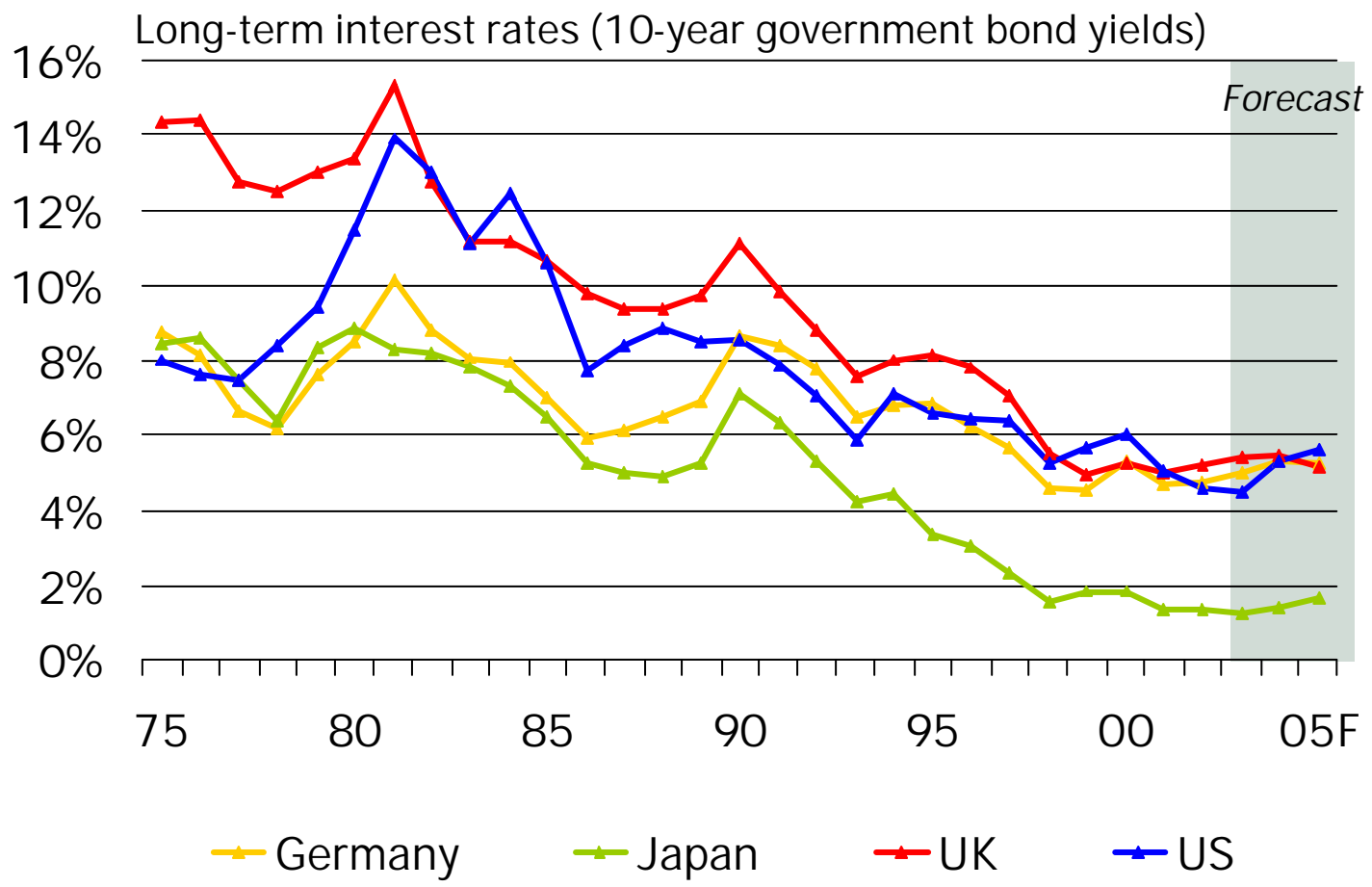


rend?



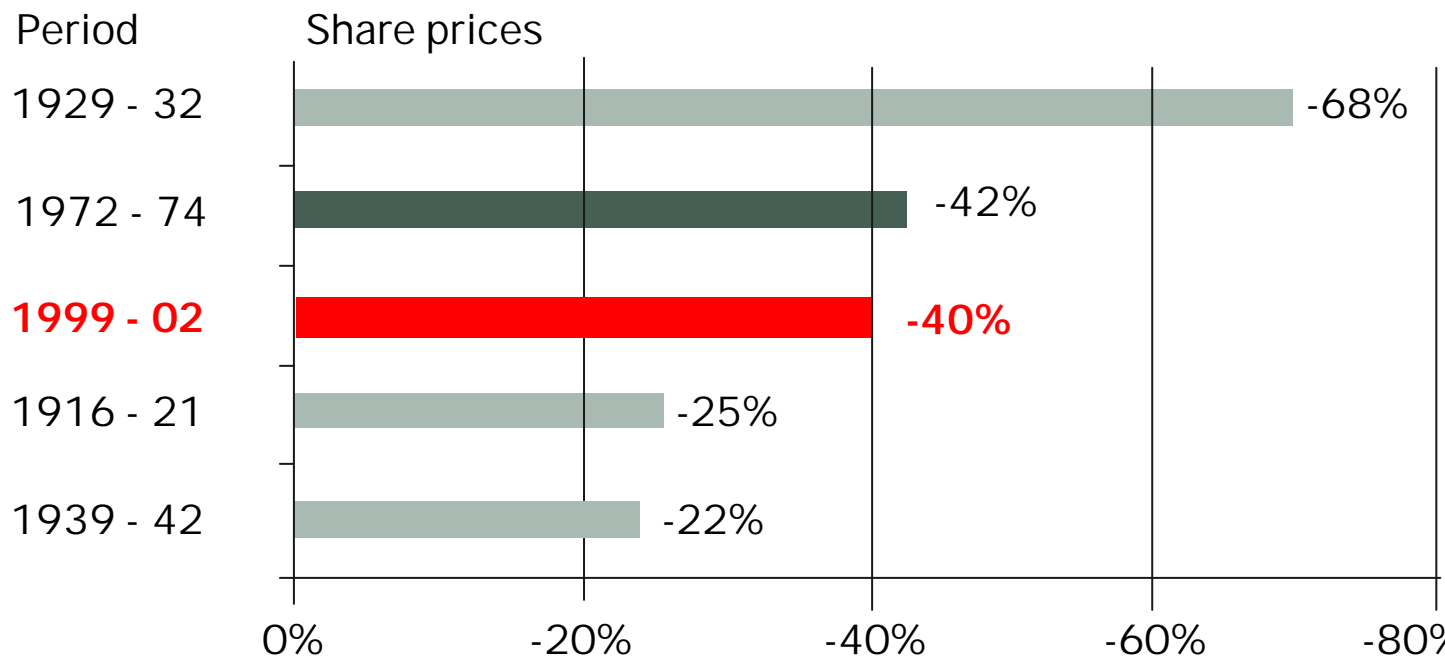
Interest rates are low – for how long will they remain low?

rend?





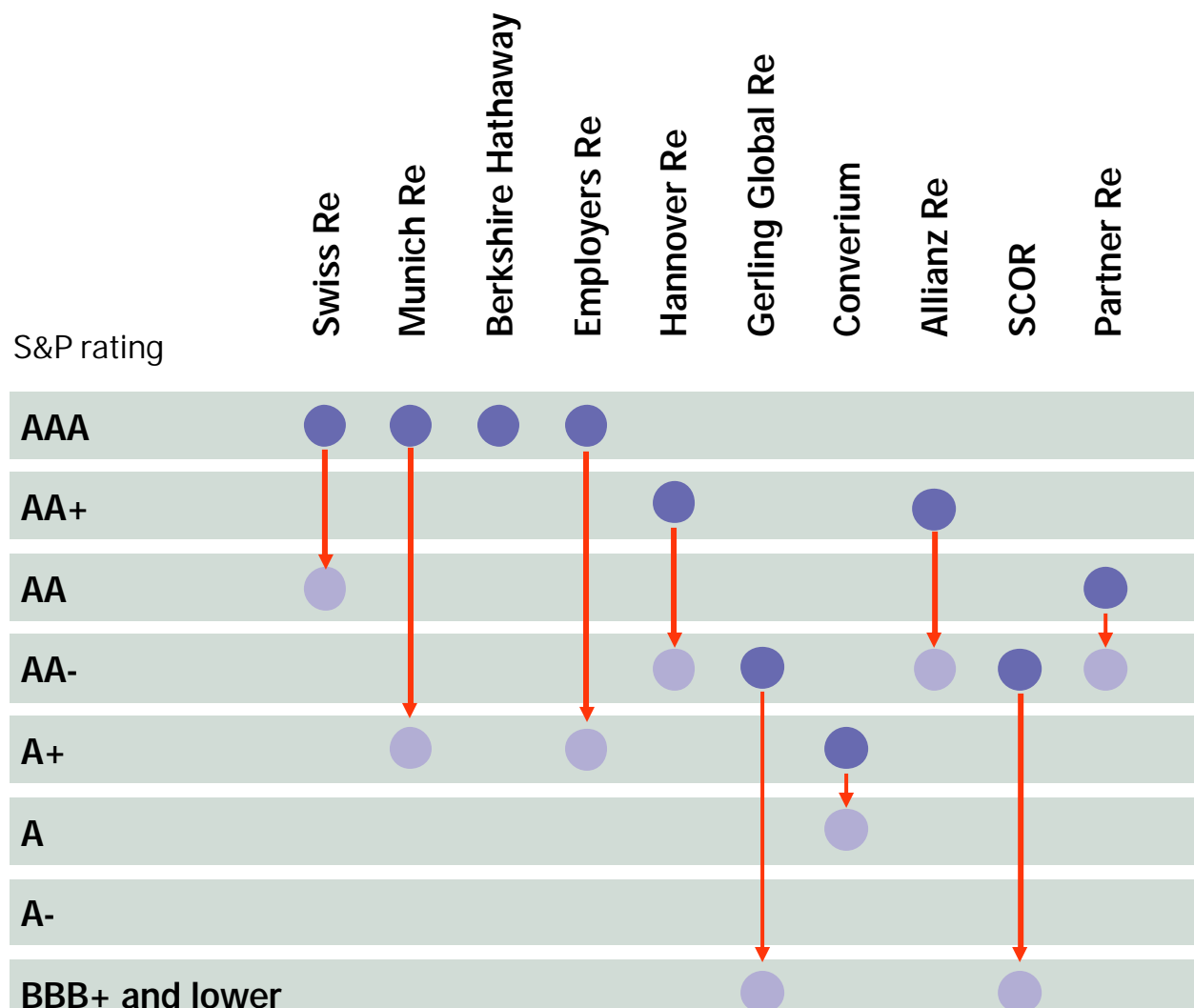
Example: Prolonged bear market



Only two stock market crashes in 100 years were more severe than the recent



Reinsurer rating downgrades 2001-2003





Risk definition

- There is not a single definition for “risk” that is consistently used in the industry
- Risk is used as one element to describe unknown future events
- In the finance industry risk describes the unexpected event, i.e. the deviation (positive or negative) from the expected outcome
- Risk should be distinguished from uncertainty



How does risk materialize?

Earning targets not achieved

undesirable

Impairment of shareholder value

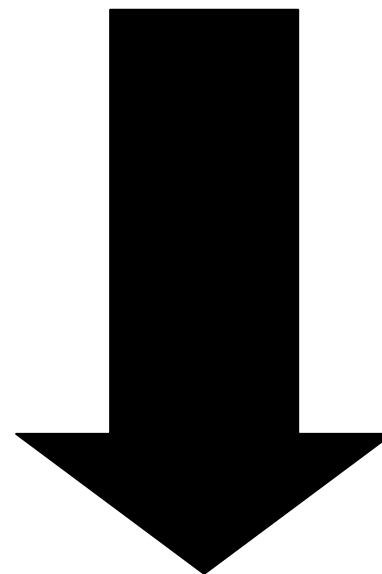
Loss of market share

Downgrading

Capital base not sufficient

Default

catastrophic



- ➡ Differentiate between different risk potentials
- ➡ Compare the different risks
- ➡ Establish an enterprise-wide integrated view



Goals of risk management

- The art of risk management is to find the right balance between the opportunity to take risk and create value for the firm and the threat risk poses to the survival of the firm

- Challenge:
 - common risk culture
 - complete and accurate assessment of risk
 - quantitative assessment of risk



Risk management philosophy: The three pillars

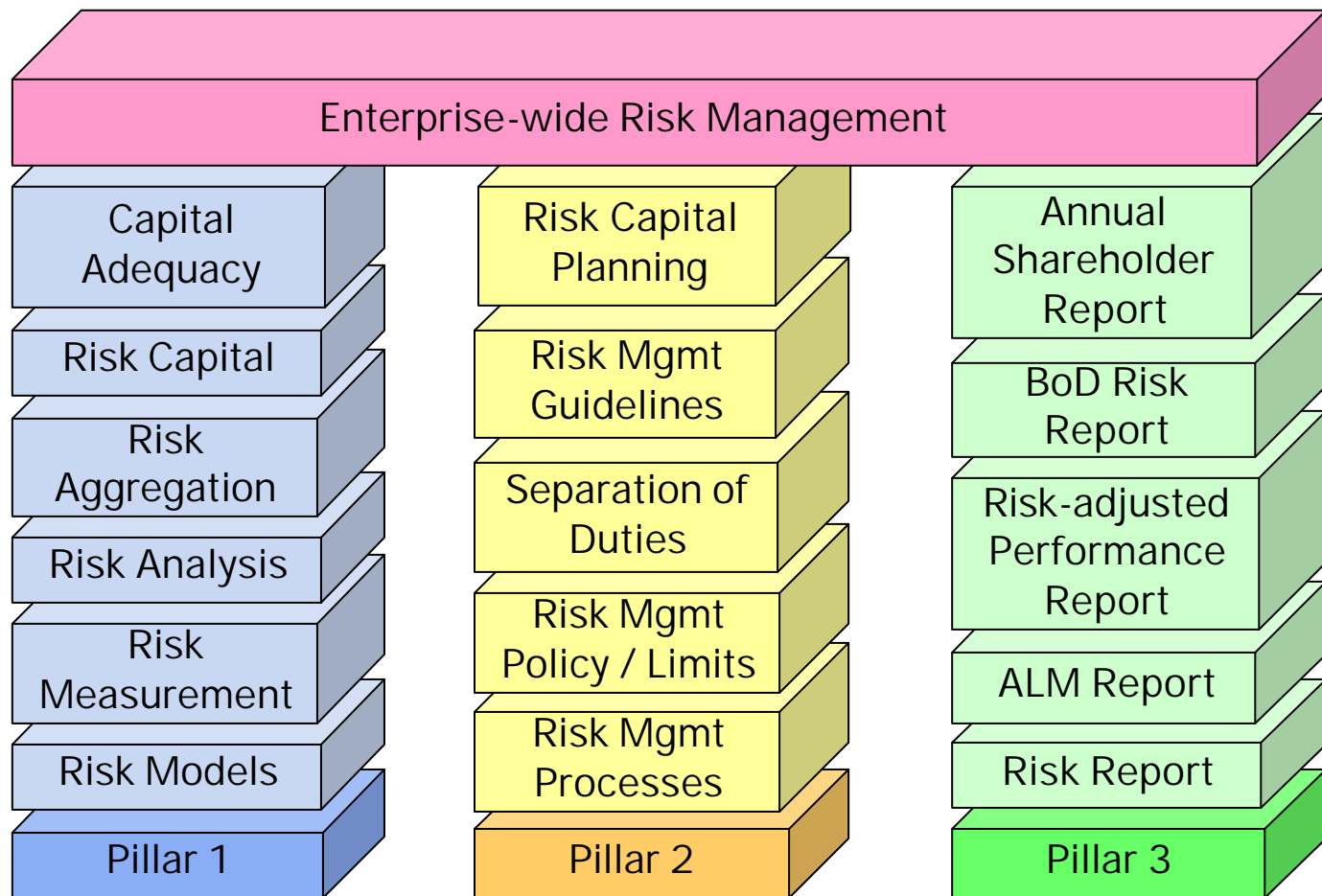
- Pillar 1 - quantitative risk measurement
 - systematic determination of total risk and the contributions of individual risk sources

- Pillar 2 - clearly defined risk management processes, incl. organisation as well as roles and responsibilities
 - common understanding of risk management function and basis for implementing and monitoring risk management policies

- Pillar 3 - transparency, which leads to proper behaviour, promotes mutual understanding, trust, and discipline in taking risks
 - confidence in the risk management organisation



The three pillars (illustrative)



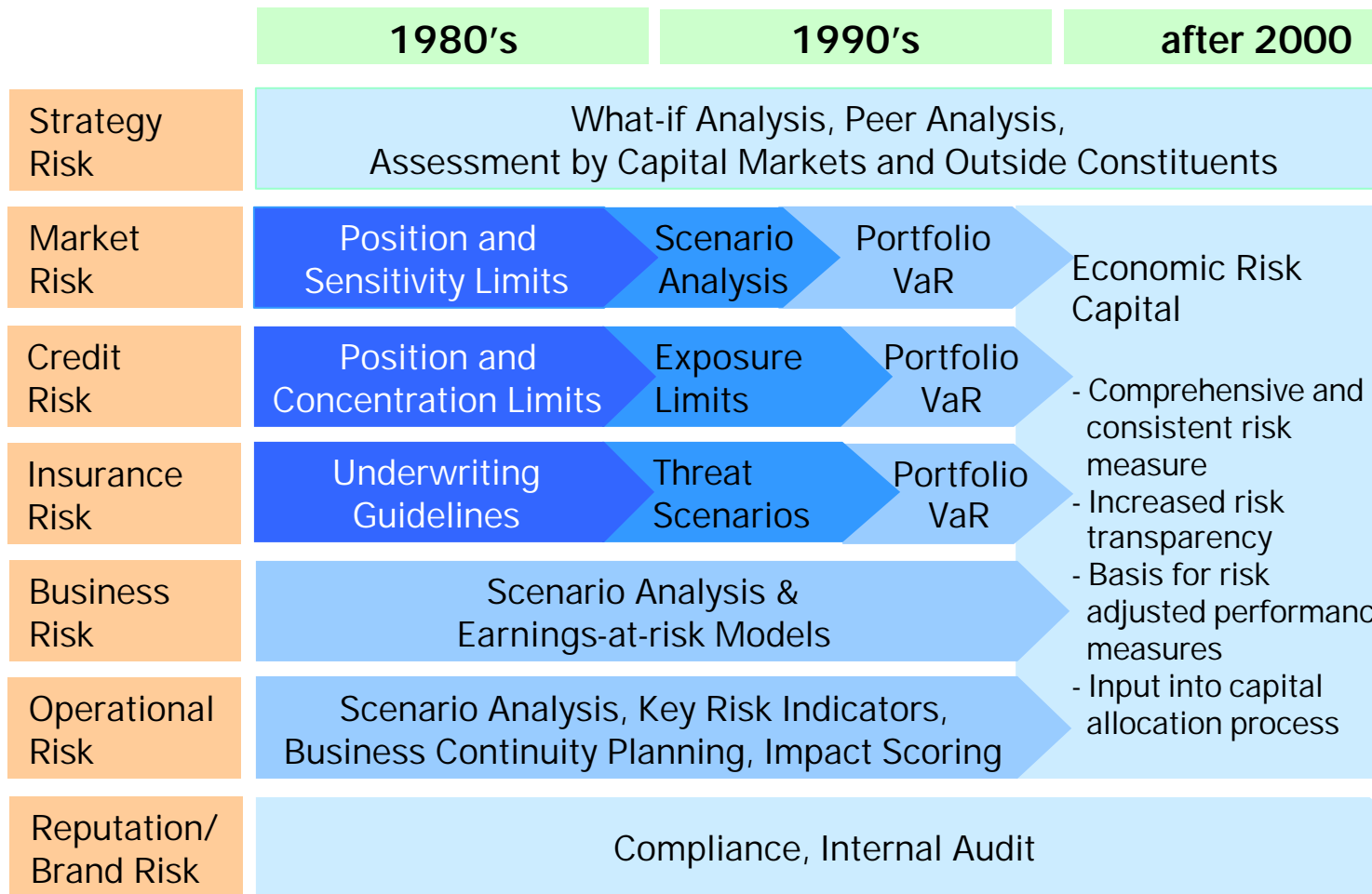
Quantitative Risk Measurement

Processes, Roles, Responsibilities

Transparency

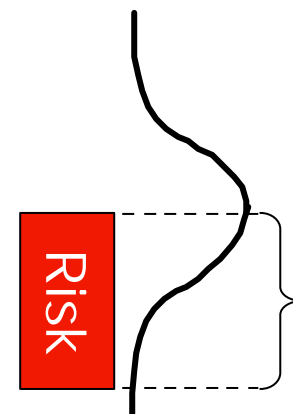
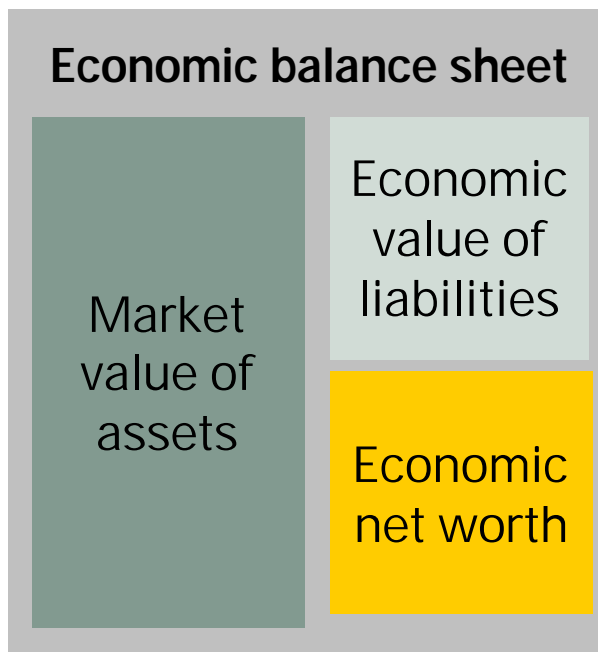


Quantitative methods - Industry best practice



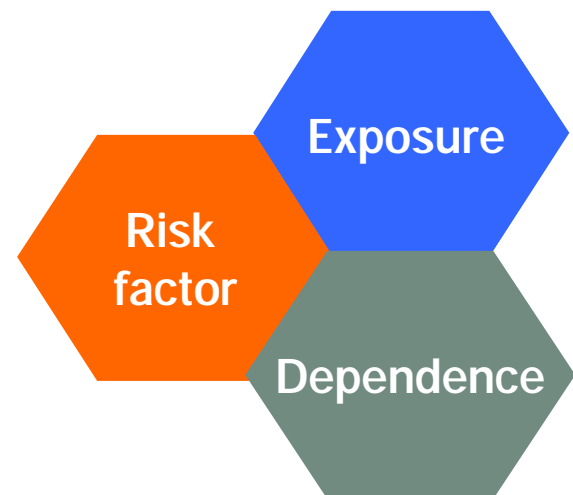
Risk measurement

- Risk is measured as unexpected loss of economic net worth within a given confidence level and time period
- Assets and liabilities are affected in various ways by the individual risk factors



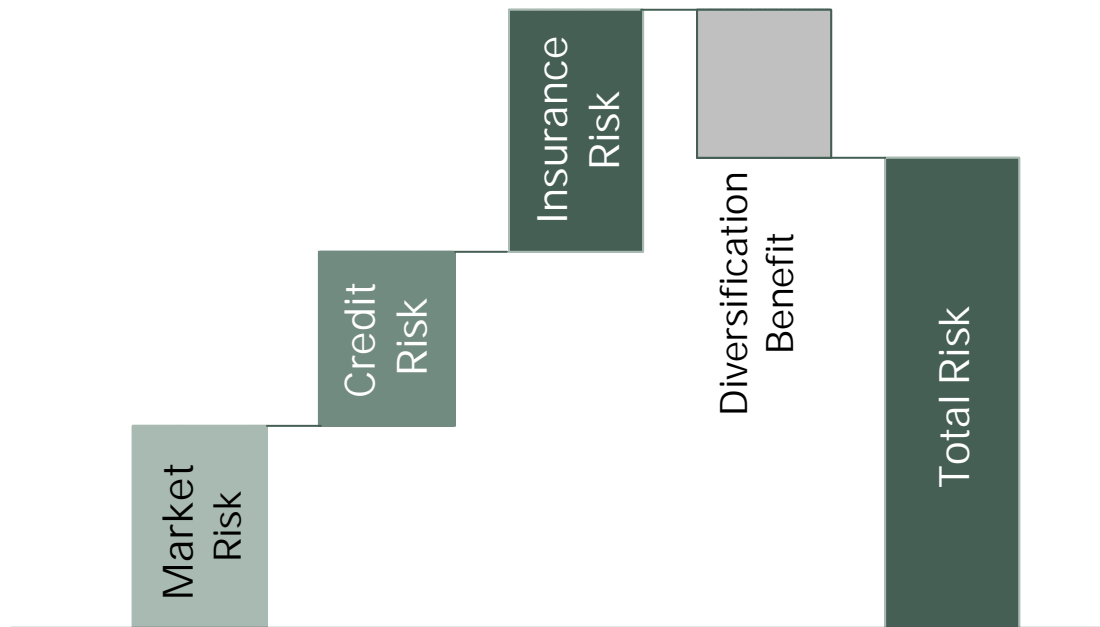
Risk modelling

- Stochastic modelling of risk factors, eg S&P 500, yield curves, loss frequency
- Dependency structure among risk factors, eg between equity markets, between credit and capital markets
- Exposure data, eg exposure per business unit to each risk factor





Risk aggregation and diversification



- Risk aggregation takes into account diversification effects



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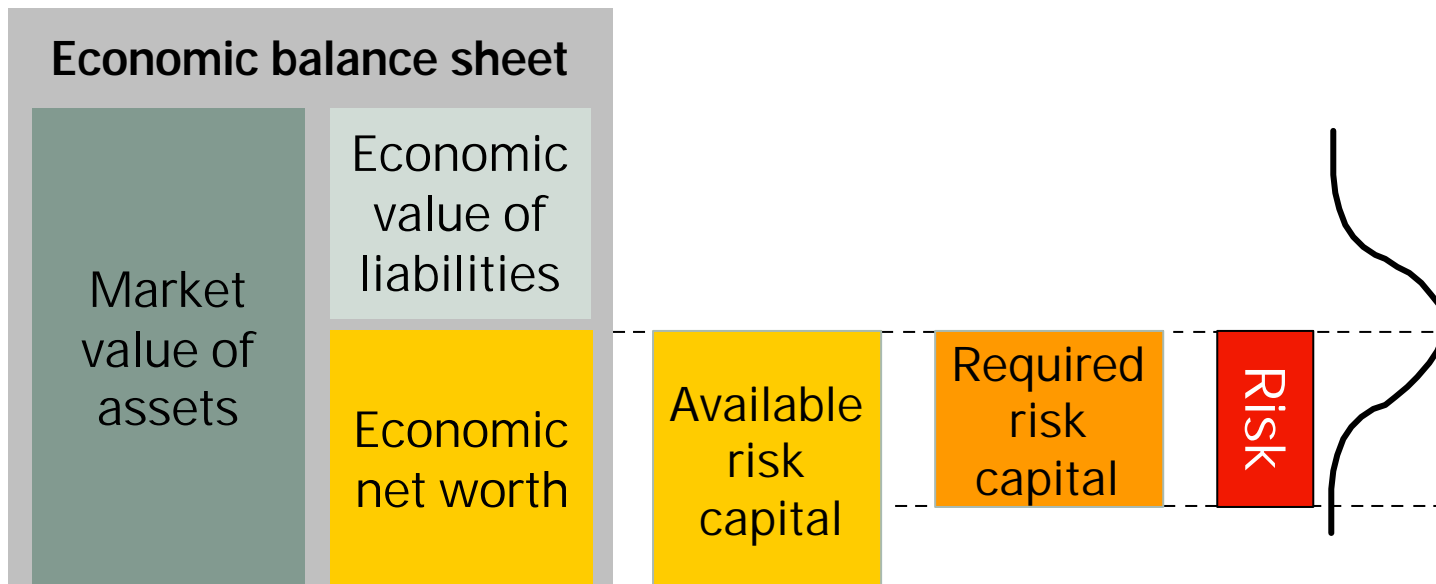
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From risk to risk capital

- Risk quantification allows for
 - risk monitoring and reporting
 - risk controlling and limiting

- Risk capital is needed to absorb unexpected losses



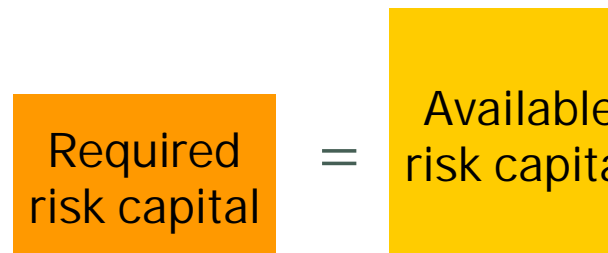
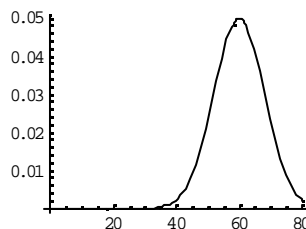
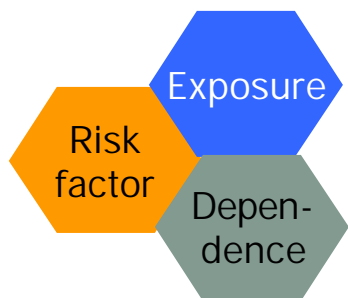


Objective of enterprise-wide and integrated risk management

- From an enterprise-wide and integrated risk management perspective a company needs
 - to clearly define its risk appetite with respect to the various risks it is or wants to be exposed to, and
 - to make sure that risk is managed so as to stay within the self-imposed boundaries
- Overall risk appetite needs to be defined to reflect the company's risk tolerance and the amount of available risk capital

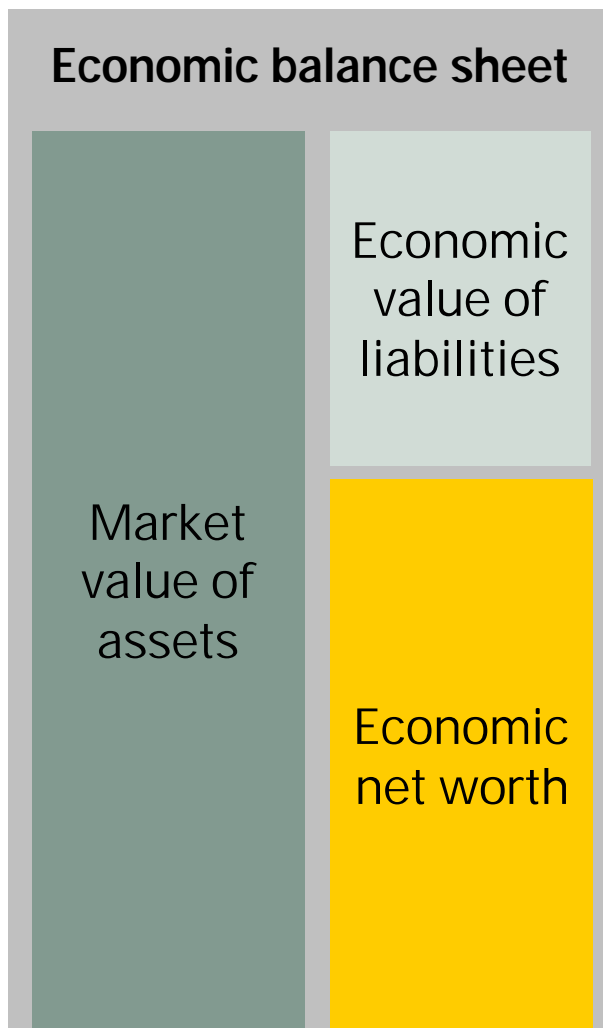


Required capital





Example: Swiss Re's risk adjusted capital (RAC)

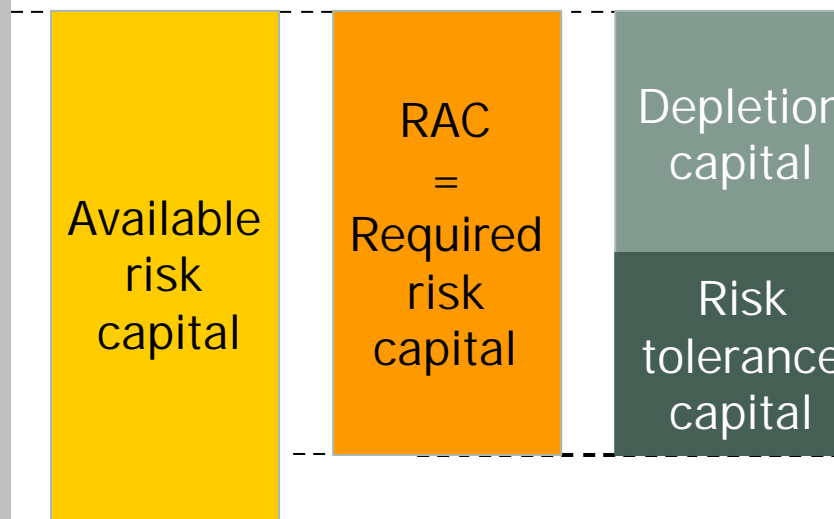


Depletion Capital

Average of the 1% worst economic outcomes (1% shortfall) within a business year

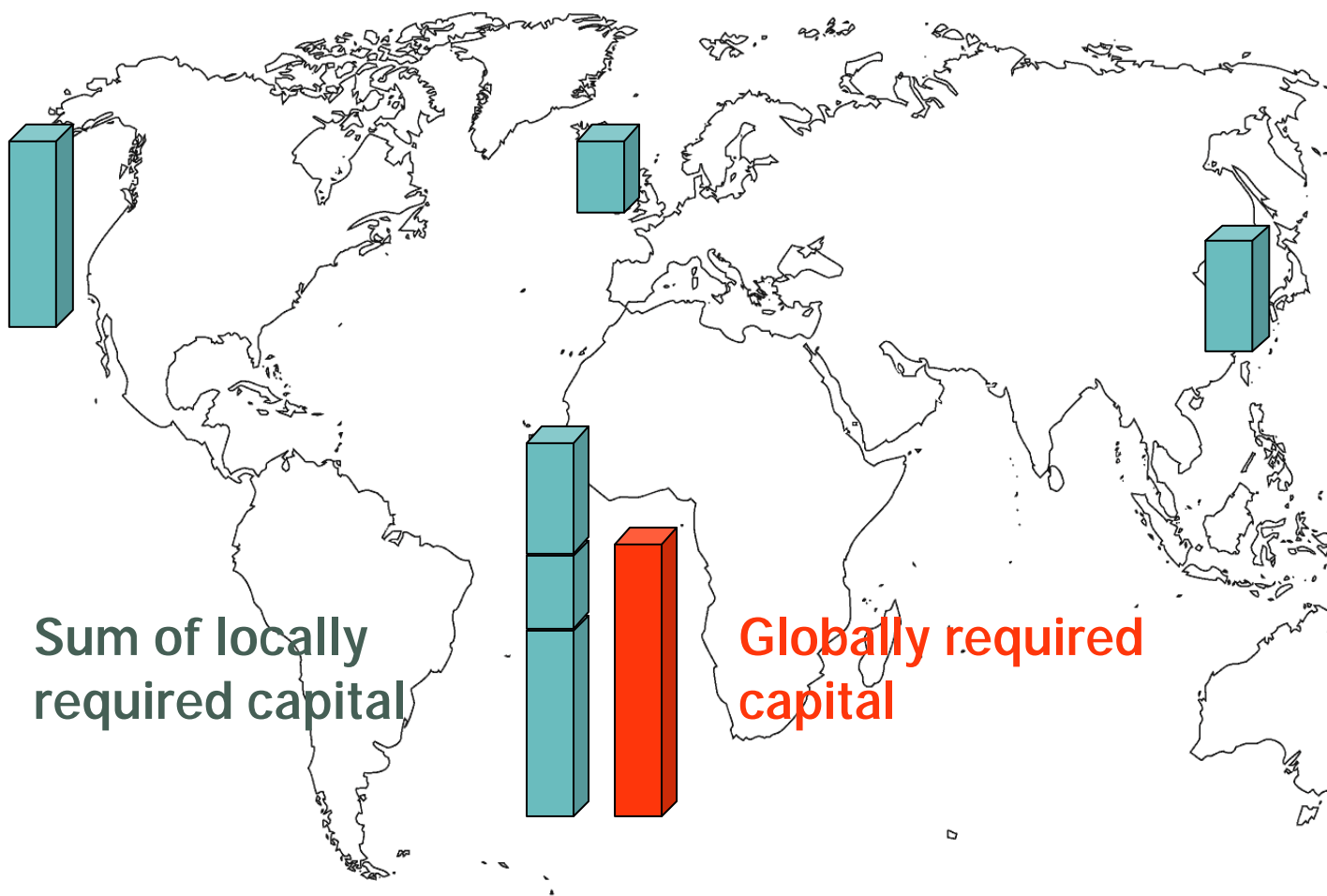
Risk Tolerance Capital

Capital required to withstand a second large event on a post-depletion book



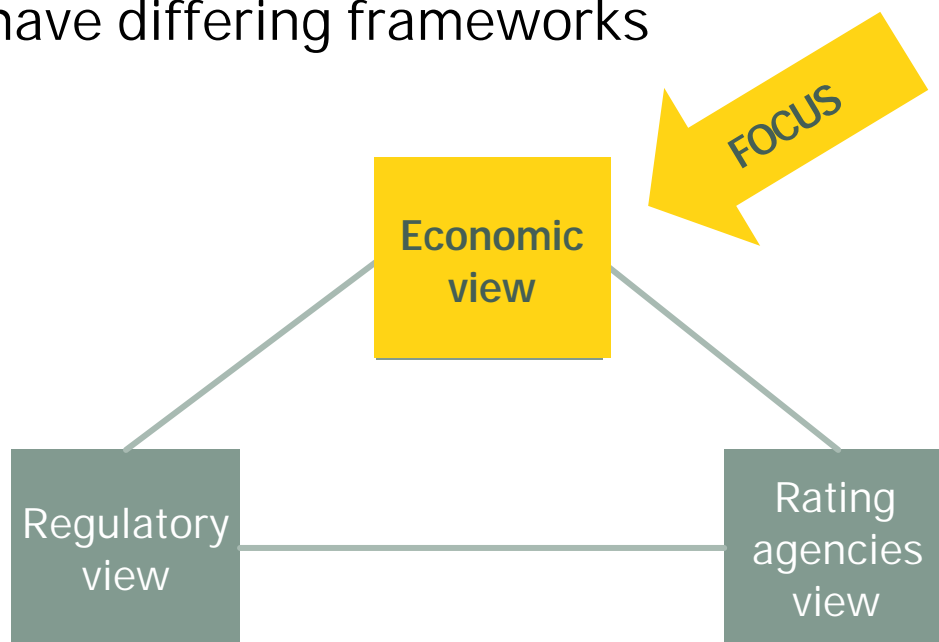


Diversification of risk capital



What is capital adequacy?

- A capital adequacy framework defines available capital (risk bearing capital) and required capital (economic risk capital)
- Different parties (regulators, management and rating agencies) have differing frameworks





Use of economic risk capital

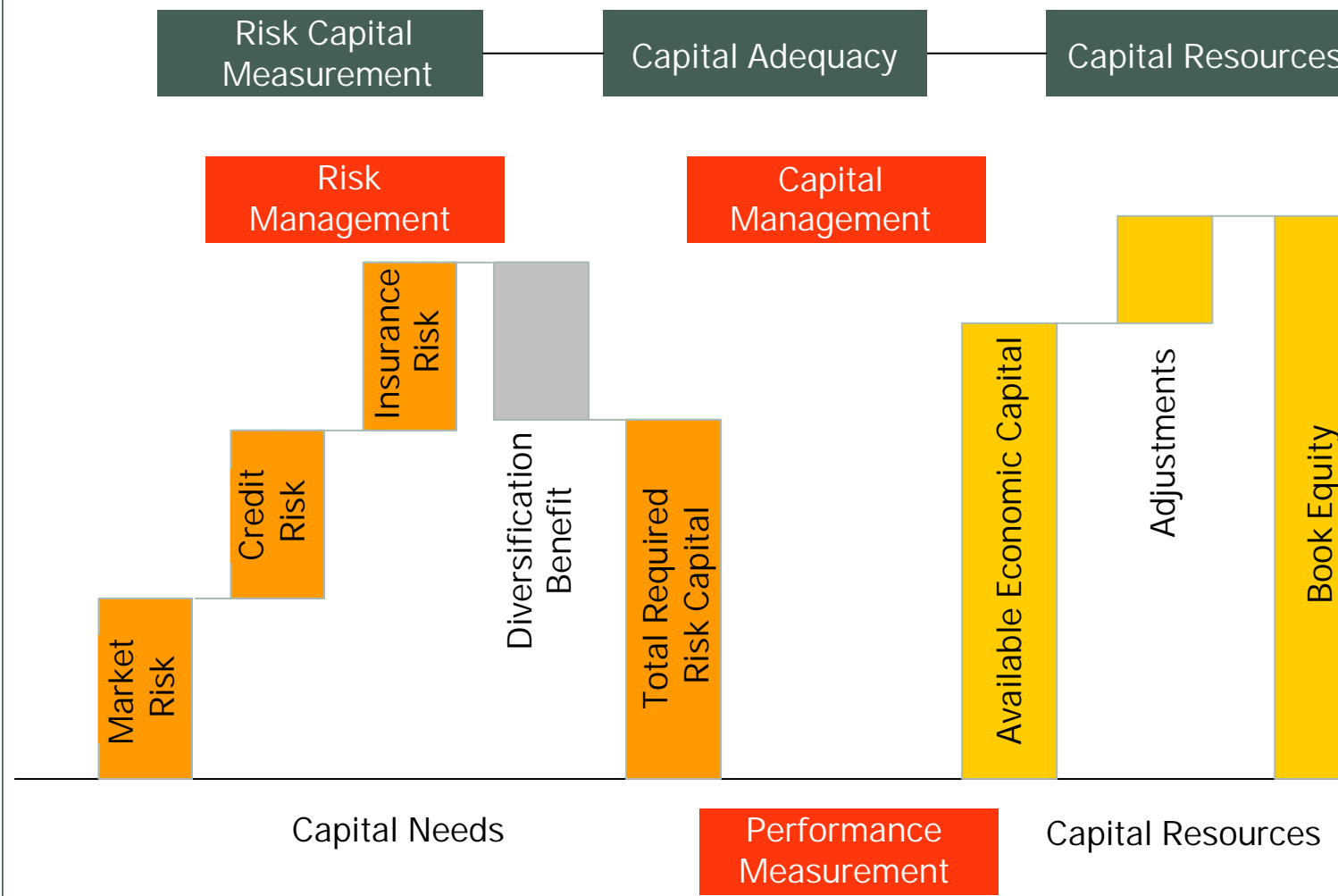
- Risk measure
 - stand-alone risk and diversified risk measure
 - risk monitoring
 - risk limits

- Capital measure
 - capital adequacy
 - capital allocation
 - capital management

- Performance measure
 - economic profit
 - capital costs



Economic risk capital applications





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Summary

- Overview of (re)insurance business
- Assets and liabilities of a (re)insurance company
- Economic view
- Risk management
- Economic risk capital
- Capital adequacy



Analysis of an Insurance Company's Balance Sheet

