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# Enterprise Risk Management

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Enterprise Risk Management in Context

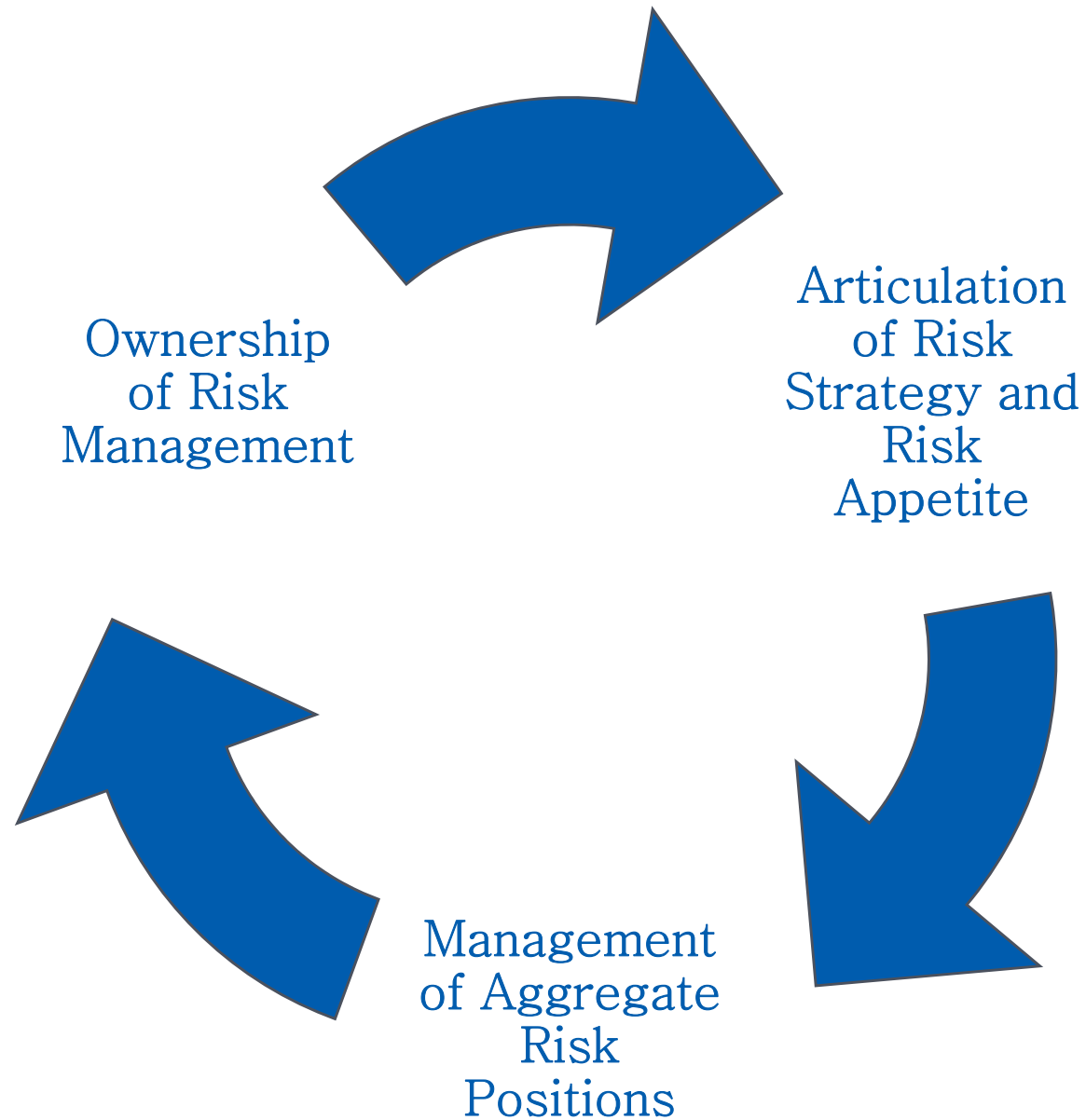
Risk Governance

Risk Appetite

Economic Capital Model

Implementation Issues

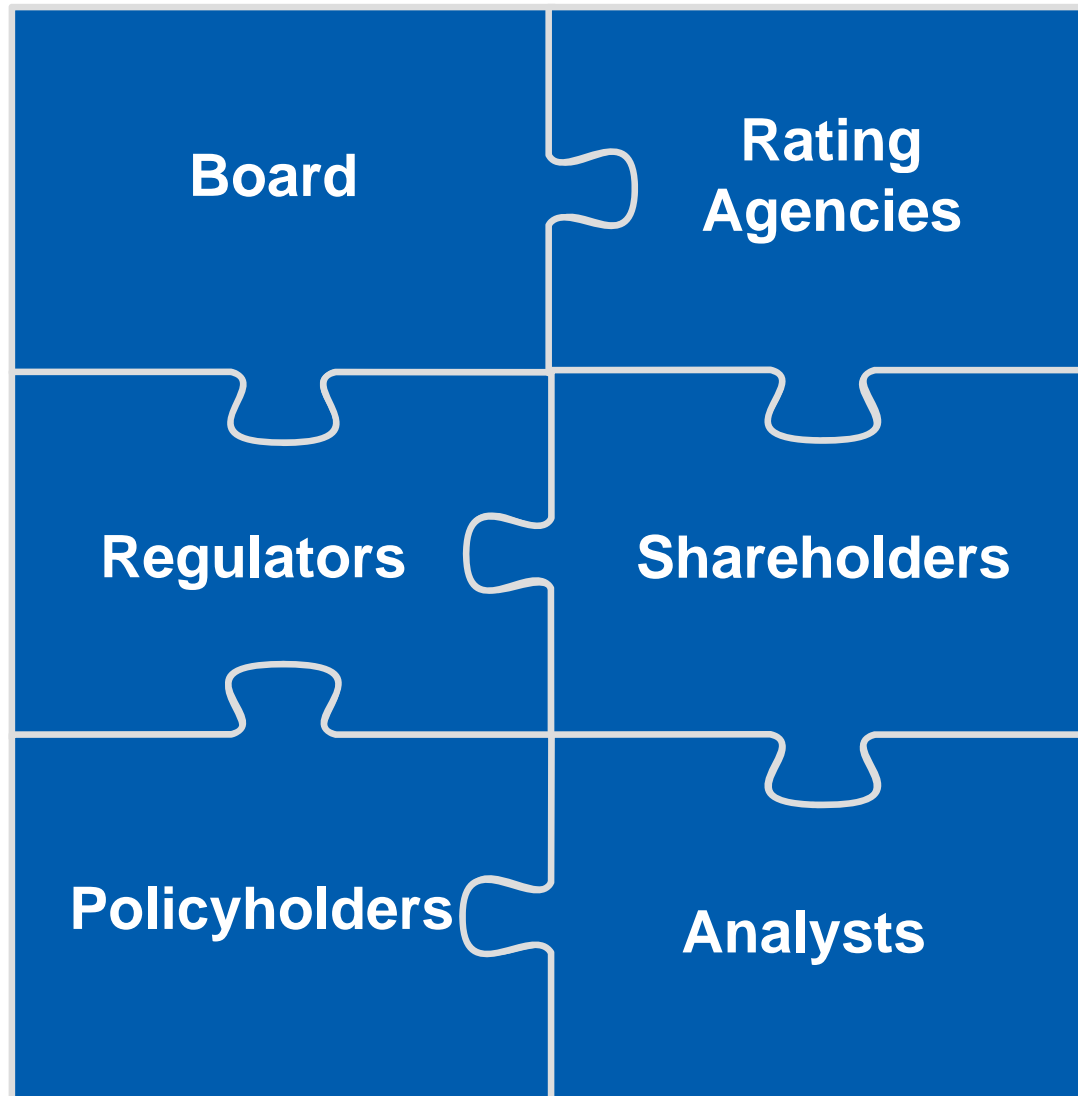
## Enterprise Risk Management in Context



### Increased complexity:

- Products
  - Variable Annuities with guarantees (GMWB, GMAB, etc.)
- Risk mitigation tools
  - Life insurance securitizations
  - Longevity bonds
  - Financial derivatives
- Investment opportunities
  - CDS
  - CDO, CDO<sup>2</sup>
  - Swaps, swaptions
  - CMBS

**ERM facilitates conscious risk-return decisions and minimizes the likelihood of surprises**

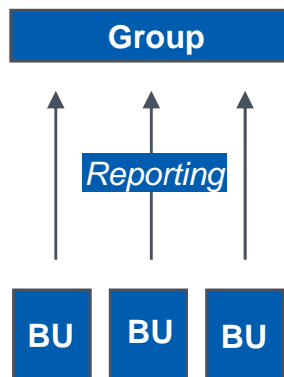


**What is the role of actuaries in ERM?**

## Risk Governance

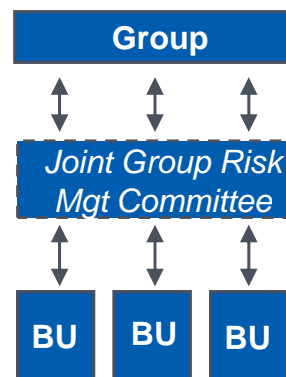
## Decentralized

- No centralized decisions making on risk and capital
- Full authority for business units
- ERM not possible



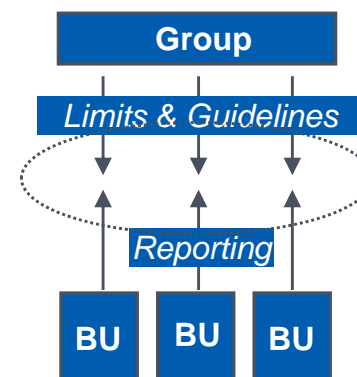
## Committee

- Committee structure with participation of business units



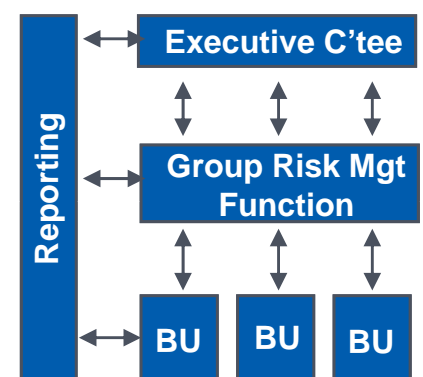
## Delegation

- Risk budgets are set centrally and allocated to business units
- Business units autonomous within the given limits

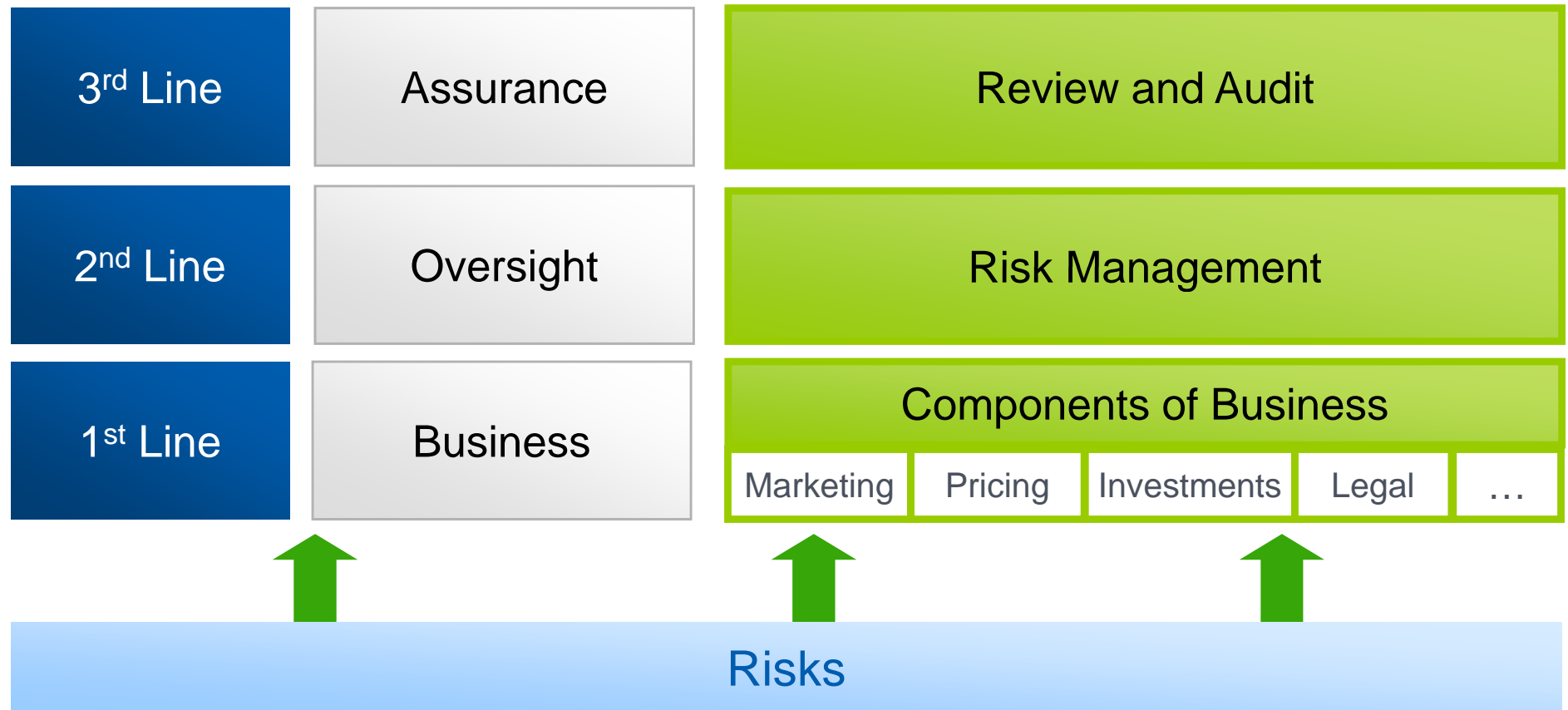


## Centralized

- Centralized decisions making on risk and capital
- Limited input from business units
- Common in large banks







Process facilitates conscious risk-return decisions and minimizes chances of surprises

## Increased speed of risk

- Dynamic hedge programs (managed daily)
- Market value measurement (assets and liabilities)
- Options (assets and liabilities)

**The risk management structure and processes need to be tied to the speed of the underlying risks**

## Risk Appetite

*providing the  
promised benefit  
to policyholder*

*ability to pay out  
dividend*



*target rating*

*Shareholder  
return  
expectations*

*earnings targets  
and volatility*

Speed of the risk

Ability to price the risk

Correlation to other risks

Ability to exit or hedge the risk

Probability distribution of the risk (return, tail)

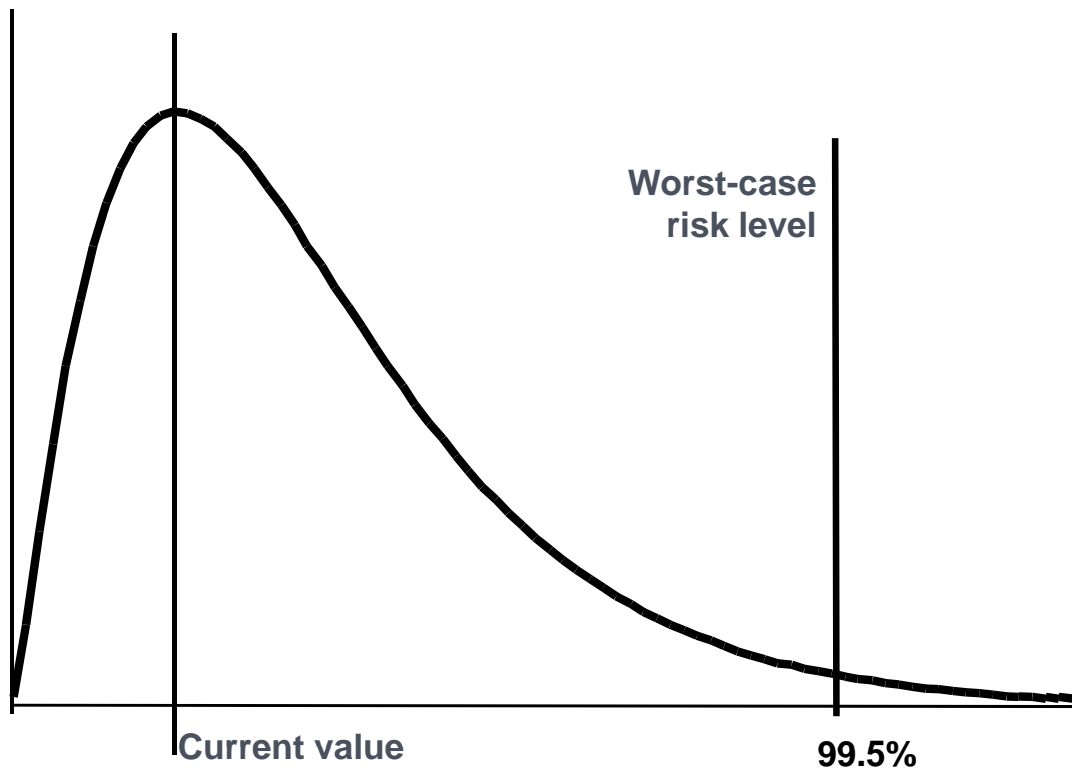
Experience in managing the risk



Risk Appetite by Risk Type

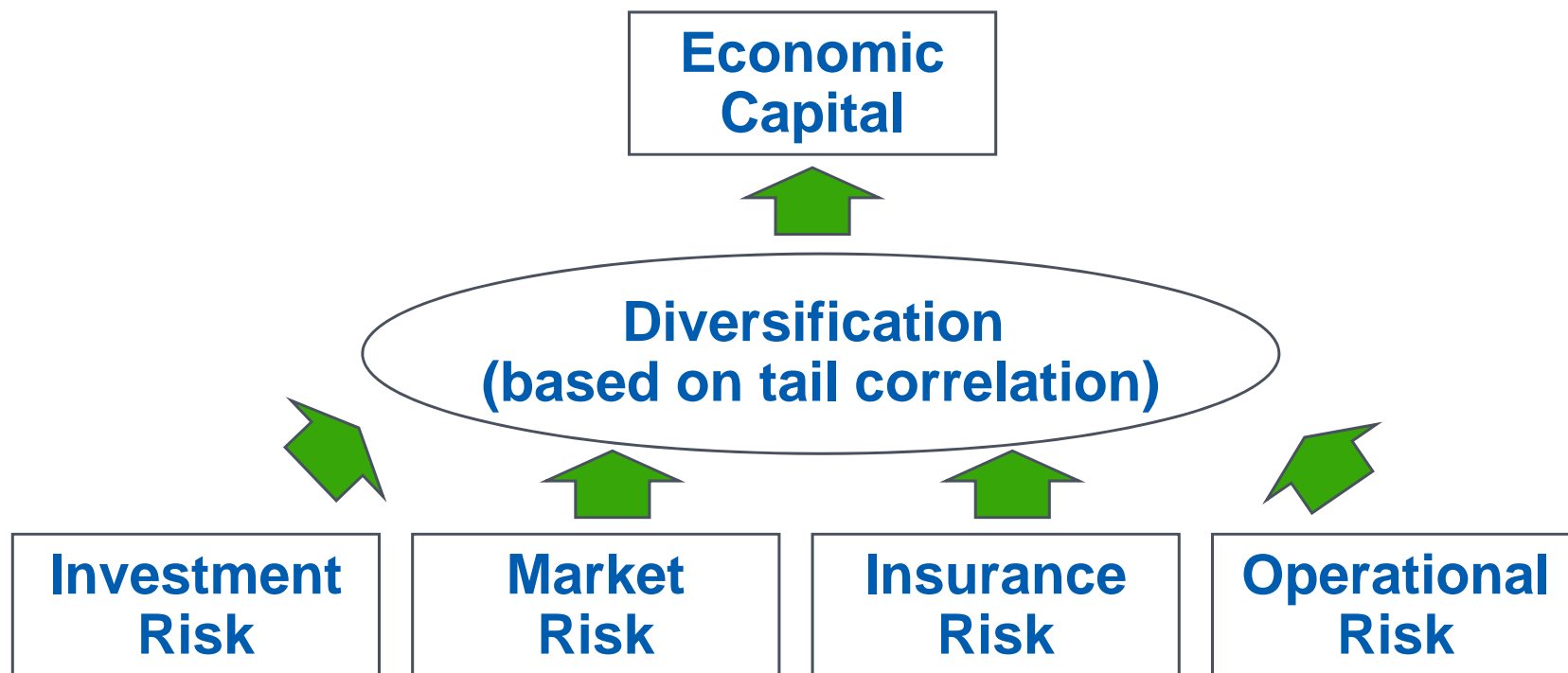
## Economic Capital Model

- o ERM requires a common metric for all risks such that exposures can be compared and aggregated



**Economic Capital is defined as the level of capital required to ensure some likelihood [99.5%] of economic solvency over a specified time horizon [1 year]**

- Applies to all risk (investment, market, insurance, operational)
- Allows for diversification benefits between risks
  - Within a risk type
  - Within a business unit between risk types
  - Between business units
- Tail correlation





## Implementation Issues

<b>Terminology</b>	<b>The whole enterprise needs to talk a common 'risk language'</b>
<b>Quantification of Operational Risk</b>	<b>Internal and external loss data Risk self assessments Scenario Analysis Key risk indicators</b>
<b>Computation Time</b>	<b>Stochastic valuations typically required Large amount of sensitivities required</b>
<b>Board Sponsorship</b>	<b>ERM requires risk decision authority at a centralized level in the company</b>
<b>Qualified Staff</b>	<b>Background in financial engineering, actuarial, audit / compliance (operational risk) Experience</b>



# Questions?

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