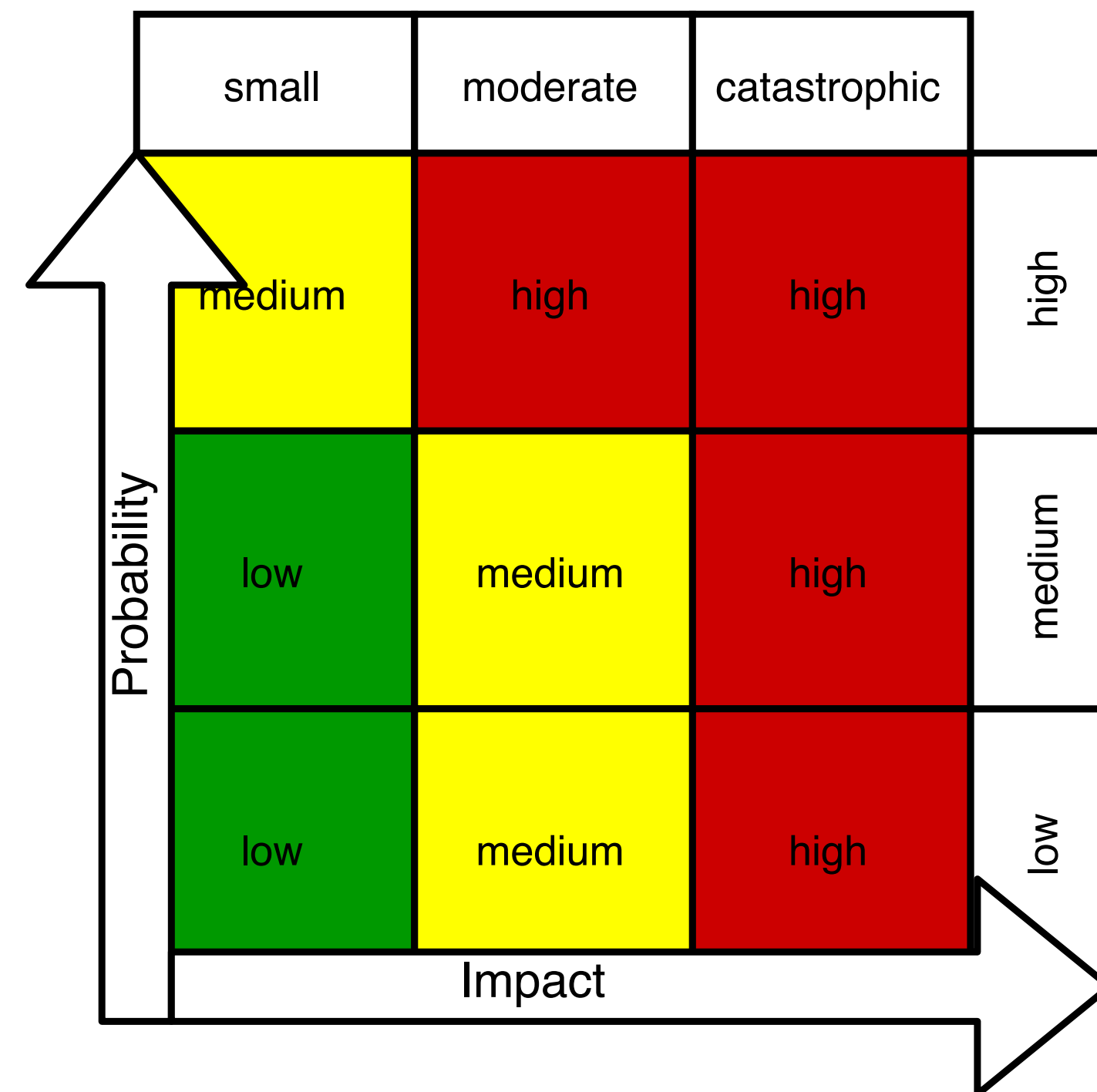


A Mutual Catastrophe Insurance Framework for the Prepositioning of Strategic Reserves

Hani Zbib,
Burcu Balcik, Marie-Ève Rancourt,
and Gilbert Laporte

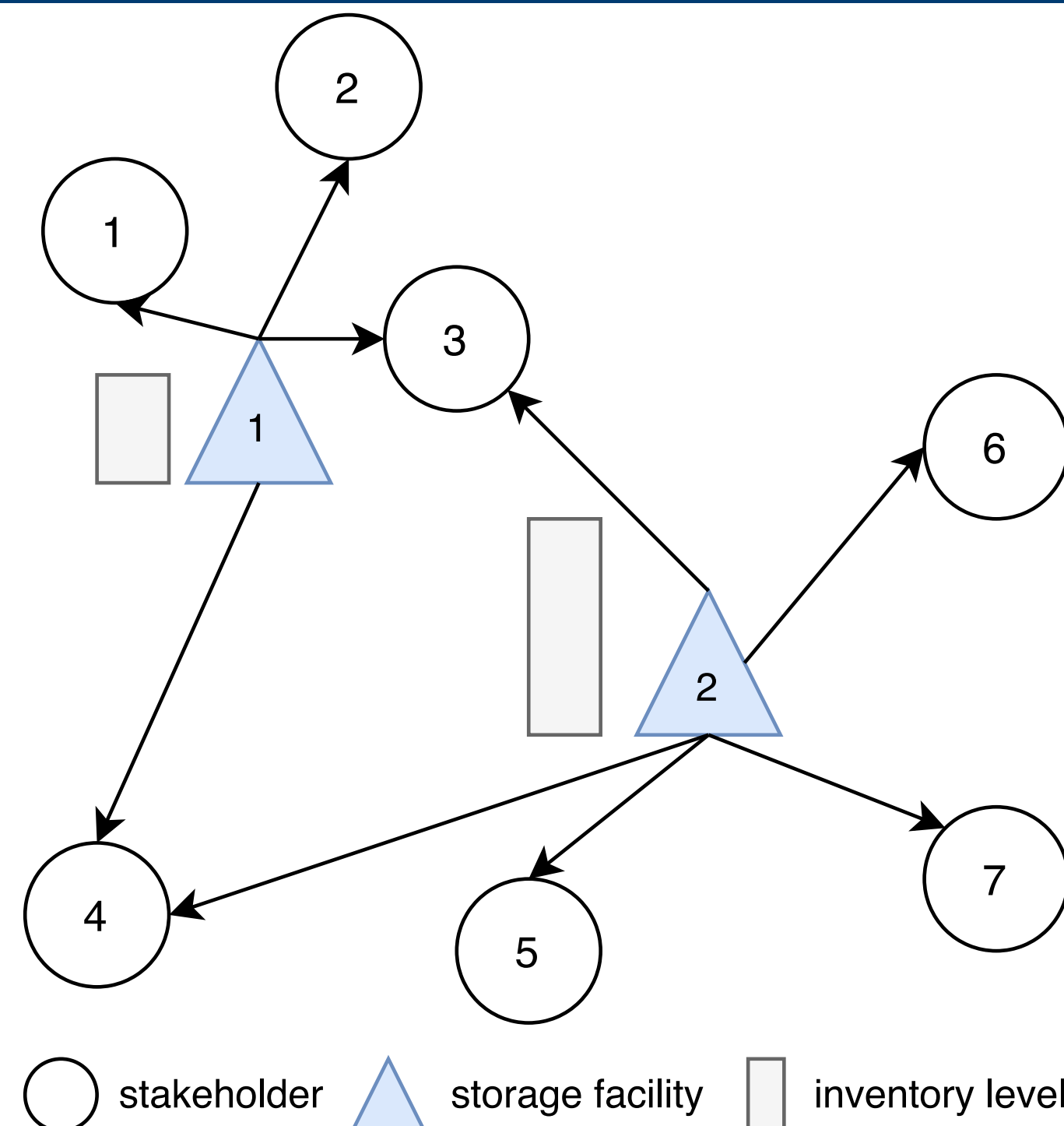
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Catastrophic risk



High impact disasters have a very high catastrophic risk

Prepositioning network



Horizontal collaboration = risk pooling benefits

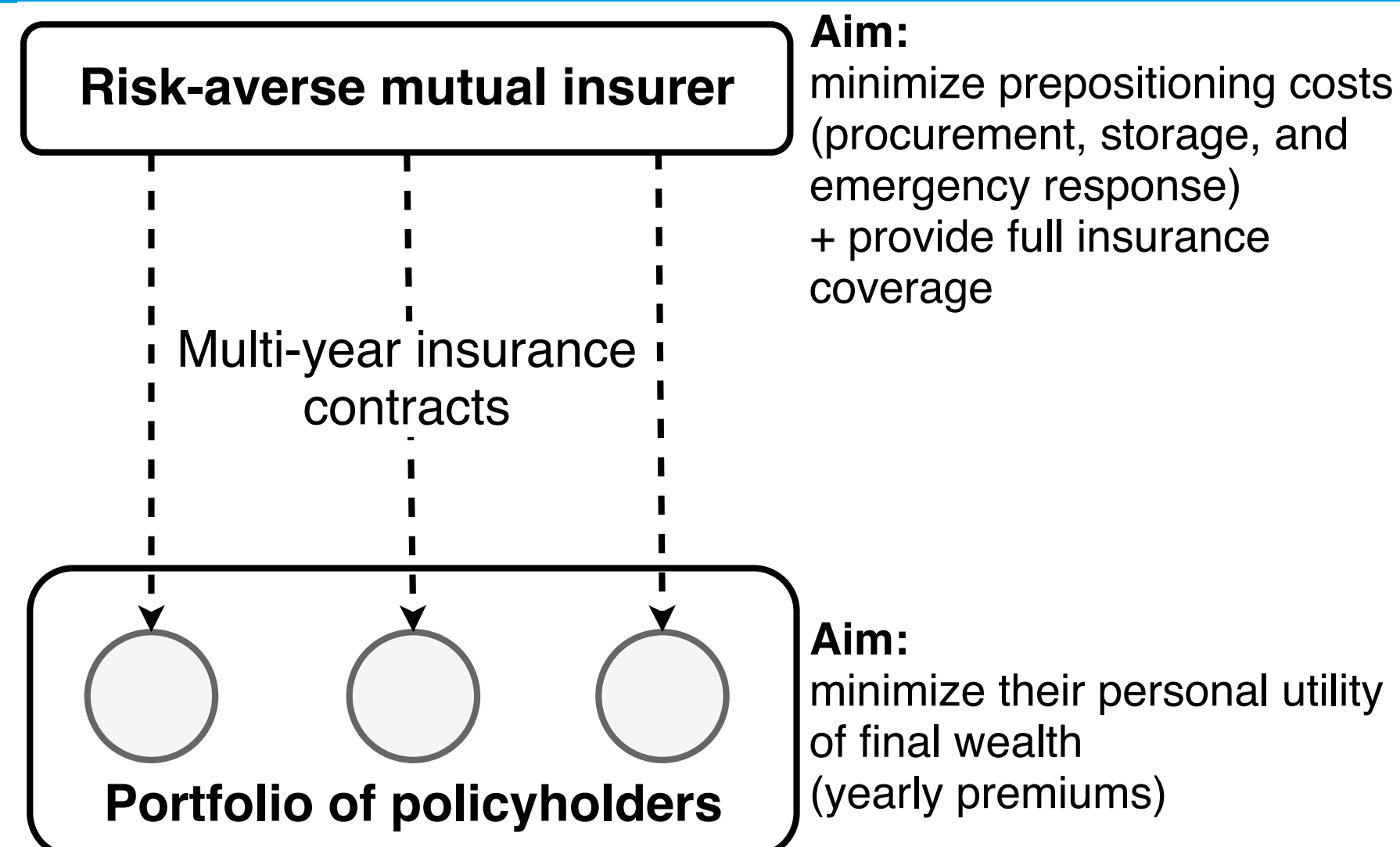
Requirements for a successful collaboration:

- Financial capital
- Logistical capacities
- Managerial expertise
- Umbrella organization

Research objective:

Systematically organize the logistical and financial functions of providing emergency response while ensuring an efficient horizontal collaboration

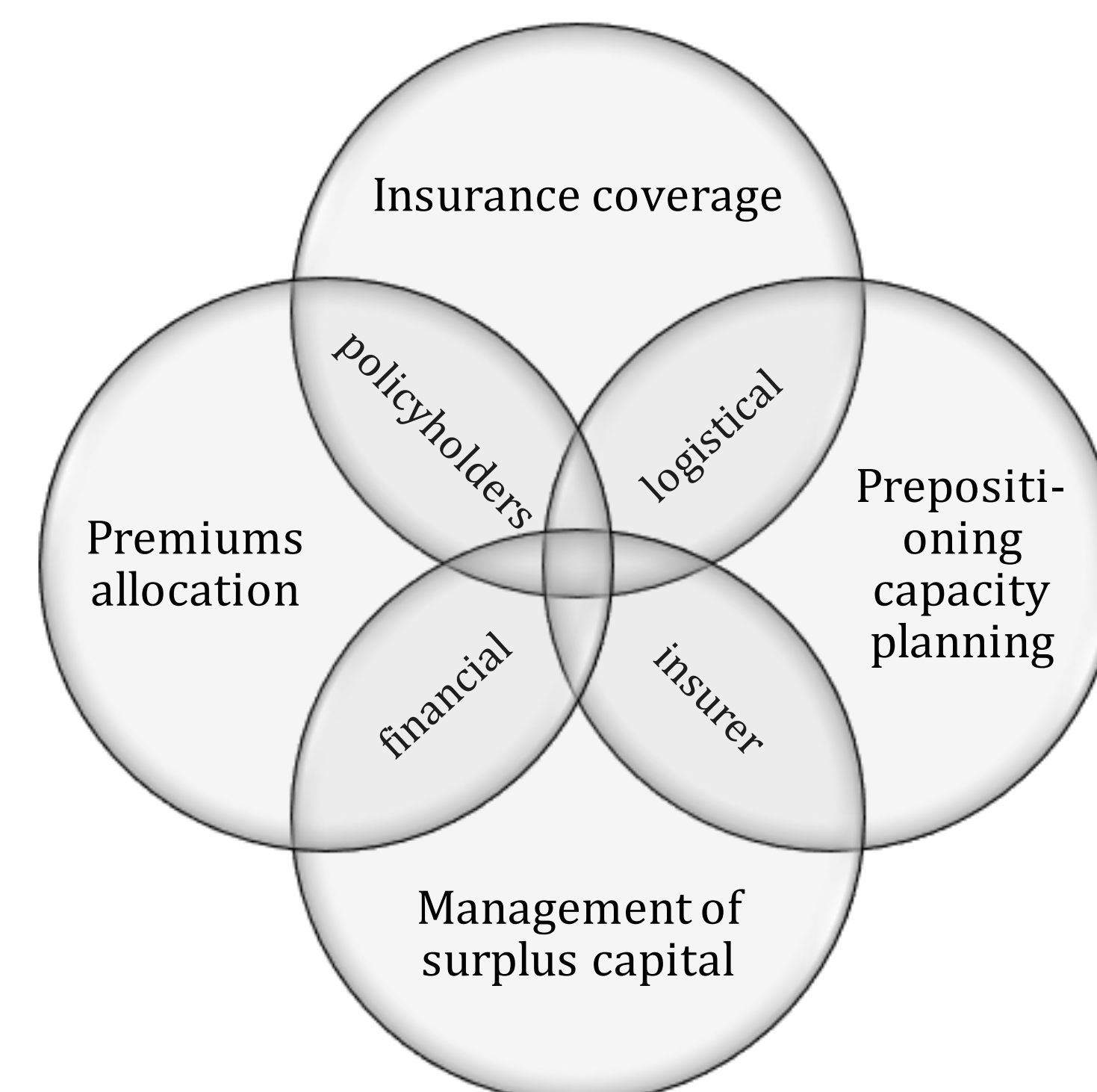
Mutual catastrophe insurance framework



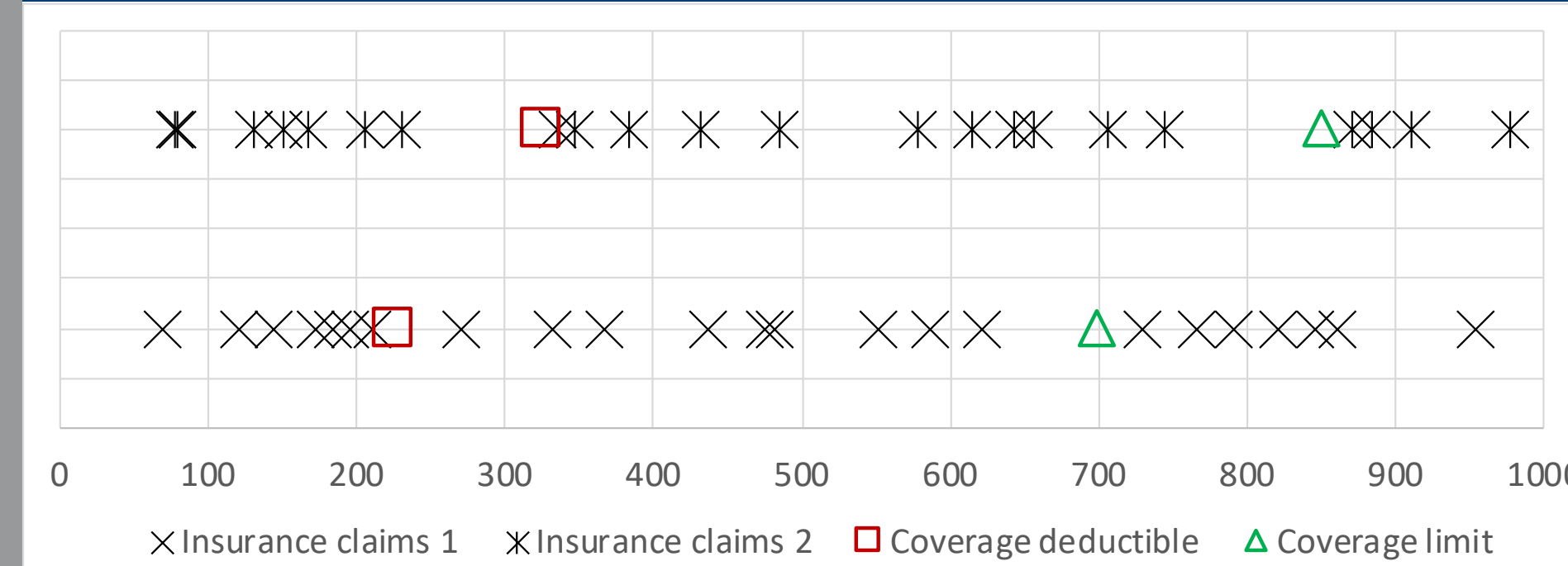
Insurance contract:

- Coverage deductible
- Coverage limit
- Yearly premiums

Framework components



Insurance coverage



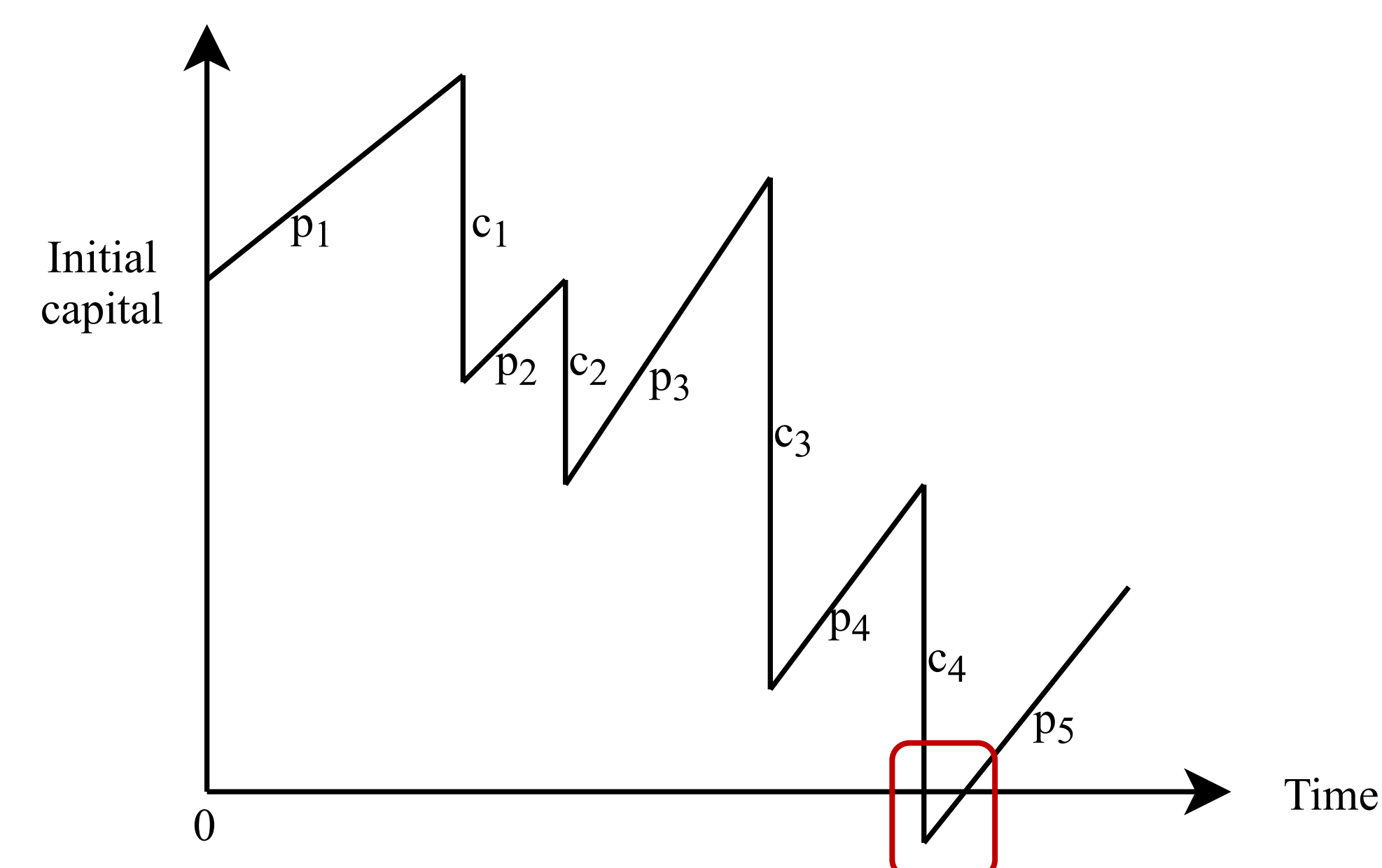
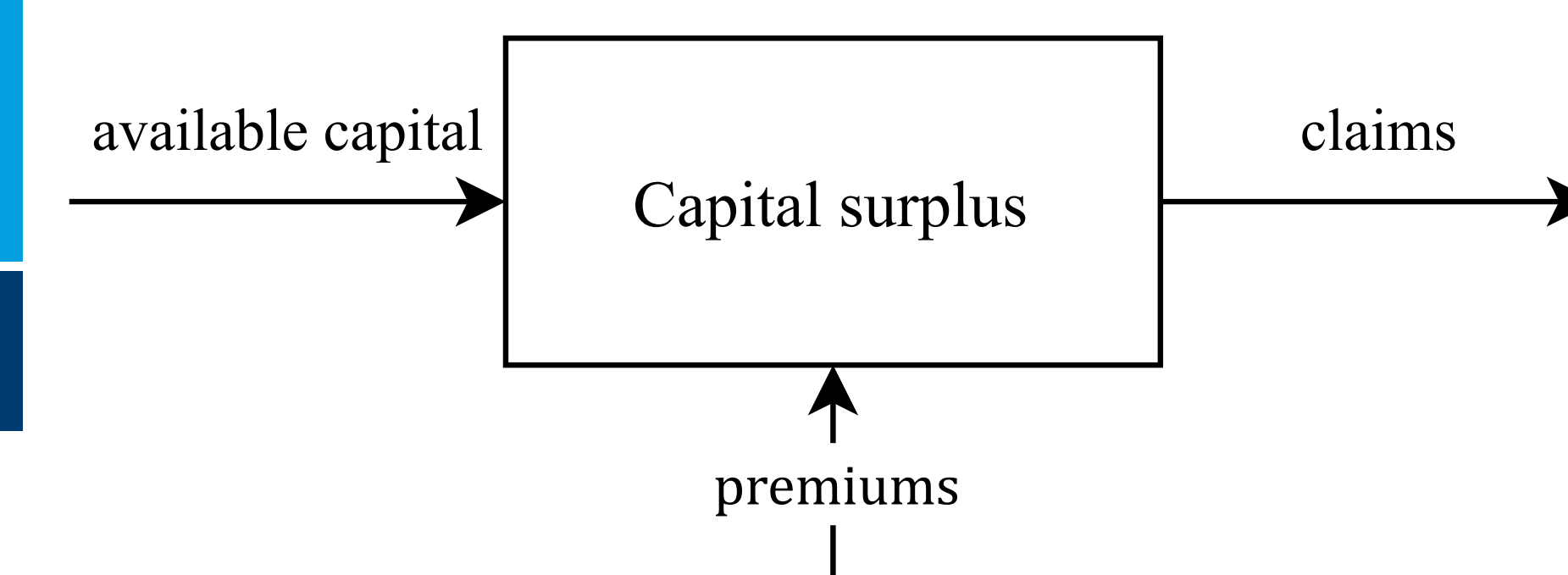
Claims are covered by:

- Insurance contract from the prepositioning network
- Emergency outsourcing

Role of deductibles and limits:

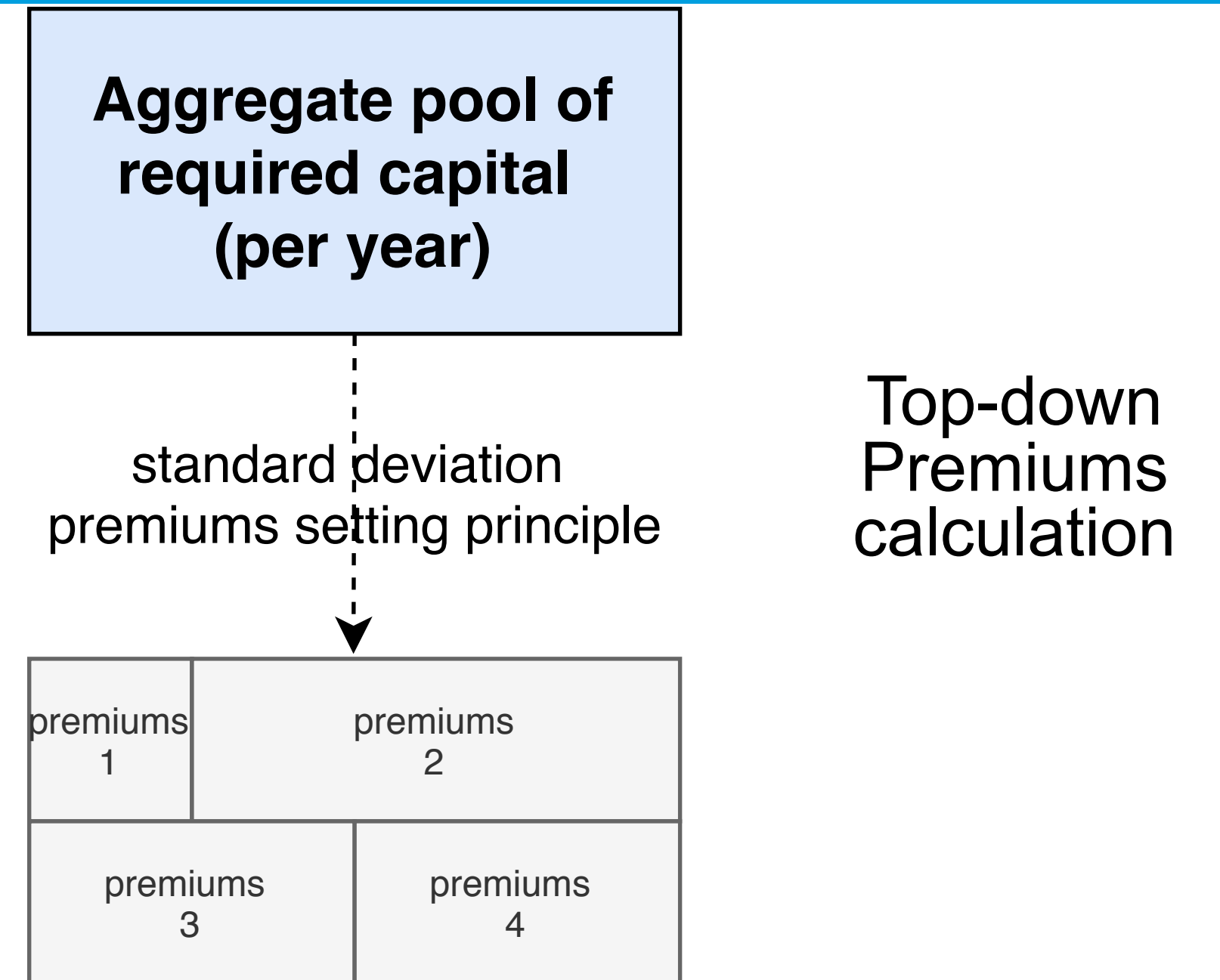
- Control the inventory levels in the prepositioning network
- Maximize the benefits of risk pooling in the network

Management of surplus capital



Cramer-Lundberg model

Premiums allocation



The insurance framework is modeled as a multi-stage stochastic program and solved using Benders Decomposition

Insights

Insurance against hurricanes for a portfolio of 18 Caribbean countries

