GUY CARPENTER

Reinsurance

Aktuarieföreningen
Stockholm – November 2017

Tobias Andersson

MARSH & McLENNAN COMPANIES

Agenda

- Introduction Guy Carpenter Nordics
- State of the Reinsurance Market
- Update on Catastrophe Modelling
- Reinsurance and the Capital Perspective

Introduction Guy Carpenter Nordics

WHO WE ARE

Marsh & McLennan Companies is a global professional services firm with two operating segments, **Risk & Insurance Services** and **Consulting**, comprising four major companies, each a global leader in its field.

Risk & Insurance Services

MARSH

Insurance broking and risk management

GUY CARPENTER

Reinsurance and intermediary advisory services

Consulting

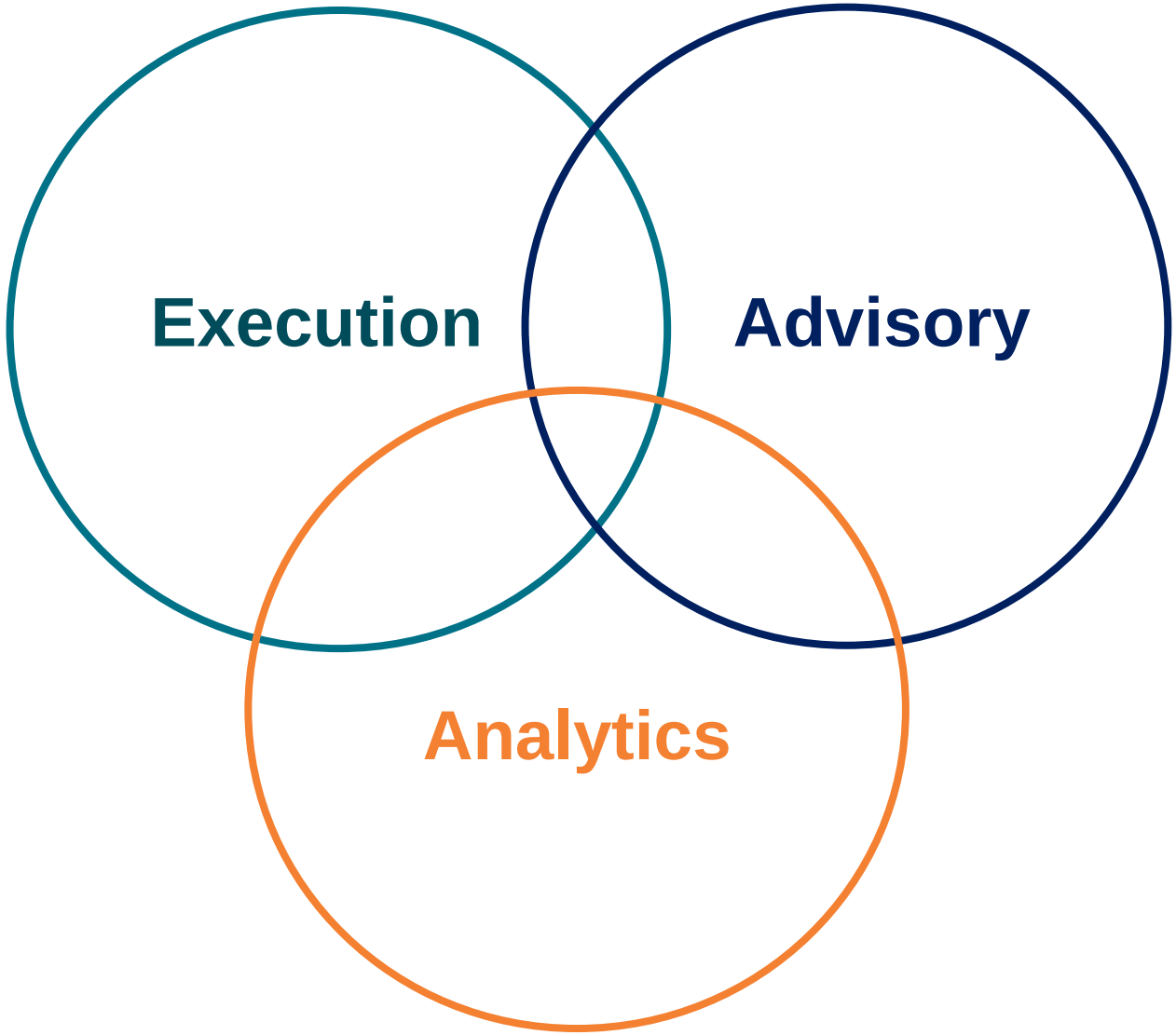
MERCER

Talent, health, retirement, and investments

OLIVER WYMAN

Management, economic, and brand strategy consulting

Guy Carpenter – An Integrated Solutions Provider



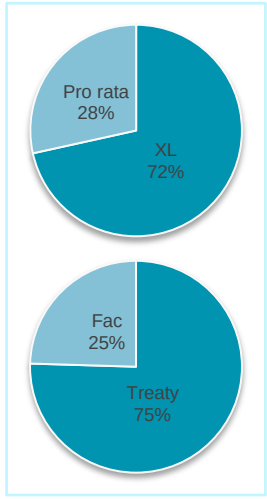
Guy Carpenter
Nordic Operations

NORDIC REGION

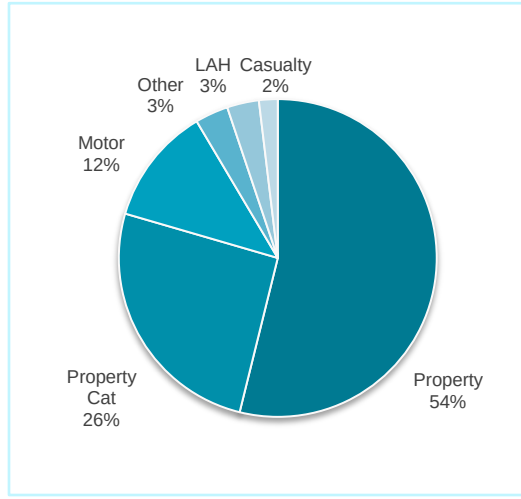
- Stockholm office founded in 1953
- Covers Nordic countries and Baltic States
- Full service broker in all lines of business
- Treaty
- GC Fac®
- GC Analytics®
- ~ 30 people

IN FIGURES

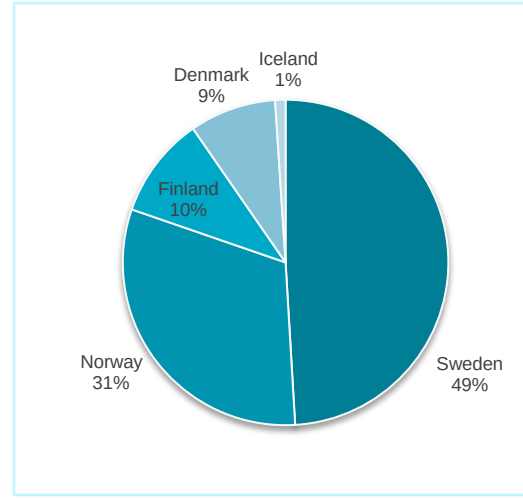
Type of business



Class of business



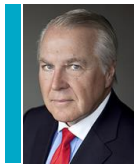
Production Area

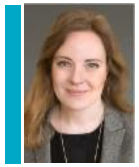


Guy Carpenter
Nordic Team

TREATY P&C

Tobias Andersson
CEO Nordic


Tomas Ljungqvist
Managing Director


Emelie Dahlgren
Vice President

Per Fager
Vice President

Dennis Lindholm
Assistant Vice President

Kirsten Eickstaedt
Managing Director

James Roberts
Vice President

Elena Barykina

FACULTATIVE

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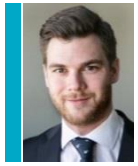
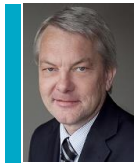
Managing Director

Mats Karlsson
Senior Vice President

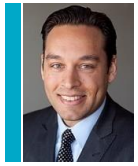
Camilla Langensjö
Senior Vice President


Andreas Holmberg
Assistant Vice President

GC ANALYTICS


Olof Fält
Managing Director

Florent Scarabin
Senior Vice President


Robert Stenlund
Vice President

Jacob Stafstedt
Vice President

SPECIALTY LINES

Colin Pearce - L&H
Senior Vice President

Alexander Burridge - L&H

Ian McKinnell – M&E
Senior Vice President

Matt Smith – M&E
Senior Vice President

Stephen Bertolla - Casualty
Managing Director

CLIENT SUPPORT SERVICES

Bengt Engberg

Bengt Nordgren

Åke Jonsson

CLIENT COORDINATORS

Mattias Meyer
Vice President

Robert Jessen

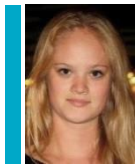
Emelie Okeijn

Susanne Fager

Marie Cidrin

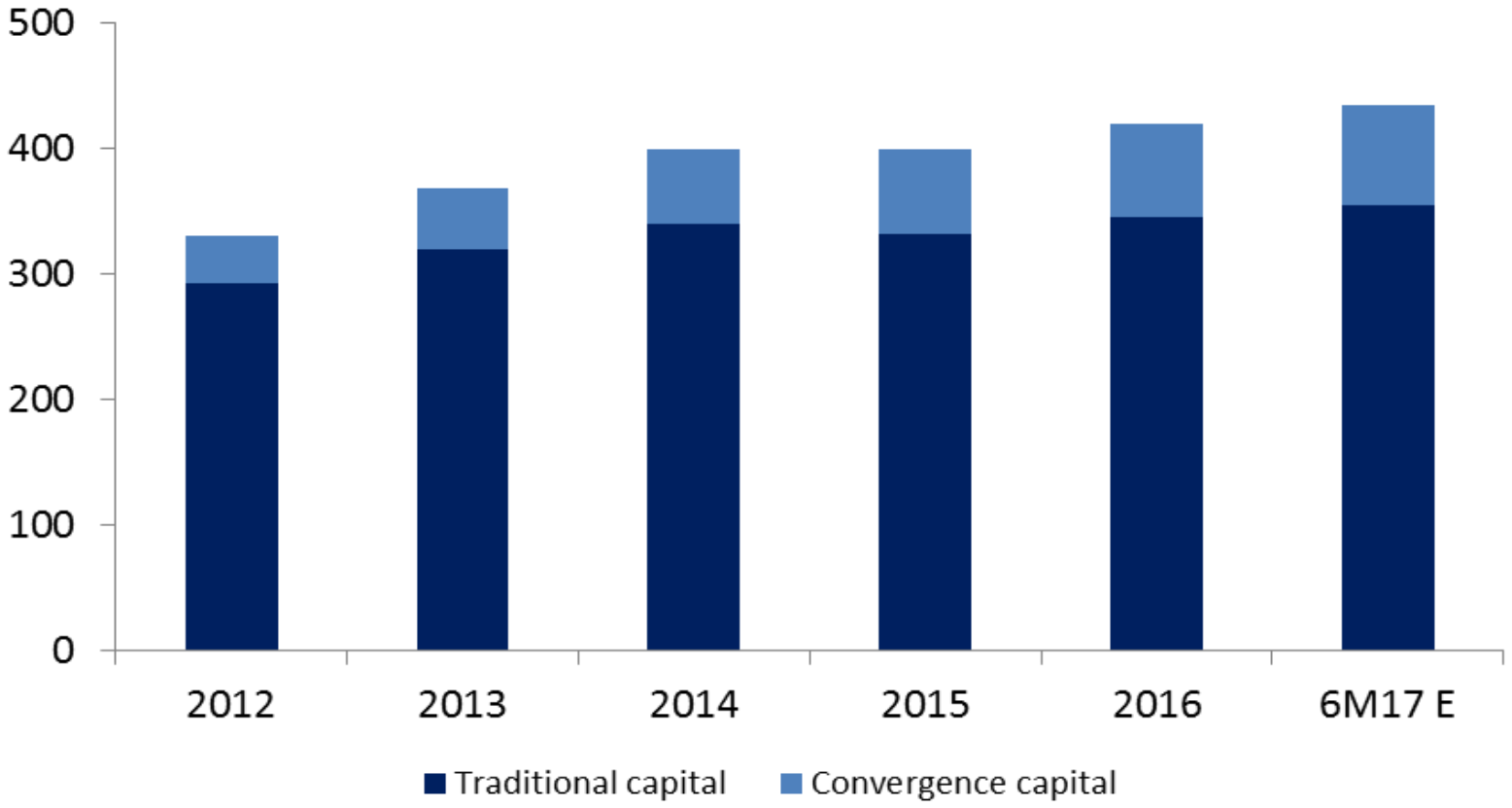
CLIENT COORDINATOR TRAINEES

Johanna Bergman


Frida Nordström

State of the Reinsurance Market

Market Environment
Dedicated Reinsurance Capital

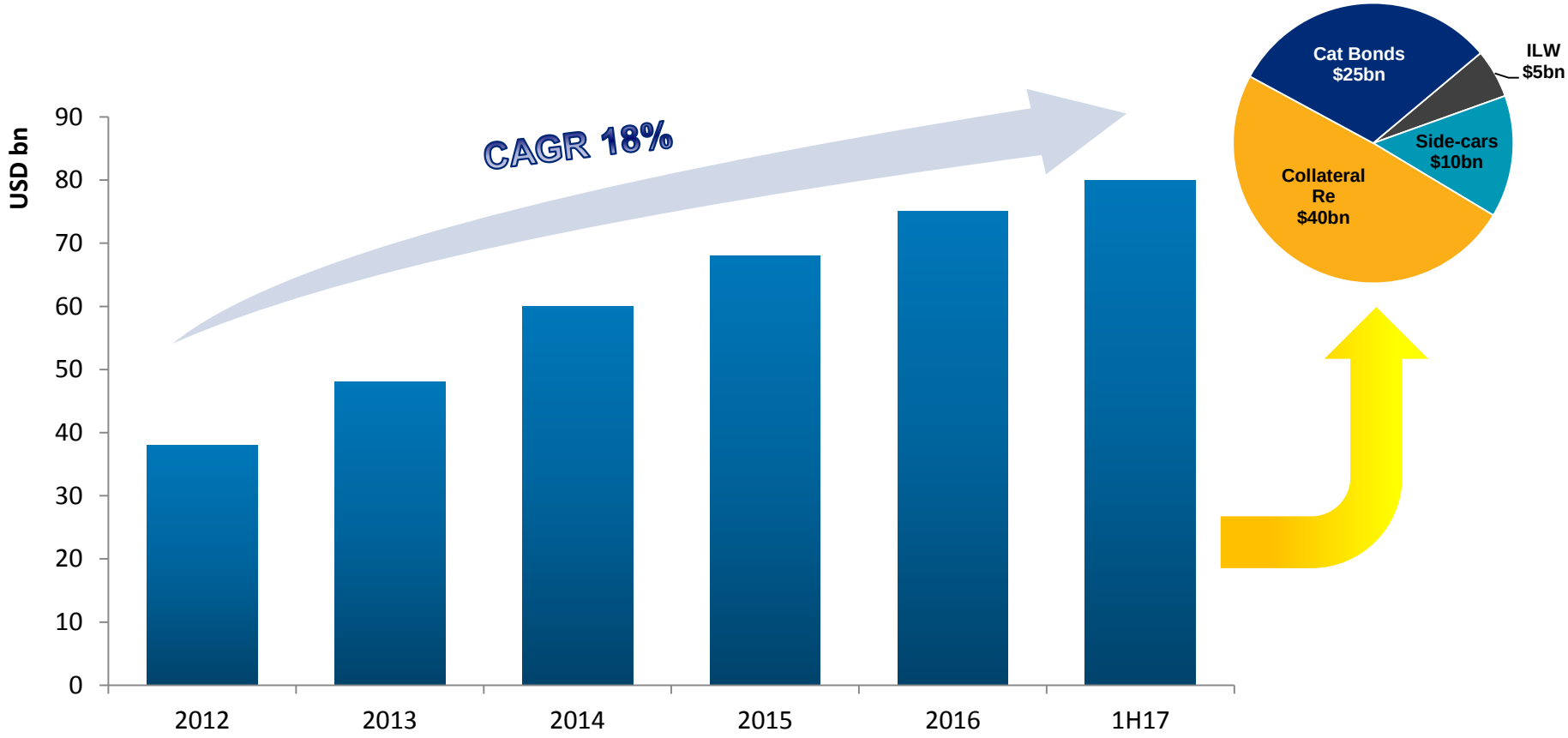


Source: Guy Carpenter, AM Best

Dedicated reinsurance capital grew another 4% through the first half of 2017 despite continued price decreases

State of the reinsurance market

Alternative capital growth stabilising

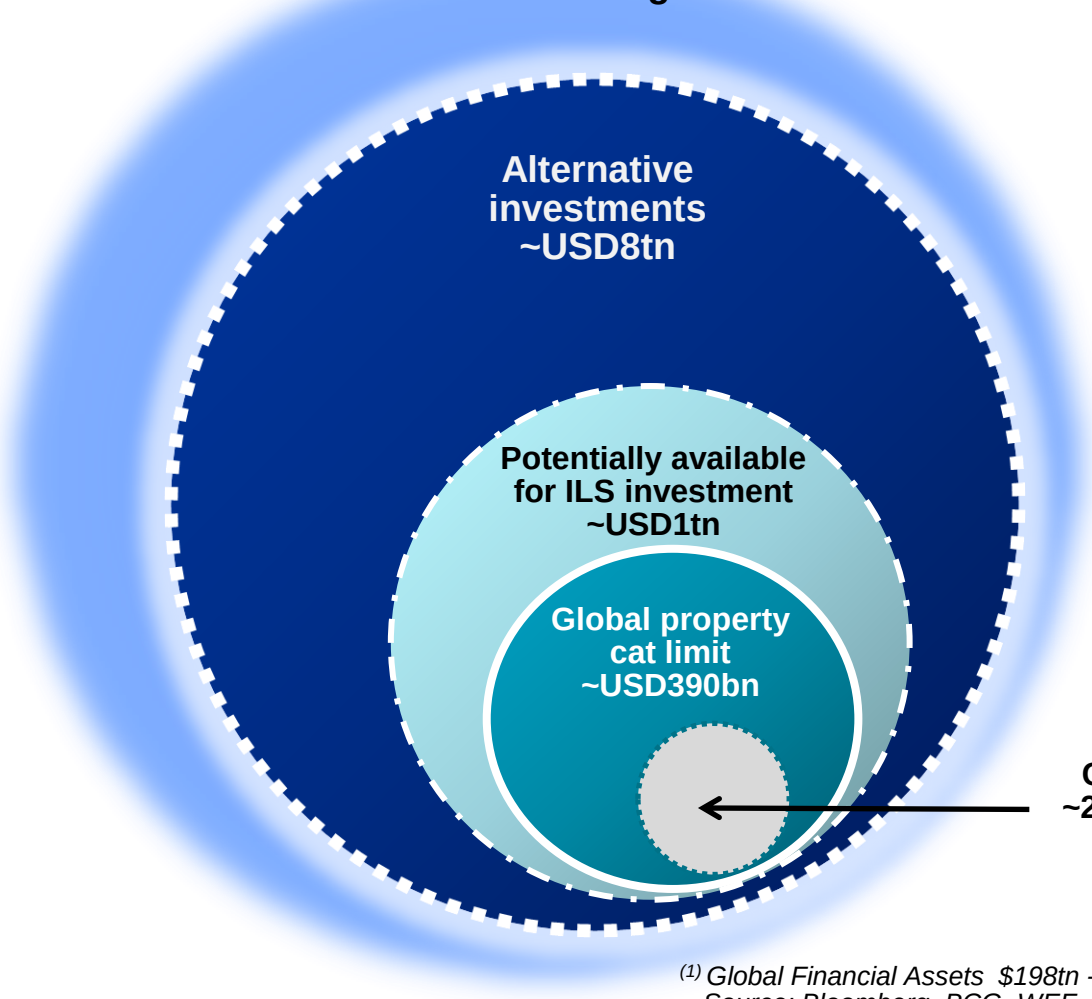


Source: AM Best, Guy Carpenter

State of the reinsurance market

Alternative capital capacity

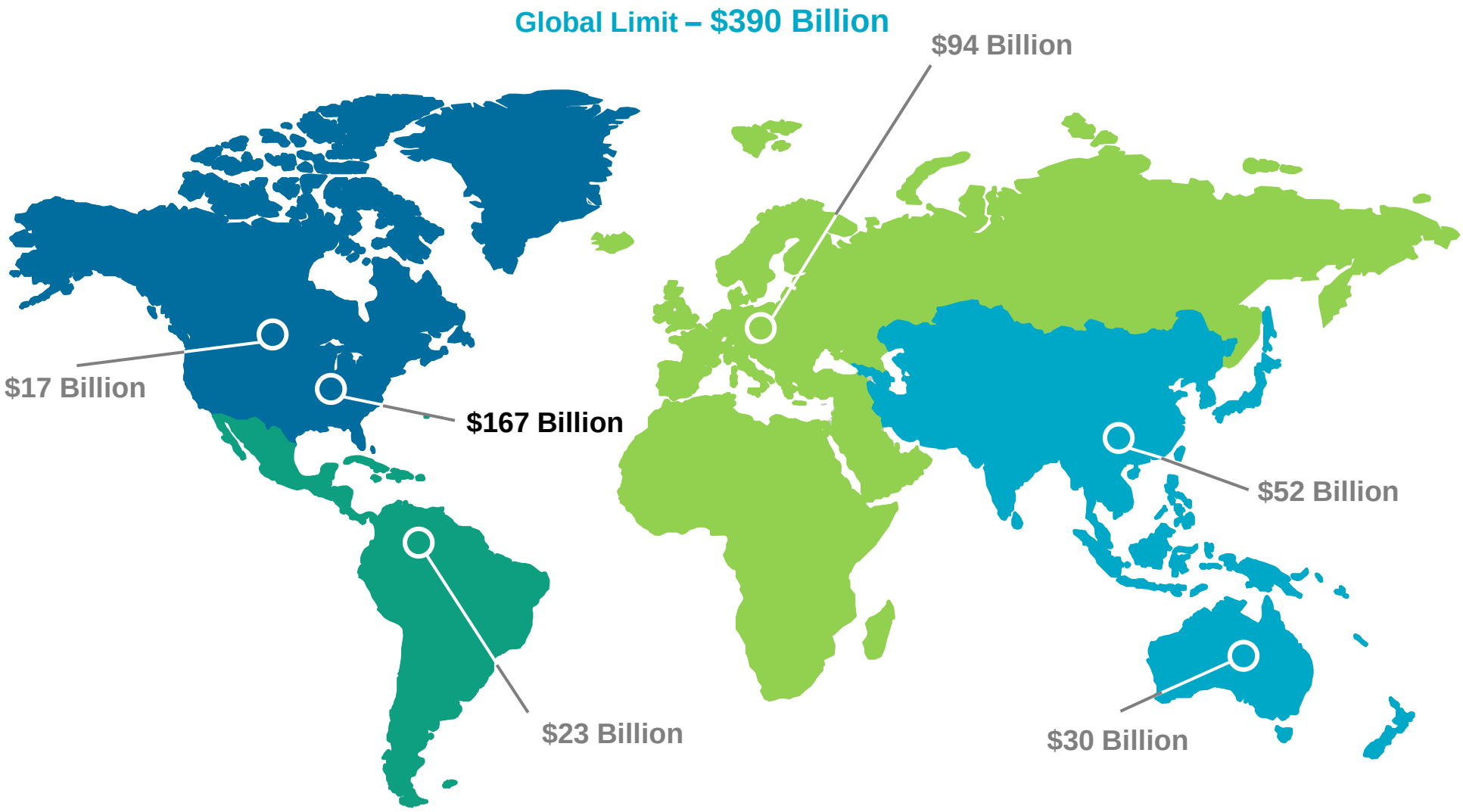
Global capital markets > USD200tn [(1)]
of which
Global assets under management USD69tn



(1) Global Financial Assets $198tn - Allianz 2017 Wealth Report
Source: Bloomberg, BCG, WEF, JP Morgan, Guy Carpenter

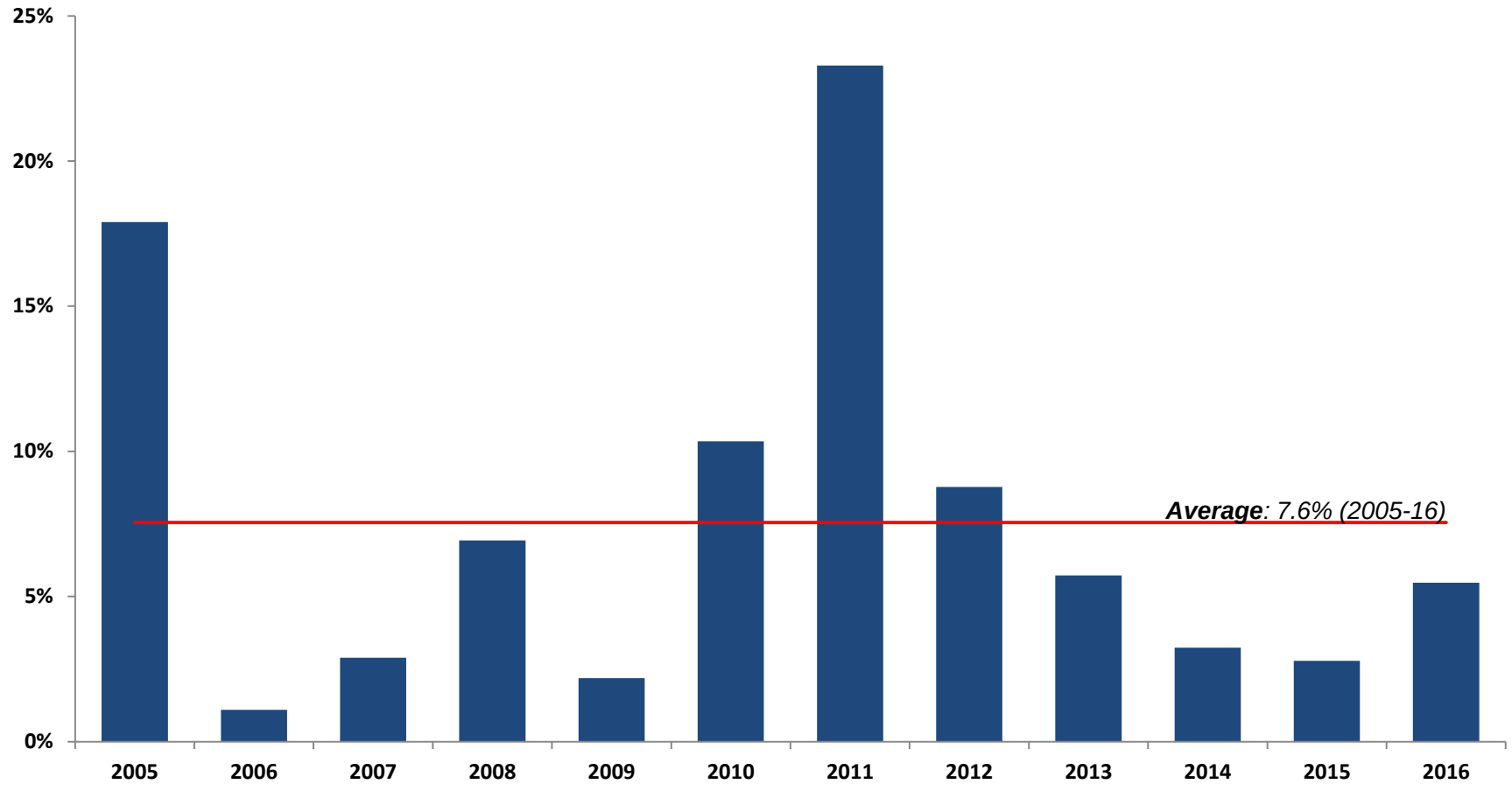
State of the reinsurance market

Estimated Worldwide Property Catastrophe Market Limit by Region July 1, 2017



GC Composite global major loss activity

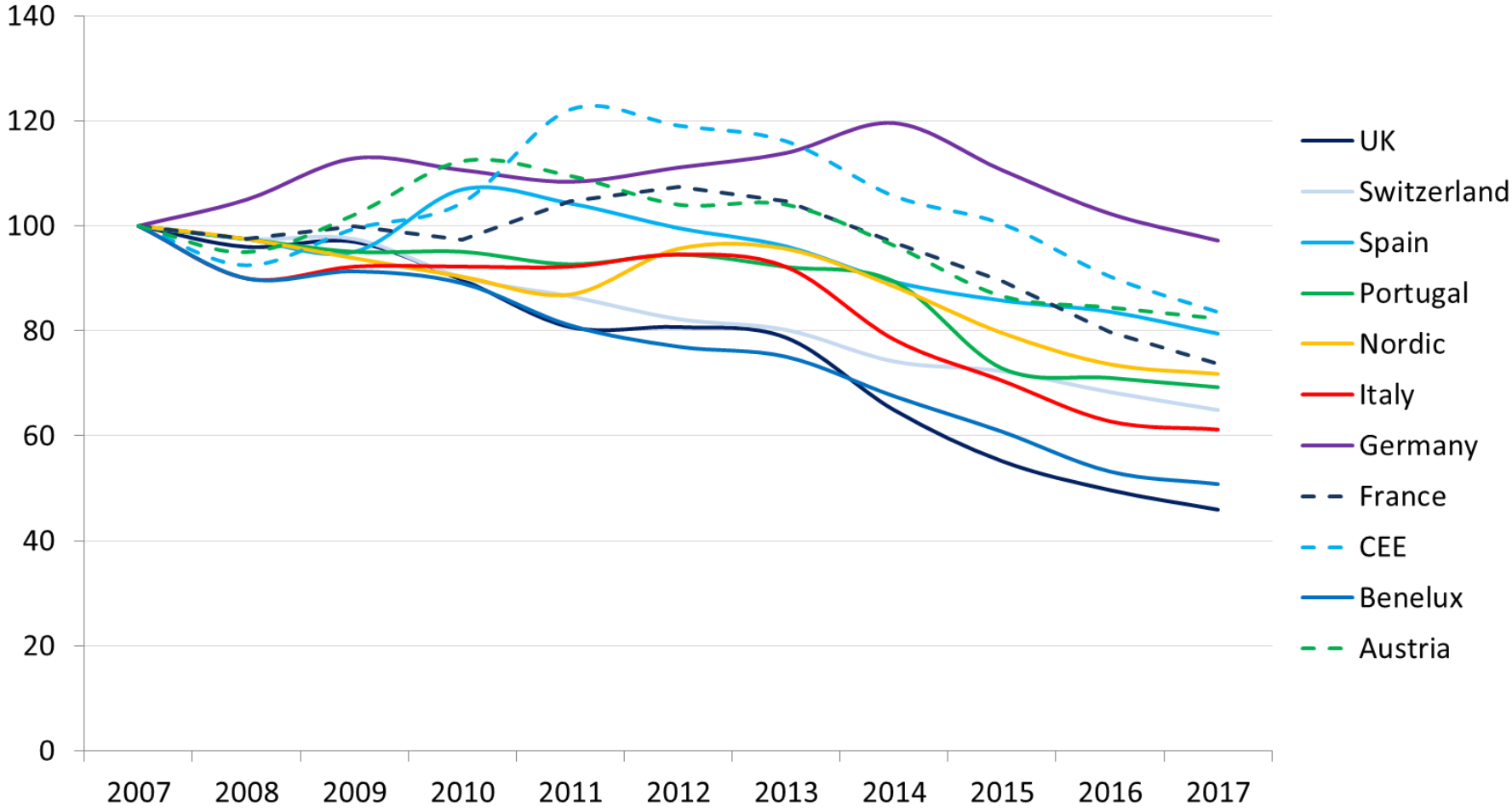
And below trend major losses (% NEP)



Note: Major losses as reported by companies and aggregated by Guy Carpenter

The state of the reinsurance market

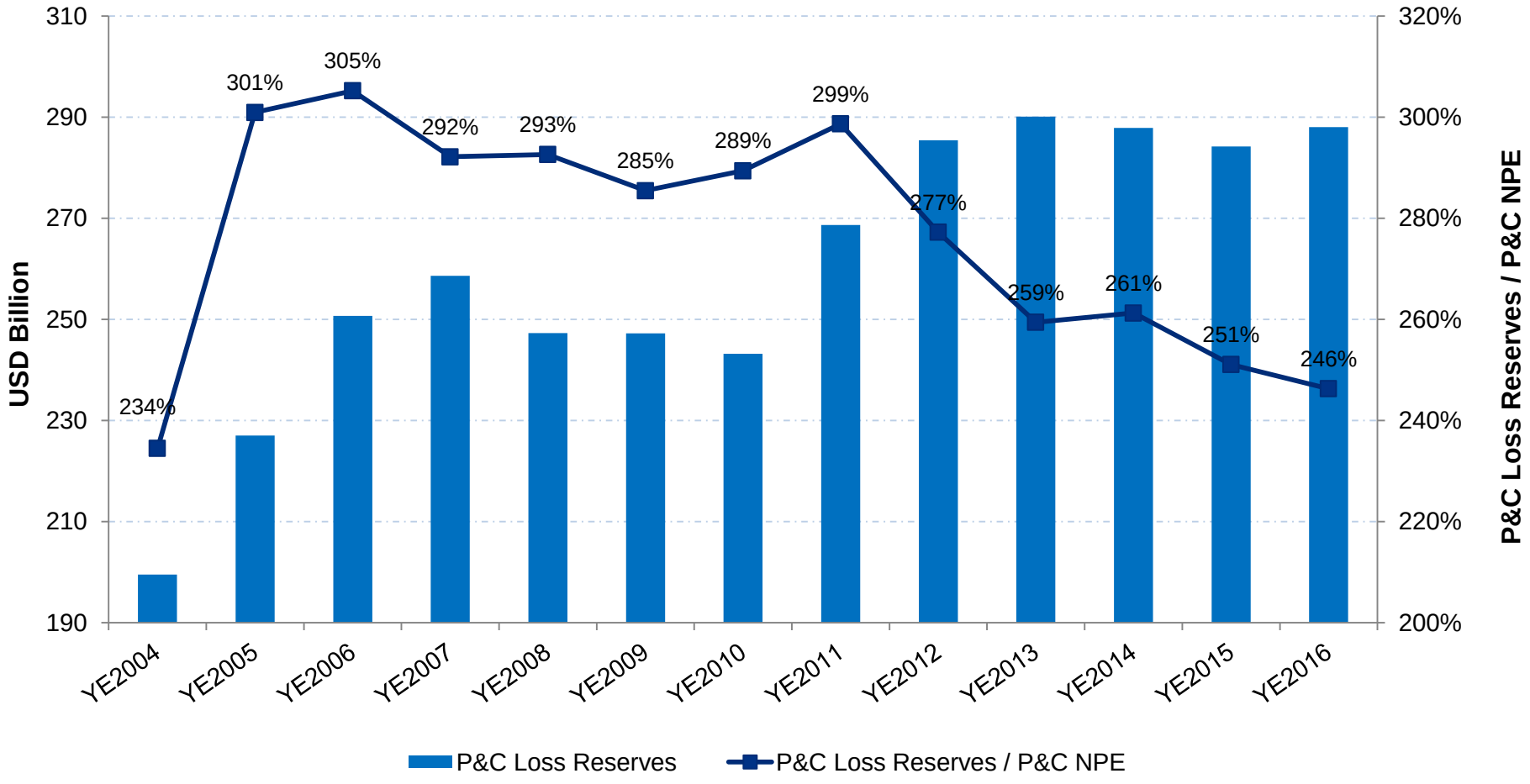
European Property Catastrophe RoL – last increase was Germany 2014



Source: Guy Carpenter

GC Composite non-life loss reserves development

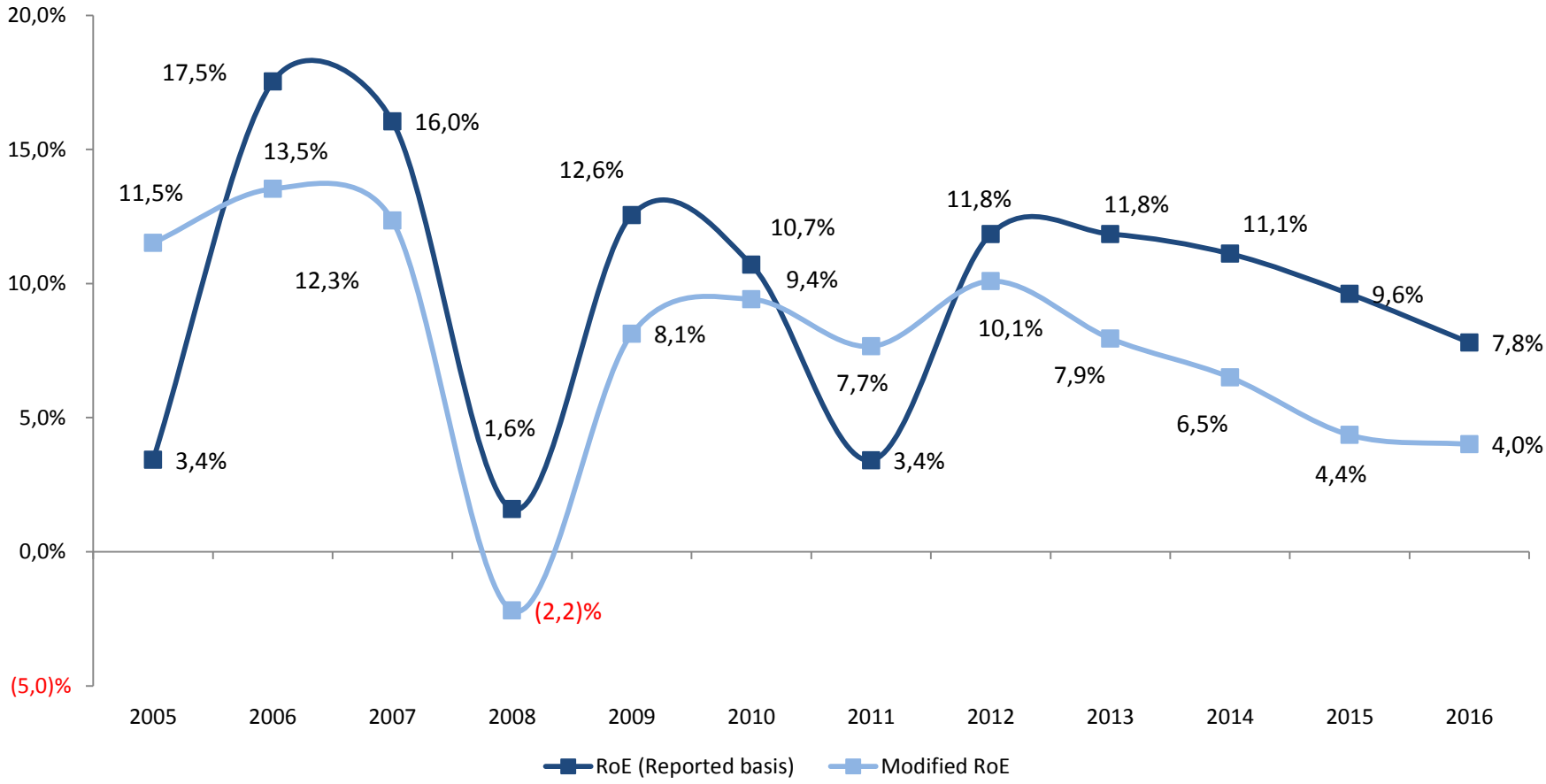
Reserve ratio slide sharply after 2011



Source: Company Annual Reports, Guy Carpenter

GC Composite reported and modified RoE

Modified RoE < Cost of equity since 2013 but still has downside

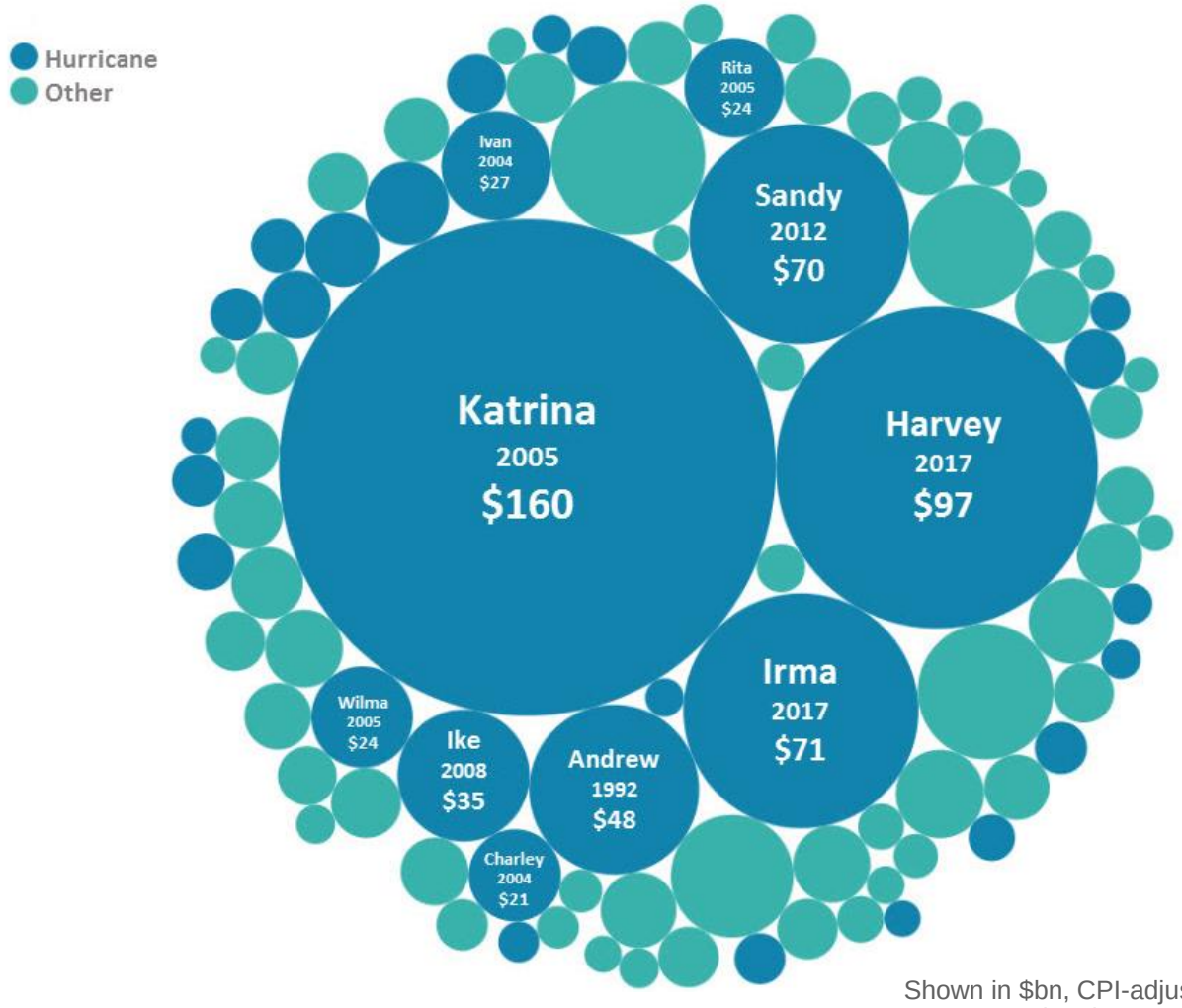


Note: modified RoE is reported RoE, adjusted for reserve development and normalised margin losses

Source: Company Annual Reports, Guy Carpenter

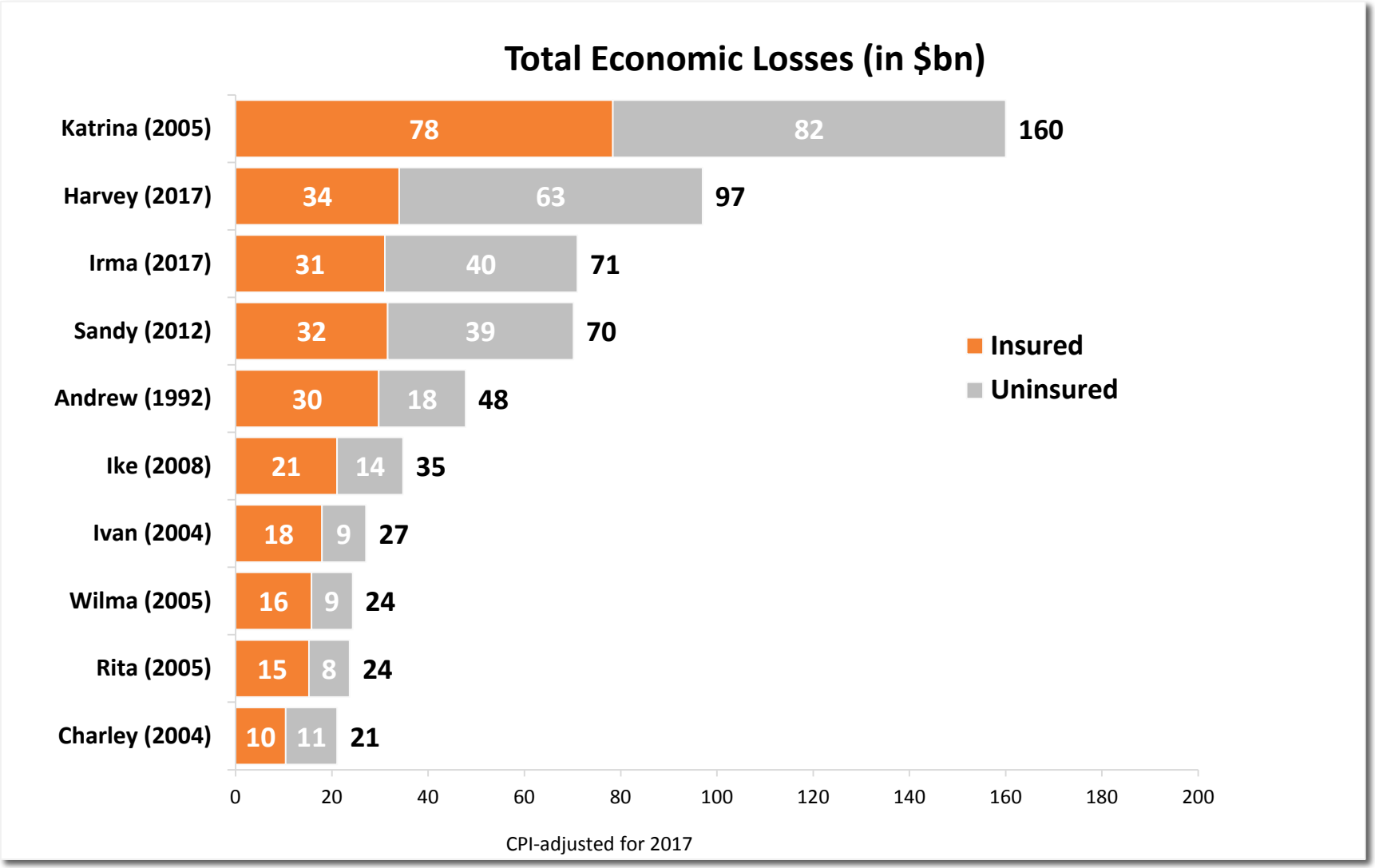
The Economic Impact of Major Recent Disasters

US weather events 1980 to present with at least $1.5B in damage



Shown in $bn, CPI-adjusted for 2017
Source: National Centers for Environmental Information, NOAA, Guy Carpenter

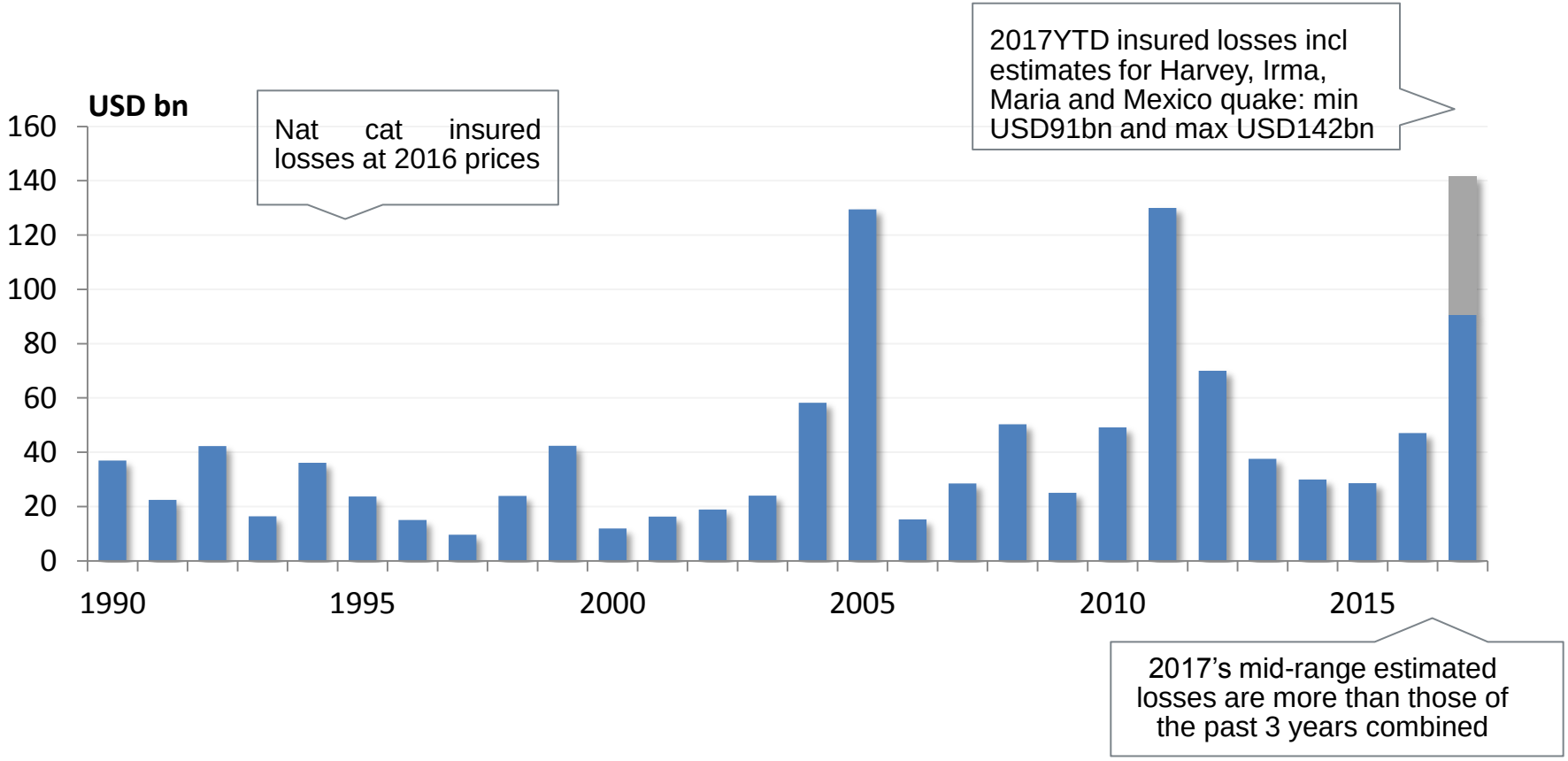
The Most Expensive Hurricanes in US History
Insured + uninsured = total economic losses



Sources: Munich Re, Geo Risks Research, NatCat Service, National Centers for Environmental Information, NOAA
Harvey and Irma Sources: Moody's and midpoint of Guy Carpenter insured loss estimate table

State of the reinsurance market

2017 – possibly the costliest year yet for insured nat cat losses



Source: Swiss Re sigma, Guy Carpenter, various.

State of the reinsurance market

Harvey, Irma, and Maria insured losses

	Insured loss estimate (USD bn)	Of which reinsurance (USD bn)	Reinsurance share (%)
Harvey	20.0	6.25	31%
Irma	30.0	15.0	50%
Maria	30.0	20.0	67%
Total	80.0	41.25	52%
Harvey estimated losses exclude NFIP losses			

Source: Various, Guy Carpenter

State of the reinsurance market

HIM losses can be characterised as a severe earnings event

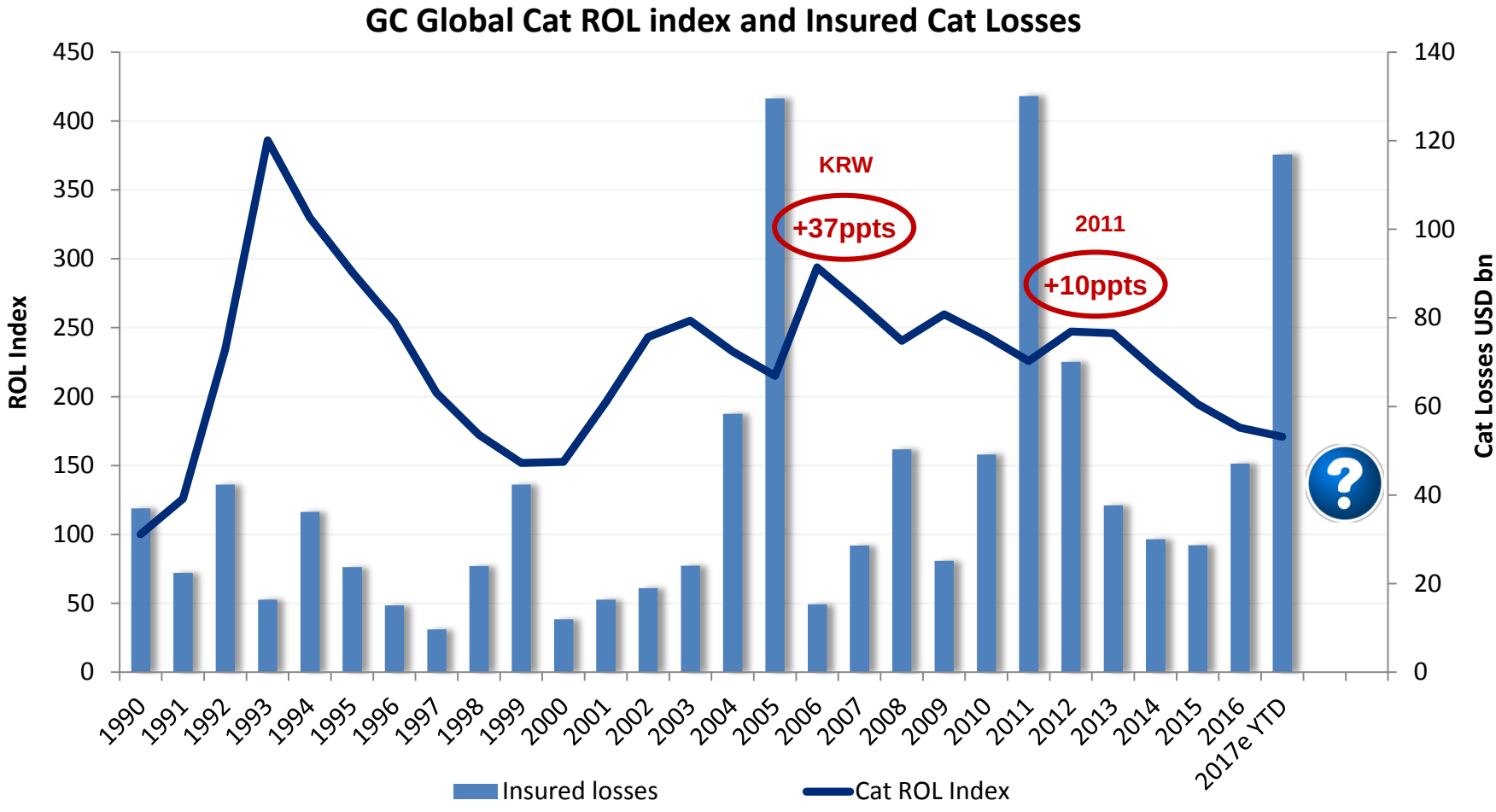
Reinsurers earnings power before tax and cats	$ 46 bn
Reinsurers share of losses	52%
Insured losses required to eliminate earnings	$ 88 bn

….but loss distribution will also be important

Source: Guy Carpenter

State of the reinsurance market

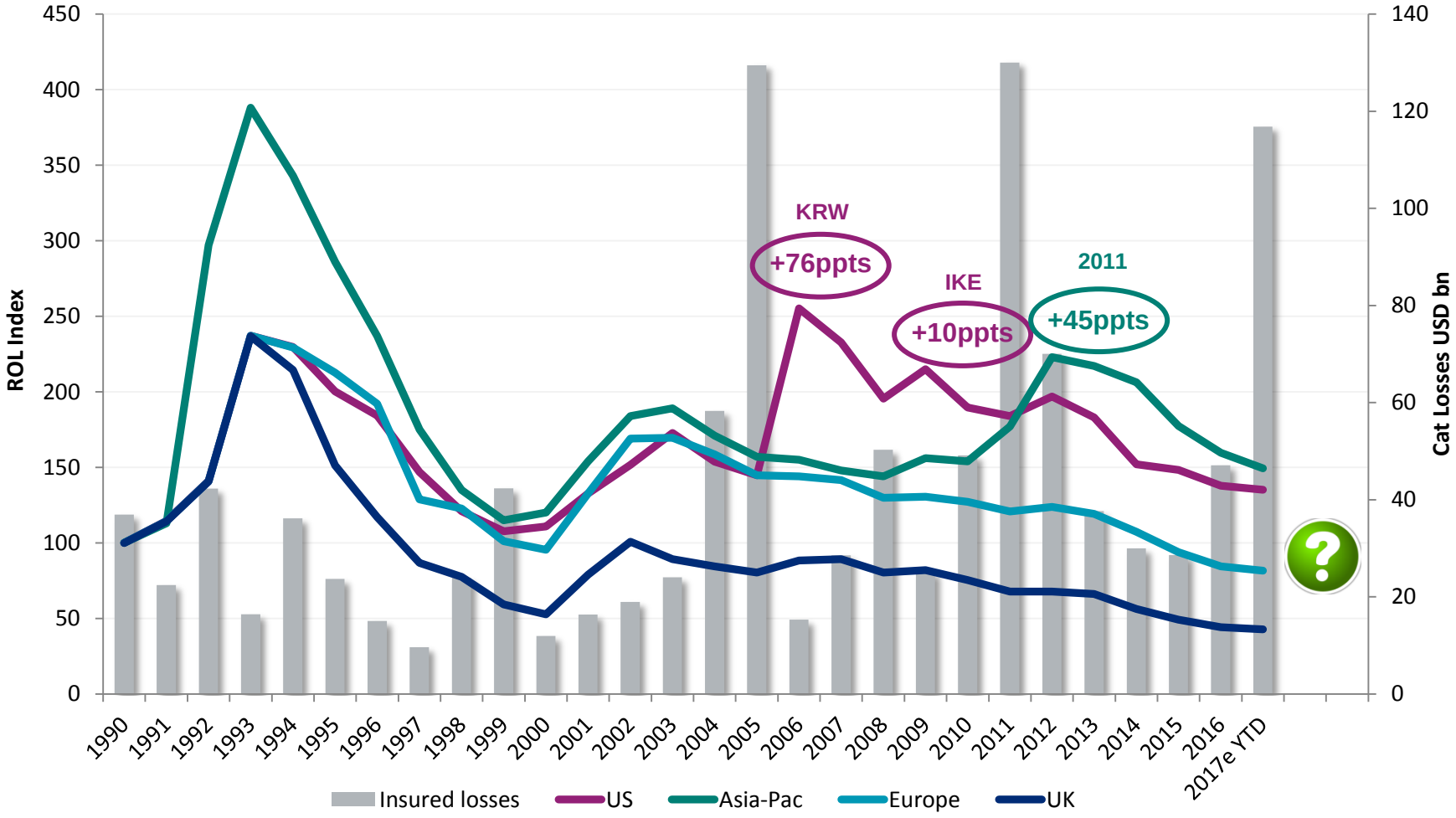
Rates influenced but not dictated by insured losses



Source: Guy Carpenter, Swiss Re

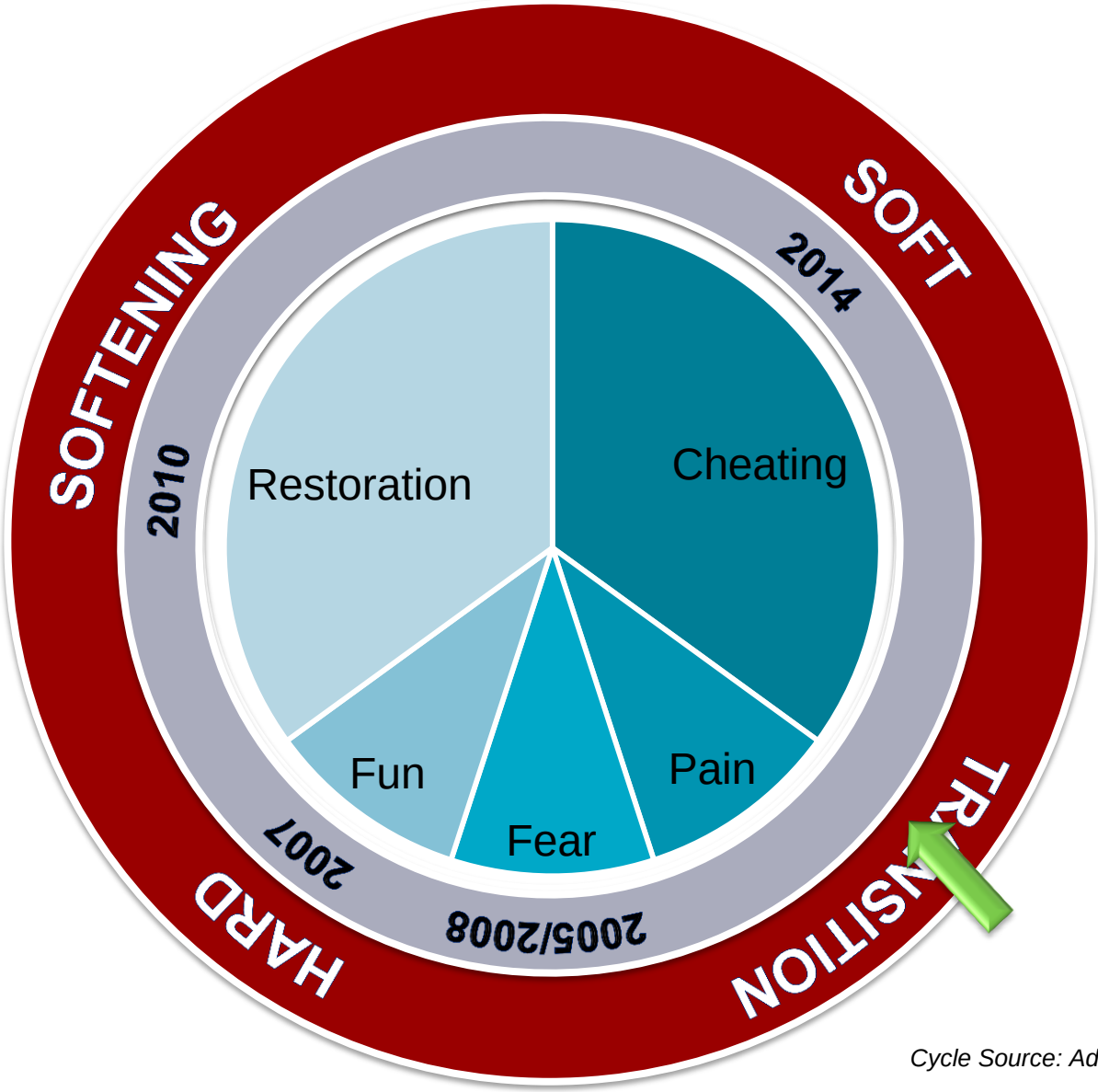
The state of the reinsurance market

Cat driven rate increases short lived and cross regional correlation broken



Source: Guy Carpenter, Swiss Re

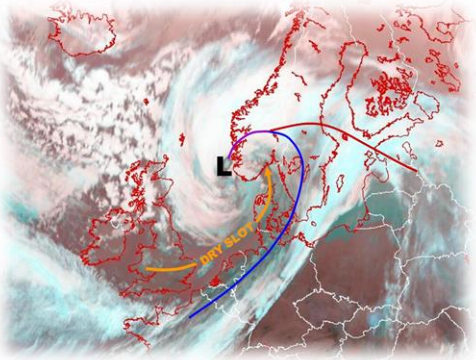
Cycle – Where Are We Now?
Soft Market is the Norm, with Occasional Hard Periods



Cycle Source: Adapted from Dowling & Partners, Guy Carpenter

Update on Catastrophe Modelling

Examples of Catastrophe perils



• Storm

• Earthquake

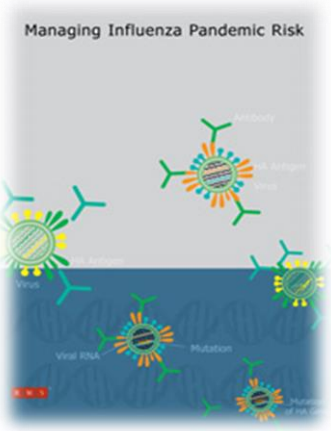
• Freeze

• Flood

• Fire

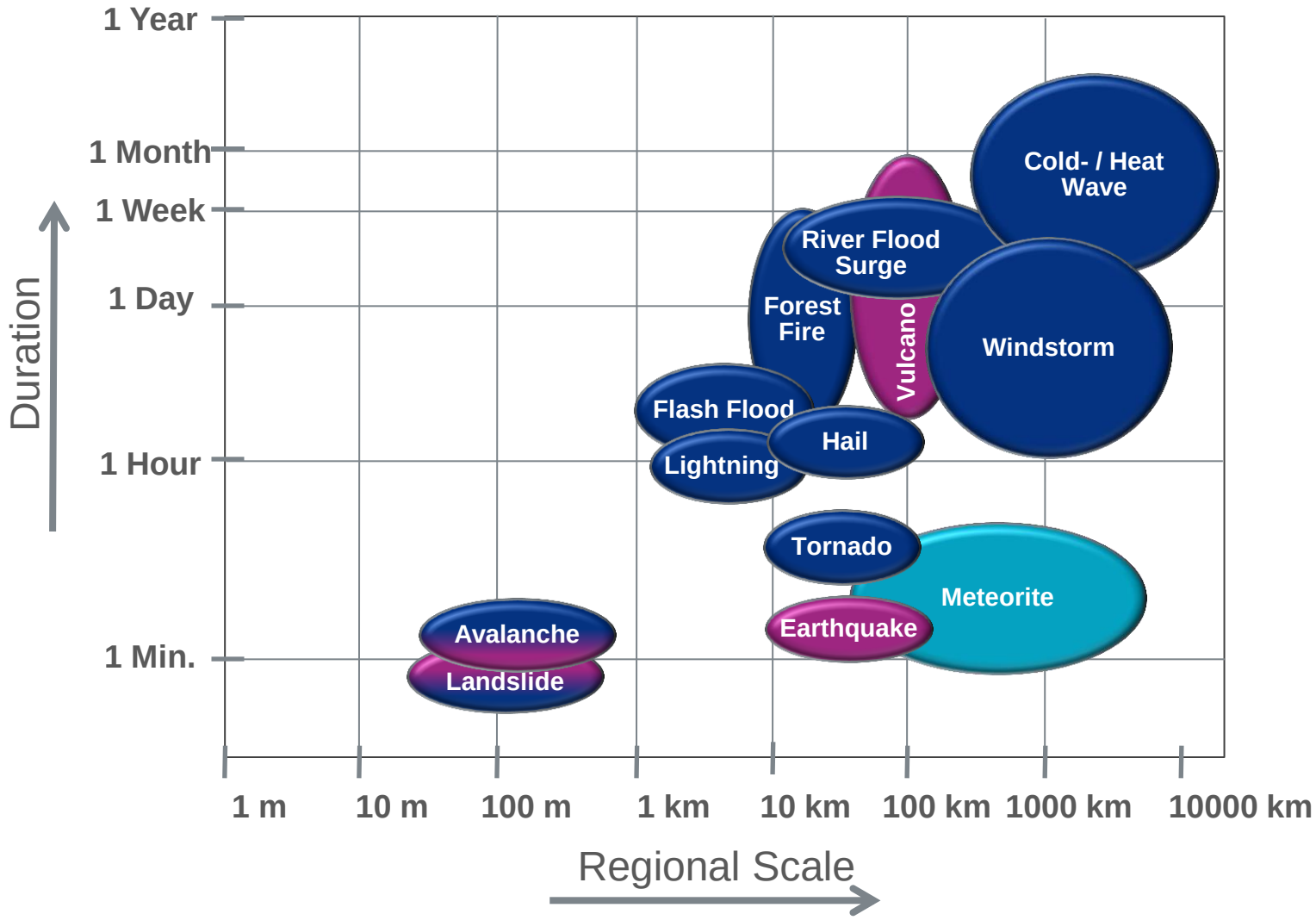
• Landslide

• Terrorism



• Pandemic

Main Types of Natural Perils



Catastrophe modelling
Two different methods

GUY CARPENTER

Actuarial (statistical) method

Assumes historical losses can be used to predict the future

Advantages

- Capture all historical perils
- Uncertainty can be measured

Disadvantages

- Change in portfolio over time must be considered
- Doesn't take into account meteorological and physical dynamics

AIR WORLDWIDE CoreLogic RMS

Technical method

- Assumes historical perils can be used to predict the future
- And that the intensity of the hazard is correlated to the size of the loss

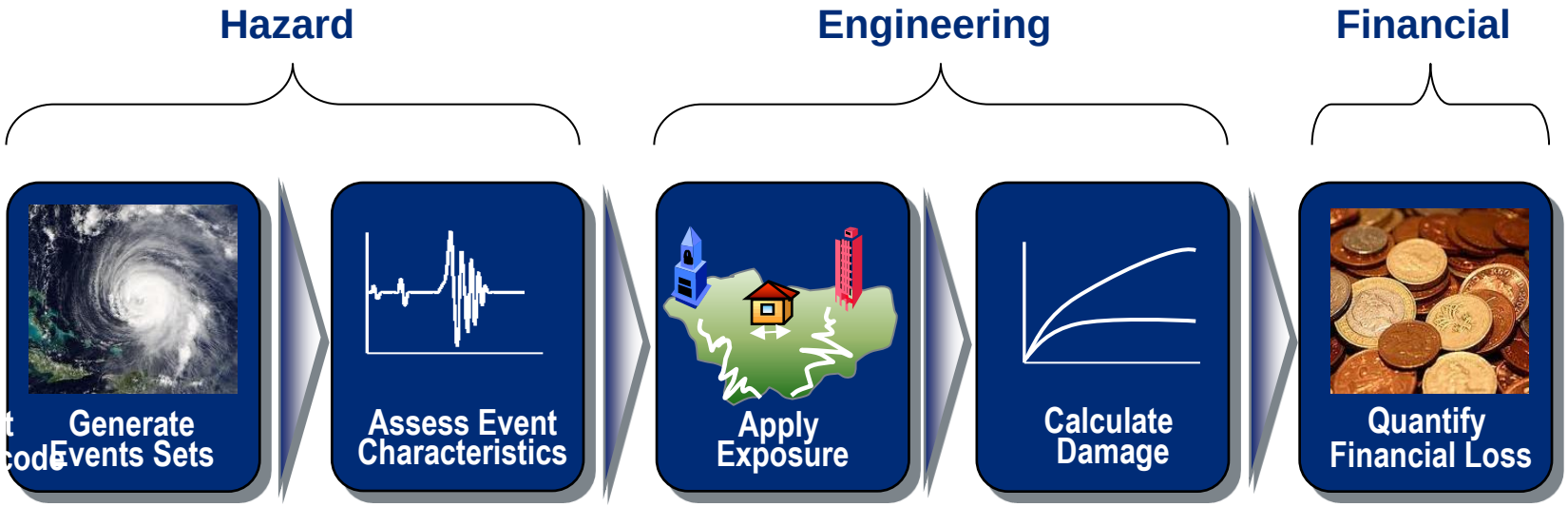
Advantages

- Analysing current portfolio
- Takes into account meteorological and physical dynamics
- Variety of output

Disadvantages

- Only cover winter storm in Nordic area
- Only losses to buildings and contents

Technical method
Framework



Intensity?

Location?

Frequency?

How strong are the ground motions?

What is the wind speed?

Where is the exposure?

What is its value?

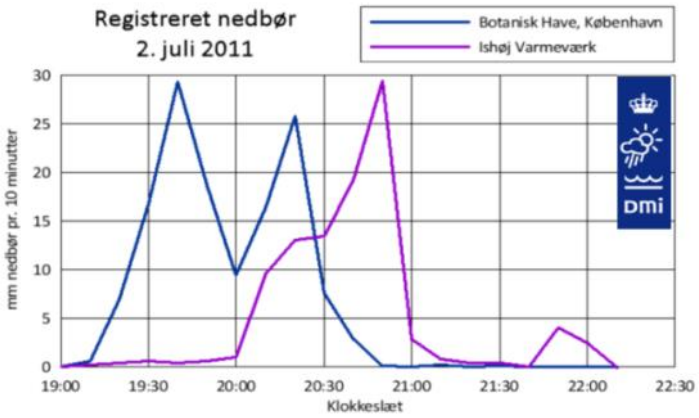
What types of buildings?

How damaged are the buildings?

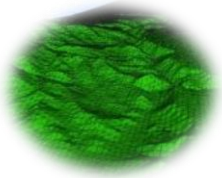
What is the loss to the insurer?

Cloudburst Modelling - Project Rationale
Cloudburst Event 2nd July 2011

- Catastrophic event on 2nd July 2011 when Copenhagen got 125 mm of rain in 1hr 15 mins (”one in a thousand years event”)
- More frequent heavy rainfalls are expected in the future.
- This calls for better planning everywhere of residential areas, infrastructures, limit soil erosion and more.
- GC are developing a cloudburst scenario model for the insurance industry in collaboration with professor Balstrøm, University of Copenhagen



Cloudburst modelling
Important building blocks in the model



Digital Terrain Model (DTM)

- 3D representation of the surface
- Where will huge water volumes get trapped ?

Building polygons

- Divert water around buildings
- Remove the volumes they take up in sinks

Historical loss data

- Estimate average loss given water depth etc.

Cloudburst modelling

- Ability to move the scenario to Stockholm, Helsinki and Oslo

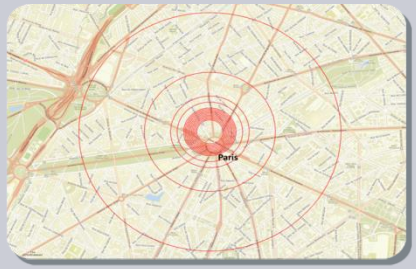
- Benefits for Insurance companies:
  - Underwriting: Identify areas with higher probability of a loss
  - Scenario losses

- Good geocoding information (coordinates / street address) of clients portfolio preferable

Man-made modelling
Rationale

RMS

Good base model, but very conservative



Uniform damage ratio within each circles, not considering any shielding effects

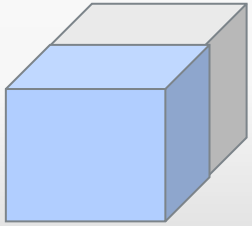
GC approach:
3D-enhanced RMS modelling

3 D

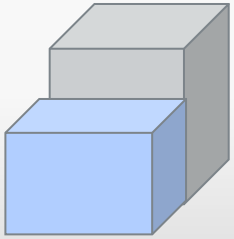
3D building layer with heights info and occupancy characteristics linked to portfolio

Line of sight approach considering shielding effects of buildings

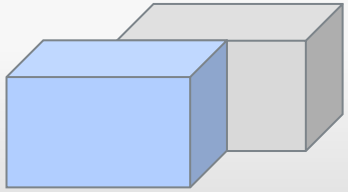
Line of sight approach
Principle and limitation



The grey building is fully protected and will not be taken into account



Part of the grey building that is above the blue building will be taken into account

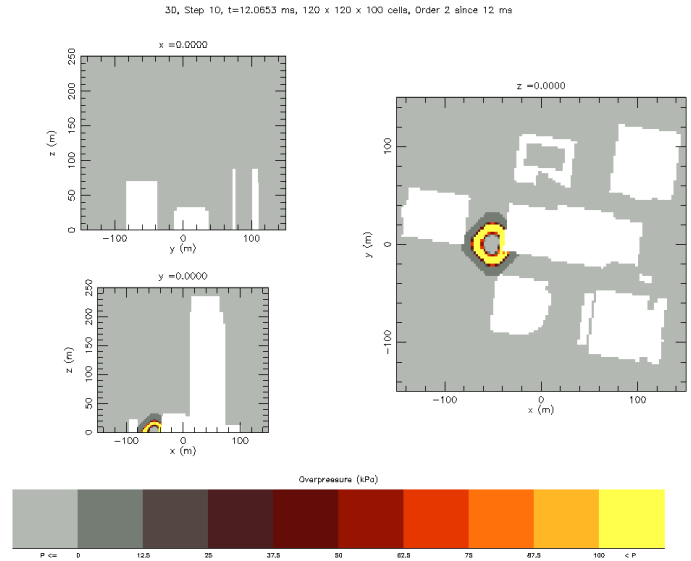


The two buildings will be taken into account in their entirety

Does not consider physical variables – only geometrical perspectives

Physical model – Pressure and impulse approach
Principle and limitation

- Developed in collaboration with Cranfield university
- Multivariable model
  - Considers both geometrical perspectives and physical variables
- Detailed damage ratios can be extracted
  - Finest resolution 5x5 meters building cell grids



Extremely time consuming to run and requires high quality input info

Reinsurance and the Capital Perspective

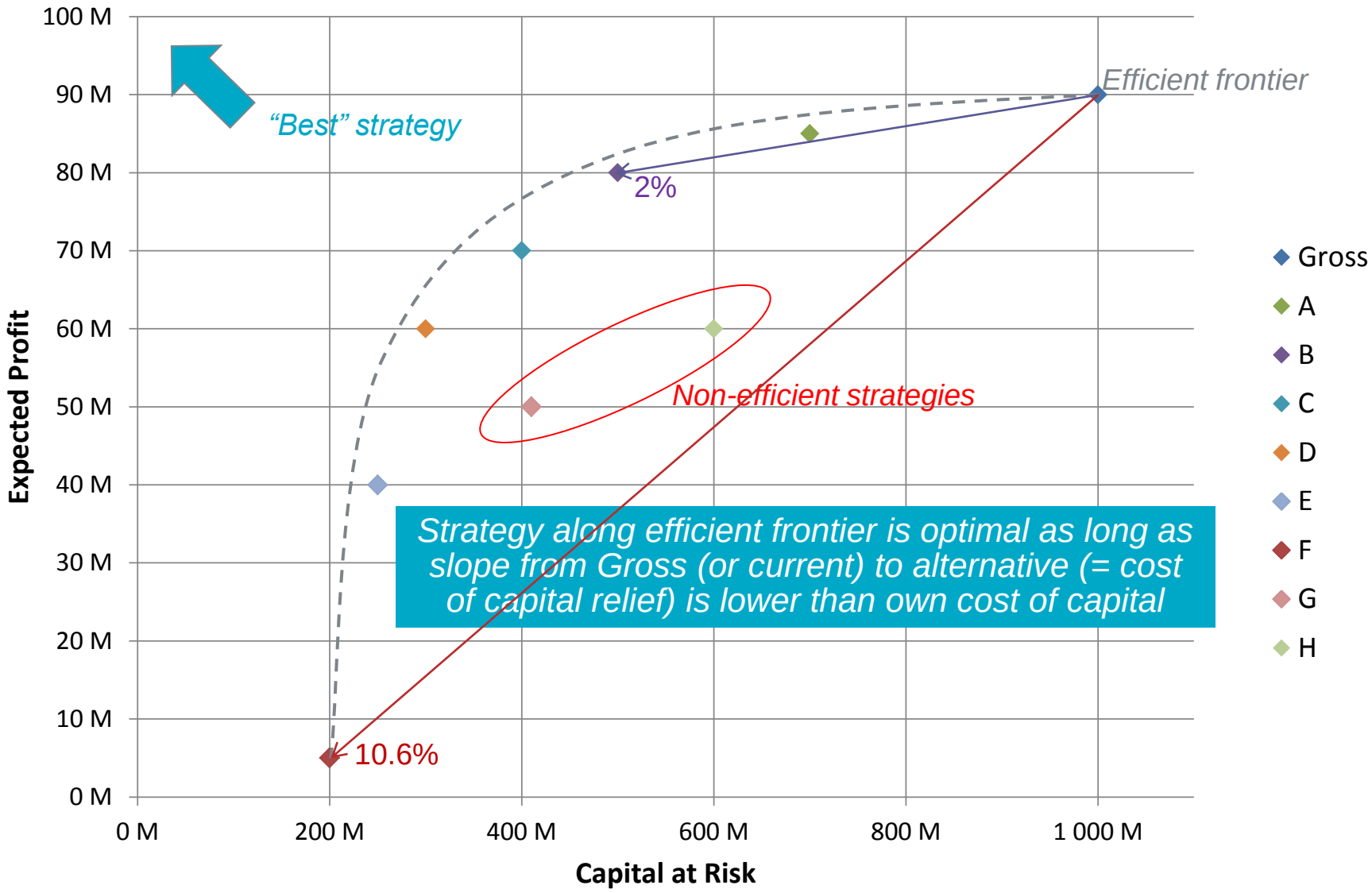
Why buy reinsurance?

- There are only four sources of capital for an insurance company

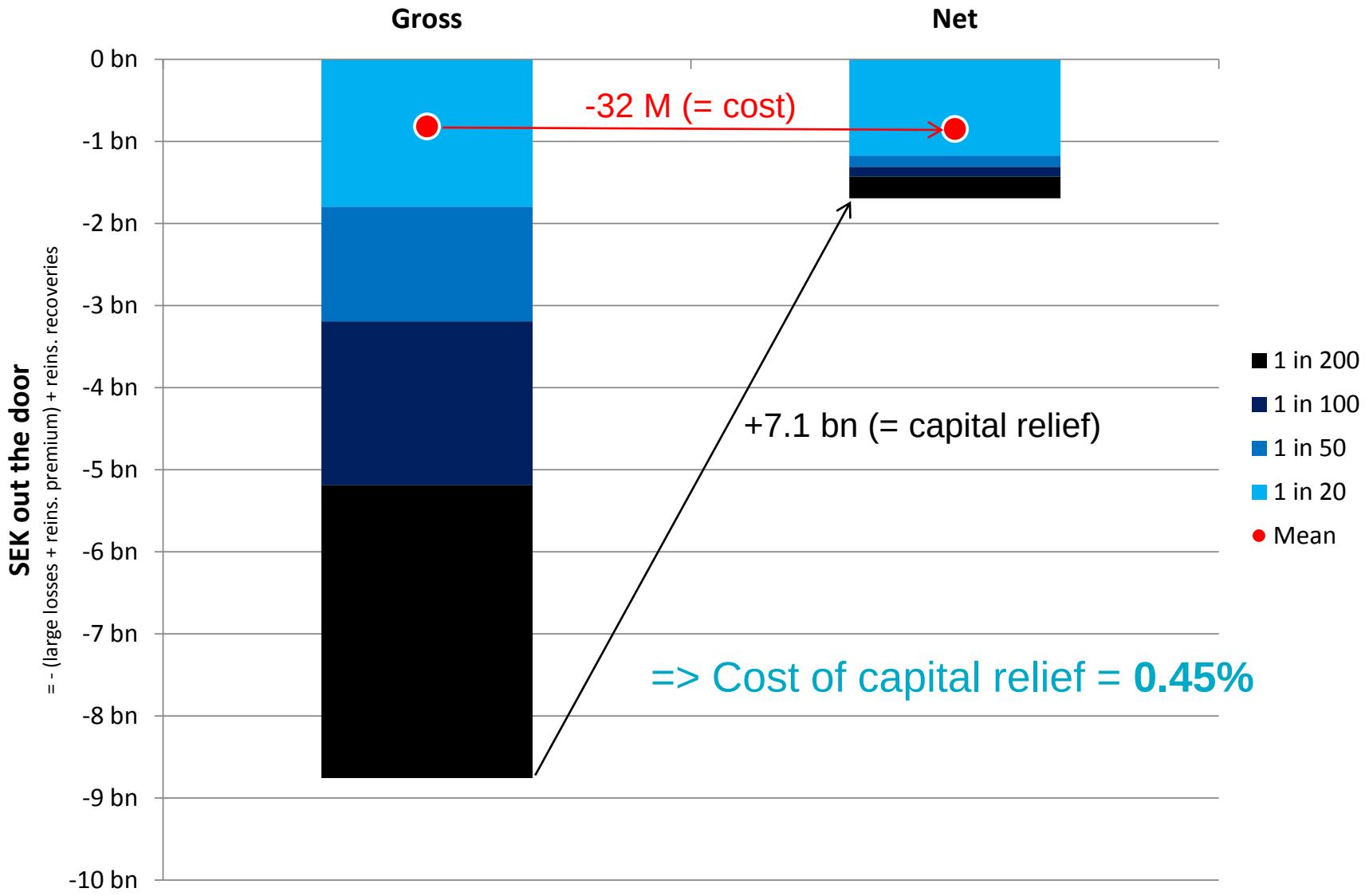
Equity	Debt	Retained earnings	Reinsurance

- Reinsurance will stabilise results
  - More stable result = Less capital need
  - Reinsurance is substitute for own capital

Reinsurance optimization



Value of reinsurance (before diversification)
Property per Risk + Cat XL



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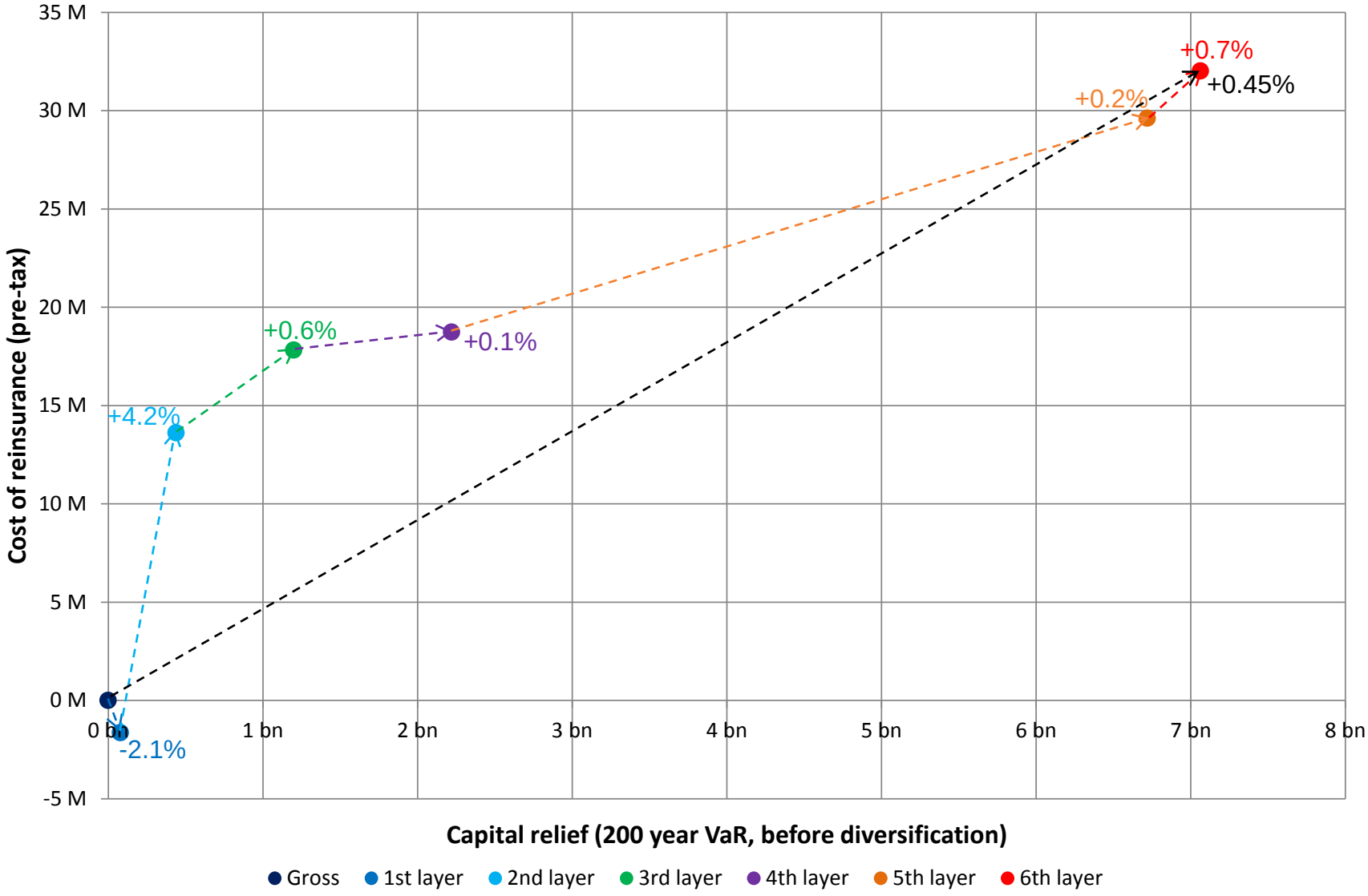
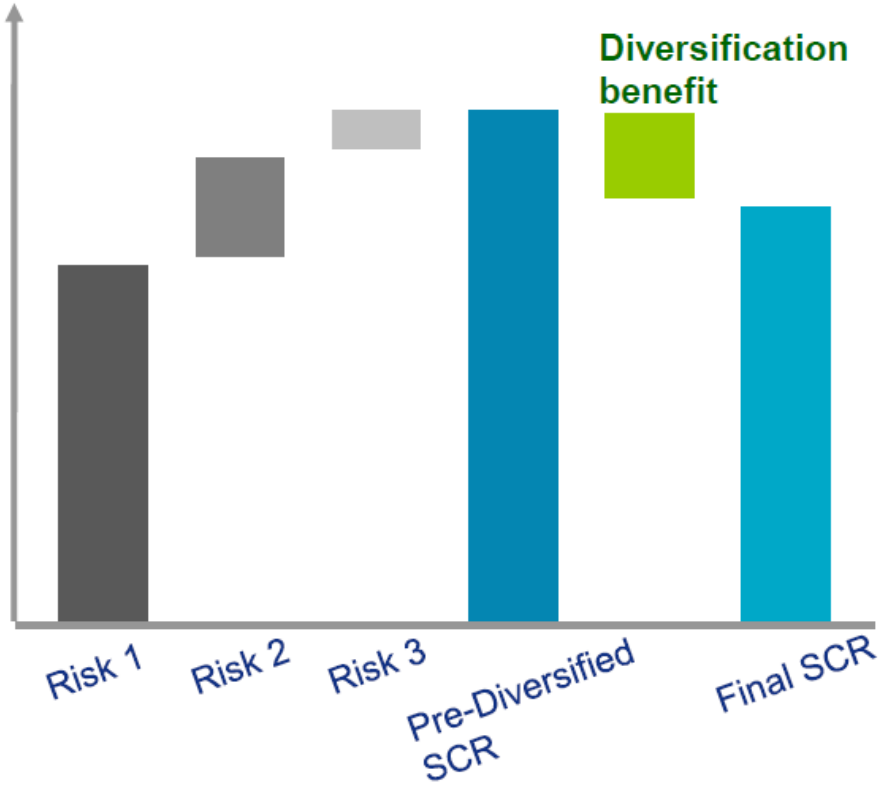
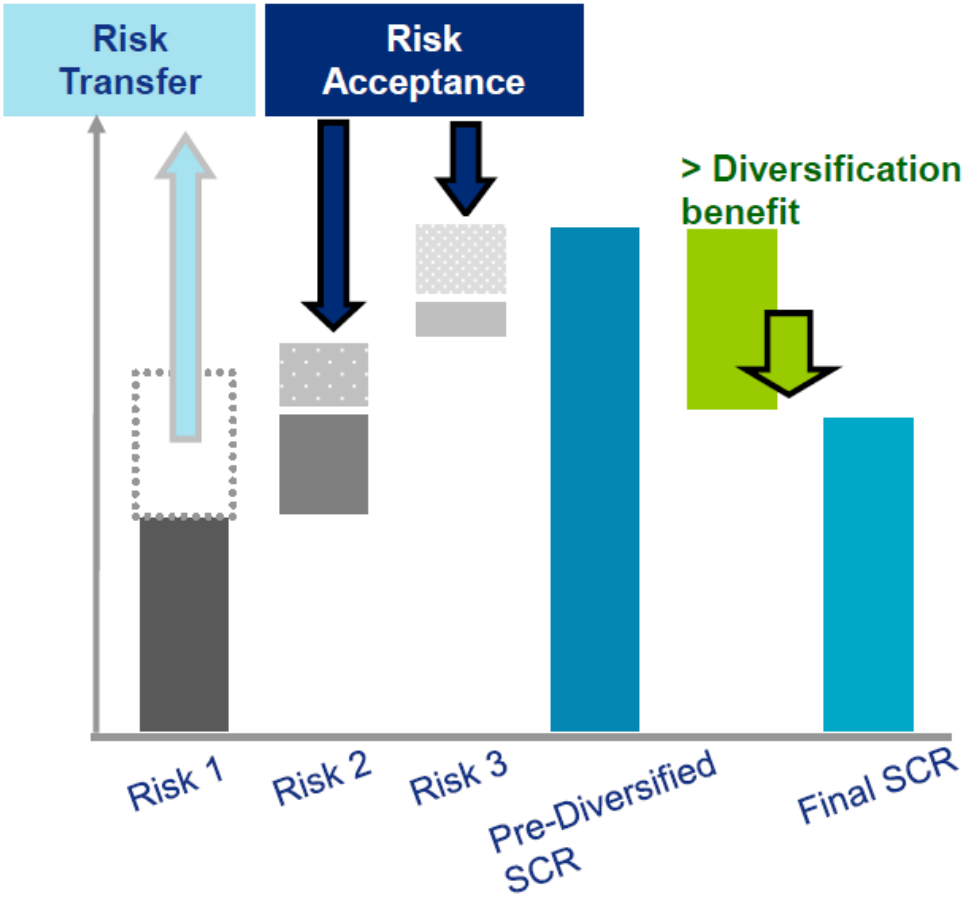


We optimize reinsurance
Holistic approach to capital management





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