

Natural Disasters Risk Management

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Swiss Re is at a glance



Swiss Re is a **leading and highly diversified global reinsurer**, founded in Zurich (Switzerland) in 1863

The company offers **traditional reinsurance products and related services** for property and casualty, as well as for life and health businesses

These traditional products are complemented by **insurance-based corporate finance solutions** and supplementary **services for comprehensive risk management**



Our financial strength¹ is currently rated:
Standard & Poor's: AA- (stable); Moody's Aa3 (stable); A.M. Best: A+ (stable)

Swiss Re named as the insurance sector leader in the 2014 **Dow Jones Sustainability Indices**



Key statistics (USD billions)	FY 2011	FY 2012	FY2013	FY 2014
Total revenues:	28.0	33.6	36.9	37.3
Net income:	2.6	4.2	4.4	3.5
Shareholders' equity:	29.6	34.0	33.0	36.0

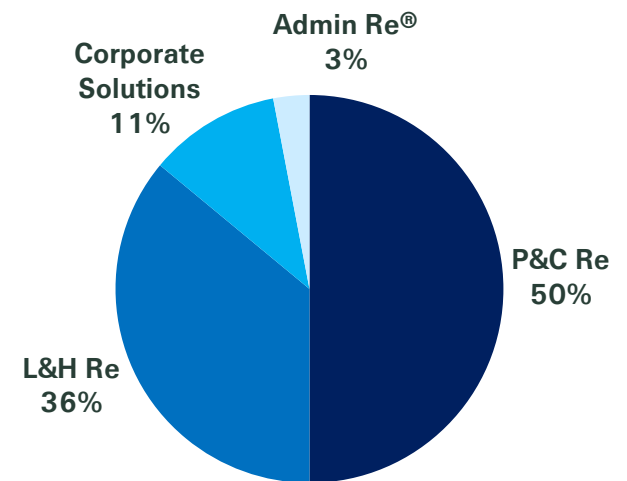
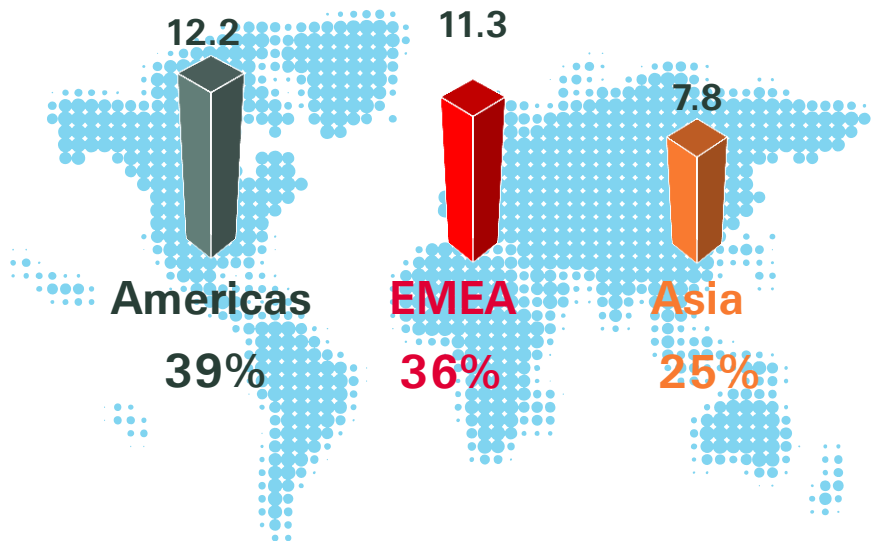
¹ As at 20 November 2015

Swiss Re is broadly diversified by geography and product line

Net premiums and fee income earned¹ 2014 (USD 31.3 bn)

by region (in USD bn)

... and by business segment

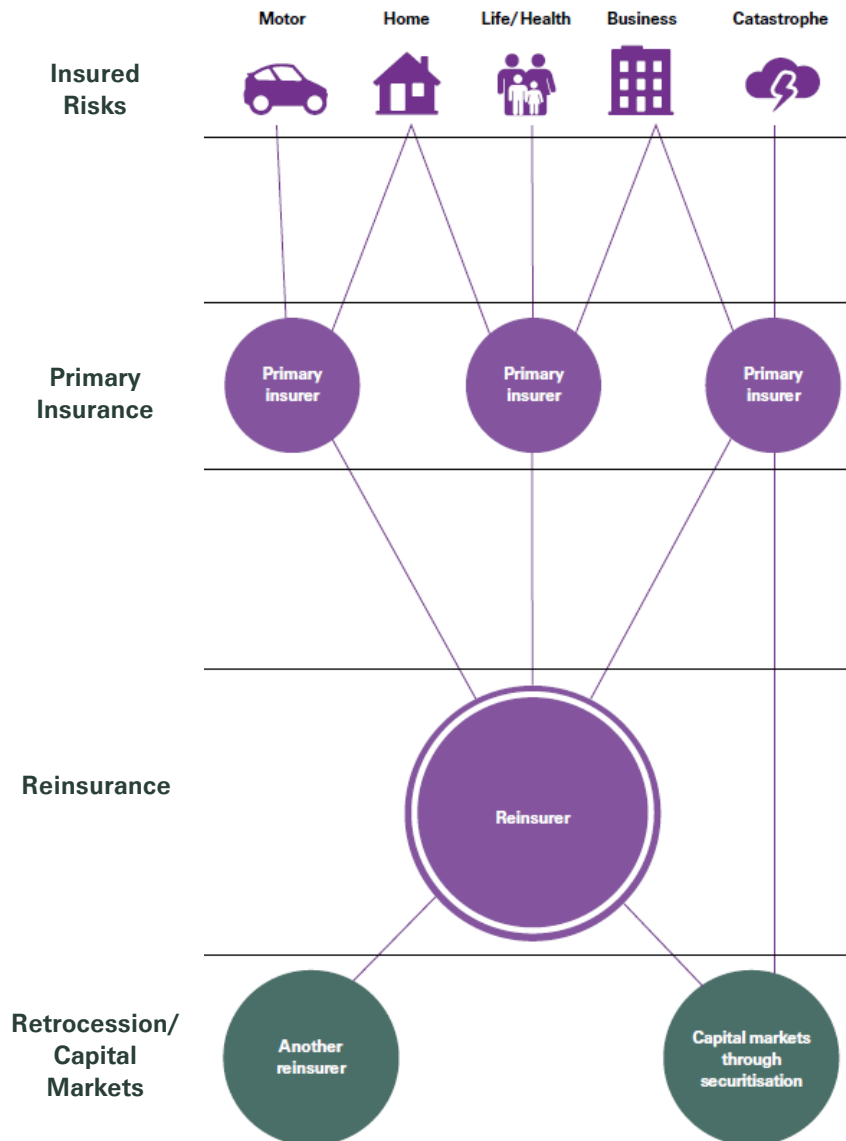


Swiss Re benefits from geographic and business mix diversification and has the ability to reallocate capital to achieve profitable growth

¹ Includes fee income from policyholders; does not reflect the exposure to HGMs through Principal Investments (PI)

Source: Swiss Re

Reinsurance A stabilising effect



Benefits of Reinsurance

Risk Transfer Function

Reinsurers allows primary insurers to smooth the impact of unexpected major losses and peak risks allowing them to benefit from reduced cost of capital.

Risk Finance Function

Reinsurance acts as an alternative finance source to equity and debt and allows global diversification, increasing insurers' capacity to take on risks, enabling economic growth and strengthening financial stability.

Information Function

Reinsurers support clients in pricing and managing risks, developing new products and expanding geographical footprint.

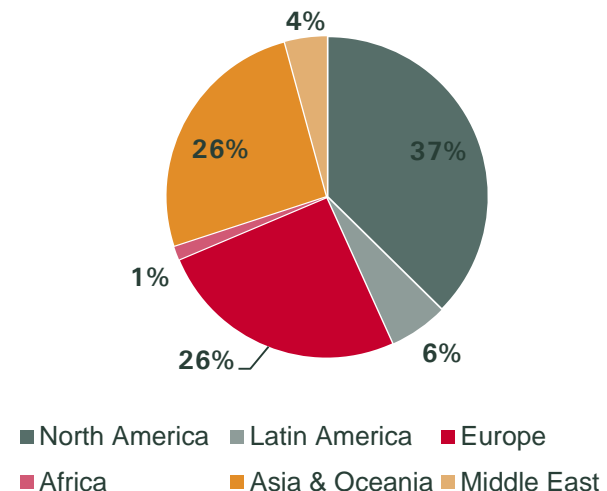
Reinsurers absorb shocks, provide capital for the real economy and support risk prevention

Reinsurance A truly global business and catalyst for economic growth

- Reinsurers take on the world's largest and most complex risks.
- The reinsurance business model depends on:
 1. The widest possible distribution of risks (**economies of scale**); and
 2. The utilization of diversification effects (**economies of scope**).
- Strong **geographic and risk diversification** is essential, it lowers the solvency risk of reinsurers and benefits ceding companies accordingly.
- However, **international risk pooling** is often impeded by national measures that constrain **market access** for non-domestic companies (e.g. in some countries in Latin America and Asia).

Non-life Reinsurance market, 2014

World Premium Income USD 191 bn



Source: Swiss Re, Economic Research & Consulting

Key messages

- Large Nat Cat scenarios in emerging economies gain significance (e.g. EQ, windstorms / tropical cyclones and flood/drought in Latin America)
- The effective reduction of the NatCat protection gap and financing of catastrophic risks requires a combined response by both private and public sector players
 - Re/insurance sector with broad geographical and risk diversification which is required to absorb these risks in a cost-efficient way
 - Valuable knowledge and experience in dealing with catastrophe risk management
 - Traditional products complemented by parametric & insurance-based capital markets solutions
 - Political and regulatory framework conditions that facilitate adaptive responses by individuals, the private and public sectors
 - Importance to consider pre-event (incl. risk transfer) and post-event public financing options
- In-house expertise: we use a proprietary natural catastrophe model for underwriting and risk management
- Integrated approach
 - underwriting
 - portfolio monitoring
 - portfolio steering
 - risk management

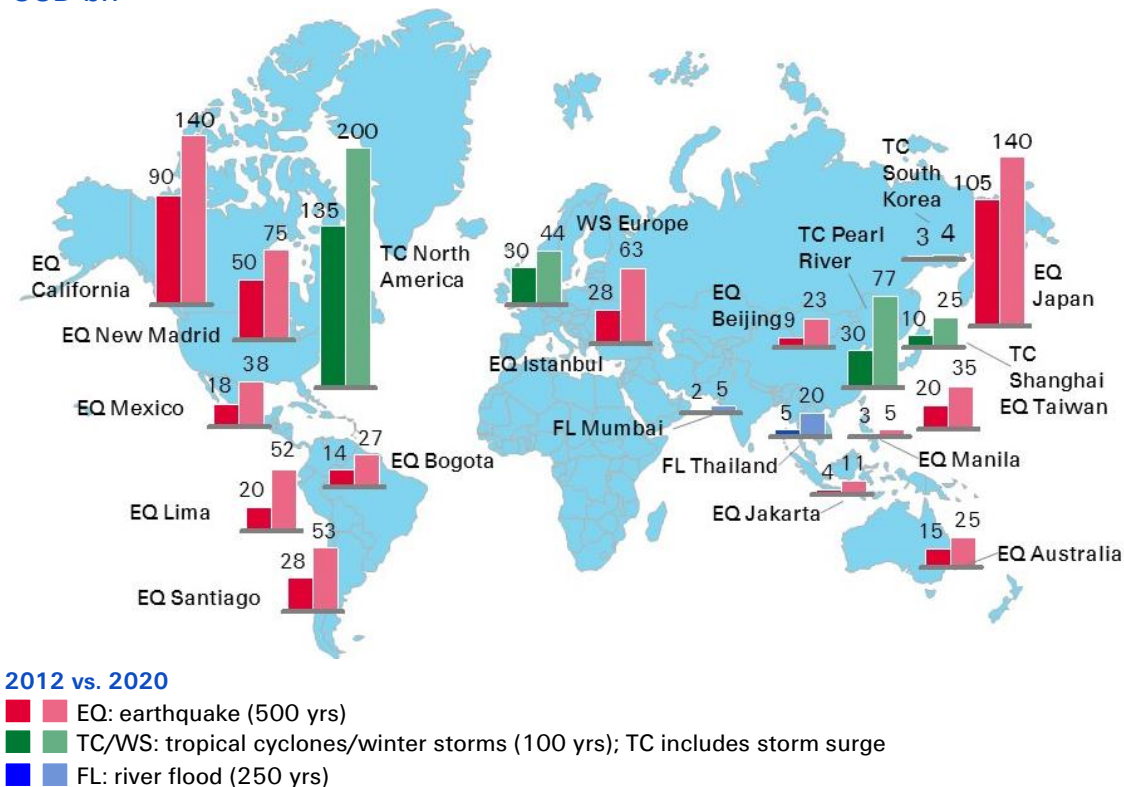
} seamless IT systems and data flow
- Swiss Re NatCat model is being assessed by Group-wide supervisor

Natural catastrophe business

Large Nat Cat scenarios in emerging economies gain significance

Increased demand in HGM Nat Cat insurance ...

Largest market loss scenario per region USD bn

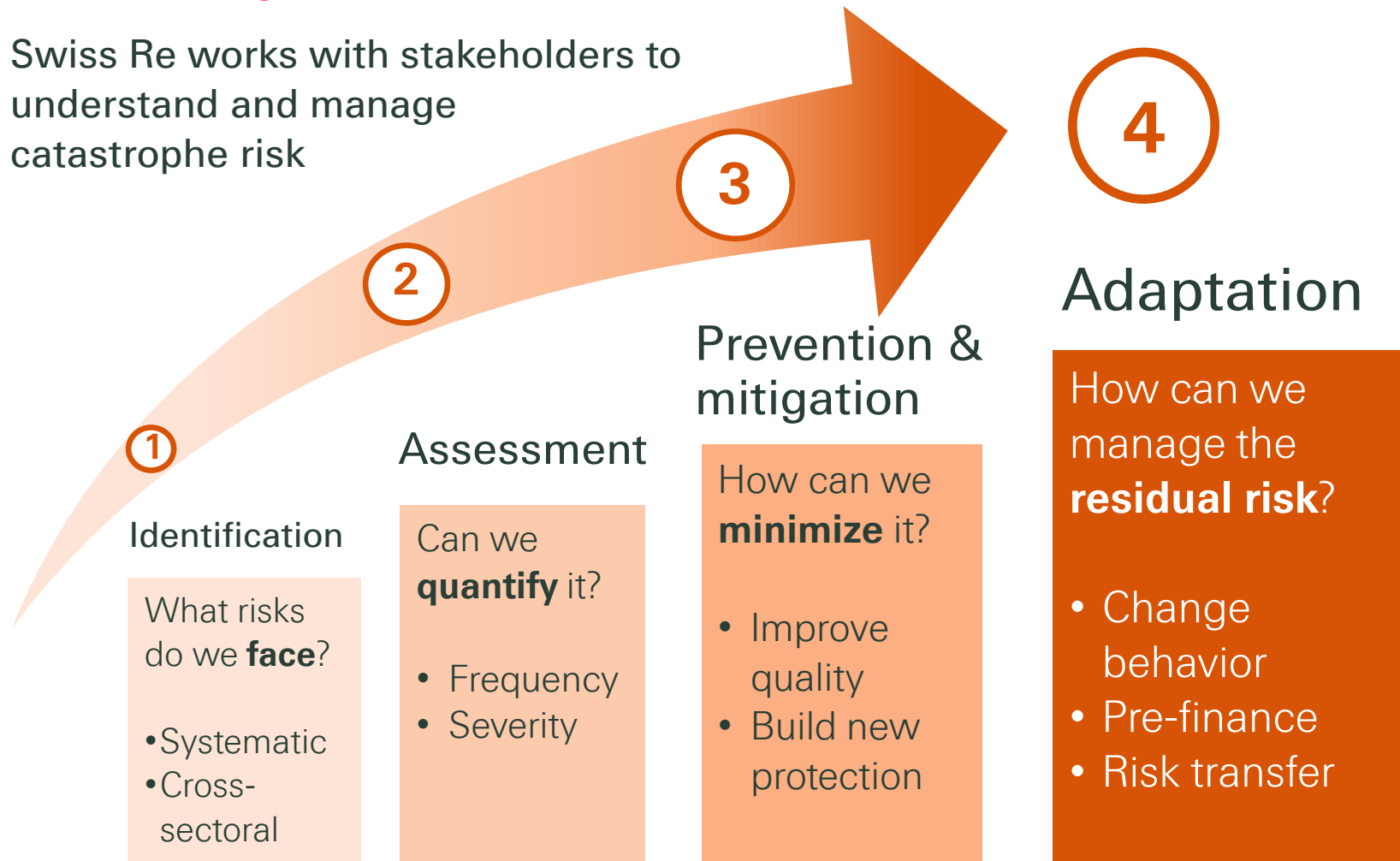


... is driven by ...

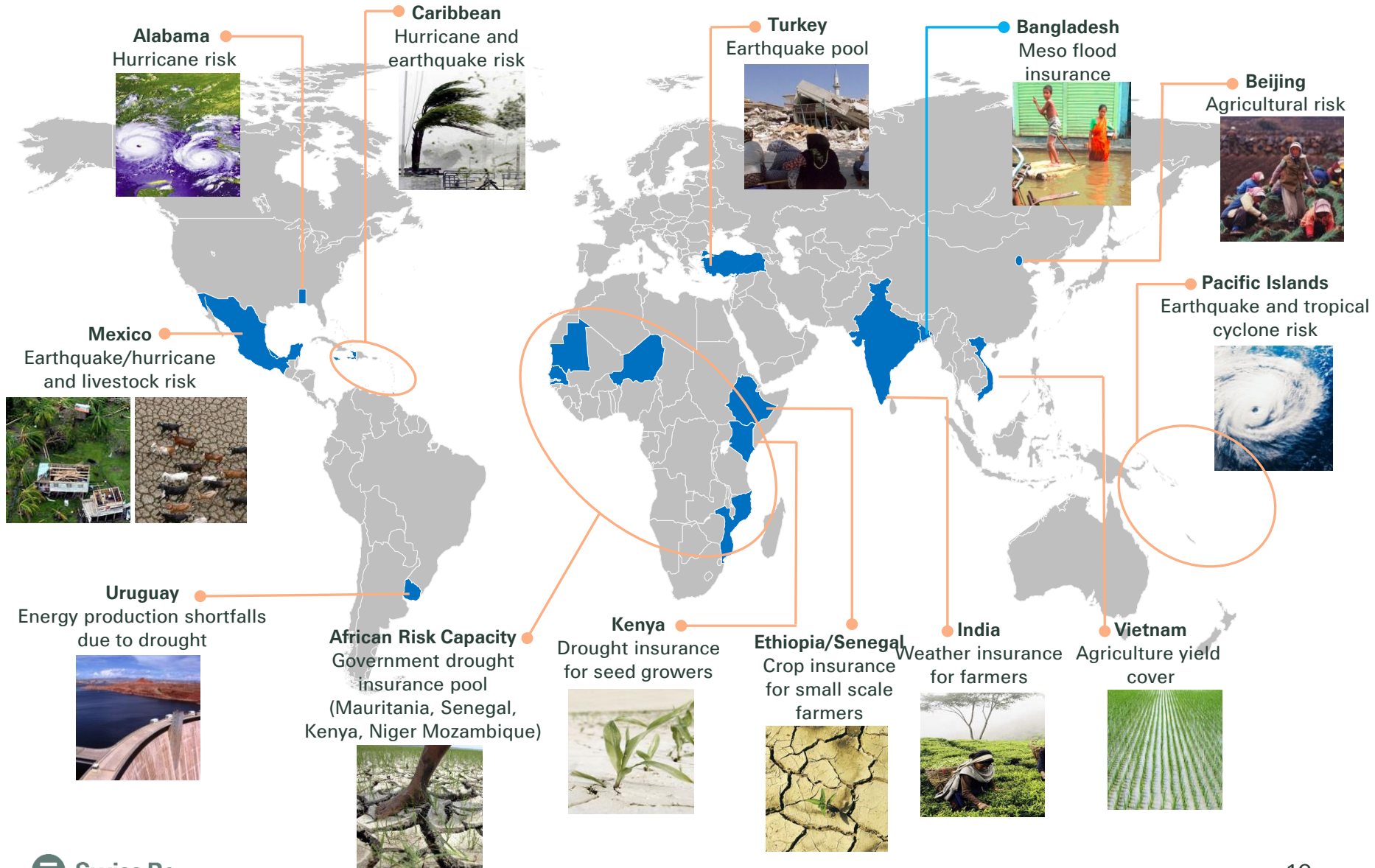
- Strong underlying growth in exposed economic values
- Globalization shifting commercial activity to higher risk areas
- Growth of middle class population leading to higher insurance penetration
- Governments moving Nat Cat loss burden into the private sector

Risk transfer and financing is a pillar of integrated disaster risk management

Swiss Re works with stakeholders to understand and manage catastrophe risk



Examples of innovative risk transfer solutions



Economics of Climate Adaptation: assess and address climate-related damage and design adaptation strategies



US Gulf Coast:
Hurricane risk to the energy system



New York:
Cyclones and surge risk to a metropolis



Hull, UK: Flood and storm risk to urban property



China: Drought risk to agriculture



Bangladesh: Flood risk to a fast-developing city



Florida: Hurricane risk to public and private assets



India: Drought risk to agriculture



Caribbean: Hurricane risk to small islands



El Salvador: Flood and landslide risk to vulnerable people



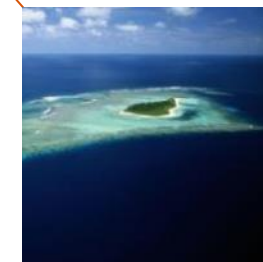
Guyana: Flash flood risk to a developing urban area



Mali: Risk of climate zone shift to agriculture



Tanzania: Drought risk to health and power generation



Samoa: Risk of sea level rise to a small island state

Research driven NatCat underwriting

Think tank "Cat Perils"



In-house models are a key resource for accurate underwriting at reasonable cost

- Taylor-made, state-of-the-art models to allow efficient Underwriting process
- No black box approach
- Option to react swiftly on new findings e.g. EQ Chile BI, Japan EQ aftershocks

Engineers Physicists
Meteorologists
Geologists
Hydrologists

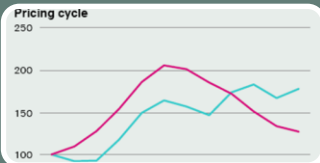
Team of experts develops custom made solutions and trains underwriters

- Value proposition and client centric approach as key drivers
- Structure and rate complex cases due to available R&D data set, e.g. ILS
- Educated underwriters to go beyond simple tool usage, strong link to Universities



Valuable client services and branding

- Own R&D and natcat risk awareness brings added value to clients and builds SR reputation
- Client tools e.g. CatNet
- Support communication activities of Swiss Re with sound expertise



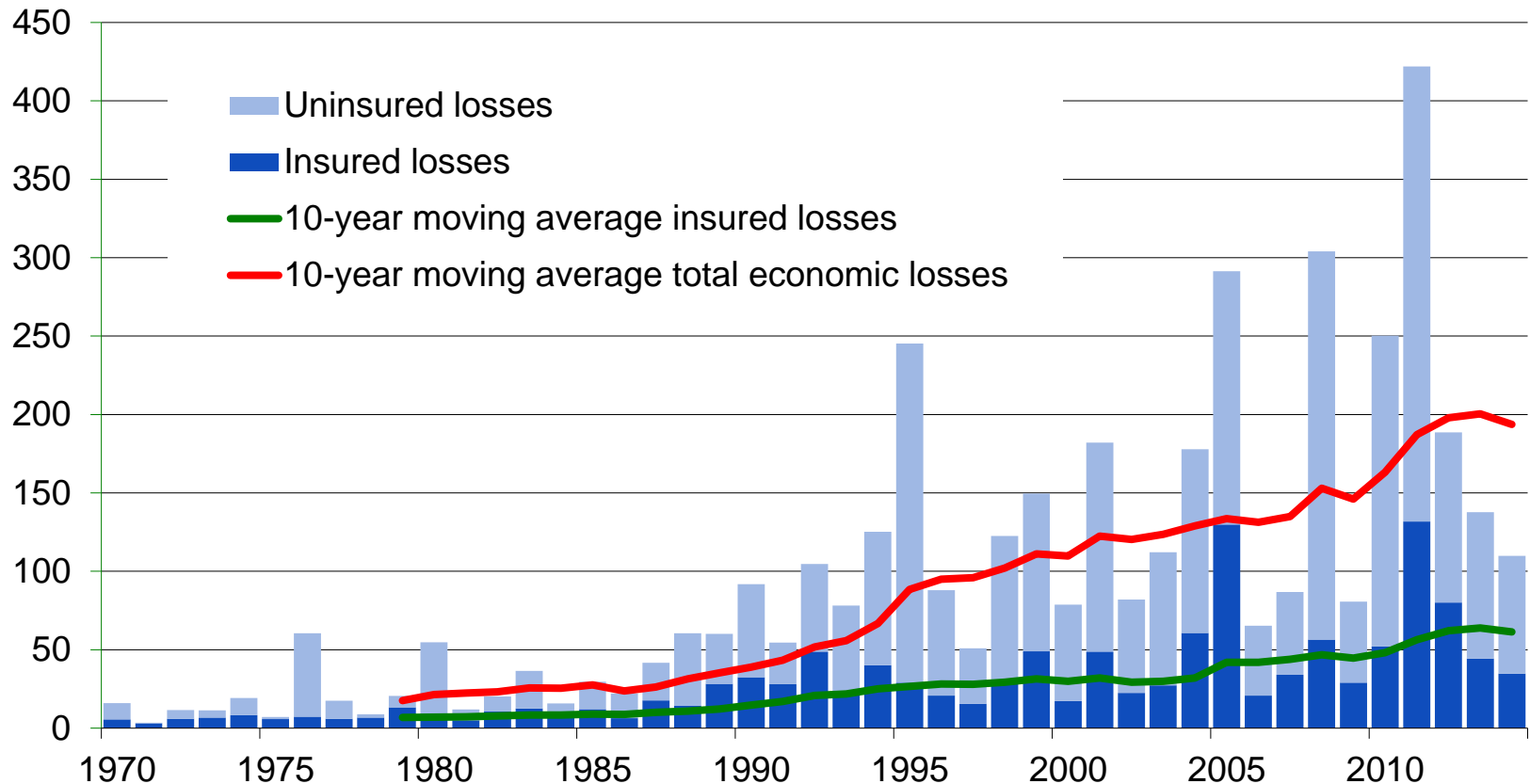
Integrated & transparent risk management

- All relevant lines of business included, automatic process
- Successful portfolio steering thanks to transparent figures and sound hazard assessment
- No big surprises as long as "mother nature behaves"

Closing the protection gap

The growing burden of uninsured losses

Natural catastrophe losses 1970 – 2014 (in 2014 USD)



Source: Swiss Re Economic Research & Consulting and Cat Perils.

- In Latin America increased protection and insurance penetration for Nat Cat risks is needed from
 - hurricane risk (e.g. Mexico, Central America and Caribbean);
 - earthquake risk (e.g. in Mexico, Central America and Andean countries);
 - flood risk (e.g. in Brazil, Argentina, Mexico, Central America, Venezuela, Andean countries)
 - drought risk (e.g. in Brazil)

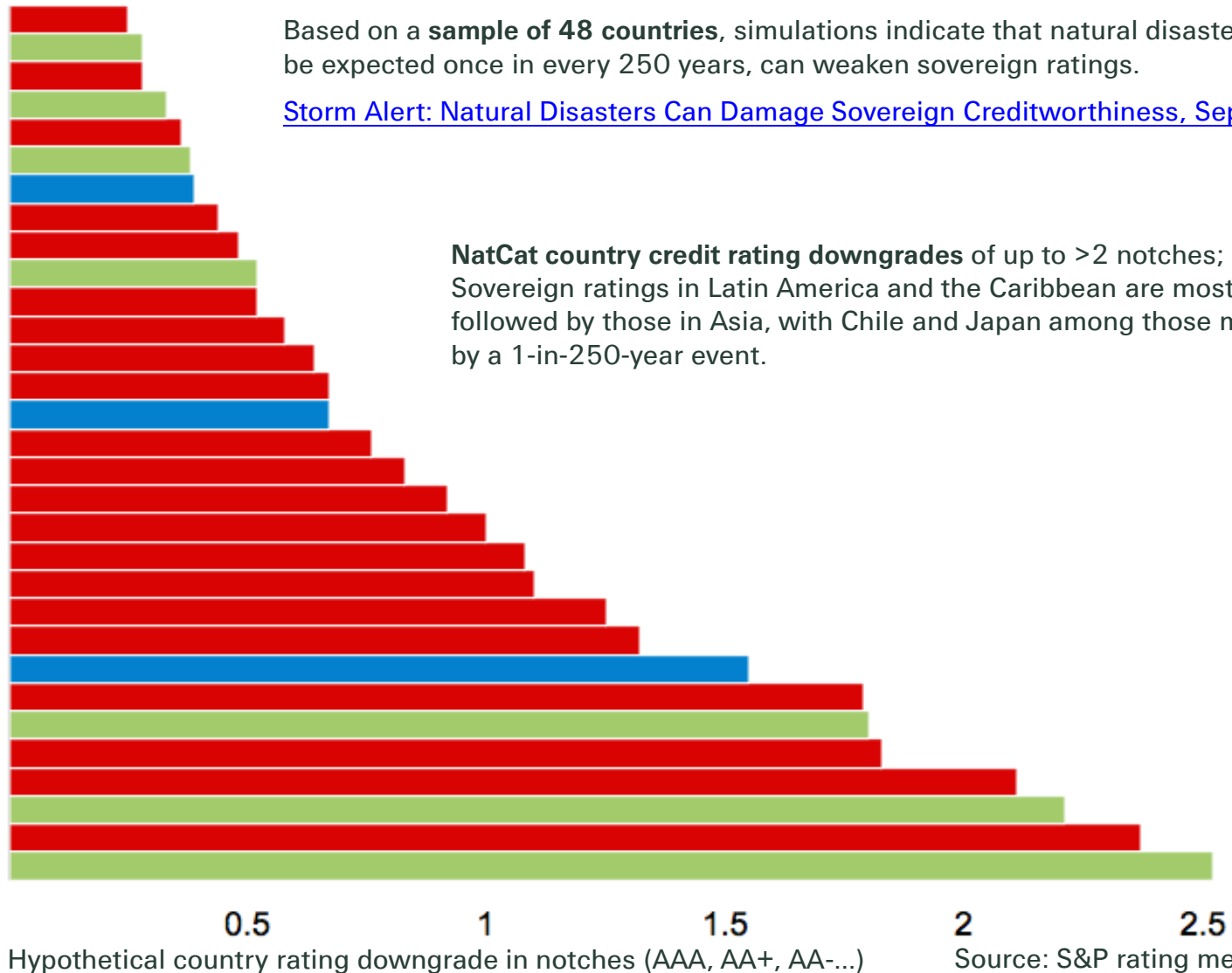
Sovereign rating impact of Nat Cat events

■ Flood ■ Tropical Cyclone ■ Earthquake

Based on a **sample of 48 countries**, simulations indicate that natural disasters, which can be expected once in every 250 years, can weaken sovereign ratings.

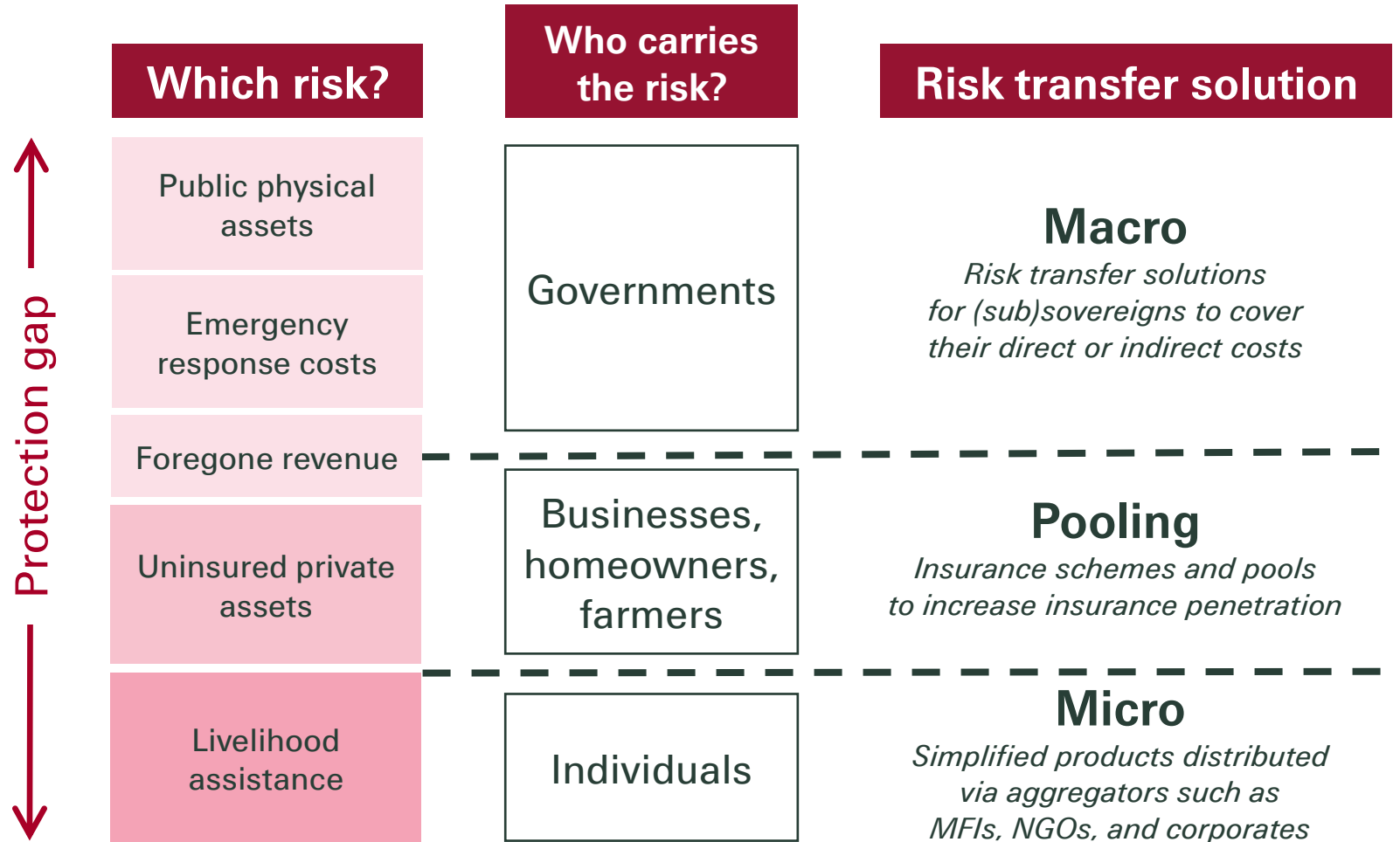
[Storm Alert: Natural Disasters Can Damage Sovereign Creditworthiness, September 2015](#)

NatCat country credit rating downgrades of up to >2 notches; Sovereign ratings in Latin America and the Caribbean are most at risk, followed by those in Asia, with Chile and Japan among those most affected by a 1-in-250-year event.



Source: S&P rating methodology, [climada](#) and Swiss Re expertise

How to close the protection gap



Understanding nat cat models

Swiss Re's proprietary model considers four elements that determine a cat loss

Hazard

Vulnerability

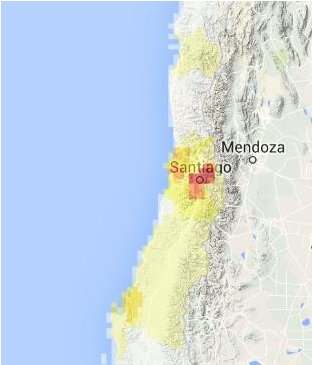
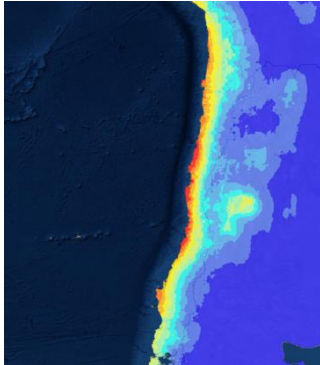
Value distribution

Cover conditions

How often / how strong?

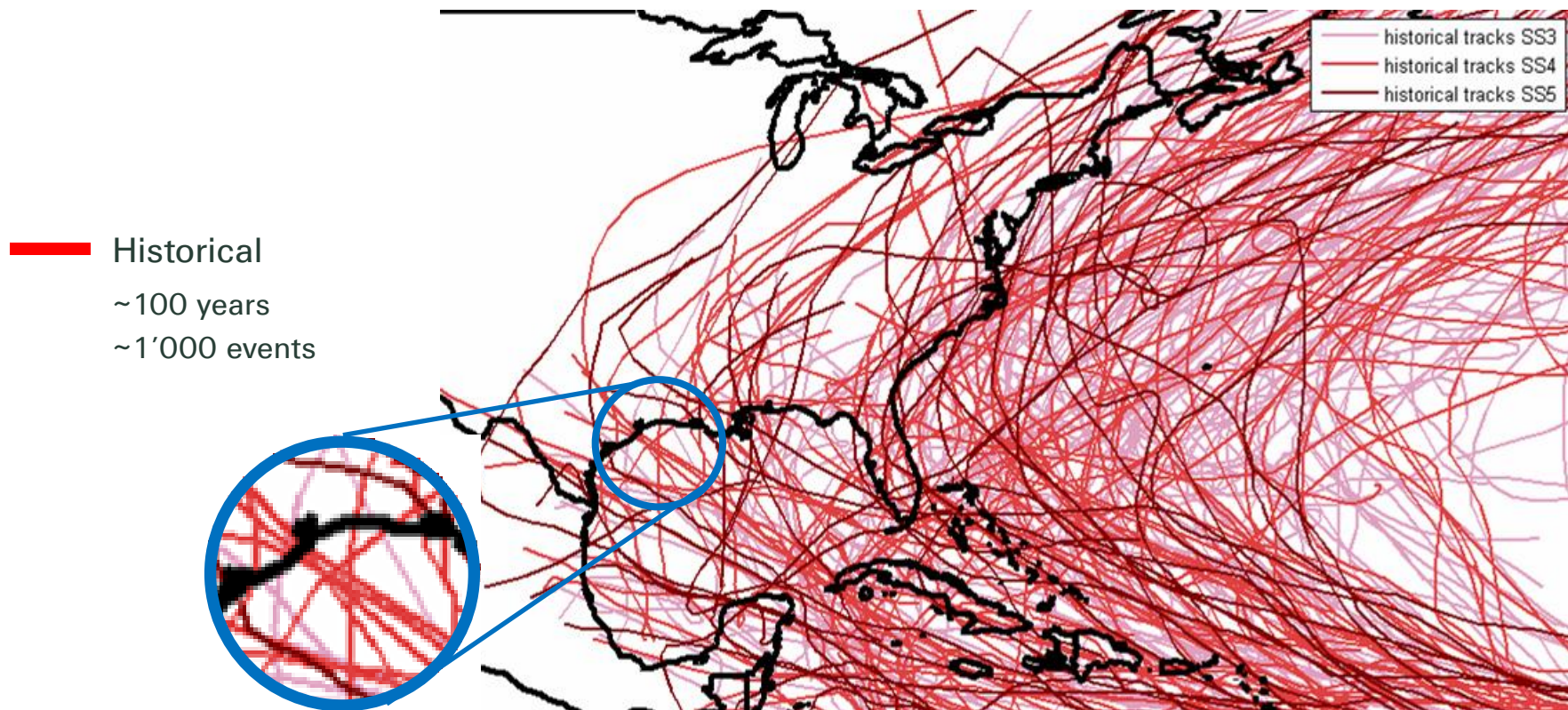
How well built and protected?

What exactly is covered ... where... and how?



- Sums insured
- Cover limits
- Deductibles
- Exclusions
- etc.

Tropical cyclones in the north Atlantic historical tracks

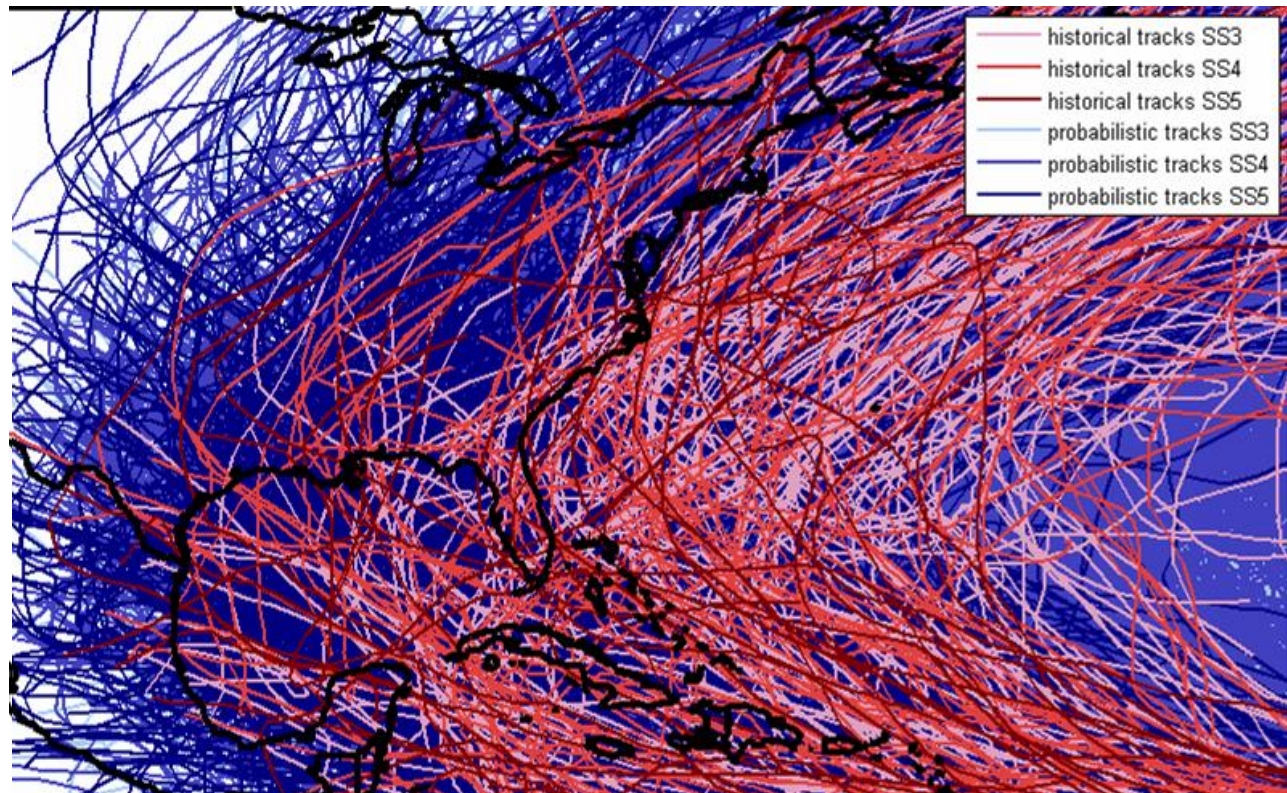


Even 100 years worth of historical events are not enough to fully reflect risk.

Tropical cyclones in the north Atlantic - historical and probabilistic tracks

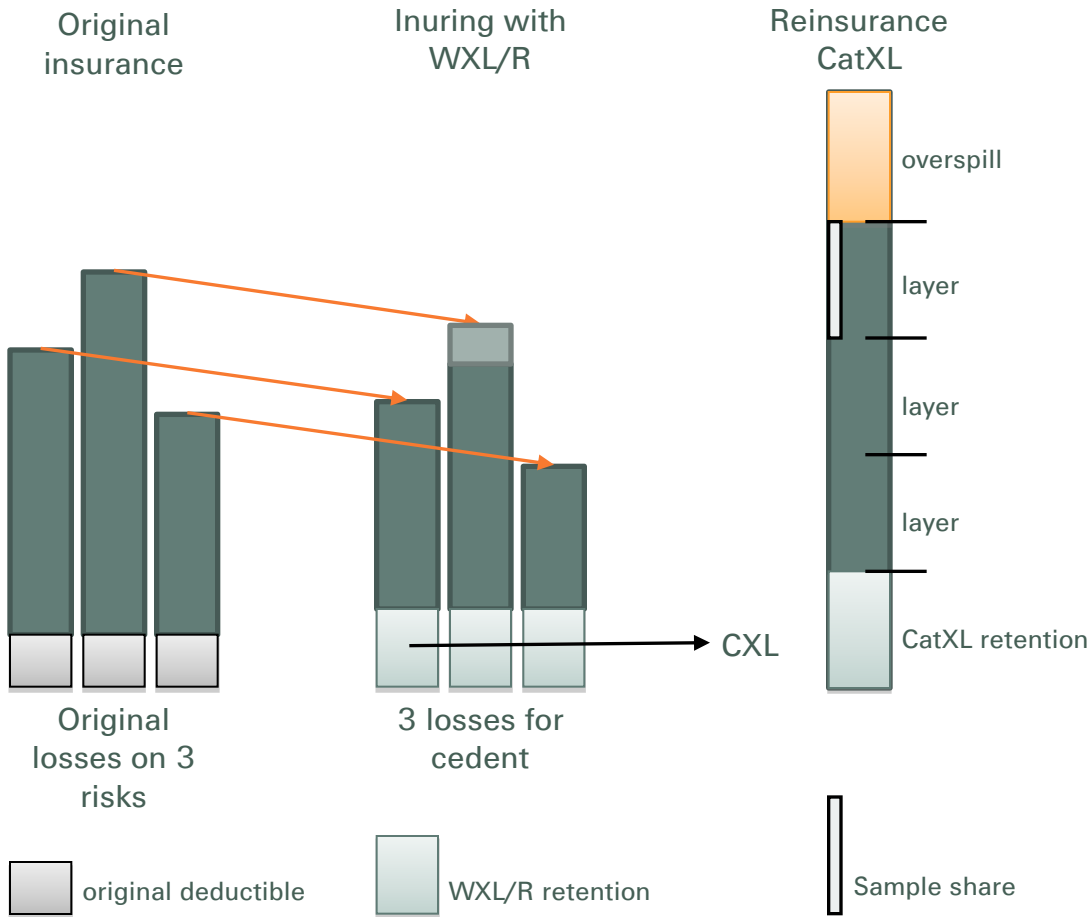
— historical
~100 years
~1'000 events

— probabilistic
~20'000 years



Probabilistic event set aims at reflecting full range of possible storms.

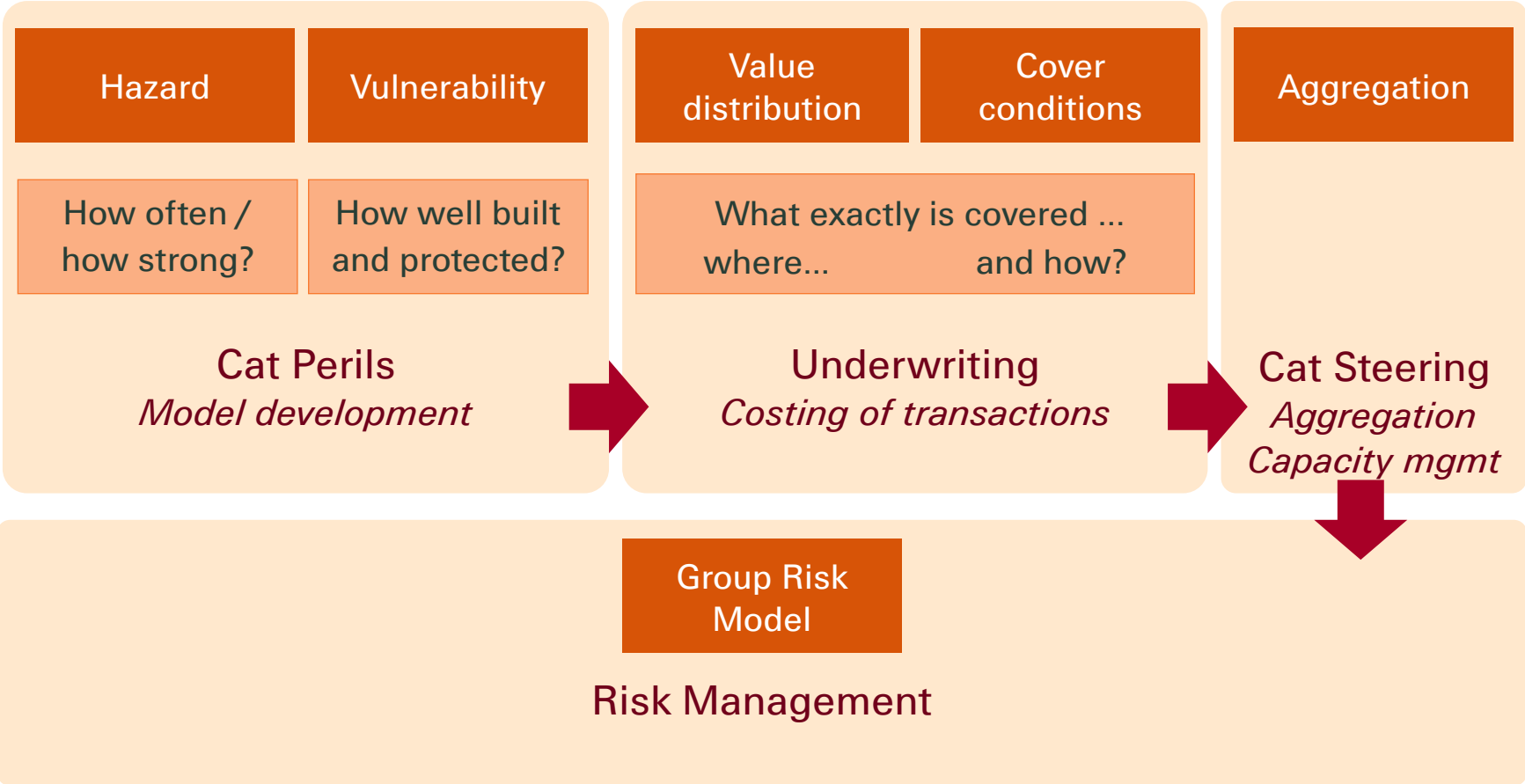
Insurance structure



- CatServer distinguishes between original conditions (primary insurer with policyholder, inuring and reinsurance conditions).
- Inuring conditions can be a WXL/R, quota share or surplus which acts prior the CatXL.
- The CatXL is structured in MultiSNAP.
- Swiss Re works with its clients and wider stakeholders to manage natural catastrophe risks by providing traditional products which are complemented by insurance-based capital markets solutions (e.g. ILS) and supplementary services for comprehensive natural catastrophes risk management

Modelling framework, data flow and Risk Management

Responsibilities and flow of data



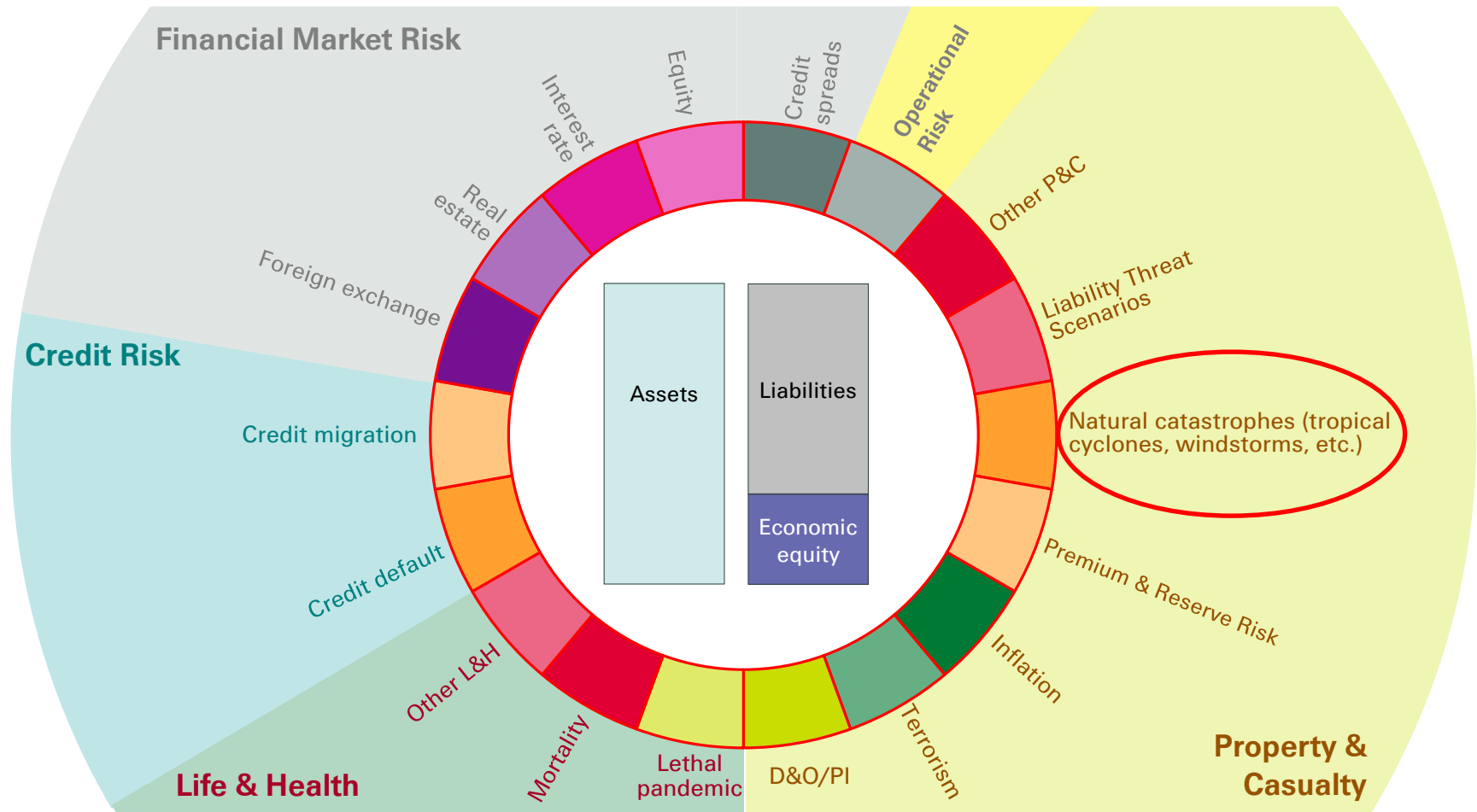
Exposure data is extensively validated in underwriting process and models reviewed on a regular basis

- Meaningfulness and completeness of exposure information used for costing is ensured by responsible underwriters
- Regular meetings with underwriters of client and on-site file reviews help to validate client processes and exposure data
- Four-eye review for all transactions
- As a standard policy, model output based on exposure information from client is the starting point for underwriting
- Adjustments for individual accounts
- Systematic adjustments

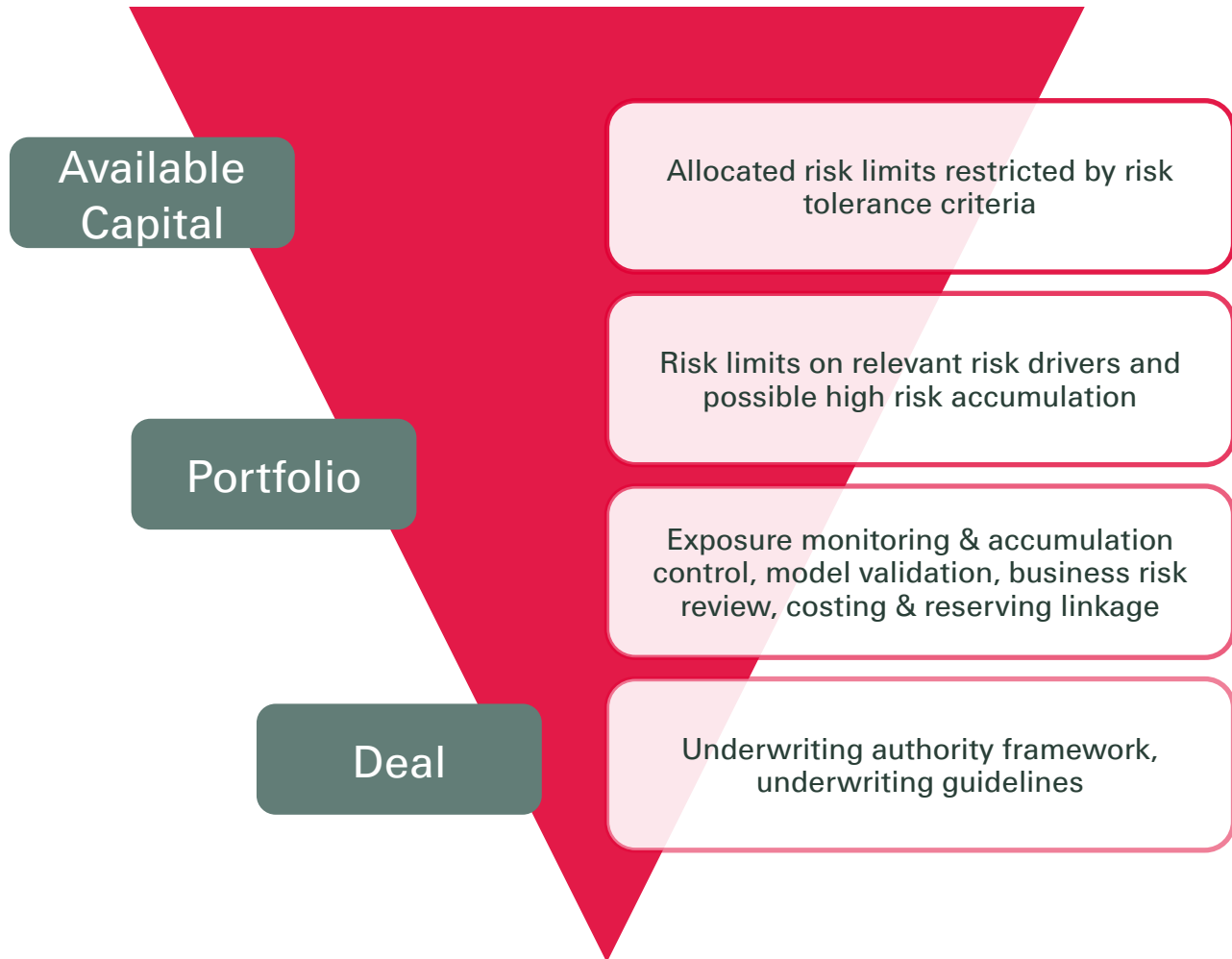
Referral process and audits provide additional validation of costing; Cat Steering validates data reported by UWs

- Referrals
- Business Risk Reviews
- In each underwriting hub, a dedicated “cat manager” is responsible for quality and completeness of exposure data.
- Data is reviewed by the Cat Steering Unit in close collaboration with cat managers.
- Various consistency checks are carried out, including thorough analysis of changes.
- Full consistency of data ensured via directly linked databases between Underwriting, Cat Steering and Risk Management

Natural catastrophes models are an integral part of the Swiss Re Group Risk Model



Risk controls in place





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