



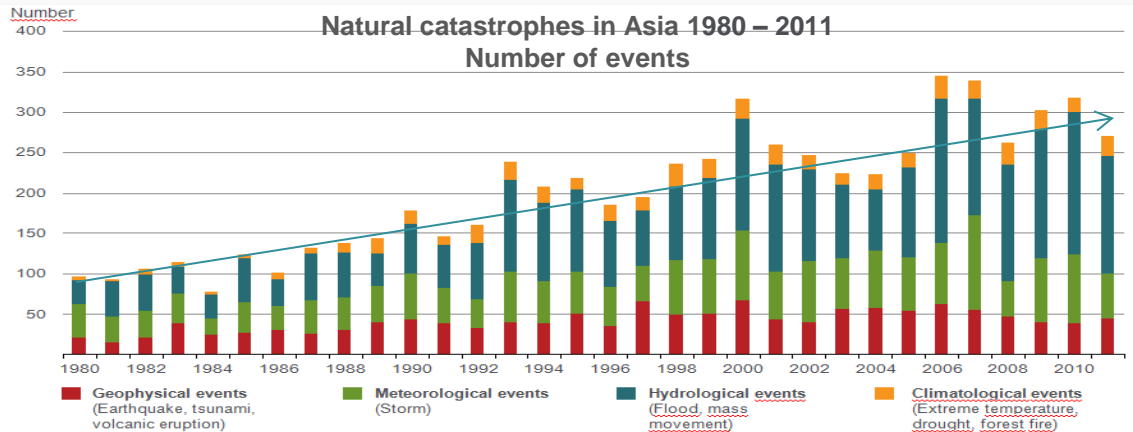
NAT-CAT RISK MANAGEMENT

Thomas Mahl, RID 1.3

Risk Solutions

Munich RE 

The last 30 years have seen a significant increase in losses caused by natural disasters



Weather-related natural disasters in particular are on the rise:

The average over the last 10 years (708) is considerably higher than the average for the last 30 years (550) → +29%

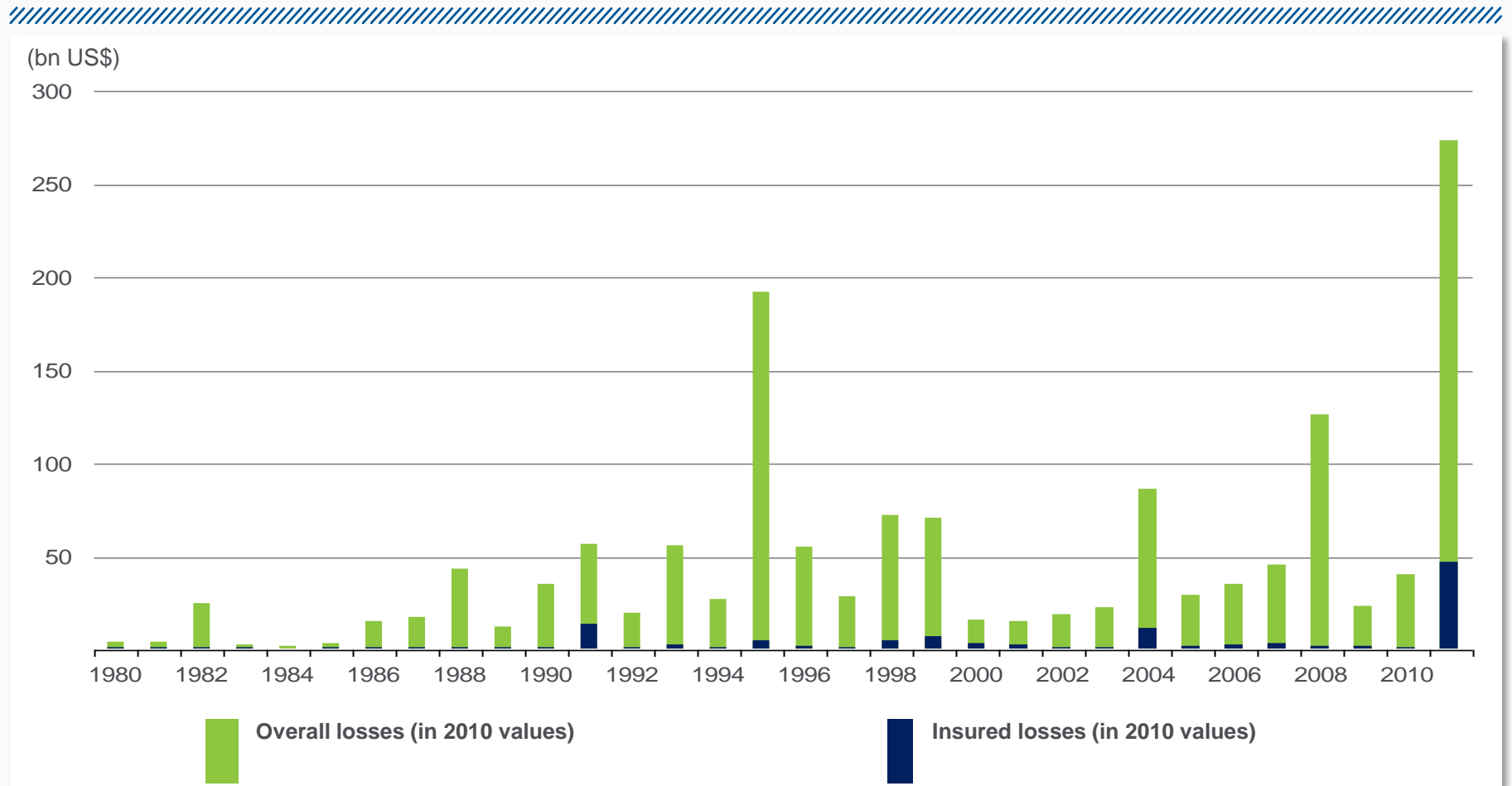


Past drivers of trends will continue to determine the further course of events:

- Population growth
- Concentration of population, location as well as values in conurbations ("urbanization")
- Settlement and industrialization of heavily exposed regions
- Climate change

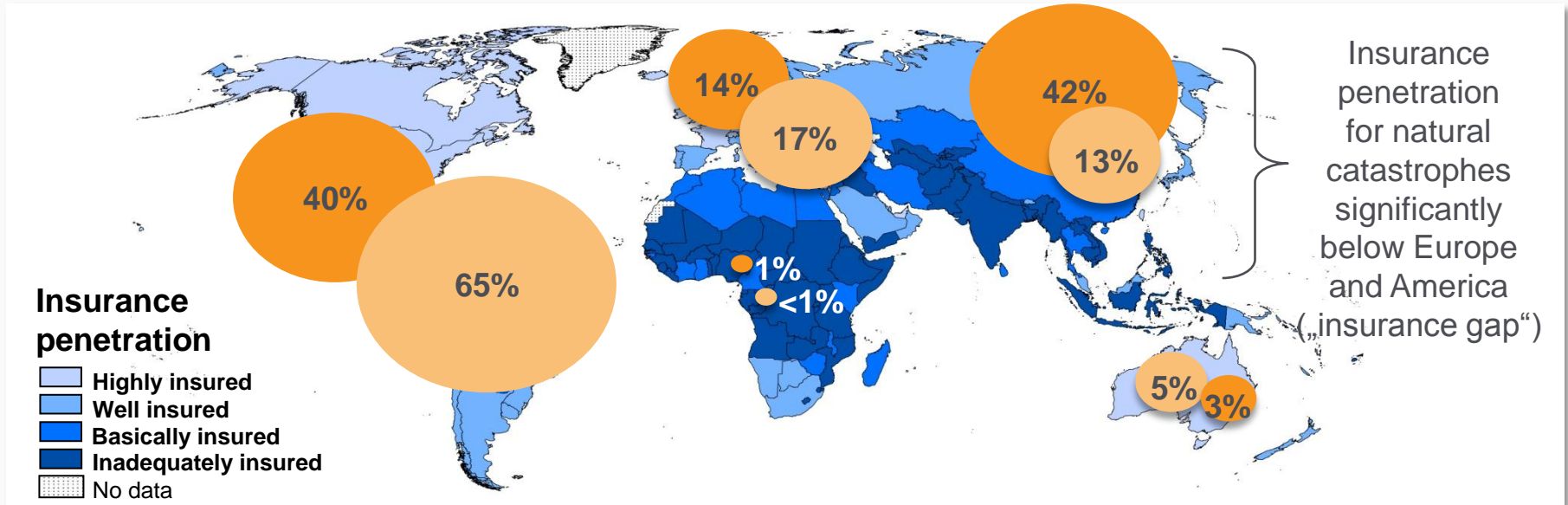
Natural catastrophes in Asia 1980 – 2011

Overall and insured losses



Natural catastrophes worldwide 1980 – 2011

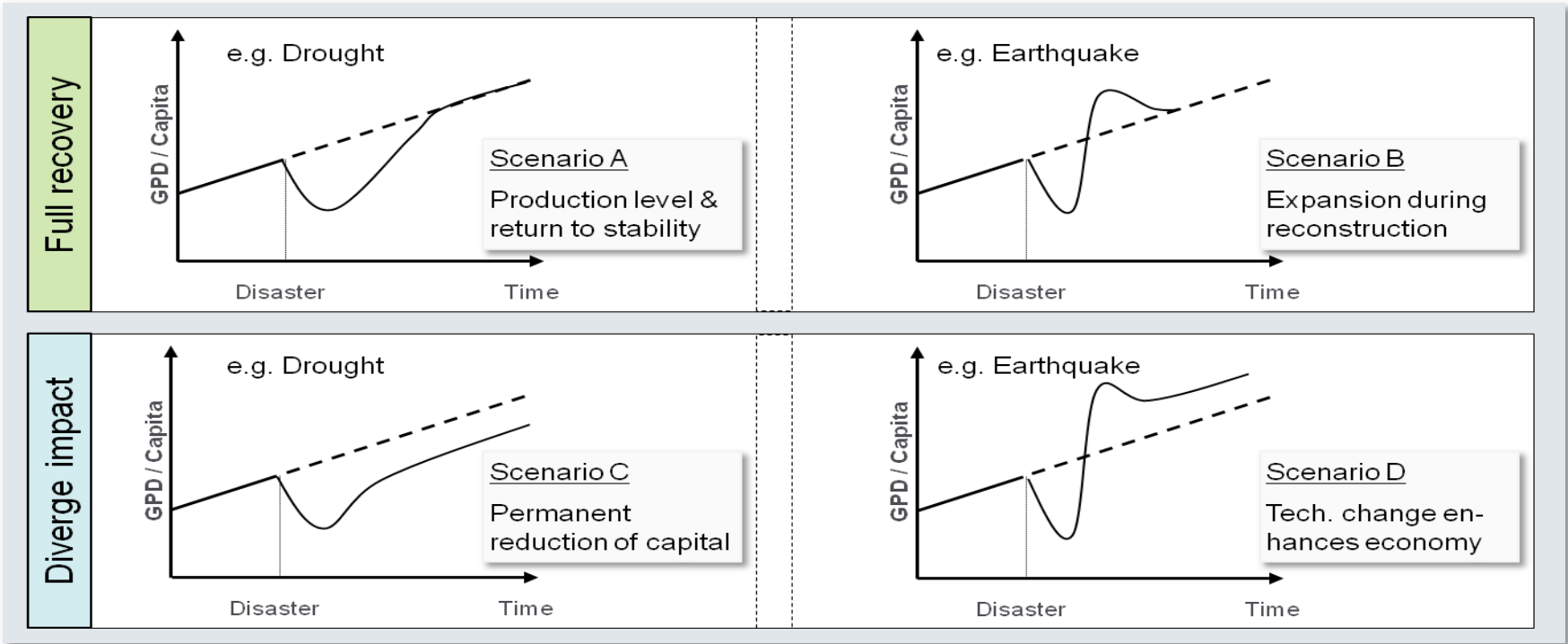
Overall losses and insured losses



Continent	Overall losses US\$ m (in 2011 values)	Insured losses US\$ m (in 2011 values)
America (North and South America)	1,407,000	566,000
Europe	495,000	146,000
Africa	44,000	2,000
Asia	1,450,000	115,000
Australia/Oceania	104,000	41,000

Natural Catastrophes – consequences

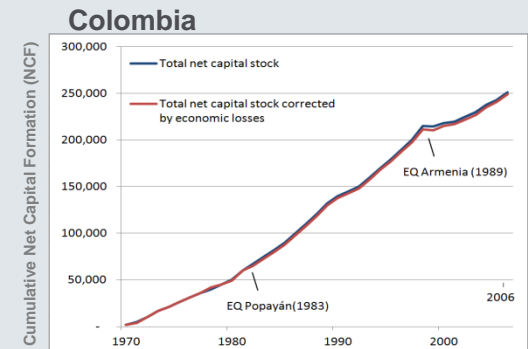
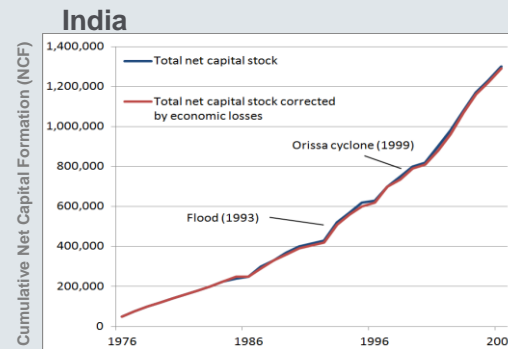
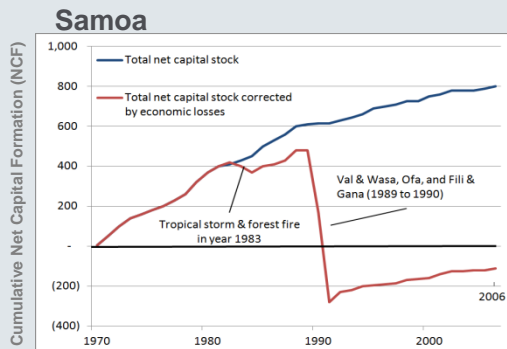
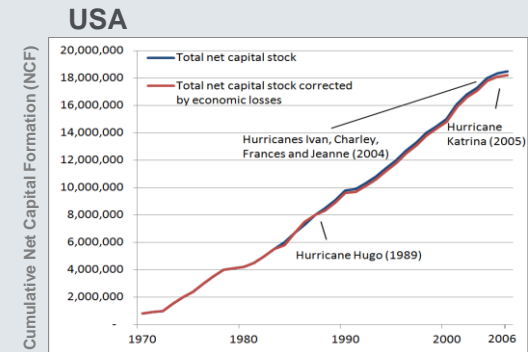
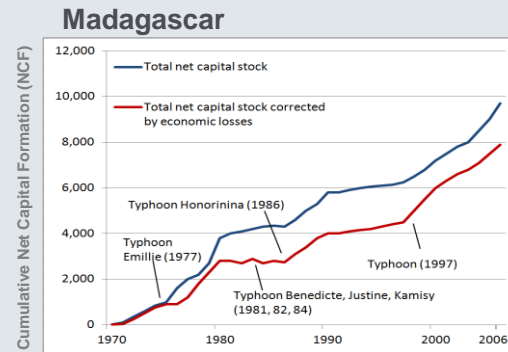
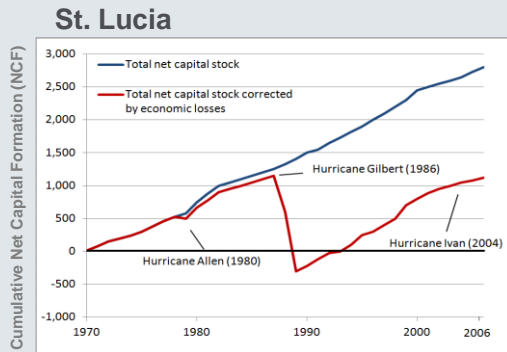
Long-term impact on GDP



Natural Catastrophes instantly destroy human and physical capital leading to immediate loss in annual production. Mid- and long-term impacts can however be very diverse.

Only a few countries can afford to be “risk-neutral” regarding natural disaster risk

Development of Cumulative Net Capital Formation (in millions of constant 2000 US\$)



Larger economies are often less effected, but still with noticeable impact

An intuitive approach suggests a certain differentiation of countries



Industrialised countries

Tend to suffer **higher economic losses** in strict dollar terms

High insurance penetration for property

Immediate emergency and medical **care** available

Have mechanisms to avoid loss of life (**early warning systems**)



Retain risks

Developing countries

Natural hazards cause **setbacks to economic** and social **development**

Lower insurance penetration and higher vulnerability of property

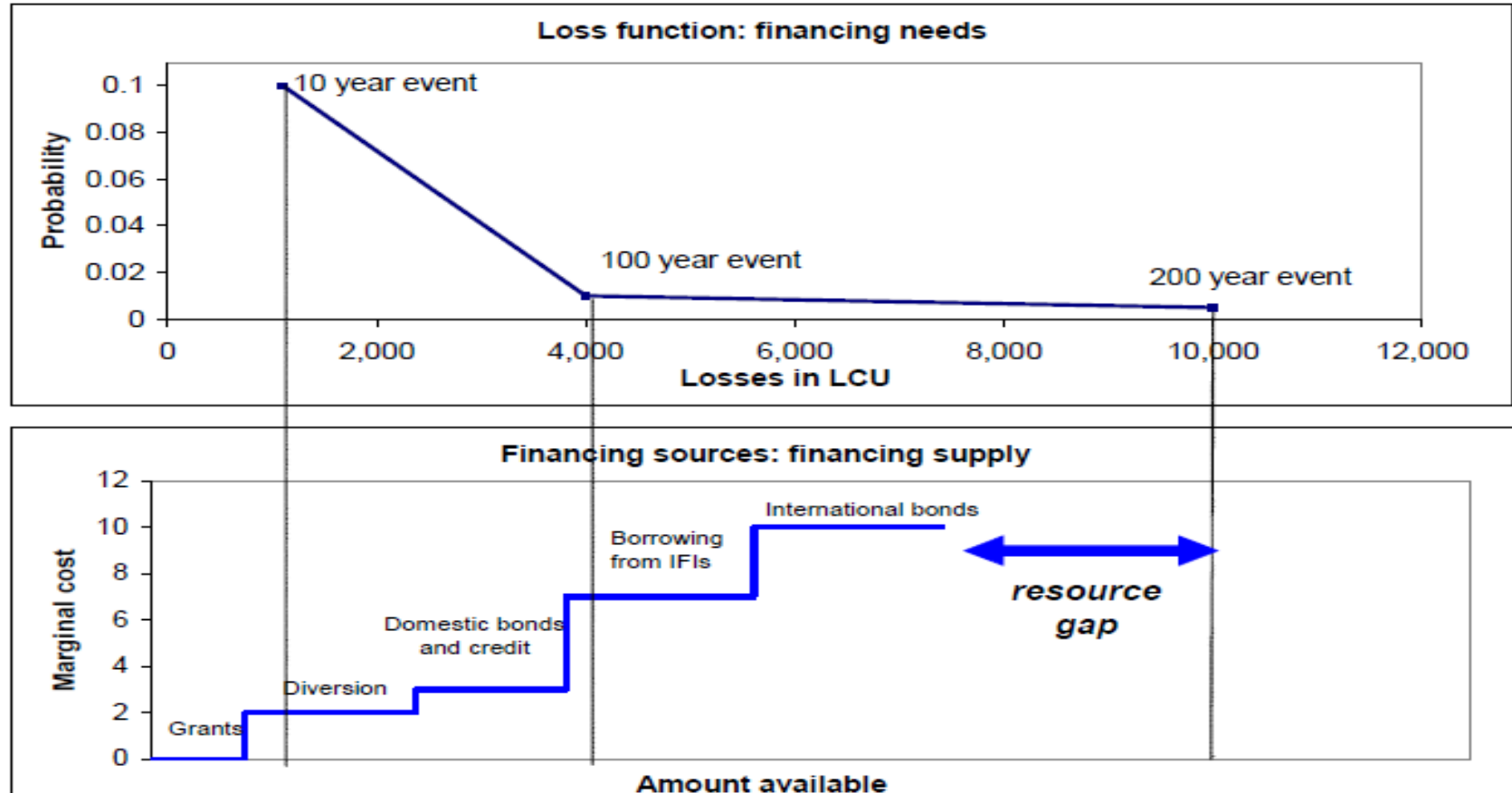
Limited availability of **medical care infrastructure**

Lack of resources for **early warning systems**



Transfer risks

Losses and financing coping capacities determine the entry point for risk financing options



Allocation Function

Provision of public goods and assets (own risk)



Correction of market failures:
Shallow insurance markets



Distribution Function

Transfer to poor and those in need post catastrophe



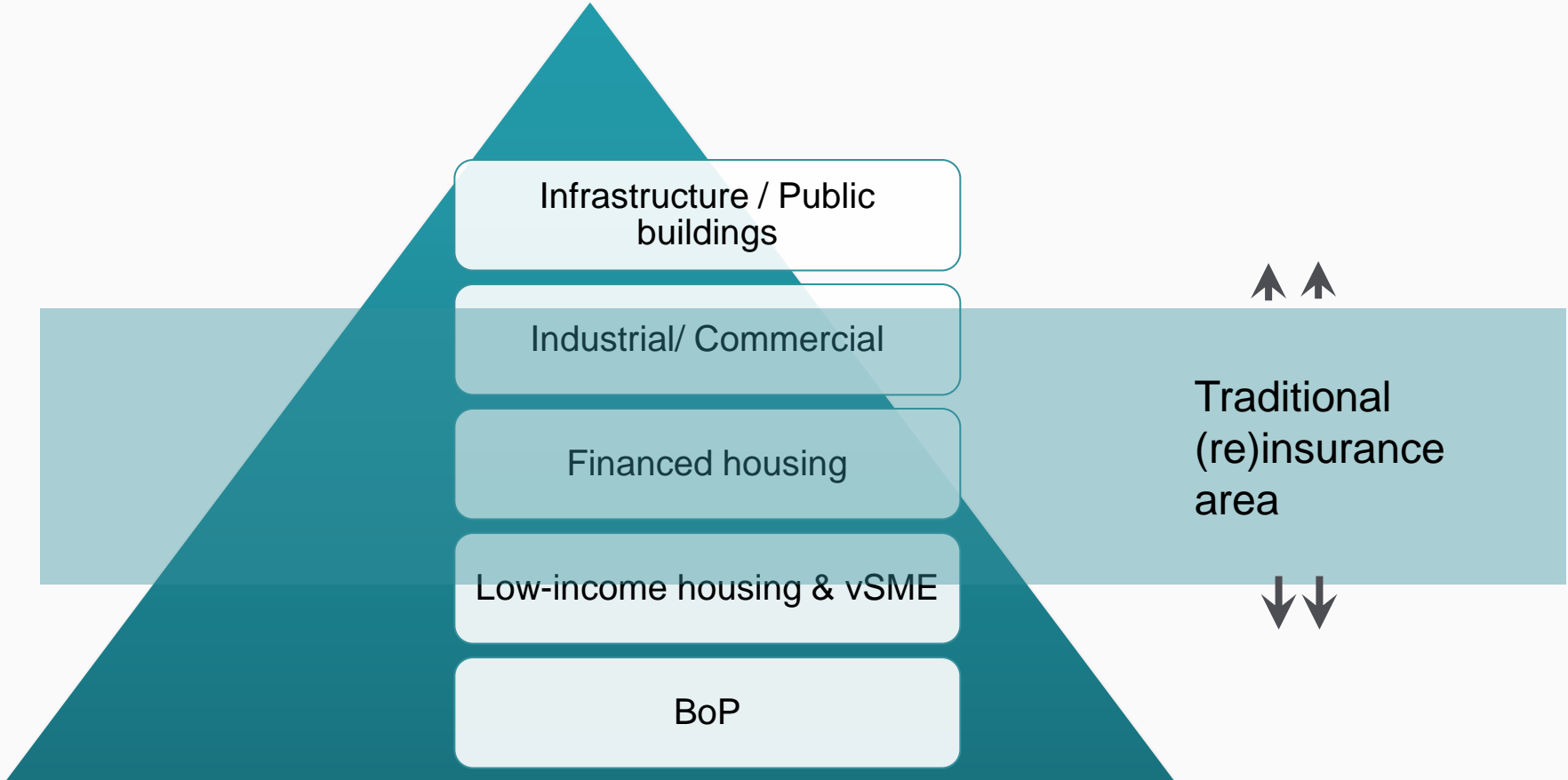
Government is insurer of last resort

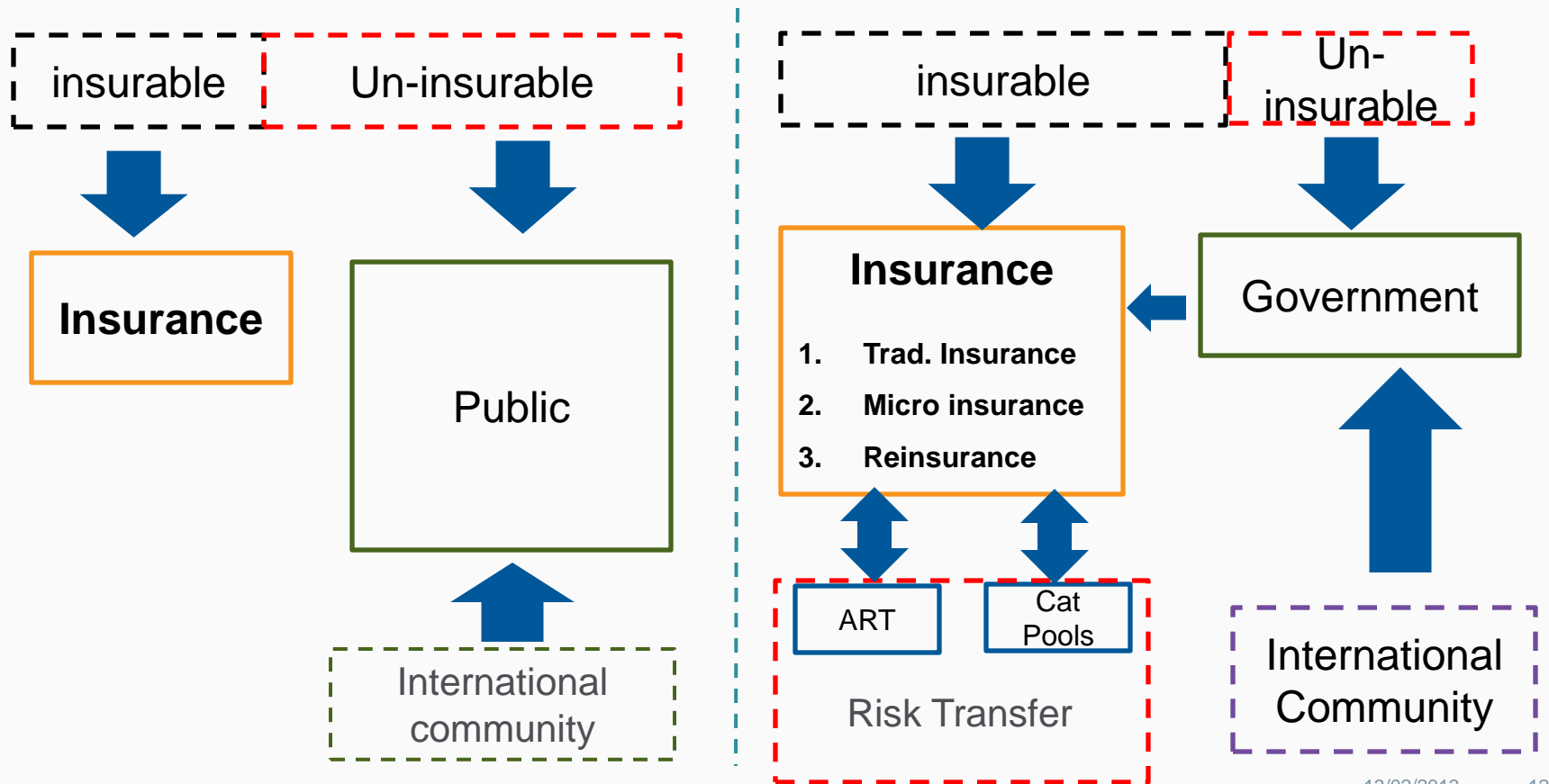
Government Risk

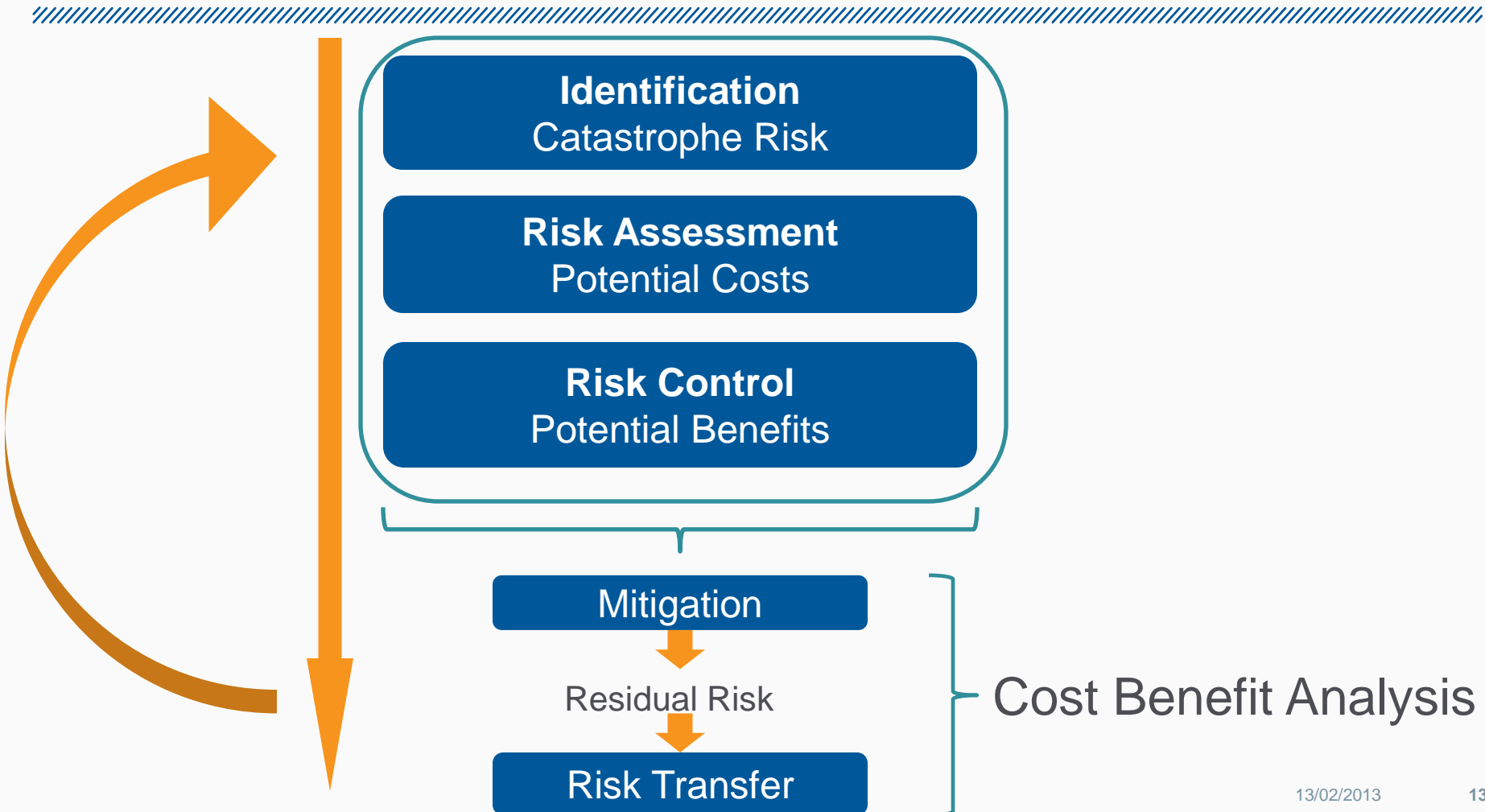
Enterprises and the public sector faces the highest complexity of risk

	Personal and Commercial Risks	Technological and Infrastructural Risks	Natural Hazards	Environmental Risks	Social and Political Risks	Purely Financial and Special Risks
Public Sector	✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓
Enterprise	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓
Residential	✓✓✓	✓	✓✓✓	✓✓	✓	✓

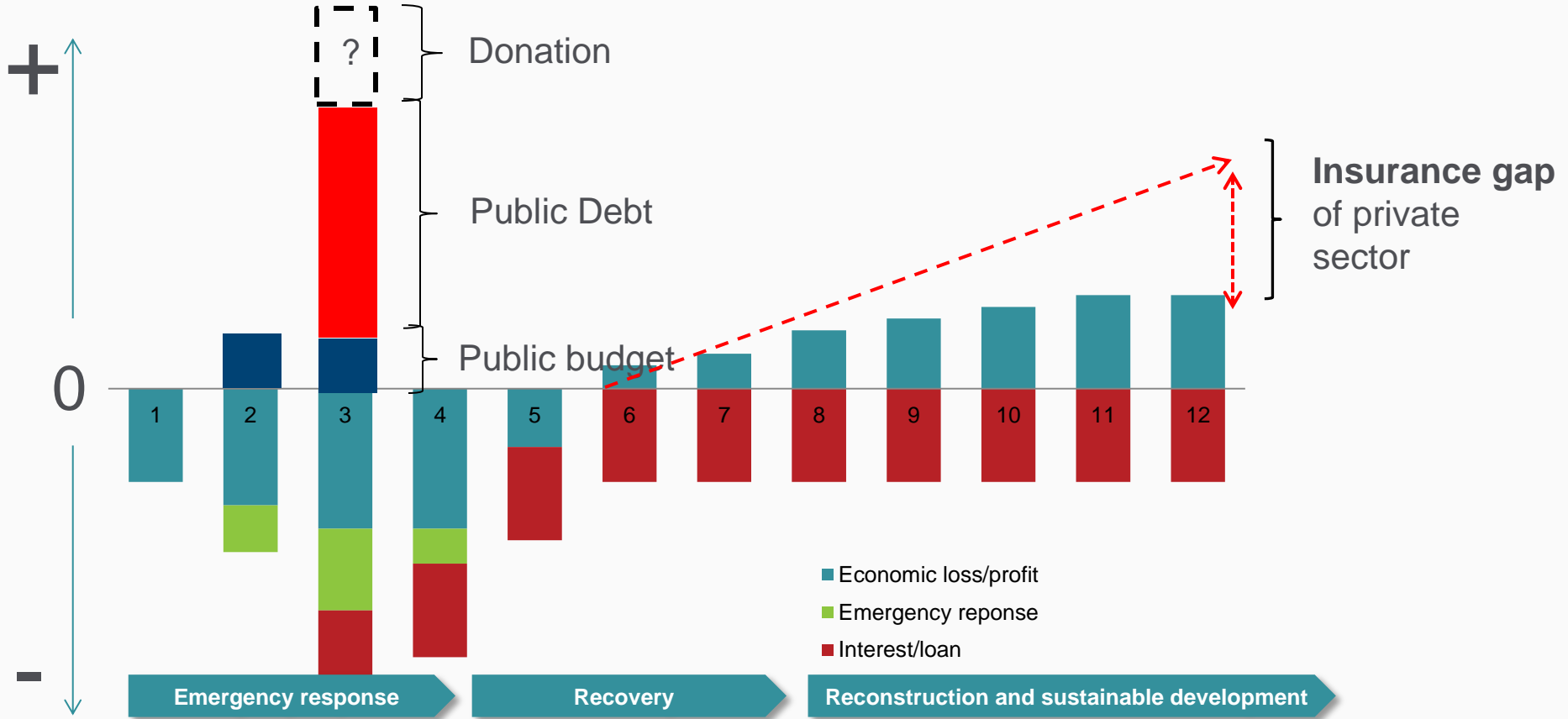
An expansion of the insurance market's target group scope reduces the contingent liability of governments



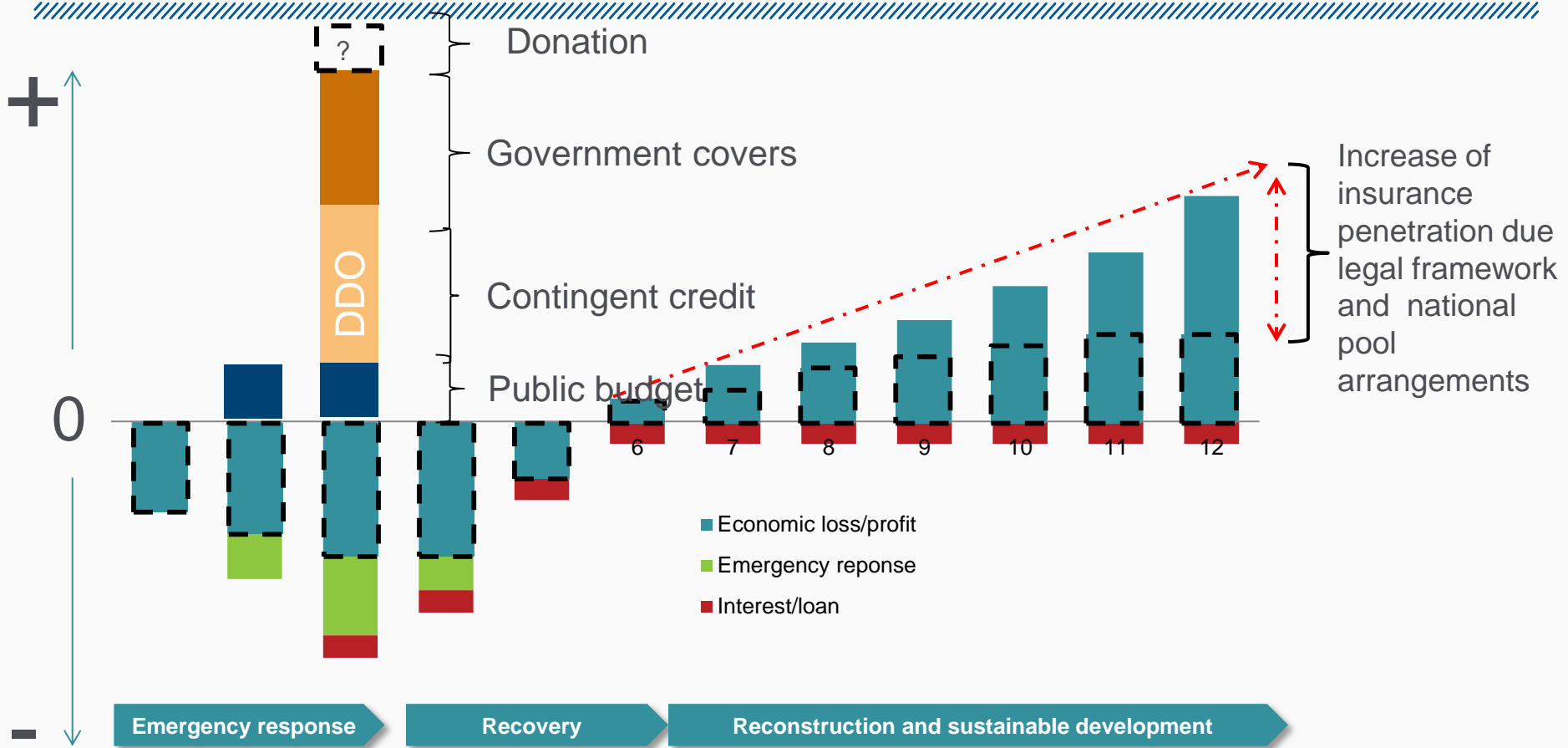




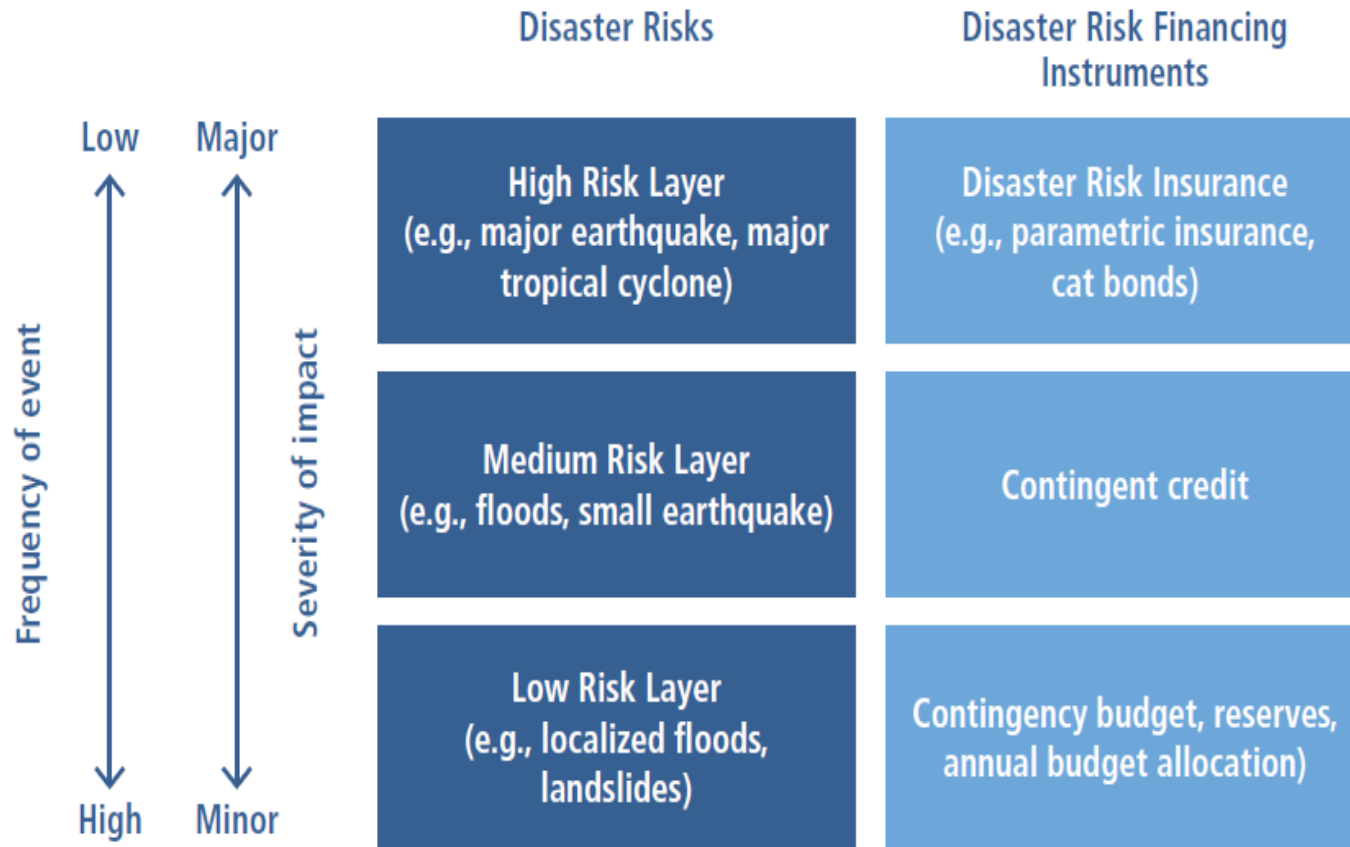
Ex post disaster risk financing relies on international donors and the governments' credibility



Sustainable ex ante risk financing solutions requires an intelligent mix of private and public sector involvement



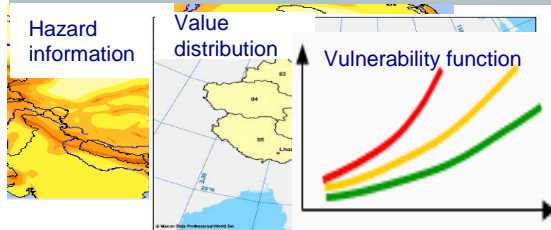
Financial management of the national budget against natural disaster



Source: World Bank Disaster Risk Financing and Insurance Program, 2010

As partner for governments our value proposition is based on three pillars

Value optimiser/Complex risk taker



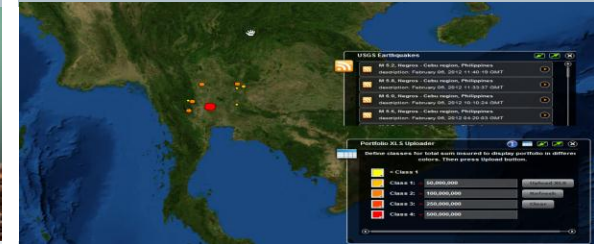
- In-depth modelling expertise
- Opinion leader in Nat Cat & Risk
- Standardized internal risk management process for identification and evaluation of emerging risks

Growth partner/ Know-how provider





- Prime partner as disaster risk advisor for supranational organisation
- Longstanding PPP experience with governmental agencies
- Expert for risk and insurance related regulatory frameworks

High level of security



- Prime capacity provider for risk transfer solutions
- Pioneer in ex-ante disaster risk financing schemas
- Development of innovative reliable disaster risk assessment +evaluation tools

Clear positioning as a comprehensive service reinsurer

	National Pool/Private sector Solutions	Government Cover
		
Policyholder	Private households or companies	Public Agencies or Institutions
Funding / Government role	(mostly) financed by private policyholders	<ul style="list-style-type: none"> ▪ Part of the federal budget ▪ Government decides about allocation of resources in cases of nat. disasters
Insured assets	Private property	Public property and bridging of liquidity gaps in federal budgets
Examples	<ul style="list-style-type: none"> ▪ Turkish Catastrophe Insurance Pool ▪ TREIF ▪ Maipark 	<ul style="list-style-type: none"> ▪ CCRIF

Generally pools pay out on a indemnity basis. This would not be appropriate in case of government covers. A fast payout, which is not subject to discussions is crucial to the purpose. Hence, parametric triggers are an ideal solution.

Overview of existing catastrophe risk financing schemas



- New Zealand Earthquake Commission
- Caribbean Catastrophic Risk Insurance Facility (CCRIF)
- Internationaler Rückversicherungsverband Fund (IRV)
- Indonesia Earthquake Company (Maipark)
- Norsk Naturskade pool (NNPP)
- Elementarschaden Pool (ES-Pool)
- Programulul Roman de Asigurare la Catastrofe (PRAC)
- Taiwan Residential Earthquake Insurance Fund (TREIF)
- Turkish Catastrophe Insurance Pool (TCIP)
- Icelandic Catastrophe Fund
- The California Earthquake Authority (CEA)
- Icelandic Catastrophe Fund
- Fonden (Mexico)

NOT
Pool

NOT
Pool

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Pool

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Back up

National Pool Solutions

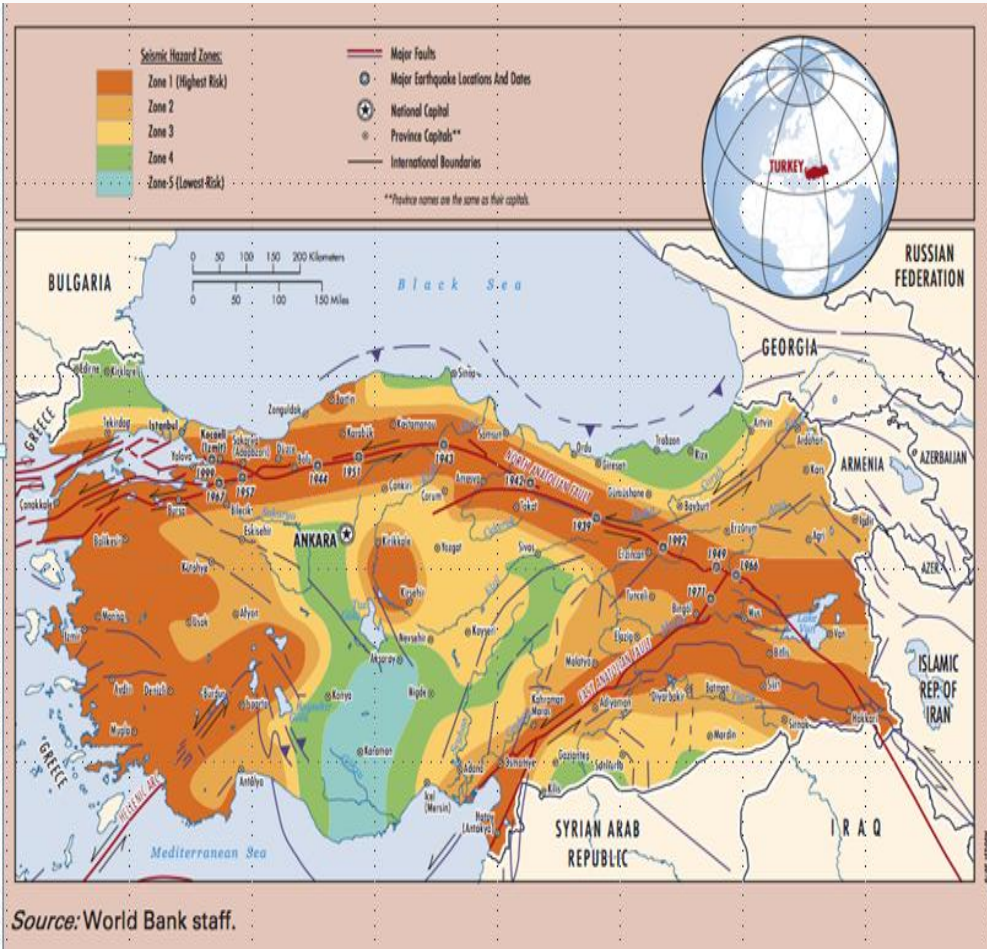
Turkish Catastrophe Insurance Pool (TCIP)



Münchener Rück
Munich Re Group



Turkey and the Earthquake exposure



- Expected annual economic losses due to earthquakes around \$1 billion
- Marmara and Duzce earthquakes (Aug.1999)
death toll >18,000;
damage >\$10 billion
- During the last few years over 100 earthquakes ranging from 4.0 to 6.2 on Richter Scale.
- 70% of the population lives in 1st and 2nd earthquake zones



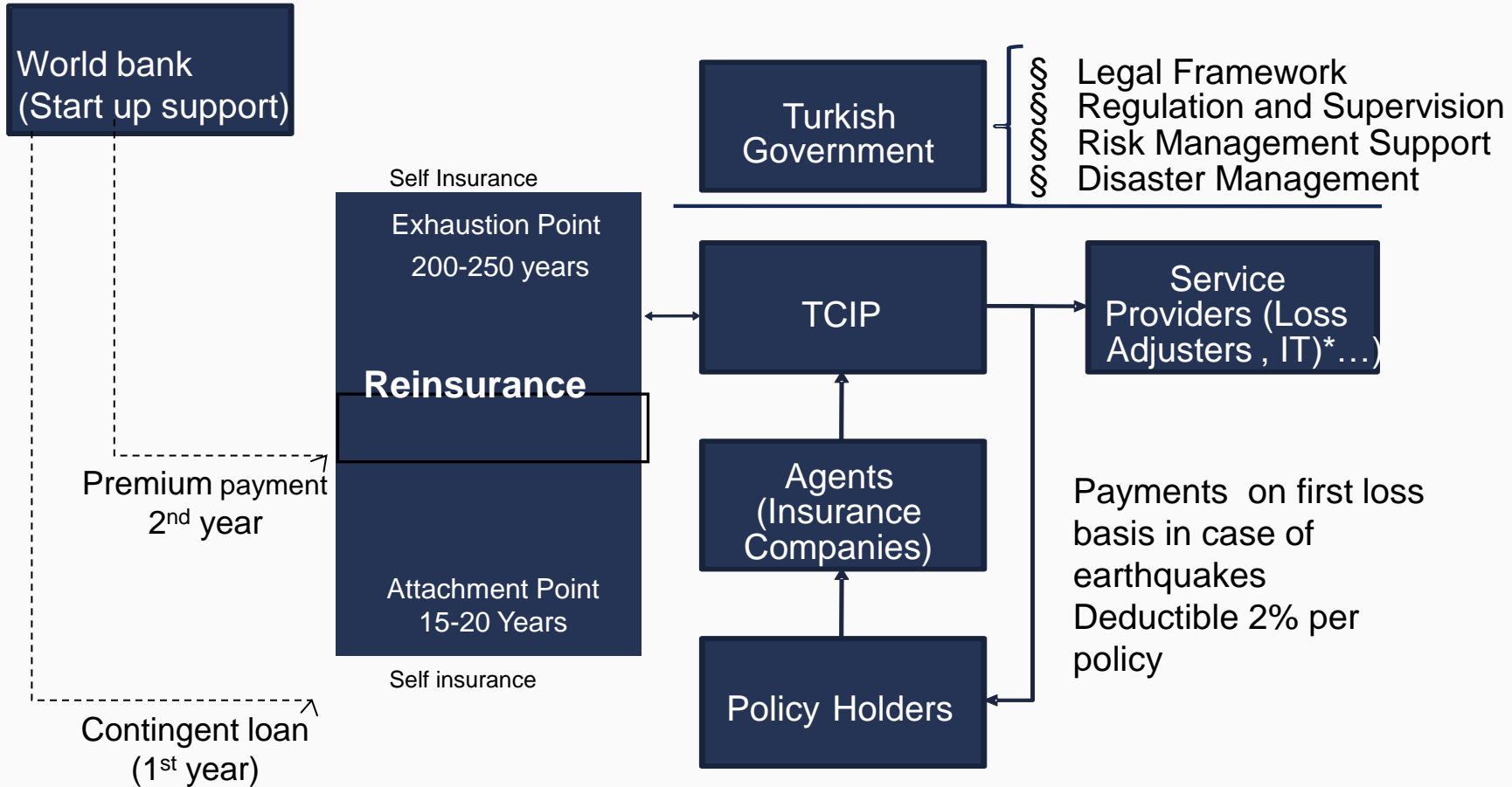
Background

- Low insurance penetration
- High exposure to a variety of adverse natural events- particularly earthquake
- Insufficient Nat-cat capacity in the domestic market
- Dependence on assistance from international donors to finance post-disaster needs

- Protection of the federal budget
- Provide homeowners with reconstruction financing after major catastrophic events
- Cover as much as possible of the economic losses
- Encourage physical risk mitigation
- Diversification of risk
- Highest standards of governance and operations and lowest possible operational costs for Pool
- Minimize cost by relying on existing distribution and service capabilities of private primary insurance

Objectives

Schematic Structure



* Use of SMS (short message service) within the GSM (global system for mobile) for policy renewals, claim advice, etc

Premium is determined by :

- Earthquake Cresta Zones
- Construction Type of the building
- The area of the building in square meters

Sum insured	
Type of Building	USD/m
	2
A) Steel of Reinforced Carcass	330
B) Amassed Stone & Brick	237
C) Others	123

x m²

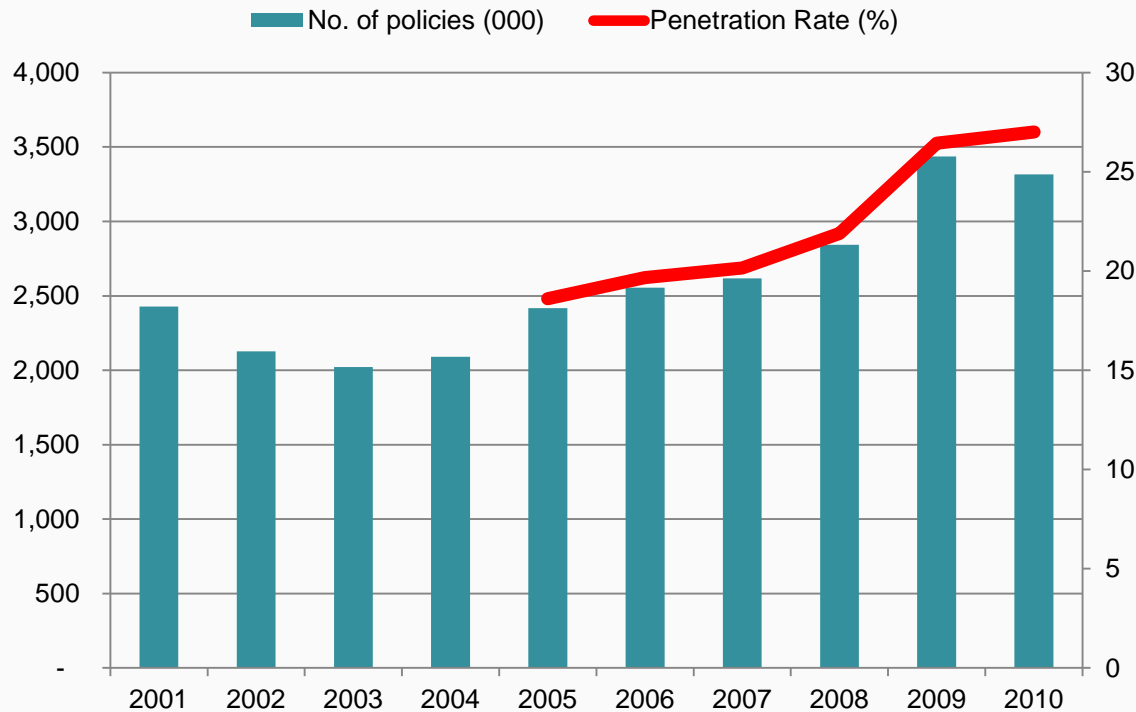
X

Tariff rate					
Type of Building	Zone 1 %	Zone 2 %	Zone 3 %	Zone 4 %	Zone 5 %
A) Steel of Reinforced Carcass	2,20	1,55	0.83	0.55	0,44
B) Amassed Stone & Brick	3.85	2.75	1.43	0.60	0.5
C) Others	5.5	3.53	1.76	0.78	0.56

84000 USD limit per policy

20% discount in case of renewal and where block policies are sold in respect of flats

Annual Number of Policies and Penetration Rate

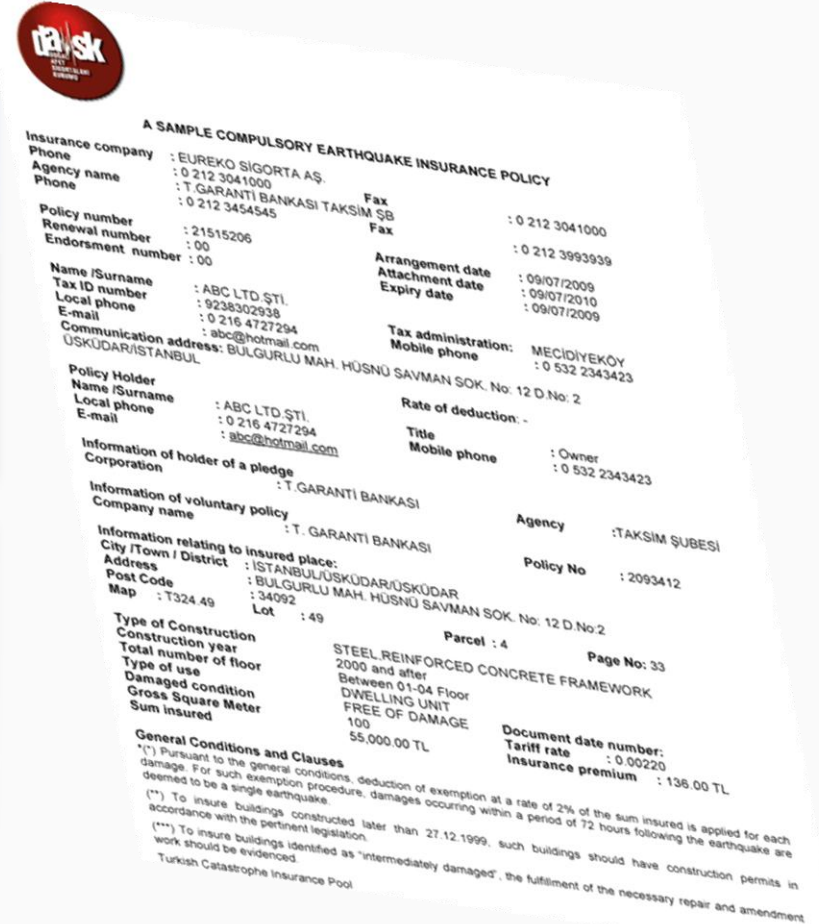


- Stunted penetration despite compulsory EQ insurance decree law
- Poor enforcement and lack of hazards information
- Only legally built with proper permits buildings are insured
- Widespread squatter communities (gecekondü)
- Need for improved building practices



TCIP
CATASTROPHE EXCESS OF LOSS
 12 MONTHS AT NOVEMBER 1, 2009
 PLACED BY WILLIS
 IN CONJUNCTION WITH AONBENFIELD, GUY CARPENTER AND LOCKTON

Willis Limited
 The Willis Building
 51 Leas Row
 London, EC2M 7PQ
 United Kingdom
 Tel: +44 (0)20 3234 6000
 Fax: +44 (0)20 3234 6223
 www.willisc.com



TCIP
 TURKISH CATASTROPHE INSURANCE POOL

A SAMPLE COMPULSORY EARTHQUAKE INSURANCE POLICY

Insurance company : EUREKO SIGORTA AŞ.
Phone : 0 212 3041000
Agency name : T. GARANTI BANKASI TAKSİM ŞB
Phone : 0 212 3454545 **Fax** : 0 212 3041000

Policy number : 21515206 **Fax** : 0 212 3993939
Renewal number : 00 **Arrangement date** : 09/07/2009
Endorsement number : 00 **Attachment date** : 09/07/2010
Expiry date : 09/07/2009

Name /Surname : ABC LTD ŞTİ.
Tax ID number : 9238302938
Local phone : 0 216 4727294
E-mail : abc@hotmail.com
Communication address: BULGURLU MAH. HÜSNÜ SAVMAN SOK. No: 12 D.No: 2
 USKÜDAR/İSTANBUL

Tax administration: MECİDİYEKOY
Mobile phone : 0 532 2343423

Rate of deduction: -
Title : Owner
Mobile phone : 0 532 2343423

Policy Holder
Name /Surname : ABC LTD ŞTİ.
Local phone : 0 216 4727294
E-mail : abc@hotmail.com

Information of holder of a pledge
 Corporation : T. GARANTI BANKASI

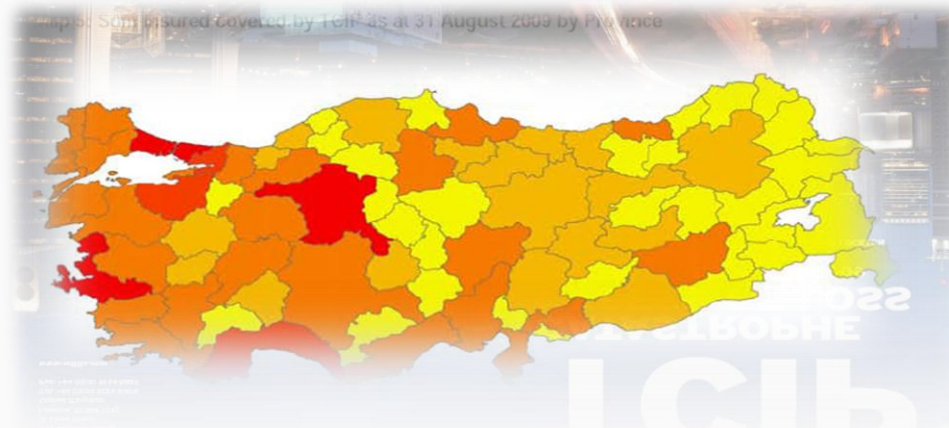
Information of voluntary policy
Company name : T. GARANTI BANKASI **Agency** : TAKSİM ŞUBESİ

Information relating to insured place:
City /Town / District : İSTANBUL/USKÜDAR/ÜSKÜDAR **Policy No** : 2093412
Address : BULGURLU MAH. HÜSNÜ SAVMAN SOK. No: 12 D.No:2
Post Code : 34092 **Parcel** : 4
Map : T324.49 **Lot** : 49 **Page No:** 33

Type of Construction : STEEL REINFORCED CONCRETE FRAMEWORK
Construction year : 2000 and after
Total number of floor : Between 01-04 Floor
Type of use : DWELLING UNIT
Damaged condition : FREE OF DAMAGE
Gross Square Meter : 100
Sum insured : 55.000.00 TL

Document date number:
Tariff rate : 0.00220
Insurance premium : 136.00 TL

General Conditions and Clauses
 (*) Pursuant to the general conditions, deduction of exemption at a rate of 2% of the sum insured is applied for each damage. For such exemption procedure, damages occurring within a period of 72 hours following the earthquake are deemed to be a single earthquake.
 (**) To insure buildings constructed later than 27.12.1999, such buildings should have construction permits in accordance with the pertinent legislation.
 (***) To insure buildings identified as "intermediately damaged", the fulfillment of the necessary repair and amendment work should be evidenced.
 Turkish Catastrophe Insurance Pool



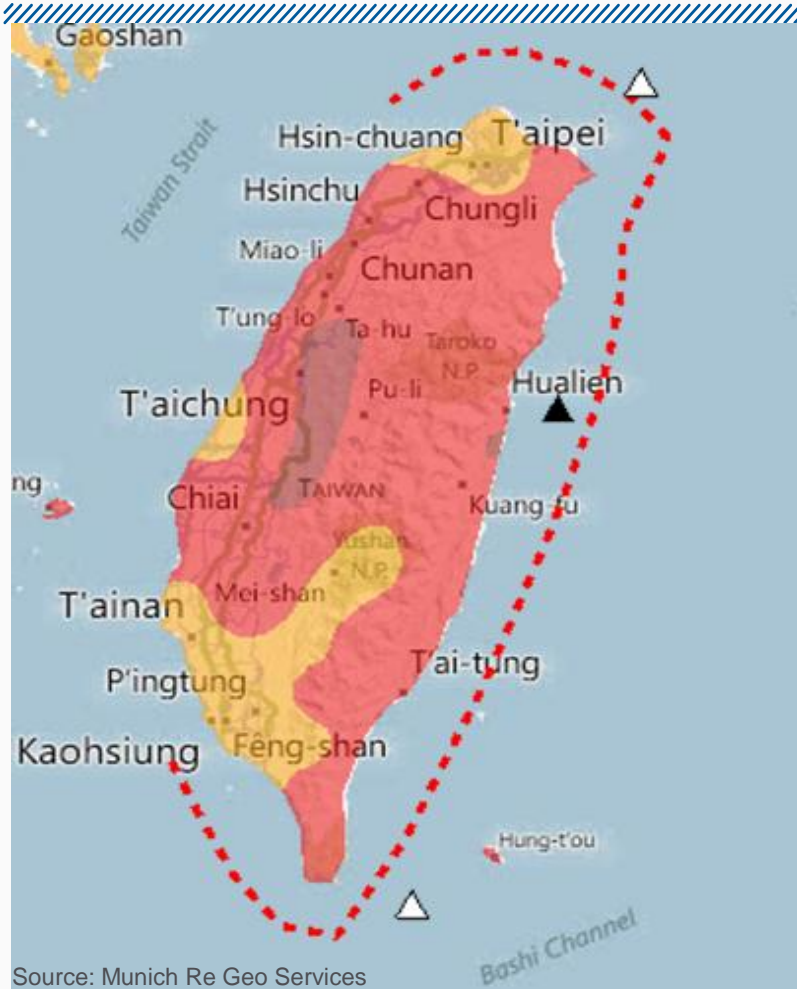
Taiwan Residential Earthquake Insurance Fund



Münchener Rück
Munich Re Group



Taiwan and the Earthquake exposure



Source: Munich Re Geo Services

- Taiwan is highly exposed to earthquake
- September (1999) Chi Chi earthquake
 - Death toll >2400;
 - Economic damage >\$12 billion
 - Insured loss > \$600mio
- End of 1999: Insurance law manifested the establishment for a mechanism for assuming earthquake risks
- July 2001: The Taiwan Residential Earthquake Pool came into existence

Taiwan Residential Earthquake Pool

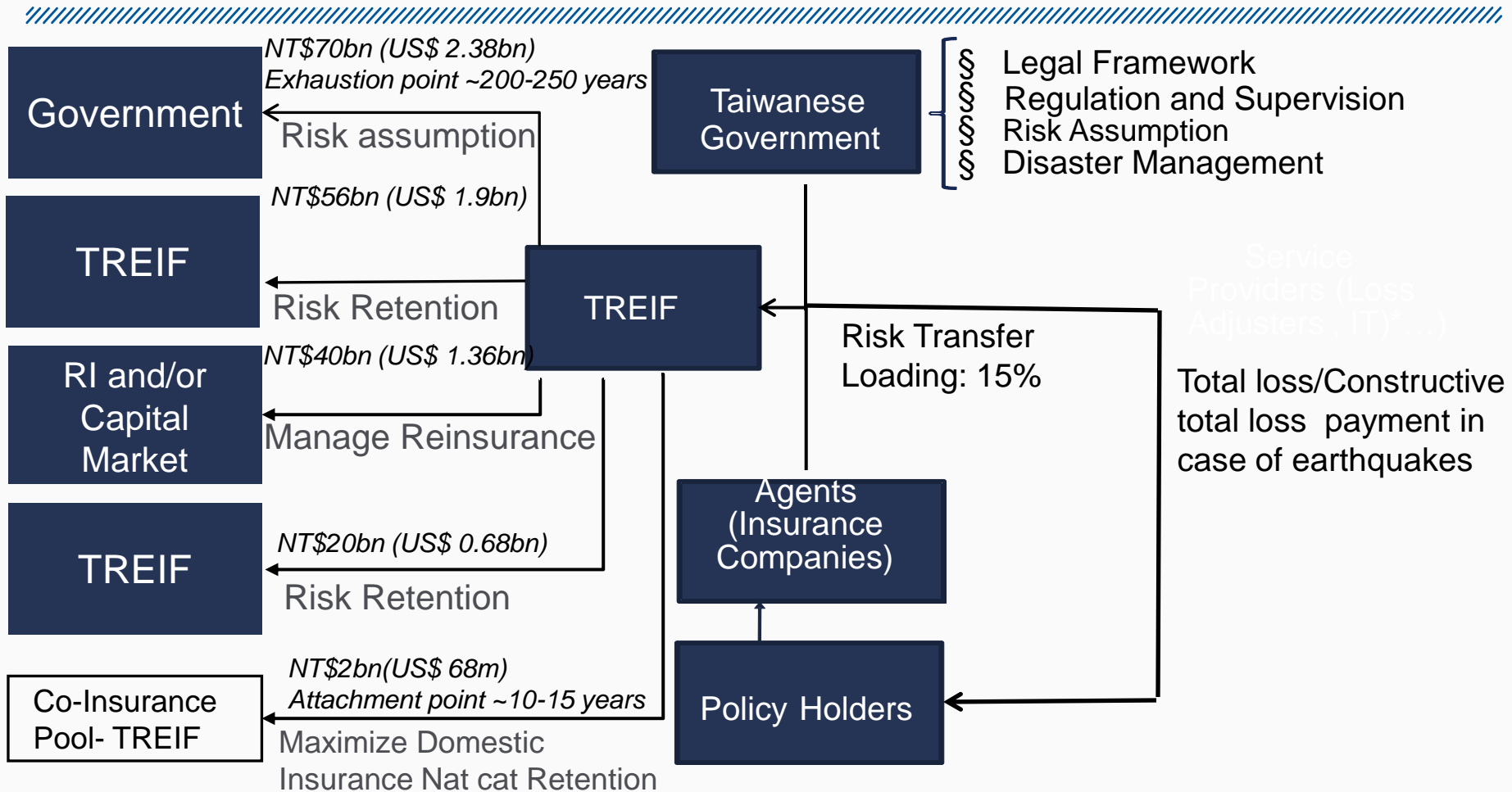
Background

- Low insurance penetration in Nat-Cat 1, 13%
- High exposure to a variety of adverse natural events- particularly earthquake
- Insufficient Nat-cat capacity in the domestic market
- Dependence on assistance from government

- Protection of the federal budget
- Provide homeowners with reconstruction financing after major catastrophic events
- Diversification of risk
- Highest standards of governance and operations and lowest possible operational costs for Pool
- Maximization of the local retention
- Minimize cost by relying on existing distribution and service capabilities of private primary insurance

Objectives

Pivotal Role of TREIF



Pivotal Role of TREIF

-
- Assume the risk of residential earthquake insurance from local insurance companies
 - Manage the risk spreading mechanism
 - Administer residential earthquake insurance underwriting, claims settlement, reinsurance placement, co-insurance and auditing
 - Education and training

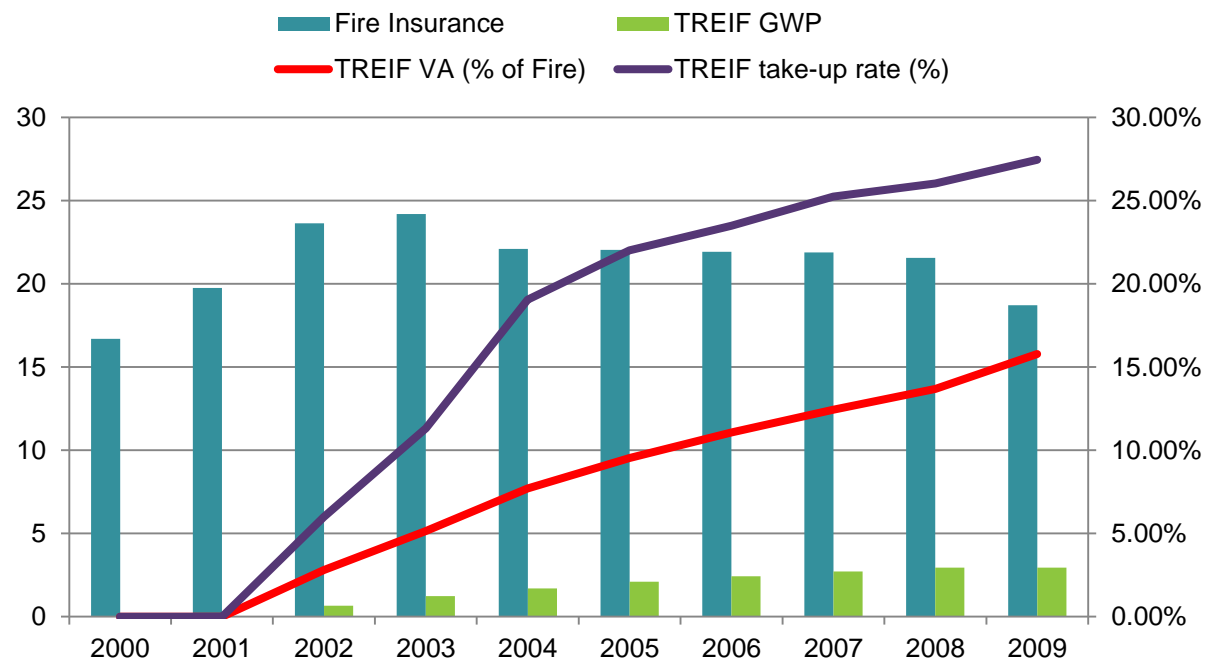
Original Terms and Conditions



Subject matter:	Household building
Perils insured:	<p>Earthquake shock</p> <p>Fire or explosion caused by Earthquake</p> <p>Landslide, subsidence, earth movement, rupture caused by earthquake</p> <p>Tsunami –tidal waves or flood caused by earthquake</p>
Premium:	NT\$ 1,350 (US\$ 46)
Sum Insured:	NT\$1,200,000 (US\$ 41,000)
Contingent Living Expenses	NT\$180,000 (US\$ 6,100)
Loss Trigger:	The loss will be paid when the insured residential building is suffered an earthquake event and its damage reached actual total loss or constructive total loss)*

)*The criteria for determining a Constructive Total Loss is described as: the repair cost of the damaged part of the residential building is more than 50% of the replacement cost f the building

Take up rate and written premium



- Take up rate at 28% only
- Mortgage borrowers buy Fire insurance only
- Solution based on uniform premium doesn't motivate risk mitigating activities

Thank you!

