Shelter

UNDERSTANDING INSURANCE & FINANCIAL INSTRUMENTS FOR DISASTER RISK MANAGEMENT

A Narrative Tool

TOWER

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REVIEW OF INSURANCE MECHANISMS

- Private indemnity insurance
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INTRODUCTION

BACKGROUND & CONTEXT

- This tool is part of a **Resilience Financing Landscape toolkit** created within the SHELTER Project.
- The information within was created by TOWER (TOW) using an **in-depth Literature review and consolidation of pre-existing material** across the five SHELTER Open labs.
- The tool can be used to **explore the different insurance mechanisms for protecting** heritage. Alternatively, it can be implemented as a complete Resilience Financing Landscape toolkit.
- For more information on the tool, please contact; Giovanni Tolin (giovanni.tolin@unismart.it)

USEFUL LINKS

SHELTER Website - https://shelter-project.com/

Resilience finance toolkit – INSERT LINK!

Shelter introduction video - https://youtu.be/gZ2Rk03_P00

THE NARRATIVE TOOL

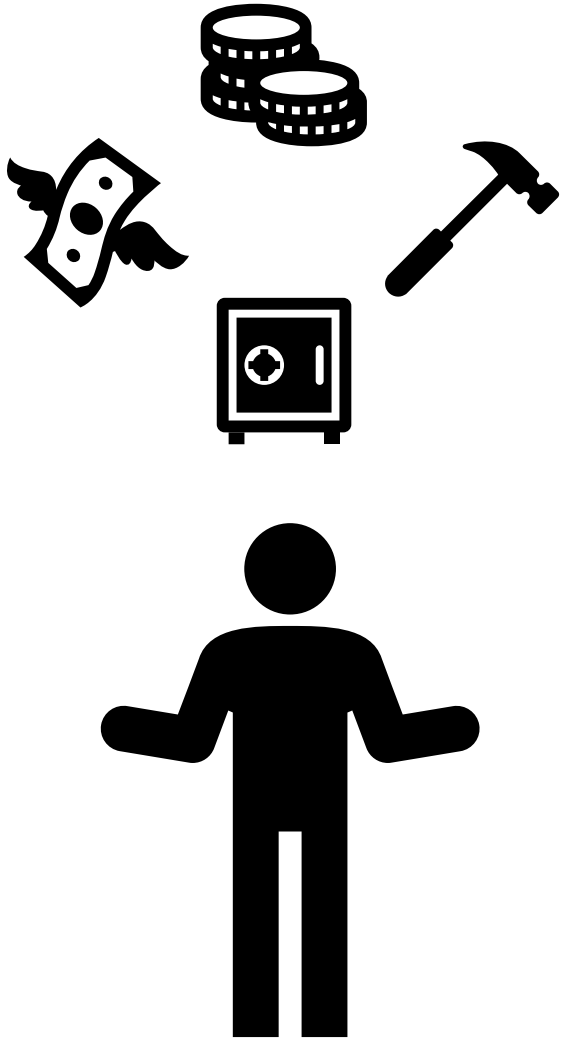
- This narrative tool provides **information and guidelines on the financing instruments used to support disaster risk management solutions.**
- Using the **5 SHELTER Open Labs as pilots**, the tool explores the existing insurance schemes and the potential alternatives that could be implemented.
- IMPORTANT – **This tool is highly context-dependent**. The insurance mechanisms used differ from country to country, between legal frameworks and the state of advancement of the insurance and the financial sector.
- For this reason, **the tool explores the context of SHELTER five Open Labs**. It cannot be utterly generalised because of the limitations imposed by the regional context as described in the T6.6 literature review concerning the different catastrophe insurance arrangements in Europe (see paragraph 5.2.1).
- Instead, **this tool provides a working and adaptable example of how insurance mechanisms in a given context can be explored**.

END USERS

- The tool is **aimed at Cultural heritage site managers, policymakers, private heritage owners and practitioners interested in developing a better understanding of insurance mechanisms** used to protect cultural heritage.

- This type of tool is crucial because a greater understanding of the insurance frameworks which support cultural heritage sites ensures that experts can take advantage of the most suitable.

- In essence, **greater clarity leads to a great capacity to protect heritage because experts can take advantage of all available financial resources**.



GLOSSARY

TERM	DESCRIPTION
Private indemnity insurance	Insurance provided by a commercial insurance company. Claim payments are based on the financial loss or damage suffered by the insured and settled according to policy terms usually after a damage assessment.
Public (sponsored) indemnity insurance	Insurance provided by an entity which is (either directly or indirectly) funded or sponsored by the government. Claim payments are based on the financial loss or damage suffered by the insured.
Private parametric insurance	Insurance provided by a commercial insurance company. Claim payments are based on the measurement of a specific hazard severity index (e.g. magnitude, level of water) and are usually independent from the actual loss suffered by the insured.
Public (sponsored) parametric insurance	Insurance provided by an entity which is (either directly or indirectly) funded or sponsored by the government. Claim payments are based on the measurement of a specific hazard severity index (e.g. magnitude, level of water) and are usually independent from the actual loss suffered by the insured.

HOW NAVIGATE THE TOOL

- The narrative tool is navigated using hyperlinks (blue underlined text) and internal buttons outlined and can be found in the bottom right corner of each slide.
- Finally, a colour coding system (Green, Yellow & Red) indicates the perceived level of viability of the insurance mechanisms.

BUTTON	ACTION
	Go to HOME
	Go back to PREVIOUS Slide
COLOUR	**MEANING**
GREEN	No or low level of viability / effectiveness
YELLOW	Medium level of viability / effectiveness
RED	High level of viability / effectiveness

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PRIVATE INDEMNITY INSURANCE	PRIVATE PARAMETRIC INSURANCE	CENTRALLY-MANAGED PRIVATE INDEMNITY INSURANCE PROGRAM
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RESILIENCE BOND		

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OVERVIEW OF INSURANCE SCHEMES IN EUROPE

OVERVIEW OF EXISTING INSURANCE SCHEMES IN EUROPE

Risk / solution	Private indemnity insurance	Public (sponsored) indemnity insurance	Private parametric insurance	Public (sponsored) parametric insurance
FLOODING	Commonly offered in most countries	Offered in some counties	Offered in some counties	Not available
EARTHQUAKE	Commonly offered in most countries	Offered in some counties	Offered in some counties	Not available
SUBSIDENCE	Offered in some counties	Not available	Not available	Not available
WILDFIRES	Commonly offered in most countries (included in general fire insurance)	Not available	Not available	Not available

RAVEENA & SANTA CORCE CHURCH (BUILDING SCALE)

OPEN LAB: RAVENNA SANTA CROCE – ARCHEOLOGICAL SITE WITH ARTISTIC DECORATIONS
COUNTRY/REGION: ITALY

COUNTRY-SPECIFIC EXISTING INSURANCE SOLUTIONS

Risk / solution	Private indemnity insurance	Public (sponsored) indemnity insurance	Private parametric insurance	Public (sponsored) parametric insurance
FLOODING	Commonly offered as an optional extension bundled with general building insurance or as stand-alone insurance	Not available	Not available	Not available
EARTHQUAKE	Commonly offered as an optional extension bundled with general building insurance or as stand-alone insurance	Not available	Not available	Not available
SUBSIDENCE	Rarely offered by insurers (coverage usually excluded from general building insurance)	Not available	Not available	Not available

OPEN LAB: RAVENNA SANTA CROCE – ARCHEOLOGICAL SITE WITH ARTISTIC DECORATIONS
COUNTRY/REGION: ITALY

OTHER SOLUTIONS TO EXPLORE

Risk / solution	Private indemnity insurance	Public (sponsored) indemnity insurance	Private parametric insurance	Public (sponsored) parametric insurance
FLOODING	- Centrally-managed insurance program for diversified risks and multiple assets - Issuing of Cat Bonds by private insurers	Insurance pool through a government-private sector partnership	Parametric insurance offered by private insurers	May not be viable without a public entity for risk management through insurance
EARTHQUAKE	- Centrally-managed insurance program for diversified risks and multiple assets - Issuing of Cat Bonds by private insurers	Insurance pool through a government-private sector partnership	Parametric insurance offered by private insurers	May not be viable without a public entity for risk management through insurance
SUBSIDENCE	Centrally-managed insurance program for diversified risks and multiple assets	No examples available but technically possible	No examples available but technically possible	No examples available but technically possible

DORDRECHT (STREET SCALE)

OPEN LAB: DORDRECHT – HISTORICAL CITY CENTRE
COUNTRY/REGION: THE NETHERLANDS

COUNTRY-SPECIFIC EXISTING INSURANCE SOLUTIONS

Risk / solution	Private indemnity insurance	Public (sponsored) indemnity insurance	Private parametric insurance	Public (sponsored) parametric insurance
FLOODING	Extremely rare – offered by very few insurers *(see the note below)*	Not available	Not available	Not available

Note: flooding risk is considered a national concern in the Netherlands. Dutch government has built a system of dykes and water defenses protecting the coastline from a 1 in 10,000 year event. Moreover Dutch legislation, such as the Calamities and Compensation Act, provides an ex-post public intervention scheme funded by the government (i.e. tax payers). Due to low probability/extremely high severity impact of potential flooding events and the guarantees put in place by the Dutch government, a private insurance market for flood insurance never developed.

OPEN LAB: DORDRECHT – HISTORICAL CITY CENTRE
COUNTRY/REGION: THE NETHERLANDS

OTHER SOLUTIONS TO EXPLORE

Risk / solution	Private indemnity insurance	Public (sponsored) indemnity insurance	Private parametric insurance	Public (sponsored) parametric insurance
FLOODING	May not be viable due to the nature and the management of the risk in the country (see note)	- Insurance pool through a government-private sector partnership - Governmental insurance pool	May not be viable due to the nature and the management of the risk in the country (see note)	Resilience Bonds

SEFERHISAR (DISTRICT SCALE)

OPEN LAB: SEFERIHISAR - ŞALEN KALESI SITE
COUNTRY/REGION: TURKEY

COUNTRY-SPECIFIC EXISTING INSURANCE SOLUTIONS

Risk / solution	Private indemnity insurance	Public (sponsored) indemnity insurance	Private parametric insurance	Public (sponsored) parametric insurance
EARTHQUAKE	Private insurance available for non residential buildings but limited supply by private insurers	- Governmental insurance pool with a mandatory solidarity scheme (only for residential buildings) - Issuing of publicly sponsored Cat Bonds	Not available	Not available

OPEN LAB: SEFERIHISAR - ŞALEN KALESI SITE
COUNTRY/REGION: TURKEY

OTHER SOLUTIONS TO EXPLORE

Risk / solution	Private indemnity insurance	Public (sponsored) indemnity insurance	Private parametric insurance	Public (sponsored) parametric insurance
EARTHQUAKE	Centrally-managed insurance program for diversified risks and multiple assets (for non-residential buildings)	Insurance pool through a government-private sector partnership (for non-residential buildings)	May not be viable without a more developed private insurance market in the country	Issuing of a publicly sponsored parametric Cat Bonds

GLACIA (REGIONAL SCALE)

OPEN LAB: GALICIA
COUNTRY/REGION: SPAIN

COUNTRY-SPECIFIC EXISTING INSURANCE SOLUTIONS

Risk / solution	Private indemnity insurance	Public (sponsored) indemnity insurance	Private parametric insurance	Public (sponsored) parametric insurance
WILDFIRES	Standard fire insurance does not usually exclude wildfires yet only residential, commercial or industrial properties can be insured (very difficult to insure historical buildings with hard-to-determine replacement value)	Not available	Not available	Not available

OPEN LAB: GALICIA
COUNTRY/REGION: SPAIN

OTHER SOLUTIONS TO EXPLORE

Risk / solution	Private indemnity insurance	Public (sponsored) indemnity insurance	Private parametric insurance	Public (sponsored) parametric insurance
WILDFIRES	Centrally-managed insurance program for diversified risks and multiple assets (for non-residential buildings)	Not available	Although parametric insurance offered by private insurers is very rare some experiments have recently been made (https://www.libertymutualre.com/static/2021-05/LM+Re+Forestry+Factsheet.pdf)	Not available

SAVE RIVER BASIN (CROSS-REGIONAL SCALE)

OPEN LAB: SAVA RIVER BASIN
COUNTRY/REGION: SLOVENIA / CROATIA / BOSNIA AND HERZEGOVINA / SERBIA / MONTENEGRO

COUNTRY-SPECIFIC EXISTING INSURANCE SOLUTIONS

Risk / solution	Private indemnity insurance	Public (sponsored) indemnity insurance	Private parametric insurance	Public (sponsored) parametric insurance
FLOODING	Private insurance available for non-residential buildings but limited supply by private insurers	Not available	Not available	Not available

OPEN LAB: SAVA RIVER BASIN
COUNTRY/REGION: SLOVENIA / CROATIA / BOSNIA AND HERZEGOVINA / SERBIA / MONTENEGRO

OTHER SOLUTIONS TO EXPLORE

Risk / solution	Private indemnity insurance	Public (sponsored) indemnity insurance	Private parametric insurance	Public (sponsored) parametric insurance
FLOODING	Centrally-managed insurance program for diversified risks and multiple assets (for non-residential buildings)	Governmental insurance pool	May not be viable without a more developed private insurance market in the country	Resilience Bonds

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REVIEW OF INSURANCE MECHANISMS

PRIVATE INDEMNITY INSURANCE

PROS	CONS
▪ Potentially widely available in voluntary private markets where insurers can profit by underwriting the risk ▪ The coverage for natural hazards can be bundled with general building fire insurance ▪ Risk-based premiums may increase risk-awareness and risk-mitigation measures by those willing to get insured ▪ Private insurers can access reinsurance market or capital markers to transfer the risk when their exposure is too high and free their capacity	▪ Insurers may avoid insuring items with a hardly measurable economic value (e.g. historic-artistic assets) ▪ Claims are paid only after damage assessments and according to policy terms and wording ▪ Risk-based premiums reduce adverse selection phenomena but may make the insurance unaffordable for people highly exposed to the hazard ▪ After severe hazards and insurance industry losses due to heavy claim payments, insurers may stop underwriting the risk

RELEVANT EXAMPLES

Main drivers for earthquake risk identification by the insurer– building information :

Italian postal code ("CAP") = **48121**
Municipality ("COMUNE") = **RAVENNA**
Sqm ("METRI QUADRI") = **80**
Type ("TIPOLOGIA") = **APARTMENT**
Construction year ("ANNO DI COSTRUZIONE") = **BEFORE 1949**
Total number of storeys ("NUMERO DEI PIANI COMPLESSIVI") = **UP TO 3**
Construction type ("CARATTERISTICHE COSTRUTTIVE") = **CONCRETE**

Example of premium calculation for a "stand-alone" earthquake insurance for a 80 sqm apartment located in Ravenna made with an online tool by the insurer Allianz Direct (part of Allianz SE, one of the major Insurance Groups in Europe): Assicurazione online Allianz Direct - Calcola un preventivo

Insured amount	Compensation Limit	Deductible	Annual premium
€ 97,900.00	70% of the Insured amount	5% of rebuilding value with minimum of € 10,000.00	€ 56.00

PRIVATE PARAMETRIC INSURANCE

PROS

- Premiums based on the actual likelihood of the hazard
- Technical certainty of claims based on an independently measured severity index (e.g. magnitude, level of water)
- No need of any damage assessment hence faster claim payment compared to indemnity insurance
- Can be used in combination with standard indemnity insurance to provide relief payment for emergency expenses

CONS

- Few specialized private insurers offer parametric products - so far we see a very low level of commercial availability and standardization (generally it is a one-to-one institutional negotiation with the insurer)
- Insurers need a sound and well-developed loss exposure model to be able to design and offer these products
- The amount of the claim payment is unrelated to the actual loss of the insured

RELEVANT EXAMPLES

Premium quotation for stand-alone earthquake parametric insurance for buildings in New Zealand made with an online tool by the insurer Bounce:
https://www.bounceinsurance.co.nz/

1. Choose one of the 3 pre-set options for coverage amount →

2. Choose the New Zealand Postal Code where the building is located →

For example: 4500 Wanganui area (Seismic Hazard PGA between 0.20 and 0.35 similar to Ravenna area)

3. Get the monthly cost (NZD 1 ≈ EUR 0,62 as of August 2022) →

NZ$ 13.66	*NZ$ 27.32*	*NZ$ 68.31*
No deductible	*No deductible*	*No deductible*

4. The claim payment is determined on the seismic intensity (PGV – peak ground velocity) measured by the NZ government earthquake agency. The insurer promises a pay-out within 5 days →

< 20 cm/sec	NO PAYMENT	NO PAYMENT	NO PAYMENT
> 20 cm/sec < 25 com/sec	NZD 1,000	NZD 4,000	NZD 5,000
> 25 cm/sec < 30 com/sec	NZD 4,000	NZD 8,000	NZD 20,000
> 30 cm/sec	NZD 10,000	NZD 20,000	NZD 50,000

CENTRALLY-MANAGED PRIVATE INDEMNITY INSURANCE PROGRAM

PROS	CONS
▪ A single institution negotiates and manages the insurance policies for a pluralities of entities and assets with homogeneity of terms and conditions ▪ Premiums can be lower and policy terms more extensive thanks to risk pooling and stronger negotiation leverage with the insurers compared to single negotiation with the insurer	▪ Coverage conditions can be less tailor-made for the specific entity needs ▪ If the majority of the insured assets are located within the same region having a high risk exposure, insurers may limit the maximum claim pay-out

RELEVANT EXAMPLES

Examples of centrally-managed private indemnity insurance programs for diversified risks and multiple assets:

- **Italian Dioceses of Padua (2021)** underwrote an insurance policy to insure the assets of all the local churches under its management. The policy is a multiple-perils coverage (including fire, weather events, earthquake, flood, burglary and theft). For natural hazards terms see the following table : [For reference https://www.diocesipadova.it/servizio-amministrativo/assicurazioni/]

Risk	**Earthquake and Flooding**	**Subsidence**	**Damage to historical-artistic assets**
Compensation limit *(per annum/single church)*	EUR 1,000,000.00	EUR 200,000.00	EUR 20,000.00
Deductible	10% minimum EUR 10,000.00	10% minimum EUR 10,000.00	10% minimum EUR 1,000.00

- **Mantua municipality in Italy (2020-2025)** (UNESCO world heritage center) issued a call for tenders open to all entitled Insurers to insure all the buildings and cultural heritage items under its managements including artworks assets in museums and public libraries. The total sums insured was over EUR 450,000,000.00. According to the publicly available documents, the buildings insurance has an aggregate compensation limit of 25,000,000.00 per event and per annum and includes coverage for earthquake, flooding and subsidence risks with a deductible of EUR 10,000,00. The risk placement was successful and the total cost for all risks insurance was under EUR 800,000.00 (less than 0.2% of the total sums insured).
  [For reference https://www.comune.mantova.it/index.php/area-documentale/category/1576-procedura-aperta-multilotto-per-affidamento-dei-serviz-assicurativi-del-comune-di-mantova-dalle-ore-245-00-del-31-12-2020-alle-ore-24-00-del-31-12-2025]

INSURANCE POOL THROUGH A GOVERNMENT-PRIVATE SECTOR PARTNERSHIP

PROS	CONS
▪ Insurance pools created and operating for public purpose can improve the affordability of natural hazards insurance ▪ Insurance pools can achieve the critical size of underwritten risks enabling them to access reinsurance and capital markets ▪ Insurance pools can put in place insurance discount mechanisms that incentivize the adoption of risk mitigation measures by the inured	▪ Affordable rates may be achieved through non risk-based premiums which does not incentivize the adoption of risk mitigation measures by the inured ▪ Financial soundness and sustainability of insurance publicly-managed insurance pools may be guaranteed by government (i.e. tax-payers) backup

RELEVANT EXAMPLES

- **The United Kingdom - Flood Re :** a not-for-profit flood reinsurance scheme managed by the private insurance industry and initially sponsored by the government. Flood Re provides cover for households at the highest risk of flooding which are offered with insurance by private insurers at unaffordable rates. The fund is subsidized by a levy on all other "normally-priced" insurance policies underwritten in the country by households. Flood Re reinsures itself through global reinsurance market but the British government is liable in case of extreme flooding events (above a 1 in 200-year annual loos). Flood Re is expected to run for 25 years until 2039, at which point the free market for flood risk insurance would be completely restored. [For reference https://www.floodre.co.uk/]

- **The United States of America – California Earthquake Authority (CEA) :** a not-for-profit, publicly-managed but largely privately-funded pool established in 1996 after private insurers stop underwriting earthquake risk in the region due to the severe losses caused by the 1994 Northridge earthquake. CEA provides complementary earthquake coverage to households who buy residential property insurance policies from one of the private insurers participating in the pool offering discounts up to 25% when people take measures to strengthen their old house and make it more resistant to earthquakes. The pool reinsures itself through both the global reinsurance market and the capital market. No backup is provided by the Californian or U.S. government. [For reference https://www.earthquakeauthority.com/]

GOVERNMENTAL INSURANCE POOL

PROS

- Governmental insurance pools created and operating for public purpose can improve the affordability of natural hazards insurance
- Governmental insurance pools underwriting risks can achieve the critical size of underwritten risks enabling them to access reinsurance and capital markets

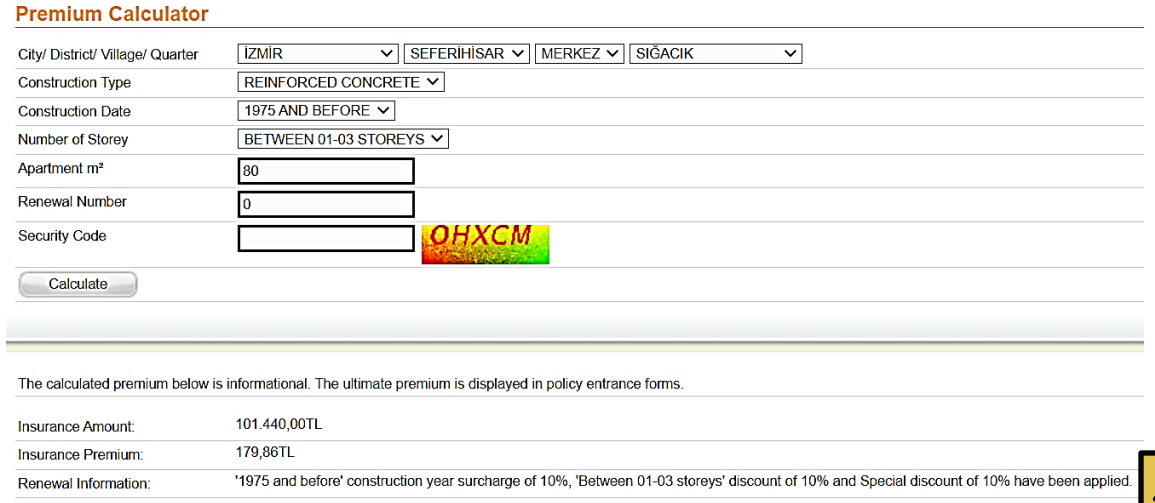
CONS

- Affordable rates may be achieved through non risk-based premiums which does not incentivize the adoption of risk mitigation measures by the inured
- The presence of a governmental insurance pool may hinder the development of a private insurance market
- Financial soundness and sustainability of governmental insurance pools may be guaranteed by government (i.e. tax-payers) backup

RELEVANT EXAMPLES

The Turkish Catastrophe Insurance Pool (TCIP) : a governmental agency and insurance pool that provides compulsory property earthquake insurance for owners of private dwellings built legally on registered land. Premium rates are actuarially consistent (mainly based on construction type, dwelling surface and seismic zone) but more affordable thanks to risk pooling. The catastrophe risk financing strategy of the TCIP relies on both risk retention and reinsurance. Turkish Government covers losses that would exceed the overall claims paying capacity of the TCIP.

Example of an earthquake insurance through TCIP (for Turkish residential buildings only) - official premium calculator by the Turkish National catastrophe Insurance Pool for a 80 sqm apartment in the Sigacik region : https://www.dask.gov.tr/e-services/portal/calculatePremiumEng



(PRIVATE AND PUBLIC-SPONSORED) CATASTROPHE BONDS

PROS	CONS
▪ Catastrophe bonds allow insurance companies and other public-sponsored insurance entities to partially or fully transfer a risk they underwrote to the capital markets thus enhancing their capacity to underwrite new risks ▪ Catastrophe bonds can be either indemnity-based (the amount of the claim is defined by the actual loss suffered by the insured after a damage assessment) or parametric (claims are based on an independently measured hazard severity index)	▪ Catastrophe bonds are employed by large institutions because of the complexity of the process to issue such instruments and the minimum size of the issue usually required to access the capital markets ▪ Catastrophe bonds are not usually used for single risks (unless the size of the risk is considerable) and are mainly used to transfer a large portfolio of different risks

RELEVANT EXAMPLES

Private indemnity catastrophe bond: the Italian private insurance company has issued in 2015 a 3.5 years term cat bond by the size of € 200 million to transfer to the capital market some of the earthquake risks in Europe (mostly in Italy) underwritten and to reduce its exposure to this risk. The bond is aimed to protect the insurer from big losses in case of severe events and exceptional claim payments thus freeing the capital needed to underwrite new risks. (For more info see https://www.artemis.bm/deal-directory/azzurro-re-i-limited/)

Public-sponsored parametric catastrophe bond: in 2012 the Mexican government with the support of the World Bank issued a cat bond by the size of US$ 315 million to have the financial capacity to respond in case of the strike of either a severe earthquake or a severe storm in the country. The trigger of the bond, i.e. the specific event following which the bond defaults and the issuer can keep the money and use them to pay for damage relieves, was based on scientific measurements (the Richter scale for earthquakes and the central pressure for storms). In 2015 after Storm Patricia hit the Mexican pacific coastline the cat bond partially defaulted and the Mexican government was entitled to a US$ 50 million payment. The payment was agreed just after 4 months after the National Hurricane Center confirmed in its final report that the storm central pressure was greater than 932 millibar thus triggering the bond default. (For more info see https://www.worldbank.org/en/news/press-release/2012/10/12/mexico-launches-second-catastrophe-bond-to-provide-coverage-against-earthquakes-and-hurricanes)

RESILIENCE BONDS

PROS	CONS
▪ The bond finance a project or infrastructure aimed to reduce the probability of the catastrophe event to occur ▪ The bond will reflect the reduction in the loss severity and probability after the project completion reducing the coupon (i.e. interests paid on the capital) ▪ A resilience bond can be linked to a project that is aimed to counter the climate change (thus the name "green bond")	▪ Yet no example of a resilience bond linked to projects for specific natural hazards ▪ Resilience bonds are a very new kind of instruments and we see few examples ▪ Need a big public / supranational and trustworthy entity to back the issue of a resilience bond ▪ Multiple sponsors and parties need to cooperate in the design of a resilience bond

RELEVANT EXAMPLES

Description of a Resilience Bond: the Resilience Bond works as a Catastrophe Bond. The main difference lays on the existence of a Project or Infrastructure that the capital raised by the issue of the bond on the market is set to finance. The Project is aimed to lower the expected probability and therefore the expected loss of the natural disaster. Upon completion of the project, the lower expected loss is reflected on a discount of the bond coupon.

The European Bank for Reconstruction and Developing is the most important institution that has been actively engaged in issuing resilience bonds. Examples include the Qairokkum hydropower upgrade in Tajikistan and the Saiss water conservation project in Morocco. But there is no actual example yet of a resilience bond specifically linked to a project for reducing the potential impact of a natural hazard: resilience bonds are still at an experimental stage.

The reasons and the decision-making behind the exploration of a resilience bond have been effectively explained in the following flow chart: https://www.refocuspartners.com/wp-content/uploads/pdf/RE.bound-Program-Flowchart-September-2017.pdf