

# **Environmental Risks and Insurance**

A Comparative Analysis of the Role of Insurance  
in the Management of Environment-related Risks

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# Environmental Risks

Risks posed by the interaction between human activities and the Environment

- Impact of industrial activities on natural resources
  - Environmental pollution
  - Soil contamination
  - Reduced biodiversity
- Damaging effects of extreme natural events
  - Hurricanes
  - Floods
  - Earthquakes

# **Environment-related Risks:**

## **AN INSURANCE PERSPECTIVE**

### **1. Environmental Liability Risk**

**FINANCIAL RISK ASSOCIATED WITH ENVIRONMENTAL POLLUTION AND  
CONTAMINATION**

### **2. Natural Catastrophe Risk**

**RISK OF MAJOR ECONOMIC DAMAGES IN CONNECTION WITH THE  
OCCURRENCE OF NATURAL DISASTERS, SUCH AS EARTHQUAKES, FLOODS  
OR OTHER EXTREME ENVIRONMENTAL CONDITIONS**

#### **INSURANCE ISSUES :**

- **POTENTIAL FOR CATASTROPHIC CONSEQUENCES (MAGNITUDE)**
  - **RISK PREDICTABILITY AND CONDITIONS OF UNCERTAINTY**
  - **RISK DIFFERENTIATION AND RISK SPREADING**

# ENVIRONMENTAL LIABILITY RISK

## RISK OF LEGAL LIABILITY:

INFLUENCED BY THE UNDERLYING LEGAL AND REGULATORY FRAMEWORK

- Pollution as a negative externality (private/social costs)
- Different legal approaches:
  - **EX ANTE REGULATION**
  - **EX POST LIABILITY**
- Goals of environmental liability:
  - **COMPENSATION**
  - **DETERRENCE**

# ENVIRONMENTAL LIABILITY RISK LEGAL REGIME

- Strict liability v. negligence
  - LEVEL OF CARE
  - LEVEL OF ACTIVITY
- Direct v. Indirect Protection of the Environment
  - FULL INTERNALIZATION
  - EVALUATION OF NATURAL RESOURCES DAMAGES (NRDs)
  - ADMINISTRATIVE/CRIMINAL LIABILITY FOR CLEANUP COSTS
- Allocation of concurrent liabilities
  - JOINT AND SEVERAL LIABILITY
  - INDIVIDUAL (PROPORTIONAL) LIABILITY

# ENVIRONMENTAL LIABILITY RISK

## Conditions of Uncertainty

- Level of Factual Uncertainty:
  - **SUDDEN/GRADUAL POLLUTION**
  - **SYNERGETIC POLLUTION (concurrent liabilities)**
  - **LONG TERM EFFECTS (trigger of coverage issue)**
- Level of Legal Uncertainty:
  - **FEATURES OF THE ENVIRONMENTAL LIABILITY REGIME**
  - **INTRINSIC COHERENCE OF THE LEGAL SYSTEM**
- Informational Asymmetries:
  - **ADVERSE SELECTION**
  - **MORAL HAZARD**

# Modern Environmental Insurance

- INTEGRATED RISK MANAGEMENT APPROACH
  - Risk remodeling phase
  - Site-specific / tailor-made coverage
  - Accurate risk classification
  - Loss prevention strategies
  - New trigger of coverage formulas (manifestation/discovery)
  - Crisis management services
- EFFECTS
  - Financial security
  - Ex ante internalization of pollution costs
  - Surrogate regulation mechanism

# ENVIRONMENTAL INSURANCE

## DIFFERENT PRODUCTS FOR DIFFERENT NEEDS

- First party v. third party coverage
- Known v. unknown pollution
- On site v. off site contamination
- New environmental insurance products on the market:
  - Environmental liability policy (third party)
  - Coverage for on-site cleanup obligations (first party)
  - Cleanup cost cap (brownfield site)
  - Environmental coverage for landfills
  - Combined coverages

# ENVIRONMENTAL INSURANCE POOLS

## INFORMATION SHARING AND INCREASED FINANCIAL CAPACITY

- **Italy:** Pool RC Inquinamento
- **France:** Assurpol
- **The Netherlands:** Nederlandse Milieupool
- **Spain:** Pool Español de Riesgos Medioambientales

# ENVIRONMENTAL LIABILITY INSURANCE

## ROLE AND FUNCTIONS:

- Compensation (Judgment proof problem)
- Surrogate regulation mechanism (additional incentives)
- Ex ante internalization of pollution costs (premium)

## ALTERNATIVE MEANS OF FINANCIAL SECURITY

- Ex ante deposits
- Guarantee provided by financial institutions
- Compensation funds (tax funded)

# PUBLIC POLICY CONCERNS

## ENVIRONMENTAL LIABILITY RISK AND INSURANCE

- The limits of liability
  - **PAST POLLUTION (NO RETROACTIVITY)**
  - **CUMULATIVE EFFECT OF AUTHORIZED EMISSIONS**
  - **DIFFUSE POLLUTION (ABSENCE OF CAUSAL LINK)**
- The problem of mandatory insurance
  - **BILATERAL OBLIGATION (insurability issues)**
  - **UNILATERAL OBLIGATION (insurance as environmental watchdog)**
- Interaction among regulation, liability funds and insurance
  - **MINIMUM LEVEL OF REGULATION (risk insurability)**
  - **STRICT LIABILITY REGIME (limited scope for risk predictability)**
  - **COMPULSORY FINANCIAL SECURITY (to be approved by the Authority)**
  - **COMPENSATION FUND FOR RESIDUAL DAMAGES**

# NATURAL CATASTROPHE RISK

## **Market failures in catastrophe insurance**

### **LOW PROBABILITY / HIGH CONSEQUENCES RISK**

- Bounded rationality of individuals
- Low level of risk predictability
- Geographical risk spreading problem (*cumulative risk in the primary market*)
- Limited capacity:
  - magnitude of losses (*aggregate claims*)
  - inter-temporal spreading problem (*mismatch between size of annual premiums and size of expected loss*)
- Adverse selection

# NATURAL CATASTROPHE RISKS

## PUBLIC-PRIVATE PARTNERSHIP IN DISASTER MANAGEMENT

- Role of the public authority:
  - providing the requisite legal framework
  - subsidizing the cost of administering the disaster management scheme
  - subsidizing the cost of insurance to the beneficiaries
  - being a reinsurer of last resort
- Role of the private insurance sector
  - expedite loss assessment
  - effective surrogate regulation

# DISASTER RISK MANAGEMENT STRATEGIES

## **Examples of institutional arrangements**

- FRANCE: National Disaster Compensation Scheme
- SPAIN: Consorcio de Compensación de Seguros
- USA: National Flood Insurance Program (NFIP)
- CALIFORNIA: California Earthquake Authority (CEA)
- FLORIDA: Florida Hurricane Catastrophe Fund (FHCF)
- NEW ZEALAND: Earthquake Commission (EQC)
- TURKEY: Turkish Catastrophe Insurance Pool (TCIP)

# NATURAL CATASTROPHE RISKS

## RISK SHARING THROUGH CAPITAL MARKETS

### Alternatives to traditional reinsurance

- Catastrophe risk securitization
  - Governments
  - Insurers
  - Reinsurers
- **Physical trigger v. loss trigger**
- **Immediate payoffs v. delayed payment**
- **Credit risk v. basis risk**
- **Cost of implementing each measure**

# REGULATION AND CATASTROPHE INSURANCE

Effects on the development of the market

- Regulatory constraints
- Market entry/exit rules
- Financial and fiscal issues
- Regulation of claims practices
- Antitrust and competition policies

# Principles of Catastrophe Risk Management

- Integrated approach (public-private partnership)
- Scientific risk estimates
  - Risk predictability
  - Expected loss estimates
- Structural mitigation and vulnerability reduction
  - Building codes and other regulatory measures
- Incentives to minimize:
  - Adverse selection
  - Moral hazard
- Expedite settlements

# ENVIRONMENT-RELATED RISKS AND INSURANCE

## Concluding remarks

- **Insurance** cannot be considered as a ready-to-use solution to the complex problems posed by the "environmental liability risk" and by the "natural catastrophe risk", but it should be regarded by governments and policy makers as a **precious and valuable instrument in the available array of risk management tools.**

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**END OF PRESENTATION**

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