NATURAL CATASTROPHE INSURANCE DECREE AND CLOSING THE INSURANCE GAP

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In response to the increase in extreme climatic events such as convective storms, floods, and wildfires, the Italian Ministry of Economy and Finance issued a Natural Catastrophes Decree in 2025 to force enterprises to subscribe insurance coverages against these events, with implementation timelines based on their size:

- Large Enterprises: with 97% already insured against natural catastrophes, mandatory insurance commenced on April 1, 2025.
- Medium Enterprises: currently, 72% are insured, with mandatory coverage starting in October 2025.
- Small and Micro Enterprises: only 19% and 4% are insured, respectively. Mandatory insurance will begin in January 2026.

Only 5% of enterprises are currently insured against these risks, the economic quantification of the new insurance obligation for Nat Cat risks, is estimated at approximately 4 trillion: of these, 2.5 trillion are already present in the insurance companies' portfolios, while 1.5 trillion will come from new risks (source: ANIA).

CORRELATION BETWEEN EXTREME EVENTS, CLIMATE, AND HEALTH

In the last few years, extreme events have multifaceted impacts on both territories and populations, ranging from property destruction to evacuations and fatalities. The interplay between climate variability and extreme events exacerbates these effects. Rising temperatures and wind speeds increase wildfire and heat-related risks, while temperature shifts affect precipitation patterns, intensifying flood risks (including flash, riverine, and coastal floods). The IPCC (The Intergovernmental Panel on Climate Change, that is the United Nations body for assessing the science related to climate change) estimates that 90% of total catastrophes are climate-related, with future extreme event frequencies possibly increasing by up to 30% for certain risks, such as wildfires. Human activities further amplify the likelihood of these occurrences.

INSURANCE IMPACTS

Climate change significantly alters the frequency and severity of insurance claims. Increased extreme weather events lead to greater property >

damage and higher claim frequencies. Shifts in precipitation patterns can cause droughts or intense rains, damaging crops, infrastructure, and homes, thus increasing compensation demands. Rising sea levels threaten coastal areas, increasing claims related to property and infrastructure. Additionally, climate change affects public health, with heat-related illnesses and vector-borne diseases leading to more health insurance claims. Agricultural risks rise as climate change impacts crop yields, increasing claims for agricultural losses. Economic instability due to climate change can affect business financial stability, raising insolvency risks and boosting commercial insurance claims.

NAT CAT DECREE

According with the Decree, the Italian insure-financial group SACE will support insurers by covering 50% of damages up to 5 billion euros, with a 15% deductible borne by the insured. All business-related buildings must be insured. Insurers are required to update their Risk Appetite Framework (RAF) to establish new tolerance limits for catastrophic risks in line with solvency requirements. These limits should reflect the company's risk-taking capacity and consider SACE's coverage. Companies must integrate natural disaster risks into their Own Risk and Solvency Assessment (ORSA) process, evaluating the impact of new regulations on their risk profile and capital needs. Developing and integrating NAT-CAT risk models is essential, requiring ongoing monitoring and updates based on data collection. Exceeding RAF limits necessitates ceasing new risk-taking and notifying IVASS and the public. Internal policies must be revised: the Underwriting Policy should incorporate new CAT-NAT risk criteria and risk transfer methods to SACE, while the Reinsurance Policy should align with new regulations, including risk transfer agreements to SACE. Companies must ensure compliance and transparency, publishing insurance offering details online and at physical sales points. >

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PRICING APPROACH

For actuaries this is an interesting area of development. One of the key challenges is related to the pricing of this covers. Catastrophic claims often follow a Polya distribution, characterized by the assumption that event occurrence increases future replication likelihood. Observing a flood in a region raises future risk, with significant impacts on people and economies. The Polya distribution is akin to the well-known Poisson distribution, crucial in insurance for measuring claim probabilities, such as motor claim frequency. However, while the Poisson distribution assumes claim frequency depends solely on interval width, the Polya distribution considers both interval width and past event occurrences. Thus, while the Poisson distribution exhibits memory lessness, the Polya distribution does not.

RISK MITIGATION

The growing probability of adverse events necessitates timely insurance coverage to mitigate risks effectively. Leveraging the increasing availability of climate and geolocated data—such as building locations, heights, number of floors, zones, and proximity to rivers—enhances risk assessment. The advancement of sophisticated statistical models aids the development of internal models for optimal risk evaluation. An important key factor is also the inclusion of climate change models to encompass the evolution of climate factors into these evaluations. Developing internal models for flood, fire, landslide, earthquake, and hail event risks is vital for comprehensive risk management strategies. This is an interesting opportunity for actuaries in the short and medium term and the research and experiences in this area are increasing rapidly. <

POISSON DISTRIBUTION:

$$P(X = x) = \frac{e^{-\lambda}\lambda^{x}}{x!}$$

where:

- λ is the average number of events per unit of time or space
- x is the number of events (a non-negative integer)
- e is the base of the natural logarithm (approximately 2.718)

POLYA DISTRIBUTION (OR BINOMIAL NEGATIVE):

$$P\,(X = x) = \binom{x + r - 1}{x} p^{r}(1 - p)^{x}$$

where:

- r is the number of failures (or successes) desired
- p is the probability of success in a single trial
- x is the number of successes (or failures) occurring before achieving r failures (or successes)

MEMORY LESSNESS

The concept of memory lessness refers to a property of probability distributions where the probability of future events is independent of the past. The continuous exponential distribution and the discrete geometric distribution are examples of distributions with this property.

Formally, for an exponential random variable

X:$P(X > s + t \mid X > s) = P\,(X > t)$