Gallagher Re

Transcending Traditional Primary and Secondary Peril Classification in Reinsurance Catastrophe Risk Management:

AN ITALIAN CASE STUDY

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Introduction

Natural catastrophes in the reinsurance industry have been traditionally categorised into primary and secondary perils, posing a clear distinction between relatively rare and large loss potential catastrophe events (hurricanes and earthquakes) and more frequent and generally less severe natural events (such as hail, flood or bush fire). Generally, the former are well monitored, with well-established catastrophe models, while the latter have historically been treated with a less rigorous approach.

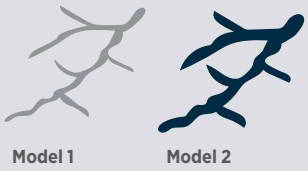
Nevertheless, the reinsurance industry has recently experienced an increasing trend in aggregated losses from secondary perils, with insured losses reaching levels typically seen from primary perils and putting bottom layers of cat excess of loss and aggregate programs under pressure [1,2,3,4]. This increasing trend is a consequence of a general rise in exposure in peril-prone areas and the effect of climate change resulting from global warming, likely leading to the occurrence of more extreme weather conditions and associated secondary peril events [5,6]. Analysis from Gallagher Re's historical natural disaster dataset indicates that secondary perils have incurred greater losses than primary perils in 26 of 33 years dating to 1990. Aggregated global data shows that secondary perils have accounted for 56% — a clear majority – of insurance industry losses during that time. Annual volatility in primary losses will always occur, but the increased cost of high impact secondary perils is leading to greater financial impact that can even offset years with significant tropical cyclone or earthquake events (such as 2022).

The Italy Case Study

Gallagher Re has worked on quantifying the impact of secondary perils in Italy. Traditionally, the reinsurance industry has been focused on Italy's primary perils, such as earthquake, but concern has gradually shifted over the last few years towards severe convective storms (SCS) and atmospheric events in general, due to the increased frequency and severity of reported claims.

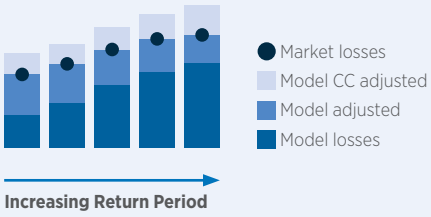
EARTHQUAKE RISK

The Italy earthquake view of risk (VoR) is part of our pan-European earthquake adjustment to align cat models to the latest available science from European consortium of earthquake engineering research institution SERA (ESHM20), as well as leveraging research from local institutions such as the National Institute of Geophysics and Volcanology (INGV) and Italian Civil Protection [7].



FLOOD RISK

The Gallagher VoR for flood is based on the evaluation of two recently released cat models both capturing fluvial and pluvial risk, as well as supporting detailed geocoding resolutions. The models were evaluated by our research team leveraging their long-lasting relationship with highly recognized academic partners.



SEVERE CONVECTIVE STORMS RISK

The Gallagher VoR for SCS leverages an in-house pan-European model extensively used in the market and developed utilising NASA data in collaboration with Karlsruhe Institute of Technology, as well as a recently released vendor model; both models are calibrated to reflect market losses and adjusted to incorporate climate change trends in terms of frequency and severity.

Figure 1: Summary of the Gallagher Re VoR for Italy

Gallagher Re estimates that losses from atmospheric perils in Italy have exceeded EUR 1 billion each year of the last four years. Similar trends have been observed in France, where major SCS events in 2022 have generated nearly 1 million claims and more than USD4 billion in losses, as reported from the French Federation of Insurers. Flood risk is also perceived as an increasing concern, as demonstrated by the 15–16 September 2022 Marche event which caused extensive damage across several Italian villages with 12 fatalities and more than 50 injuries.

Within this context, a clear understanding of these nat cats and their expected evolution driven by climate change are crucial aspects to provide robust risk management to risk carriers. Figure 1 illustrates a brief summary of our VoR for Italy, which focuses on but is not limited to earthquake, flood and SCS risks.

Gallagher Re's analytics team has applied the VoR to our Italy industry exposure database (a detailed collection of exposure data on all insurable motor and property assets for the country) assessing earthquake, flood and SCS risks and their relative contribution at portfolio-level losses, as well as the spatial distribution of this loss relativity at CRESTA level (a geographical aggregation standard used in the insurance industry and similar to Italian provinces [8]).

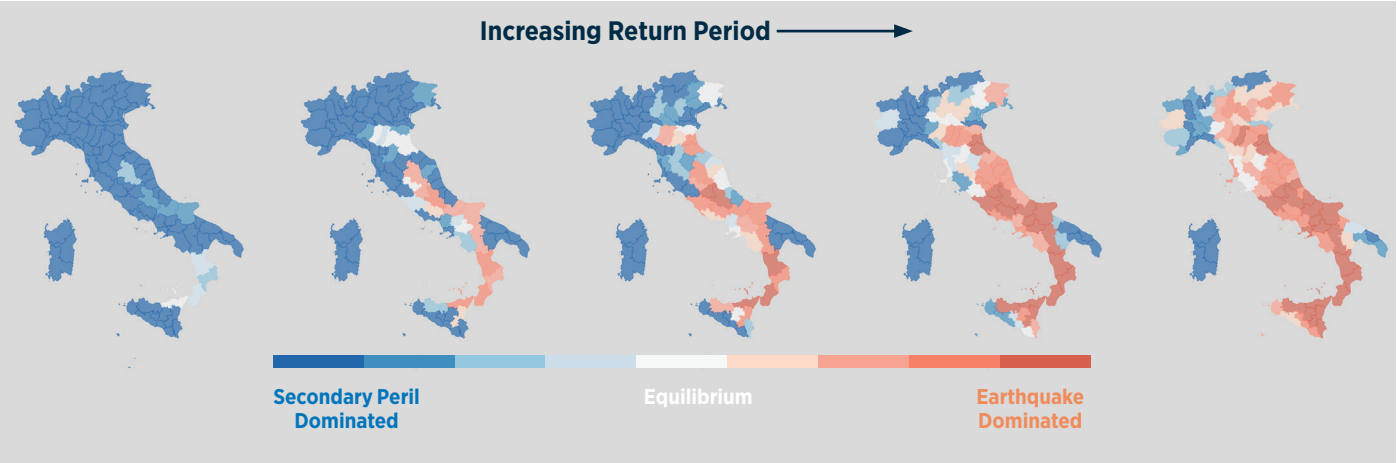


Figure 2: CRESTA contribution of secondary perils vs. earthquake across several return periods: Orange indicates the CRESTA is dominated by earthquake risk, blue indicates losses driven by SCS and flood, and white indicates equilibrium between peak and secondary perils.

Assuming no correlation across the three perils, Figure 2 compares losses from earthquake against secondary peril losses (SCS and flood combined) across several return periods. The analysed return periods go from typical entry point of common reinsurance CAT XL programs to return period levels for which reinsurance capacity is typically bought.

Despite the high loss potential of earthquakes, it is the secondary perils that clearly drive the short return period losses across Italy.

While earthquake is the main loss contributor from low to moderate return periods along the Apennines (and drives the tail of the loss distribution across South, Central and Northeast regions of Italy), SCS and flood dominate expected risk for mid-return period ranges in the highly insured Northern region of the country.

In Northwestern Italy, SCS and flood continue to drive the risk, even at long return periods, compared to earthquake, highlighting the fallacy of considering them as secondary for clients with high exposure concentration in the region.

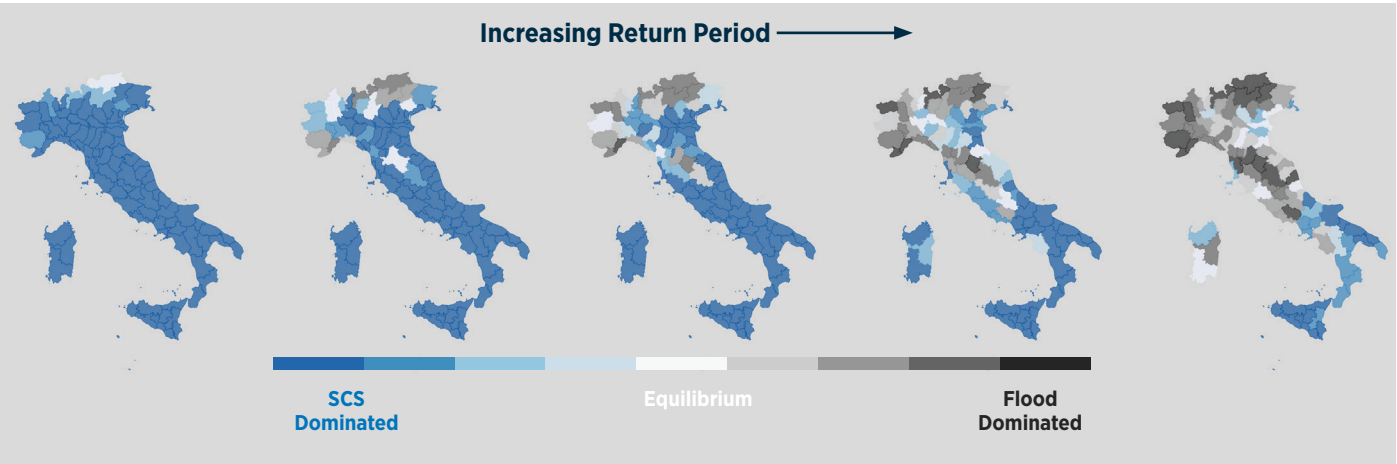


Figure 3: CRESTA contribution of SCS vs. flood across several return periods: Blue indicates the CRESTA is dominated by SCS risk, while gray indicates losses driven by flood,

Figure 3 considers the contribution to losses from SCS and flood across the same return periods; despite flood's significant impact in Northern Italy, SCS is the key peril countrywide for frequent losses. While flood events tend to drive expected losses for rarer scenarios in Northern and Central Italy across Adige Northeast, Arno, Tiber (Central), and especially the Po basin in the Northwest, it is clear from Figure 2 and Figure 3 that flood risk is the primary peril in the Northwest.

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The Added Value of the Gallagher Re VoR

The Gallagher Re VoR combines world-class analytics capabilities with our enduring relationships with highly recognized academic partners, representing a clear differentiator for a more refined understanding of nat cat risk.

The impact of the Gallagher Re VoR, rather than only using default catastrophe vendor models, is evidenced in Figure 4.

The stacked bar chart shows the relative contribution of each peril to the total expected losses from low (top row) to high (bottom row) return periods for three highly populated CRESTA regions: Torino, Florence and Rome.

Earthquake, flood and SCS splits are shown for losses given by unadjusted models and the Gallagher Re VoR ones, with the latter normalised with respect to unadjusted losses to better understand the impact of the VoR and its relativity against default models.

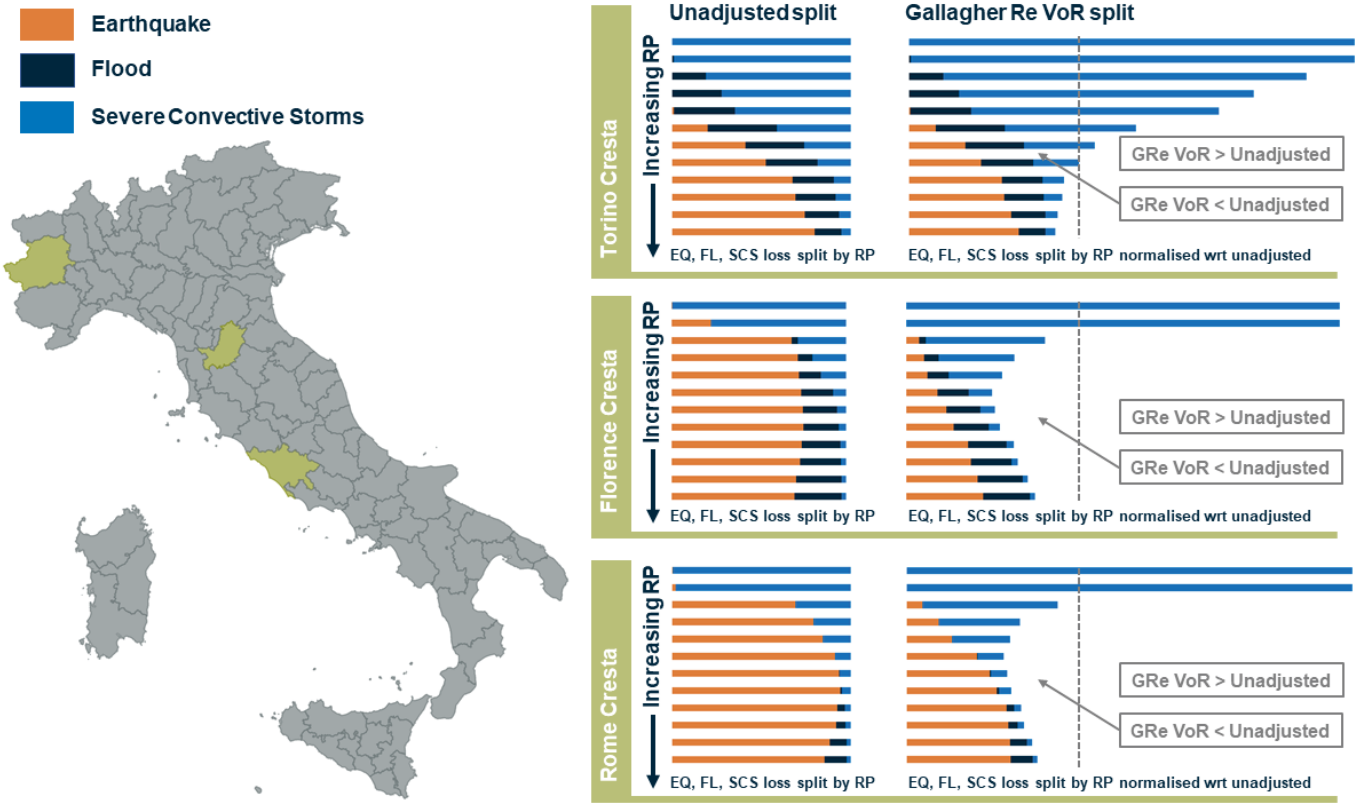

Figure 4: Comparison between nat cat losses split from default models (first column) and Gallagher Re VoR (second column) for Torino, Florence and Rome CRESTAs; Gallagher losses are normalised with respect to unadjusted losses to better understand the impact of the Gallagher Re VoR. Bars to the left of the grey dash line indicates expected losses are lower than those associated with default cat models; bars to the right indicate that the Gallagher Re VoR is higher than default models.

The analysis of Torino CRESTA suggests that seismic risk is modest, SCS clearly dominates frequent losses, and flood represents a significant amount of total expected losses in mid-return periods. The Gallagher Re VoR for Torino shows a little reduction of earthquake losses associated with an overall decrease at the tail, but a significant increase of SCS damage (>100%) for frequent return periods, leading to an overall increase of nat cat losses up to mid-return period scenarios.

The Gallagher Re earthquake VoR shows a significant reduction of expected quake losses for both Florence and Rome CRESTAs, with higher impact at the shorter return periods. As a result, predicted total nat cat losses are significantly lower compared with default models at mid-return period ranges (-30% to -40%) and moderately lower at larger return period ranges (-15% to -20%). Consequently, flood risk becomes notable at higher RPs in Florence.

Conclusions

Gallagher Re has performed a in-depth analysis on nat cat losses for Italy with the aim of demonstrating the importance of performing a comprehensive evaluation of all perils, including the so-called secondary ones, as well as quantifying their impact. Our analysis suggests that different perils could drive losses across different return periods and within different geographic locations across Italy.

In summary:

- Earthquake, as expected, drives tail losses across North, Northeast, Central and South Italy.
- SCS events drive short return period losses countrywide but are still considerably contributing to total expected nat cat losses at mid-return period ranges in the more highly insured region of Northern Italy.
- Flood risk becomes significant at comparable return period levels to quake ones, suggesting it represents a relatively minor threat. However, it shows a very different geographic distribution than earthquake, driving losses in Northwest (Po Valley) and representing a considerable risk for reinsurance coverage in the Arno (Central) and Adige (Northeast) basins.

The current complex and fast-paced environment requires an improved approach towards the management of nat cat risks and a comprehensive understanding of all perils. Modelling of emerging risks, capturing the impact of climate change on frequency and severity of weather-related perils, cross-peril correlation, time-dependent seismic risk, dynamic exposure modelling, and leveraging artificial intelligence are the current and future challenges for the industry. Gallagher Re's Analytics team, with the support of the Gallagher Research Centre, is at the forefront of nat cat modelling, providing our clients with a holistic VoR for natural disasters.

References

[1] https://www.theinsurer.com/news/gallagher-re-pricing-reaching-distress-levels-in-florida-and-australia/23677.article

[2] https://www.insurancejournal.com/news/national/2022/01/24/650571.htm

[3] https://www.artemis.bm/news/munich-re-sees-24-month-hard-market-lowers-proportional-exposure-qs/

[4] https://www.theinsurer.com/video-interview/gallagher-res-james-kent-market-is-behaving-logically-as-it-gears-up-for-1-1/

[5] https://www.ajg.com/gallagherre/news-and-insights/2022/july/impact-of-climate-change-on-natural-perils/

[6] Seneviratne, S.I. et al, 2021: Weather and Climate Extreme Events in a Changing Climate. In Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Masson-Delmotte et al., (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 1513–1766, doi:10.1017/9781009157896.013.

[7] https://www.ajg.com/gallagherre/news-and-insights/2021/november/earthquake-risk-in-italy/

[8] https://about.cresta.org/

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