Multi-Hazard Parametric Catastrophe Bond Trigger Design for Subduction Earthquakes and Tsunamis

Katsuichiro Goda, Western University, Ontario, Canada

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Abstract: This study presents trigger design methods and performance evaluations of multi-hazard parametric catastrophe bonds for mega-thrust subduction earthquakes and tsunamis. The catastrophe bonds serve as alternative disaster risk financing tools for insurers and reinsurers as well as municipalities and governments. Two types of parametric catastrophe bond trigger are investigated. A scenario-based method utilizes available earthquake source-based information, such as magnitude and location, whereas a station-intensity-based method can be implemented when seismic and tsunami hazard monitoring systems are in place in a region. The case study results, focusing on wooden buildings in Miyagi Prefecture, in Japan indicate that the station-intensity based trigger methods outperform the scenario-based trigger methods significantly. Incorporating seismic and tsunami hazard information from multiple recording stations results in smaller trigger errors. The station-intensity-based methods are applicable to building portfolios at both municipality levels and regional levels. The work is published in Earthquake Spectra (doi: 10.1177/8755293020981974).

Biography: Dr Katsuichiro Goda is an Associate Professor and a Canada Research Chair in Multi-Hazard Risk Assessment at the University of Western Ontario, Canada. His research is focused on catastrophic earthquake-related multi-hazard risk management from economic and societal viewpoints. His research interests are broad and multidisciplinary, and cover a wide range of academic fields, including engineering seismology, earthquake engineering, tsunami engineering, and decision-making under uncertainty. In 2012, his professional expertise was recognized through a prestigious 2012 Charles F. Richter Early Career Award given by the Seismological Society of America and a Humboldt Research Fellowship Award for experienced researchers by the Alexander von Humboldt Foundation. He received the 2017 IASSAR Early Achievement Research Award given by the International Association for Structural Safety and Reliability.