

Optimal catastrophe risk pooling

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Key words: Catastrophe risk, Extreme value theory, Risk pooling

Abstract:

Catastrophe risk has long been recognized to pose a serious threat to the insurance sector. Although natural disasters such as flooding, hurricane or severe drought are rare events, they generally lead to devastating damages that traditional insurance schemes may not be able to efficiently cover. Catastrophe risk pooling is an effective way to diversify such risks. This approach has recently been explored by multiple schemes such as the Caribbean Catastrophe Risk Insurance Facility Segregated Portfolio Company (CCRIF SPC) or the African Risk Capacity Group. In this work, we study a risk pooling model where each participant brings in a portion of their loss to the pool and in return participants share the aggregated loss of the pool together. By maximizing the diversification benefit for the pool using Extreme Value Theory techniques, we derive an approximation of the optimal pooling strategy for each participant. Simulation studies are undertaken to examine our results and the real data analysis from the U.S. National Flood Insurance Program is also carried out to illustrate how this framework can be applied in practice.