Abstract

The current system for managing natural disaster risk in the United States is problematic for both homeowners and insurers. Homeowners are often uninsured or underinsured against natural disaster losses, and typically do not invest in retrofits that can reduce losses. Insurers often do not want to insure against these losses, which are some of their biggest exposures and can cause an undesirably high chance of insolvency. There is a need to design an improved system that acknowledges the different perspectives of the stakeholders. In this article, we introduce a new modeling framework to help understand and manage the insurer's role in catastrophe risk management. The framework includes a new game-theoretic optimization model of insurer decisions that interacts with a utility-based homeowner decision model and is integrated with a regional catastrophe loss estimation model. Reinsurer and government roles are represented as bounds on the insurer-insured interactions. We demonstrate the model for a full-scale case study for hurricane risk to residential buildings in eastern North Carolina; present the results from the perspectives of all stakeholders-primary insurers, homeowners (insured and uninsured), and reinsurers; and examine the effect of key parameters on the results.

Citation

Kesete, Y., J. Peng, X. G. Shan, Y. Gao, R. Davidson, L. K. Nozick, and J. Kruse. "Modeling Insurer-homeowner Interactions in Managing Natural Disaster Risk", Risk Analysis, 34(6): 1040-1055, 2014.