Abstract

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Developing a Post Disaster Insurance Profile using Evolutionary Game Theory

The increasing rate and magnitude of natural disasters increase the financial burden on host communities. This paper develops an ex ante disaster insurance profile. To this effect, and utilizing an evolutionary game theory, this paper presents three stakeholders: (1) home owners purchasing disaster insurance policies (2) insurers offering different insurance policies and (3) state government offering different ex post disaster recovery compensation plans. The utilization of evolutionary game theory approach allows for maximizing the host community’s total welfare by decreasing their losses depending on their needs and objective functions. The authors created a hypothetical sample of 1,000 home owners accounting for heterogeneous income levels, three insurers each offering three unique insurance plans and two different ex-post governmental disaster compensation plans. The results of the proposed model indicated that: (1) home owners evolved toward insurance plans with the least premium values (2) insurance plans with the most comprehensive coverage did not survive through the evolutionary process and (3) the evolutionary stable strategy is an oscillating line of chosen plans and insurers as a result of the stochastic and dynamics nature of the hazardous event. Currently, the authors are integrating the proposed model into a holistic decision making tool incorporating social, environmental, and economic vulnerability indicators. This should allow for a better prediction for the host communities’ disaster response, welfare, and resilience.