



When Climate Hazard Granularity Challenges Risk Pooling: A Spatial Perspective

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The French "CatNat" regime provides mandatory natural disaster coverage based on national solidarity, using a uniform rate for all homeowners. However, the increasing availability of high-resolution geoscience data challenges this uniformity. This is notably the case for Clay Shrink-Swell (CSS) risk, which has become a primary cost driver in the last years. Does the shift from national pooling to granular risk segmentation threaten the viability of such solidarity regimes?

To answer this question, we combine empirical analysis with theoretical modeling. First, utilizing a large-scale collection of insurance quotes, we identify a fragmented market where insurers leveraging granular hazard maps coexist with traditional "pooling" actors. Second, to capture the long-term dynamics of this fragmentation, we develop a game-theoretic model of market equilibrium. This model allows us to explicitly simulate how risk selection strategies impact affordability and access to coverage. Our findings suggest that while granular segmentation improves pricing accuracy, it risks creating "insurance deserts" for vulnerable areas. Finally, this technical evolution undermines the regime's solidarity principle, potentially reducing the socio-economic resilience of communities facing increasing climate geohazards.