

DISSERTATION PROPOSAL

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“Essays on Beliefs about Catastrophic Risks”

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In this dissertation, I use a variety of empirical methods including reduced-form regression models, hedonic models, residential sorting models, survey elicitations, and laboratory experiments, to study the effects of disaster experience on risk perceptions, and the influence of those beliefs on subsequent behavior. I examine beliefs in two domains: home flooding risk, responses to which will convulse coastal real estate markets in coming decades, and car accidents, a leading cause of death for the non-elderly and the basis for a \$300 billion insurance market in the United States.

In the first chapter, I leverage the natural experiment created by flood disasters in the United States to test the hypothesis that agents who personally experience disasters form a lasting belief “scar” that leads to adaptive behavior. I focus on real estate markets, where transactions data is readily available, stakes are high, and choices differ significantly in terms of risk exposure. Drawing on data from over 6 million Florida real estate transactions between 2005 and 2016, I use negative binomial models and find evidence that scarred buyers who experienced disasters in their previous homes shift purchases away from coastal properties in Florida, retreating to larger properties inland. I find these effects are sharp but transient, disappearing in the years after a shock. I show that these patterns are hard to reconcile with a Bayesian updating model. Hedonic models show that an influx of scarred buyers to a given Florida market leads to a decrease of the amenity value of water proximity in equilibrium. I then develop a sorting model that can estimate the quantitative effect of disaster shock on individual demand for housing near the water, using propensity score matching to find a group of non-scarred buyers that serves as a control group. I attempt to isolate the informational effect of flood exposure and eliminate other channels through which disaster exposure may affect purchase behavior (e.g. wealth effects due to uninsured property damage). I measure the shift in beliefs that would be needed to rationalize observed changes in purchasing behavior, and consider the welfare implications of transient shifts in preferences or beliefs. Additionally, I use my model to project the effect of a future increase in flooding events on the evolution of coastal housing markets.

In the second chapter, I (along with coauthor Saurabh Bhargava) explore the extent to which consumers’ information advantage in an insurance market can be eroded by behavioral biases. We link telematics driving data from a large U.S. automobile insurer to a detailed driver survey with elicitations of risk forecasts and beliefs about relative driving safety. We find that drivers have private knowledge of their marginal risk that cannot be predicted from insurer ratings variables, but that most drivers significantly underestimate their average insurance risk. Using driver forecasts and surveyed measures of decision-making, we estimate a “behaviorally-adjusted” forecast and find that behavioral bias significantly erodes potential private knowledge of risk on average, and for the marginal driver, by about 20%, with potentially large negative consequences for consumers’ welfare and ambiguous implications for market efficiency. Finally, we use hypothetical insurance choices from the same sample of drivers to show that behavioral erosion offers a possible explanation for surprisingly small adverse selection effects found by previous researchers.

In the third chapter, I (along with coauthor Caroline Hopkins) use a longitudinal survey of residents of coastal U.S. counties to examine the tendency for insurance demand to rise abruptly and dramatically in the aftermath of natural disasters. We consider two treatments that shed light on how insurance consumers react to both the informative and non-informative aspects of a disaster. First, we study the effect of randomized exposure to flood maps published by the U.S. Federal Emergency Management Agency (FEMA). We find clear evidence that this information treatment affects beliefs about future flooding, and differentially impacts respondents with more vulnerable homes. Effects on stated willingness to pay for insurance, by contrast, are muted or absent. Second, we use hurricane exposure in 2016, 2017, and 2018 as a quasi-experimental treatment, leveraging our longitudinal data to measure the effect of hurricanes on the evolution of beliefs over time. We find that perceived risk and worry attenuate quickly as a storm recedes into memory. The large swings in beliefs we observe suggest a complicated decision making process that is not well-suited to climate adaptation, and which will force policymakers to think carefully about the need to encourage adaptive behavior.