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Insuring against catastrophic risks: The role of loss experience and emotions

Howard Kunreuther, W.J. Wouter Botzen, Mark V. Pauly, and Peter Robinson[1]

INTRODUCTION

Costly flood events around the world and expectations that the flood risk might increase in many regions as a result of climate change have increased the importance of protecting oneself against future flood-related damage by purchasing flood insurance. The 2017 hurricane season was a record in terms of economic costs, in which Hurricane Harvey resulted in flood damage in the United States alone of $85 billion.

But take-up for flood insurance is low. Only 17 percent of homeowners in the area devastated by Hurricane Harvey had flood insurance, and only 15 percent of those suffering damage from Hurricane Florence in September 2018 are estimated to have had flood insurance. CoreLogic estimates that Hurricane Florence caused flood damage of about $28.5 billion in the Carolinas and Virginia, with uninsured flood losses at $18.5 billion. Hurricane Michael, which made landfall in October 2018 near Mexico Beach, Florida, was predominantly a wind event, nevertheless, damage estimates from storm surge are $3.7 billion, of which about 10 percent were insured.

KEY FINDINGS

- This research comprises two web-based experiments involving 1,346 individuals in Florida most of whom were over 30 years of age, and 1,041 Dutch homeowners.
- 31% of individuals in the U.S. study chose to switch from insured against a hurricane related loss to uninsured or vice versa at least once over the course of the experiment. This finding is contrary to predictions of classical economic models where individuals maximize their expected utility.
- In the Dutch study, individuals who worry more about flooding and exhibit more anticipated regret about not purchasing flood insurance if a flood were to occur, are more likely to have higher flood insurance demand under lower flooding probabilities.

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One reason that individuals do not purchase insurance is that they are strongly influenced by cognitive biases in their decision process. Using web-based experimental data from the U.S. and the Netherlands, we studied the relationship between demand for insurance against catastrophic risks and emotional factors. Specifically, these experiments examine the role that regret might play on future insurance purchase decisions after one has experienced an uninsured loss, or paid an insurance premium but not made a claim.

U.S. DATA

The U.S. dataset was obtained from an experiment conducted with 1,346 individuals in Florida, nearly all of whom were over 30 years of age and likely to have insurance experience (see Kunreuther & Pauly, 2018). The experiment consisted of a 10-period game in which individuals were asked to imagine owning a house worth $100,000, and faced a chance of hurricane damage to their house that would cost $50,000 to repair. Individuals were told that based on expert estimates there was a probability of 1/25 in any period that a hurricane would occur. Both the probability of a hurricane and the resulting damage were constant over time. Insurance could be purchased to fully cover the cost of repairing the damage from a hurricane.

Individuals evaluated their insurance decisions after each period by answering one of the following questions using the following 5-point scale ranging between "Very unhappy" (1) to "Very glad" (5):

- How do you feel about (not) having bought insurance now that you know a hurricane did occur?
- How do you feel about (not) having bought insurance now that you know a hurricane did not occur?

Risk-averse individuals should purchase insurance coverage when premiums are subsidized and actuarially fair if they were maximizing their expected utility. In this sense, individual insurance decisions should not be affected by loss experience if the objective risk itself does not change.

FINDINGS

The study found that 31 percent switched from being insured to uninsured or vice versa at least once over the 10 periods, which is inconsistent with expected utility theory. Most of the uninsured individuals who were very unhappy after experiencing a loss purchased insurance in the next period, presumably because they regretted not having purchased coverage prior to the hurricane. A few who were insured over a number of periods and did not suffer any losses switched to being uninsured, presumably because they felt they had wasted their premiums rather than recognizing that the best return on an insurance policy is no return at all (i.e., not suffering a loss). Six percent remained uninsured for all 10 periods, although their premiums were subsidized and actuarially fair, a finding that is inconsistent with expected utility theory predictions unless these individuals were risk takers.

DUTCH DATA

The Dutch dataset was obtained from an experiment conducted with 1,041 Dutch homeowners (see Robinson & Botzen, 2018). Individuals were first asked to imagine purchasing a property worth €240,000 in a flood-prone area. Then maximum willingness-to-pay (WTP) for flood insurance was elicited for nine different probabilities of €60,000 flood damage to the property attributed to different river water levels nearby. We constructed a variable that indicates the lowest flood probability that each individual was willing to pay anything for flood insurance. Individuals were then asked the extent to which they agree with the following statements on a 5-point scale ranging from "Strongly disagree" (1) to "Strongly agree" (5):

- I would feel regret about not purchasing flood insurance if a flood occurs.
- I am worried about the danger of flooding at my current residence.

FINDINGS

Based on a correlation and regression analysis, it was found that individuals who worry more about flooding and exhibit more anticipated regret about not purchasing flood insurance are more likely to purchase insurance at lower flood probabilities. While worry and regret affected the likelihood at which individuals were prepared to pay a positive amount for flood insurance, these variables do not affect the maximum WTP values across the nine flood insurance purchase decisions. This finding suggests that worry and regret influence the threshold probability at which individuals are willing to pay for flood insurance, but not the most they are willing to pay for coverage.

EXPLAINING ANOMALOUS BEHAVIOR

Anomalous behavior in flood insurance purchasing can be explained by examining individuals' self-reported feelings about their insurance decisions after they find out whether they suffered a hurricane-related loss. Uninsured individuals who experienced a loss were significantly less happy about their insurance decision than uninsured individuals who did not experience a loss. Individuals who stated high levels of unhappiness after experiencing a hurricane-related loss were more likely to purchase insurance against damage from the next hurricane. That is, individuals who switched from being uninsured to insured were the ones with the strongest negative emotions. Uninsured losses may have led individuals to regret not having purchased coverage.

KEY FINDINGS

- Uninsured individuals who stated high levels of regret after experiencing a hurricane loss were more likely to purchase insurance against the next hurricane risk.
- Two policies that may help to overcome emotionally-based biases are:
  - providing insurance as a default option;
  - extending the mandatory insurance purchase requirement to all property owners in the floodplain, including to those who do not have a federally-backed mortgage.
- Two policies that may incentivize individuals who use the threshold level of concern decision rule to purchase natural disaster insurance:
  - instead of describing risk in yearly probability format, the risk could be presented as a higher probability of occurring at least once over a longer time frame;
  - bundle low-probability risks with other risks into a single insurance policy.

When insured individuals have not experienced a loss for multiple periods, they may feel that their premiums have been wasted and regret having made these payments. Insured individuals who did not suffer a loss in the previous period were relatively happier with their insurance decision than uninsured individuals who experienced a loss. This is unsurprising given that uninsured losses require a much larger out-of-pocket expense than the premium payment. Moreover, the rather low increase in unhappiness of insured individuals who did not experience a loss in the previous period did not affect switching rates in the next period.

POLICY IMPLICATIONS

These two studies reveal that individuals who experienced regret because they were uninsured at the time of a hurricane tended to purchase insurance in the next period. One way to reduce regret for these individuals is to add flood coverage to a homeowners' policy. Given that most individuals have a strong preference for the status quo, they are not likely to opt out of this protection. To increase uptake even further, more stringent measures may be needed, such as mandatory flood insurance for those residing in flood-prone areas.

One way to overcome the decision not to purchase insurance for events with low probabilities would be to reframe the likelihood of a flood over a longer time frame. For example, instead of characterizing a risk as a 1-in-100 probability of disaster related damage in a given year, the likelihood could be presented as a 1-in-4 probability of at least one flood or hurricane occurring during a 30-year period (see Chaudhry et al., 2018). Future research may shed light on when it is appropriate to impose the types of policy strategies highlighted above as well as the welfare implications of these policies.

Sources:

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Authors:

Howard Kunreuther (kunreuth@wharton.upenn.edu) is the James G. Dinan Professor of Decision Sciences and Business and Public Policy at the Wharton School, and co-director of the Wharton Risk Management and Decision Processes Center. He is a Fellow of the American Association for the Advancement of Science and a Distinguished Fellow of the Society for Risk Analysis. He is co-author of *Insurance and Behavioral Economics: Improving Decisions in the Most Misunderstood Industry* (with M. Pauly and S. McMorrow).

Wouter Botzen (wouter.botzen@vu.nl) is Professor of Economics of Climate Change and Natural Disasters, and Deputy Head at the Department of Environmental Economics of the Institute for Environmental Studies, VU University of Amsterdam. His research interests focus on climate change economics, individual decision making under risk, natural disaster insurance, and natural disaster risk management. He is the author of *Managing Extreme Climate Change Risks through Insurance* (Cambridge University Press, 2013).

Mark V. Pauly (pauly@wharton.upenn.edu) is Bendheim Professor in the Department of Health Care Management at the Wharton School of the University of Pennsylvania. He is a former consultant to the Congressional Budget Office, the Office of the Secretary of the U.S. Department of Health and Human Services, and served on the Medicare Technical Advisory Panel. In 2012 he received the William B. Graham Prize for Health Services Research.

Peter Robinson (peter.robinson@vu.nl) is a PhD researcher at the Department of Environmental Economics of the Institute for Environmental Studies, VU University of Amsterdam. His research interests include insurance demand against natural disaster risks, as well as individual decision making under risk and uncertainty.