

INFORMED DECISIONS ON CATASTROPHE RISK

Characteristics and Protective Behaviors of Hazard Insurance Purchasers

We study the relationship between disaster risk reduction and insurance coverage to assess the presence of moral hazard for two different natural hazards with survey data from Germany and the United States. The results show that moral hazard is absent. Nevertheless, adverse risk selection may be present. This has significant policy relevance such as opportunities for strengthening the link between insurance and risk reduction measures and the use of risk-based insurance premiums.

To determine the existence of moral hazard and whether insurance and risk reduction measures are substitutes, we looked at the confluence of having insurance and the homeowners' undertaking long-term risk reduction activities and short-term emergency preparedness measures.

ABSENCE OF MORAL HAZARD

Moral hazard is not present in the investigated markets. In fact, there is slight evidence for a higher tendency toward self-protection across insured individuals.

DEDUCTIBLE

Insurers offset their concern about policyholders' moral hazard through the use of a deductible.

Unfortunately for insurers, the deductible has a very minor influence on risk reduction measures taken, unless the deductible is very high.

- Findings in this brief are the result of two separate studies using a variety of statistical methods on the flood insurance market in Germany, and flood and windstorm insurance markets in the United States.
- Moral hazard occurs when insured individuals undertake fewer risk reduction measures than they would if uninsured. In this case, insurance and risk reduction measures could be considered substitutes.
- 42 percent of flood insurance purchasers in New York City undertook long-term mitigation measures such as elevating utility and electricity installations, versus 30 percent of non-purchasers.
- Emergency preparations during an imminent threat do not significantly differ between flood insurance purchasers and non-purchasers in New York City.
- In Germany, individuals with flood insurance more proactively informed themselves about the risk.
- Our survey data suggest that homeowners are not aware of their deductible amount, or if they are aware, believe it to be relatively low. 62% of our respondents with homeowners insurance in the U.S. did not know the amount of their deductible.

We find that decisions to mitigate disaster risks, including insurance purchase, are mainly driven by individuals' internal characteristics rather than external incentives.

Personality traits of flood insurance purchasers

Strong private value of preparing for floods
Internal locus of control
Peace of mind

Conditions that predict purchase of flood insurance

Prior flood damage
Received disaster assistance previously
Income level
Risk reduction measures undertaken

Positive indicators:

- Flood insurance demand is related to a strong private value of being well-prepared for flooding.
- Households purchase flood insurance to get peace of mind.

Negative indicators:

- Households that received federal disaster assistance in the past are less likely to carry insurance.
- Low-income homeowners had significantly lower demand for flood insurance. Thus, there is a need for solutions to overcome the affordability challenge.

We studied the relationship between disaster risk reduction and insurance coverage to assess the presence of moral hazard for two different natural hazards with survey data from Germany and the United States. Our statistical and methodological approach was guided by the approaches taken in previous studies investigating moral hazard in insurance markets. We applied multiple statistical methods across varied market constructs to investigate different aspects of moral hazard and to act as a robustness check. The results show that moral hazard is absent. Nevertheless, adverse risk selection may be present. This has significant policy relevance such as opportunities for strengthening the link between insurance and risk reduction measures.

USA Data

One of the USA datasets was obtained from our survey of more than 1,000 homeowners who live in a house with a ground floor in flood-prone areas in New York City (NYC). A professional survey company implemented the survey over the phone about six months after Superstorm Sandy flooded NYC in October 2012. This dataset includes individual level information on implemented flood risk reduction measures and flood insurance purchases from the National Flood Insurance Program as well as a range of variables that influence these decisions. Our individual level data is especially suitable for determining whether the relationship between insurance purchase and risk reduction activities by individuals are substitutes or complements, and for identifying the behavioral mechanisms behind these relationships. Of our total number of respondents, 44% purchased flood insurance because doing so was mandatory, 21% purchased it voluntarily, 33% did not have flood insurance and 2% did not know whether they had flood coverage.

A second USA dataset was obtained from field surveys that measured the evolution of coastal residents' risk perceptions and preparation plans as three hurricanes—Irene (2011), Isaac (2012), and Sandy (2012)—approached the United States. The surveys were conducted by phone, and were initiated up to 72 hours before each storm's predicted landfall, and then repeated with different random samples three times a day (morning, afternoon, and evening) until 6 hours before predicted landfall. The survey shifts were timed to allow measures of subjective storm beliefs to be paired with objective storm information carried in the 5 a.m., 11 a.m. and 5 p.m. EDT National Hurricane Center advisories (see Meyer et al., 2014 for further details). In these studies, perceptions and preparation decisions were measured in real time as they were being made by residents threatened by the storms. The surveys for these three storms provided 1,698 respondents in total. While 86% of total respondents indicated having a homeowners' insurance policy, only 32% indicated having a separate flood insurance policy.

Germany Data

The German data were obtained from surveys carried out in the Elbe and Danube river catchment areas in response to flood events occurring in 2002, 2005, and 2006 (see e.g., Kreibich et al., 2011). Surveys were conducted as a 30-minute telephone interview directed to the person in the household with the best knowledge about flood damage. The surveys provide approximately 2,000 respondents in total, of which 42% had flood insurance. The surveys were intended to ascertain both damage outcomes from the flood and whether a respondent had undertaken precautionary flood risk reduction measures.

Long-Term Risk Reduction Measures versus Short-Term Emergency Preparedness Measures

Moral hazard describes a scenario when insured individuals undertake fewer risk reduction measures than they would if uninsured. We search for the presence of moral hazard by comparing risk-reduction activities of homeowners with and without hazard insurance.

We differentiate between long-term risk-reduction activities and short-term emergency preparedness measures. Long-term risk-reduction activities—such as dry proofing walls of a building to make them impervious to water—are undertaken well in advance of a flood. These often have a high upfront cost with an uncertain benefit. Emergency preparedness measures—such as moving contents to higher floors to avoid them suffering flood damage—are undertaken during an imminent threat of a disaster. Emergency preparedness measures are generally less costly and have more certain risk reduction benefits.

Findings

We find that individuals who purchased flood insurance (either voluntarily and mandatorily) are more likely than the uninsured to have undertaken long-term risk reduction measures such as having water-resistant floors, window protection and elevating utility and electric installations (see Figure 1). Deductibles did not influence protective behavior.

Moreover, we find that decisions to reduce natural disaster risks and to buy insurance are jointly and mainly driven by internal (behavioral) characteristics of individuals who face low-probability, high-impact events such as floods or hurricanes. The exception was income level: low-income homeowners were less likely to have flood insurance.

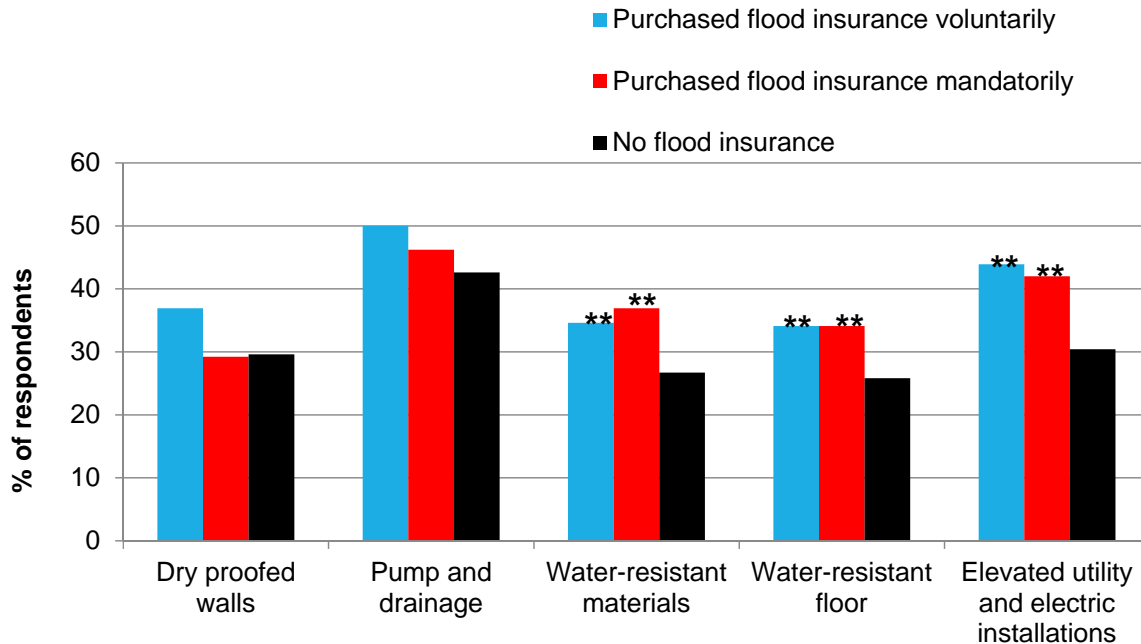


Figure 1. Percentage of respondents—individuals in New York City who purchased flood insurance voluntarily, mandatorily or not at all—who implemented specific risk reduction measures.

Note: ** indicates a significant difference at the 5% level with the no flood insurance group.

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Botzen, W.J., Kunreuther, H., Michel-Kerjan, E. (2017). Protecting Against Disaster Risks: Why Insurance and Prevention May Be Complements. Working Paper, Wharton Risk Management and Decision Processes Center.

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