

INFORMED DECISIONS ON CATASTROPHE RISK

Seeing is Believing? Property Prices in Inundated Areas

A key element in hazard and disaster management is understanding how individuals perceive risk.

Inadequate distinction between assessed risk and perceived risk is a major difficulty towards managing flood risk.

- *Risk assessment* estimates the chances of a specific set of events occurring and/or their potential consequences.
- *Risk perception* is concerned with psychological and emotional factors that have been shown to have an enormous impact on behavior.

We compared the price of inundated properties to the price of non-inundated properties, both inside and outside the floodplain. We wanted to distinguish between an “information effect” from being located in the floodplain, and an “inundation effect.”

- In 1994, a severe flood caused by tropical storm Alberto destroyed parts of Albany, Georgia, causing 15 deaths and displacing almost 22,000 people.
- In addition to FEMA hazard maps classifying floodplain areas, we use a map of the area that was inundated by the 1994 flood.

We find that property values decreased for inundated properties – whether inside or outside the floodplain.

Non-inundated properties in the floodplain did not decrease in value, suggesting that it is in fact the “inundation effect” that lowers the property prices.

- We find that immediately after the 1994 flood, inundated properties inside the floodplain, on average, sold for 48% less than the “control” property (non-inundated, outside the floodplain). On average, inundated properties outside the floodplain sold for 36% less than the “control” property. When evaluated at an average priced home in city of Albany, the losses in value are equivalent to \$38,258 and \$29,121 respectively.

The property price decrease vanished after few years.

- In the absence of additional flooding, the price differential between the inundated properties and the non-inundated properties vanished after about 6 years.

Introduction

The city of Albany is located along the banks of the Flint River in Southwest Georgia. It comprises a total area of 55.8 square miles and is home to over 77,000 people. In 1994, a severe flood caused by tropical storm Alberto destroyed parts of downtown and south Albany, causing 15 deaths and displacing almost 22,000 people.

We are interested in determining whether people who experienced the 1994 flood (“inundation effect”) assess the risk differently from people who are at risk for flooding but were not affected by the 1994 flood (“information effect”). We use housing prices pre- and post-flood to assess the effects of flood experience on risk perception.

Data and Methodology

We divided our study area into four mutually exclusive groups: inundated, in the floodplain; inundated, outside the floodplain; non-inundated, in the floodplain; and non-inundated, outside the floodplain. We limit our analysis to an area in the city of Albany, Georgia (Dougherty County), for which the data on the extent of inundation and damage were available.

We used four data sources to construct our dataset: Dougherty County’s Tax Assessor’s Office for individual property sales of residential homes in the city of Albany; Georgia’s Geographic Information System (GIS) clearinghouse for parcel level GIS data; FEMA for floodplain maps of the Flint River at Albany; and USGS for flood inundation maps and to estimate losses from the 1994 flood at census-block level. The USGS along with partners at the National Weather Service, the U.S. Army Corps of Engineers, FEMA, state agencies, local agencies and universities, has developed a web-based tool that provides digital geospatial flood-inundation maps showing flood water extent and depth on the land surface. We obtained maps with the inundated area for a water surface altitude of 192.5 feet at Flint River, corresponding to the 1994 flood caused by tropical storm Alberto.

Each property studied is a single-family residence sold between 1985 and 2007. Individual property sales data contain information on housing structural characteristics, such as number of bedrooms, number of bathrooms, heated square feet, presence of garage, in addition to sale date and sale price. Property sale prices were adjusted to 2007 constant dollars, using the housing price index for the Albany metropolitan area from the Office of Federal Housing Enterprise Oversight. The GIS database was utilized to determine the location attributes of the properties, such as proximity to rivers, railroad, major roads, and parks. Other neighborhood characteristics (median household income and percent of non-white residents) were determined at the block group level using 2000 census data.

Findings

The results suggest that there was a decrease in value for floodplain properties only after flooding, particularly in the floodplain properties that were inundated.

When the impacts of floods are visualized and remembered, subjective risk probabilities are high, but as the effects of flooding fade over time (e.g., due to reconstruction), subjective probabilities decay and eventually vanish.

In the absence of additional flooding, the price differential between the floodplain properties and the non-floodplain properties did indeed vanish. Moreover, there was no significant price discount associated with properties in the floodplain if they were not in the inundated area.

These results suggest that in most cases, the falling property values in the area affected by a large flood event are to those houses that are inside the inundated area; there is less effect on homeowners of properties that were not inundated, meaning that simply having information about the probabilities of a damaging flood does not cause the same response as experiencing flood damage first-hand.

Conclusions

Our findings suggest that buyers of floodplain properties have a limited awareness about flood hazards, despite the federal requirement for flood insurance for floodplain properties with a federally-backed mortgage. Our results suggest that it is the result of being flooded, rather than knowing there is a potential to be flooded, that affects property prices (“seeing is believing”).

If there were an information effect associated with being located in the floodplain, one would expect to see a price reduction for non-inundated floodplain properties as well, but our results suggest that this is not the case. We did not find any price reduction for the floodplain properties when we dropped the inundated properties from the model. The non-inundated properties, including those in the floodplain, did not significantly reduce in value following the flood. In inundated areas, the price reductions vanished after about six years.

These results offer important lessons for public risk communication. Flood risk, for instance, is often communicated using the probabilities of occurrence. However, this might not be sufficient warning for individuals who have never directly been affected by flooding to cause them to behave proactively for their protection against flood risk. Therefore, future public risk communication strategies should explicitly address those individuals who have not personally experienced a flood.

Reference: Atreya, A., & Ferreira, S. (2014). Seeing is Believing? Evidence from Property Prices in Inundated Areas. *Risk Analysis*.

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