RQ: What is the impact of flood experience on flood preparedness?
What we want to find out ideally: Is this effect stronger or weaker in hurricane regions?

A simple model:

$$\Pr(p) = \pi * c_f - c_p \in [0,1]$$

Preparedness (probability to prepare) is driven by risk perception, expected damage, preparation cost

$$\pi = f(f, e) \in [0,1]$$

Risk perception is driven by real flood risk and personal flood experience.

- p: preparing for a flood (in the data)
- π: flood risk perception
- c_f: expected cost of flood event
- c_p: cost of preparing for a flood
- f: flood risk
- e: flood experience (in the data)

Potential confounders:

- Real flood risk is confounding flood experience and flood risk perception. Not a problem for our estimation.
- Risk perception: Reverse causalities between risk perception and preparedness unlikely, since a rational agent should not change perceived likelihood of flood π on the basis of preparedness p. The agent should instead render expected flood damage c_f lower with higher preparedness p.

RQ1: What is the impact of flood experience on flood preparedness?
Hypothesis 1: Flood experience has a positive effect on preparedness.
M1: $\boldsymbol{preparedness_i = \beta_0 + \beta_1 * experience_i + \beta * X}$

➔ Tells us overall effect of experience on preparedness

If we find a positive effect with M1:
RQ2: Is this relationship stronger or weaker in hurricane regions? (What is the impact of hurricane fatigue on preparedness?)
Hypothesis 2:

- **H 2.a:** People prepare more in hurricane regions due to seasonality of hurricanes (high f, high π) and increased flood damage (c_f) in recent years.
- **H 2.b:** People prepare less in hurricane regions due to a phenomenon called disaster fatigue which can lead to people "giving up on preparing".

M2.1: Add a hurricane dummy (1 for respondent lives in hurricane region, 0 otherwise).

$$\boldsymbol{preparedness_i = \beta_0 + \beta_1 * experience_i + \beta_3 * Hurricane_i + \beta * X}$$

➔ Tells us the proportion to which the effect of experience on preparedness is explained by (hurricane) region.

M2.2: Split the data into Florida and New York (or two other regions) and repeat M1.
Florida sample: $preparedness_i = \beta_0 + \beta_1 * experience_i + \beta * X$
New York sample: $preparedness_i = \beta_0 + \beta_1 * experience_i + \beta * X$

➔ Possible robustness check
➔ Tells us whether the impact of experience on preparedness differs between a hurricane region and a non-hurricane region.
➔ If we find a meaningful difference in effect size, this could be explained by several things:

- Higher levels of preparedness (should lead to lower effect size)

    - Higher levels of experience (experience is equally high in NY and FL)
    - Hurricanes
- Caveat: Due to higher risk perception π, people in Florida might practice drills regardless of personal experience. In this case, the effect would be weaker but not due to disaster fatigue. We can check this by estimating the impact of preparedness on experience (e.g., "inverting" M2.2). A significant effect would indicate that households have prepared even though they have not directly experienced flood.

Risks:

- If we don't find an effect in M1, my thesis will be very short
- What is the added value of doing M2.1 and M2.2?
- We might be able to find out whether the relationship is stronger or weaker in hurricane regions but probably not why that is the case.

Data:

- FEMA 2023 national household survey (website currently down)
- 509 respondents on Coastal Flooding
- After cleaning: **385 respondents, 180 in Florida, 43 in New York,** 60 in Washington
- If we drop "awareness", "flood zone", "risk perception", "efficacy" from the data (variables with most missing data), we can increase to **427 respondents (209 in Florida, 59 in New York**, 75 in Washington)

Choice of variables:

- Preparedness:
    - To mitigate the effect of wealth and income, choose a preparation measure with low c_p. Now preparedness only depends on e (through π) and c_f.
    - To control for different levels of preparedness between New York and Florida, choose a preparation measure that has been adopted to similar share in both groups.
- Hurricane: calculated based on region.

FEMA National Household Survey 2023: selected variables

id (string)	
State (string)	
Zipcode (string)	
Hurricane (calculated; binary)	Hurricane = 1 if state in hurricane region. Determine weather the state is in a hurricane region through web sources
awareness (binary)	In the past year, have you read, seen, or heard any information about how to get better prepared for coastal flooding?
perception (categorical)	Thinking about the area you live in, how likely would it be for coastal flooding to impact you?
experience (binary)	Have you or your family ever experienced the impacts of coastalflooding?
supplies (binary)	Have you bought emergency supplies in the last year?

documents (binary)	Have you insured your property or documents in the last year?
involved (binary)	have you got involved in your community in the last year?
Learned_rountes (binary)	Have you learned evacuation routes in the last year?
Made_plan (binary)	Have you made an emergency plan in the last year?
Made_safer (binary)	Have you made your homes safer in the last year?
Planned_neighbors (binary)	Have you made an emergency plan with your neighbors in the last year?
Practiced_drills (binary)	have you practiced emergency drills in the last year?
documents (binary)	Have you safeguarded important documents in the last year?
Rainy_day (binary)	Have you saved up for a rainy day in the last year?
alerts (binary)	Have you signed up for alerts in the last year?
Family_communication (binary)	Have you made a communication plan with your family in the last year?
Income (integer, binned)	Household income
Age (integer, binned)	Respondents age
Education (integer, binned)	Respondents “highest completed level of education”
Rentmortgage (integer, binned)	Monthly rent or mortgage payments, respectively
Homeownership (binary)	1 if household owns the house, 0 if household is renting the house