Earth's Future

Supporting Information for

The Effect of Flood Exposure on Insurance Adoption among US Households

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Introduction

Following are supporting figures and tables describing the relevant data for the study and additional analyses.

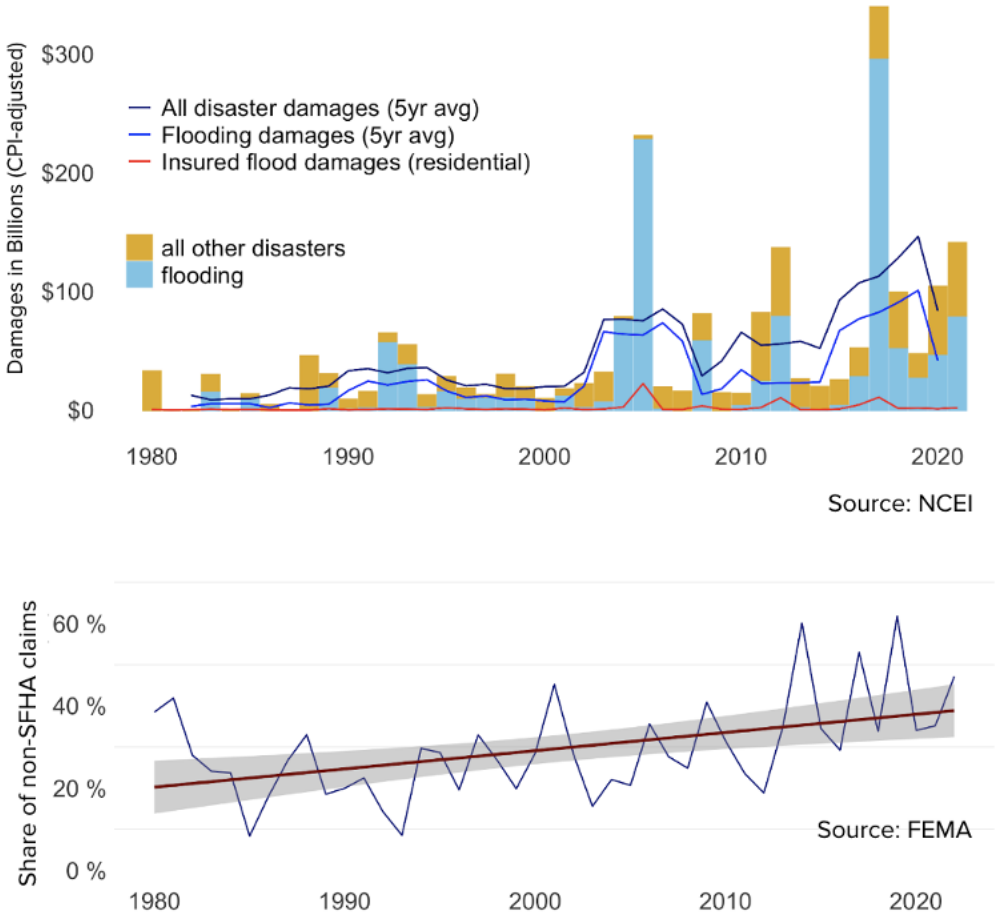


Figure S1. Flood-related damages and share of damage claims from non-SFHA zones. a) 5-year rolling average of flooding vs total disaster damages show that flooding has been a key driver of total damages over the time period 1980-2020. Flood damage claims from residential insurance policyholders continue to represent a small portion of total flood damages. b) The share of residential flood damage claims from non-SFHA zones have been increasing over the same time period.

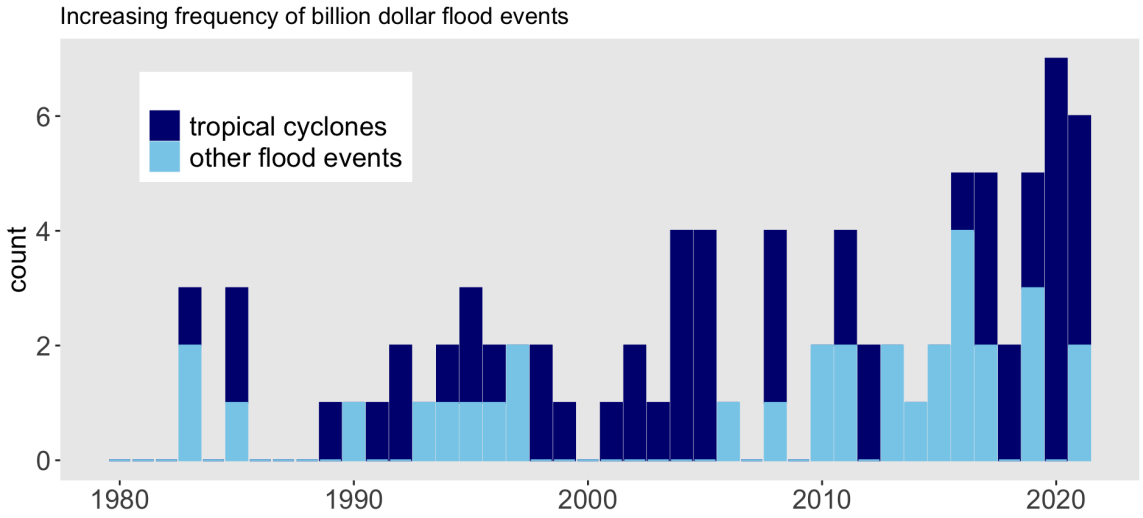


Figure S2. Frequency of billion-dollar flood events. The number of tropical cyclones and other flood events causing >billion in damages are increasing. (Source: NCEI)

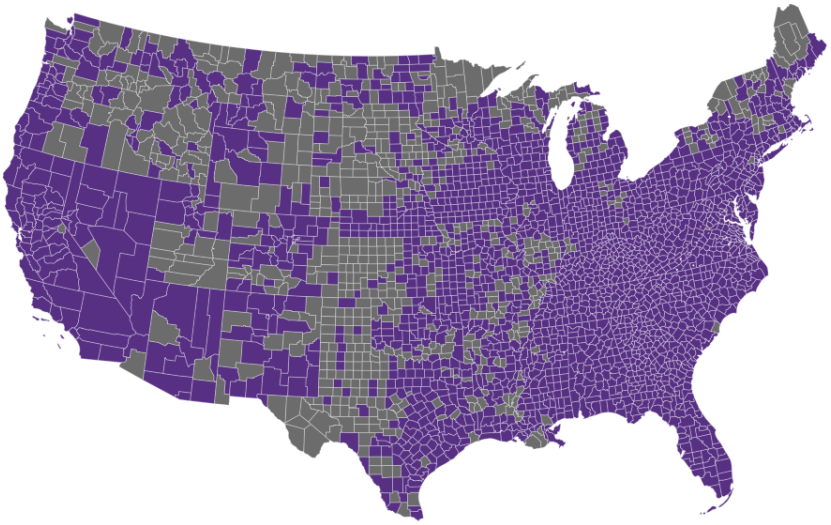
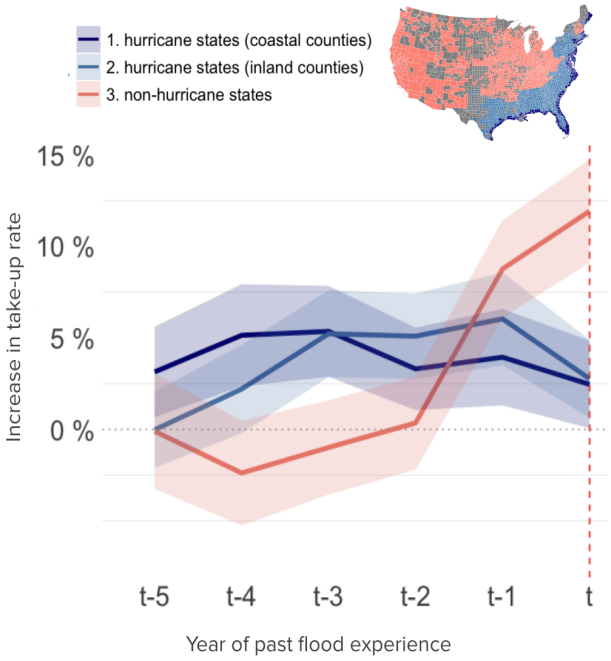


Figure S3. Counties with >50% properties covered by flood maps. Of the 2,408 counties where some level of flood map coverage exists, 2,392 counties are selected for this analysis, accounting for 94% of the population. These counties are selected based on the flood mapped areas accounting for at least 50% of residential properties in the county.



	Estimated take-up attributed to disaster at time t (95% CI)	Average predicted increase in policies per county
Hurricane states (coastal) n = 236	**2.5%** (0.06% - 4.9%)	**20**
Hurricane states (inland) n = 789	**2.8%** (0.64% - 4.9%)	**0.52**
Non-hurricane states n = 1367	**11.9%** (9.1% - 14.7%)	**0.58**

Figure S4. Estimated salience effect of flooding on insurance demand. The plot shows the estimated impact of disaster declarations on insurance take-up across counties with differing baseline take-up rates. Table shows the average predicted increase in insurance policies per county attributed to a major disaster declaration at time t (calculated as: increase in take-up rate x baseline take-up rate in 2020 x average policy count for each county). Predicted increase in policies are on average 35 times greater in hurricane coastal counties compared to counties in non-hurricane states.

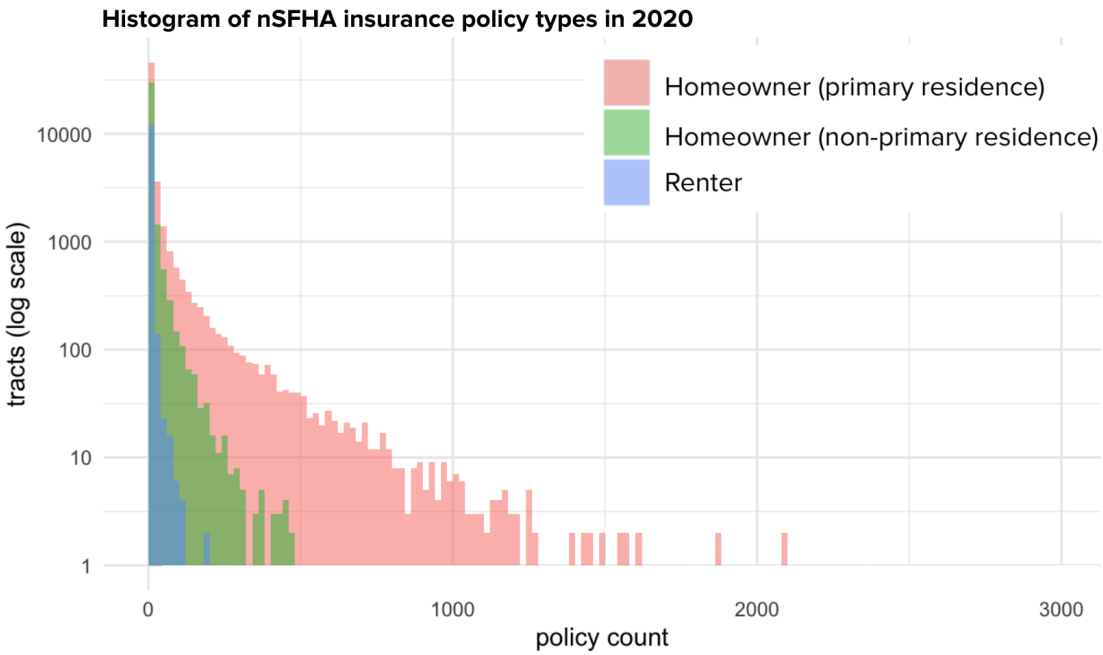


Figure S5. Histogram of nSFHA policies in 2020, comparison across policy types.

		2009		2020	
Subset	Number of Counties	**Average policies-in-force (PIF)**	**Average PIF ratio**	**Average policies-in-force (PIF)**	**Average PIF ratio**
All counties	2,392	777 (5774)	1.51% (5.6%)	903 (6985)	1.70% (5.7%)
Hurricane states - coastal	229	5316 (17036)	9.77% (14.9%)	6439 (20783)	10.5% (14.8%)
Hurricane states - inland	796	337 (1591)	0.80% (1.6%)	464 (2996)	0.96% (2.2%)
Non-hurricane states	1,367	236 (1555)	0.56% (1.3%)	208 (839)	0.58% (1.7%)

Table S1. Comparison of baseline flood insurance take-up rates across county subsets, in 2009 and 2020.

	Homeowners (Primary residence)		Homeowners (Non-primary residence)		Renters
Building coverage	Yes		Yes		No
Content coverage	Yes	No	Yes	No	Yes
Primary residence indicator	Yes		No		Yes/No
Number of census tracts with at least one policy in 2020	n=49,534		n=29,304		n=8,878

Table S2. Classification method for flood insurance policy types. Renter policies are distinguishable as they are only eligible to purchase content coverage. Policies purchased by homeowners versus landlords are distinguished by whether the policy is for a primary residence or not.