

FHFA ECON SUMMIT  
PAPER DISCUSSION:



# IMPACTS OF INCREASING FLOOD LOSSES ON MORTGAGE CREDIT RISK IN THE UNITED STATES



BECKA BROLINSON

11/12/24

## Motivation and Research Questions

- Motivation:
  - Natural disasters may lead to increases in mortgage delinquency and defaults
  - Impacts to households such as loss in housing security, changes in credit scores, and may end in foreclosure
- Research Questions:
  - Do flood events lead to increases in mortgage delinquency and default?
  - In the future, will there be increases in delinquencies and default associated with flood events?

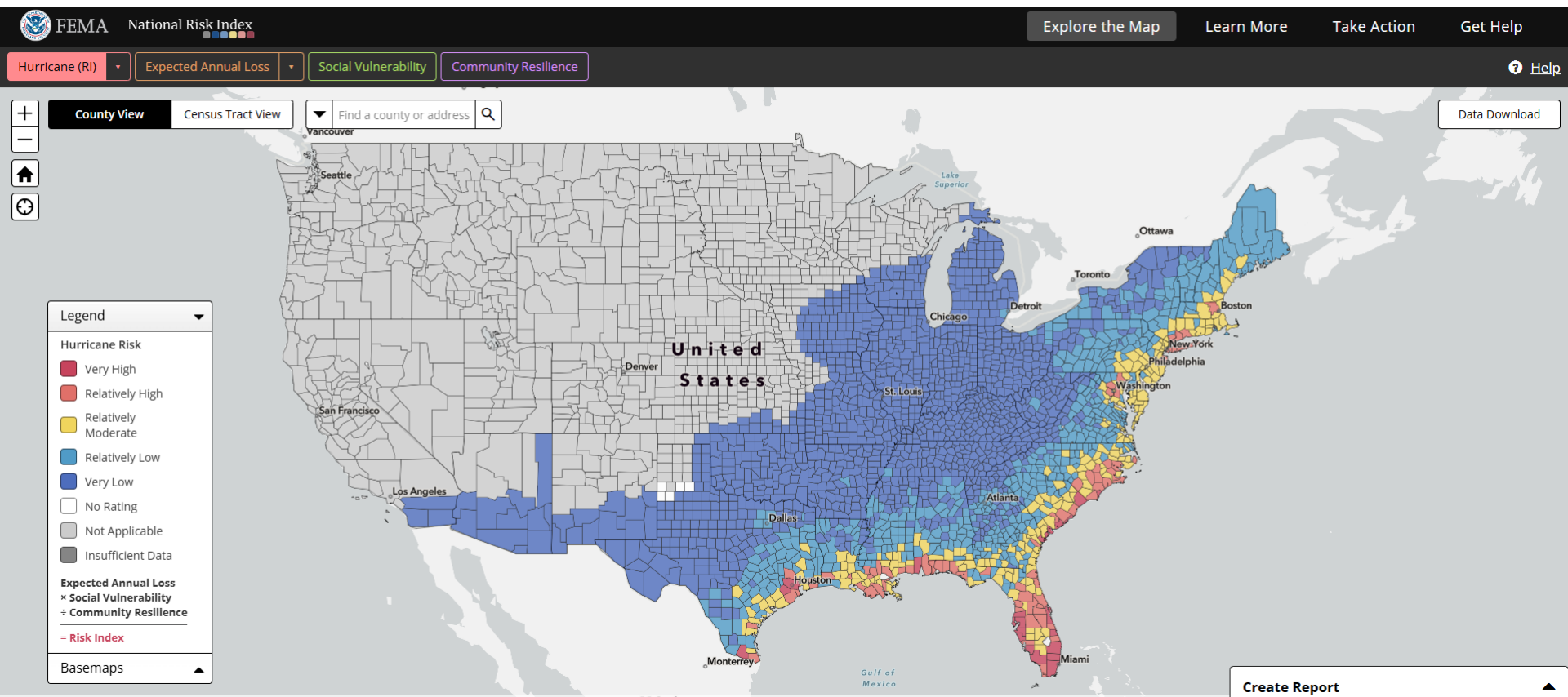
# Mortgage Performance Declines Following Flood Events:

TABLE 6. Effects of flood hazards on delinquency.

Authors	Year	Location	Obs.	Effect size	Independent variable	Model
Calabrese et al.	2021	Florida	2,750,000	3.35	Hazard ratio of $\geq$ Cat 3 Hurricane	Cox Hazard Model
Du and Zhao	2020	Texas	12,631,231	0.38	$\geq$ 6 months after Harvey	DiD
	2020	PR	2,330,786	1.19	$\geq$ 6 months after Maria	DiD
Kousky et al.	2020	Texas	27,061	2.59	Hurricane Harvey severe damage	Multinomial Logit
Rossi	2021	US	100,000	1.88	$\geq$ Cat 3 Hurricane	Logit

- This Paper:
  - Evaluates mortgage performance following flood events for Gulf and Atlantic Coast States using loan-level data from FR Y-14M combined with FSF data on historical flood events
    - Heterogeneity by depth, borrower characteristics, community insurance uptake
  - Uses projections of future flood risk to project future mortgage performance

# Hurricane Risk Concentrated in Gulf & Atlantic States



Esri, TomTom, Garmin, FAO, NOAA, USGS, EPA, USFWS | FEMA, Compass, CDM Smith, ABS Consulting, Factor, Inc., Arizona State University (for Social Hazard Events and Losses Database for the United States), the Centers for Disease Control Agency for Toxic... Powered by Esri





# 2022 GSE Acquisition Distribution based on FEMA Census Tract Hurricane Risk Index

[Link to FHFA Public Use Database](#)

Hazard - Hurricane State - All County - All Tract - All



## Distribution of Single Family GSE Acq UPB by Hurricane Risk Ratings

Very High	5.22% (\$60.79B)
Relatively High	7.22% (\$84.05B)
Relatively Moderate	14.21% (\$165.54B)
Relatively Low	13.50% (\$157.27B)
Very Low	29.12% (\$339.25B)
Not Applicable	30.67% (\$357.22B)
Insufficient Data	0.06% (\$0.67B)
No Rating	0.00% (\$0.04B)

## Distribution of Multi Family GSE Acq UPB by Hurricane Risk Ratings

Very High	4.78% (6.38B)
Relatively High	8.68% (11.59B)
Relatively Moderate	16.51% (22.04B)
Relatively Low	15.53% (20.74B)
Very Low	32.84% (43.84B)
Not Applicable	21.64% (28.89B)
Insufficient Data	0.00% (0.00B)
No Rating	0.01% (0.01B)

Select Chart/Table  
Acquisition Distribution by Ri...

DTS High-Needs Counties  
All

State All

County All

Tract All

Risk Type Hurricane

Reset Filters

Source: FHFA  
Data Source: FHFA Public Use Database - 2022 ..

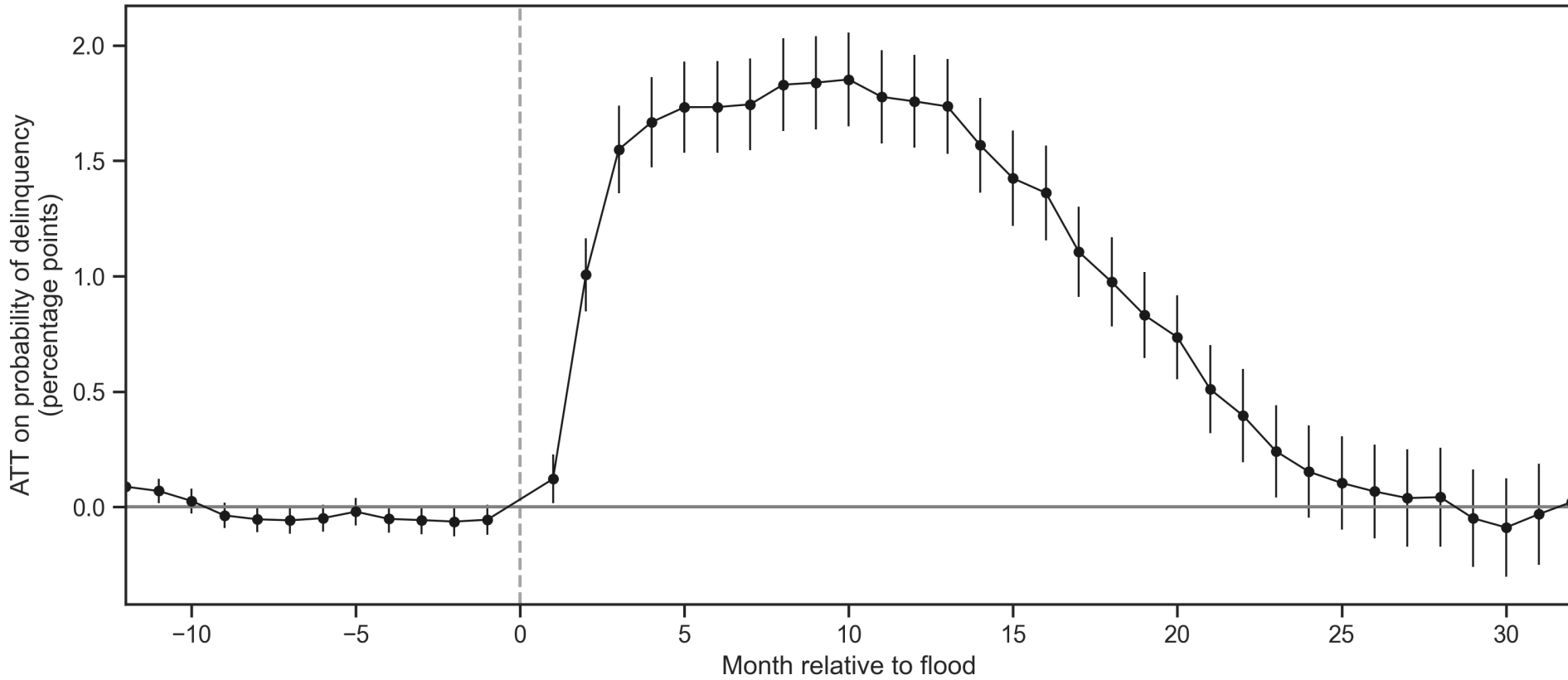
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Last Updated: 8/21/2024  
Updated by Daniel Yoo, FHFA..



# Headline Results: Does Delinquency Increase Following a Hurricane?

Answer: Yes



## Comments and Suggestions

- Context
  - Information about baseline delinquency rates for all of the heterogeneity analysis for the audience to understand the magnitude of the effect size
- Forbearance, loan modifications, prepays, and foreclosure?
  - Delinquency and forbearance are not one in the same
  - Loan modifications following disasters may increase mortgage survivorship (Dunksy 2023)
  - Prepayments increase for some borrowers following disasters (Kousky et al 2020) and some borrowers may have an incentive to strategically default (Liao & Mulder 2024), borrower equity

## Comments and Suggestions

- You look at treatment effects by FICO score, can you use FICO score as the outcome variable?
  - I.e. do borrowers impacted by flood events have subsequent changes in their FICO score?
- Heterogeneity by baseline flood risk?
  - The specification has loan-fixed effects but it would be interesting to see whether there are differential effects not just by flood depth but by baseline flood risk using FSF flood factor or measure of SFHA status.
- Other Disasters?
  - These results could be interesting to compare across other disaster types such as wildfires