

Mortgage Finance and Climate Change Risk

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Introduction -- The Emerging Climate Change Challenge for Real Estate Owners

- The majority of American adults are home owners (“The American Dream”)
- Home ownership is a bet on the place where the home is located (the local labor market, the amenities and local quality of life)
- The opportunity cost of owning a home is to hold a more diversified asset portfolio
- Climate change raises the probability of “fat tail risk” and poses new risks to home owners
- Home owners are “amateurs”. I am a home owner! My opportunity cost is to rent from a professional management company.

Mortgage Finance in the United States

- Most younger home buyers pay for their home by using their cash to make a 30% down payment
- Borrow the remaining balance from a bank and pay this back over 30 years with a fixed rate mortgage.
- 30 years is a long time!
- The borrower holds a “real option” to default on the mortgage!
- Ambiguous climate change uncertainty raises the value of this option

The Lender's Profit Maximization Decision

- U.S banks issues loans and then must decide whether to hold these loans or securitize them.
- If the residential loans are “conforming” (meeting certain financial rules), the bank can sell the loan to the GSEs (Freddie Mac and Fannie Mae)
- The GSEs do **not** pay a lower price to the banks for “climate risky” loans.

Mortgage Finance and Climate Change: Securitization Dynamics in the Aftermath of Natural Disasters, Ouazad and Kahn (2021)

- We study bank lending patterns after fifteen major hurricanes including Sandy, Katrina and Harvey.
- An Event Study, an unexpected shock occurs --- Do lenders change their behavior?
- “Using the government-sponsored enterprises’ sharp securitization rules, this paper provides evidence that, in the aftermath of natural disasters, lenders are more likely to approve mortgages that can be securitized, thereby transferring climate risk.”

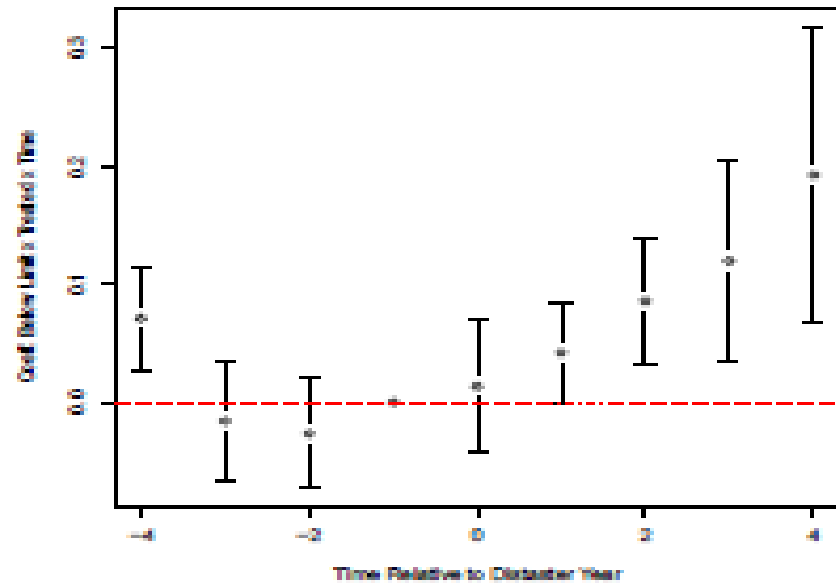
The 15 Events

Year	Name	From	To	Category	States	Normalized PL [†] USD b\$, 2018
2005	Katrina	25-Aug	30-Aug	5	FL, LA, MS, AL	\$116.88
2012	Sandy	30-Oct	31-Oct	3	NY	\$73.49
2008	Ike	12-Sep	14-Sep	4	TX, LA	\$35.15
2005	Wilma	24-Oct	24-Oct	5	FL	\$31.90
2004	Charley	13-Aug	14-Aug	4	FL, SC	\$26.93
2004	Ivan	12-Sep	21-Sep	5	AL, FL	\$25.89
2004	Frances	03-Sep	09-Sep	4	FL	\$16.48
2005	Rita	20-Sep	24-Sep	5	LA, TX	\$14.89
2004	Jeanne	15-Sep	29-Sep	3	FL	\$13.57
2011	Irene	26-Aug	28-Aug	3	NC	\$10.79
2008	Gustav	31-Aug	03-Sep	4	LA	\$5.45
2005	Dennis	04-Jul	18-Jul	4	FL, AL	\$3.54
2005	Ophelia	09-Oct	18-Oct	3	NC	\$2.48
2012	Isaac	21-Aug	03-Sep	1	LA	\$2.36
2008	Dolly	20-Jul	27-Jul	1	TX	\$1.48

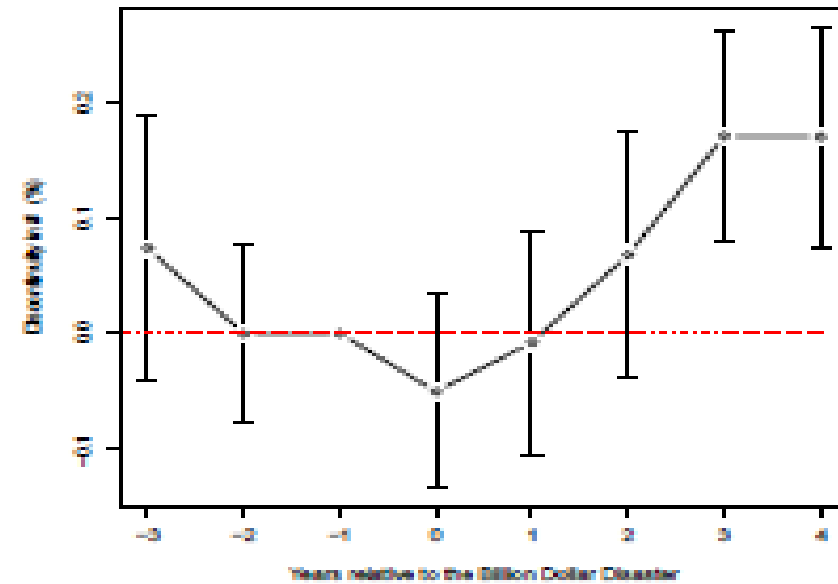
Figure 4: Main Results – Impact of Billion-Dollar Events

This figure presents (i) the coefficients of interest in specification (1) with securitization as the dependent variable, and (ii) the coefficients of interest in specification (2) with the discontinuity in the number of securitizations as the dependent variable. The bottom figure presents results for OCC- and FRS-regulated lenders, that are more likely to arbitrage between “originate-and-hold” and “originate-and-distribute.” The bars are 95% confidence intervals.

(a) Evolution of the Probability of Securitization (Specification (1))



(b) Evolution of the Discontinuity in the Number of Securitizations (Specification (2))



Lessons for Accelerating Adaption to Climate Change: New Rules of the Game!

- Contrasting Japan and the United States
- Create **incentives** to discover emerging climate risk and to adapt to the emerging risk
- Build up adaptation human capital → lower the cost of adaptation
- Discovering “known unknowns”
- Price Discrimination: To enhance resilience, the borrower should be offered a menu of interest rates and access to housing insurance that depend on;
 - The area’s objective risks
 - The owner’s adaptation investments
- A Key paper co-authored by a Nobel Laureate paper
 - Ehrlich I, Becker GS. Market insurance, self-insurance, and self-protection. Journal of political Economy. 1972 Jul 1;80(4):623-48.

My New Yale University Press Book “Adapting to Climate Change”

