

Discussion of “Mortgage markets with climate-change risk: Evidence from wildfires in California”

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Bank of Canada's Annual Meeting, 2022

A Very Important and Careful Paper

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- “**Unsurprisingly**, we find a significant increase in mortgage delinquency and foreclosure after a fire event when we do not control for the size of the fire: after a fire, the probabilities of delinquency and foreclosure are 0.40% and 0.30% higher, respectively, in the treatment than in the control group.”

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Climate Risk: Papers on hedonic pricing, few on the key role of leverage

Hedonic Pricing and Natural Disaster Risk

- Donovan, Champ & Butry (2007), Nicholls (2019), McCoy & Walsh (2018),
- Baldauf, Garlappi & Yannelis (2020), Filippova, Nguyen, Noy & Rehm (2020), Zhang (2016), Zhang & Leonard (2019), Bunten & Kahn (2014).

Emerging Literature on Leverage and Disaster Risk Perceptions

- Bakkensen, Phan & Wong (2022), an offspring of the literature on leverage and collateral constraints Fostel & Geanakoplos (2014), Thurner, Farmer & Geanakoplos (2012), Geanakoplos (2010).

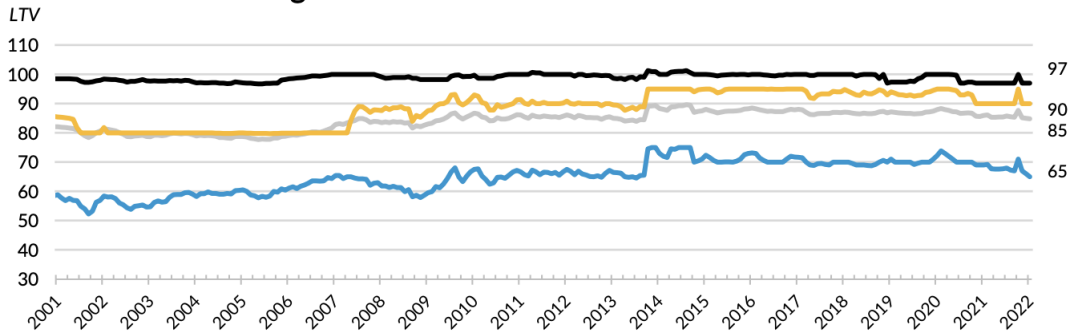
What Drives Mortgage Default?

- Guiso, Sapienza & Zingales (2013), Ganong & Noel (2020), Gerardi, Herkenhoff, Ohanian & Willen (2018), Bradley, Cutts & Liu (2015), Elul, Souleles, Chomsisengphet, Glennon & Hunt (2010).

→ Discuss the importance of beliefs, current LTV, abilities to refinance, impact of appraisals.
Balance sheet view of households.

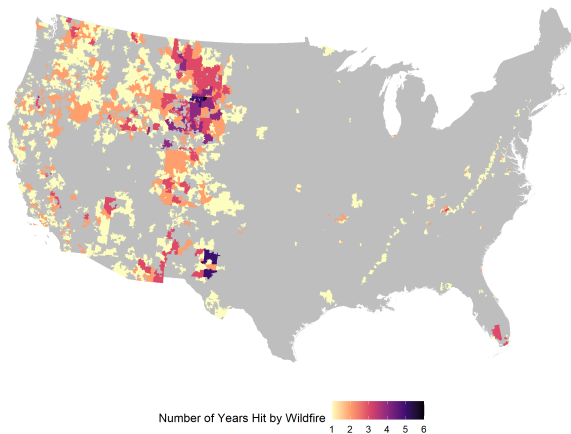
The Importance of Leverage

Combined LTV at Origination



→ Who bears wildfire risk? Not mortgage insurance.

Nationwide Originations in Wildfire Areas



Source: National Interagency Fire Center perimeters.

Financial Aggregates in Areas Exposed to Wildfires

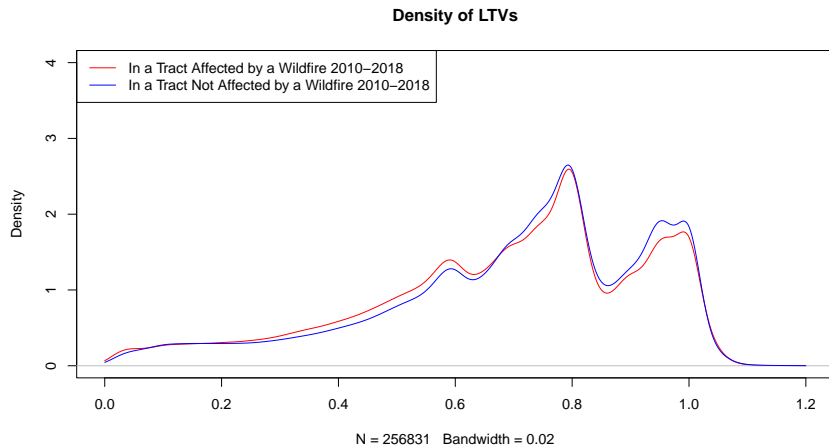
My calculations: in 2020 alone, there were 88.792 billion dollars of originations in tracts where at least one wildfire occurred between 2010 and 2018.

Occupancy Type	Loan Amount (USD)
Principal residence	74,974,835,000
Second residence	9,727,075,000
Investment property	4,091,035,000

Who Bears Risk? Financial Aggregates in Areas Exposed to Wildfires

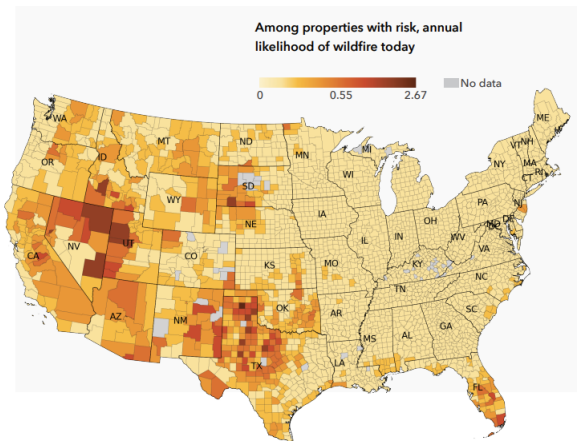
Purchaser Name	Loan Amount
Not applicable	24,063,120,000
Fannie Mae	22,420,715,000
Ginnie Mae	11,854,275,000
Freddie Mac	14,608,940,000
Farmer Mac	1,245,000
Private securitizer	675,675,000
Commercial bank, savings bank, or savings association	4,071,030,000
Affiliate institution	757,835,000
Other type of purchaser	2,652,270,000
Credit union, mortgage company, or finance company	7,441,430,000
Life insurance company	246,410,000

Nationwide LTV Distribution in Areas Exposed to Wildfires

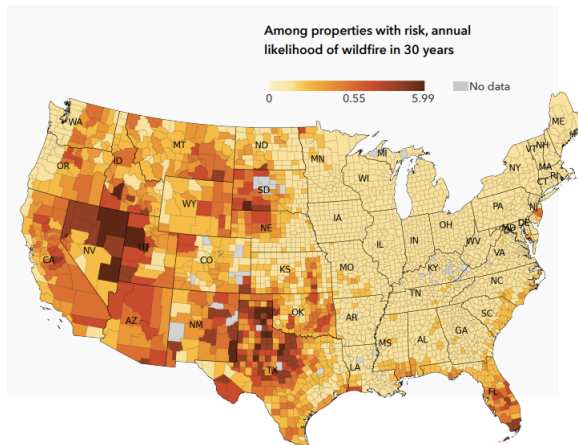


Related to Pari Sastry "Who Bears Flood Risk? Evidence from Mortgage Markets in Florida."

California's Wildfires are “New News”: Forward-Looking Risk



Forward-Looking Risk



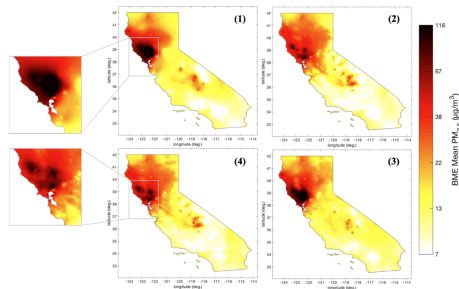
New news most likely to mean that such probabilities are not priced in premia, reinsurance yields, and in households' choices. The most interesting problems in climate economics are those “non-steady-state”

PM 2.5, Amenity Values, and the Control Group

- Understudied in the literature overall: particulate matter, impact on amenity value; also drought, lack of access to water.
- \Rightarrow explains the importance of looking at results using control 1 and control 2 separately.



Washington County, UT,
depends on water from the
Colorado River



Median value of daily average
PM_{2.5} concentrations on
October 10, 2017.

Natural Disasters → Delinquencies, Prepayments?

- Early findings in the hurricane literature (Gallagher & Hartley 2017):
Greater flooding results in larger reductions in total debt. Lower debt levels are driven by homeowners using flood insurance to repay their mortgages rather than to rebuild.
- Federal Reserve of Philadelphia: Prof. Wachter suggests that hurricanes may not have an impact on performance.
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- Kousky, Palim & Pan (2020) presents a case study of Hurricane Harvey:
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- Ouazad & Kahn (2022) presents evidence of rising foreclosure and prepayment risk using 15 billion dollar hurricanes and Black Knight McDash mortgage performance.

Forebearance Policies, Political Salience and Mortgage performance

“We find a significant increase in mortgage delinquency and foreclosure after a fire, but these effects decrease in fire size.”

“However, insured mortgages in very large wildfires are less likely than in small fires to become 90 day delinquent or to become foreclosed.”

Current argument that mortgage forbearance policies may have a significant mitigating impact on delinquencies and defaults.

*“Freddie Mac’s disaster relief options are available to borrowers with homes in **presidentially-declared** Major Disaster Areas where federal Individual Assistance programs are made available to affected individuals and households. In areas where the Federal Emergency Management Agency (FEMA) has not made Individual Assistance available, servicers may leverage Freddie Mac’s forbearance programs to provide immediate mortgage relief to borrowers affected by the fires.”*

Insurance and Rebuilding

Authors present an interesting case where insurance provides incentives to rebuild communities.

Debate: whether insurers should pay for buying elsewhere (land or land+structure) or rebuilding in place.

→ Parametric Insurance as an Arrow Debreu contingent asset?

A key idea here is that communities benefit from the agglomeration of people (and businesses) at the wildfire-exposed fringe of their communities. (cf. San Diego witch fire).

Testable hypothesis on the importance of such margins for community growth and welfare.

Further Identification Comments: Selection, email from UCSD

I had one naive question (with apologies in advance if I'm off base, which may be likely): my understanding had been that special laws apply after natural disasters that are intended to prevent borrowers from getting into trouble and therefore make it harder to go into default, etc. As a result of some of this, I was under the perhaps flawed impression that in Fannie and Freddie's loan-level performance data, there is a lot of missing payment data following natural disasters because servicers do not report the payment status in the same way during this period.

Does the BlackKnight data fix this issue? I would have thought the data also comes from the same servicers and therefore is subject to the same issue, but I don't know for sure and was hoping you might be able to shed light on this? I can reassure you that I am asking this *not* in the spirit of challenging your paper, which I have zero intention of doing, but rather in the spirit of genuinely wanting to know the answer because (relative to my previous understanding) it would be an advance to address this missing data issue. Either way, you are clearly finding very interesting and significant effects.

Thank you, and I look forward to our paths crossing again soon hopefully!

Further Identification Comments: Selection and Essential Heterogeneity

- You estimate the propensity score using the log odds ratio $\log(p/(1 - p))$.
- Can you use this to estimate:
- the LATE. Angrist (2004) has a very practical approach to implement Angrist & Imbens (1995).
- the policy relevant TE. Heckman, Urzua & Vytlačil's (2006) essential heterogeneity.

- **Foundational paper that will have a long-lasting impact on our understanding of mortgage performance and wildfires.**

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- Heterogeneity is challenging → major concern when estimating the impact of natural disasters on mortgage finance.
- Key role of political salience, insurance markets, mortgage markets.

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