



# Moratorium Shield: California Non-Renewal and FAIR Plan Responses



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## Motivation

- Climate change creates harsher forest fire seasons causing the private insurance market to struggle
- Insurer initiated non-renewals and FAIR plan exposure are increasing
- Moratorium policy is unique, outcomes unknown
- FAIR plan costly for the government to oversee; consumers on it pay much higher premiums
  - this oversubscription needs to be addressed

## Background

**Moratorium**  
Non-renewals historically increase after fires

**FAIR Plan**  
State insurer of last resort. Funded by private firms, overseen by the government.

Starting in 2019: treated *emergency zone* ZIP codes can't have insurance revoked for one year (I focus only on ZIP codes with the policy in 2019)

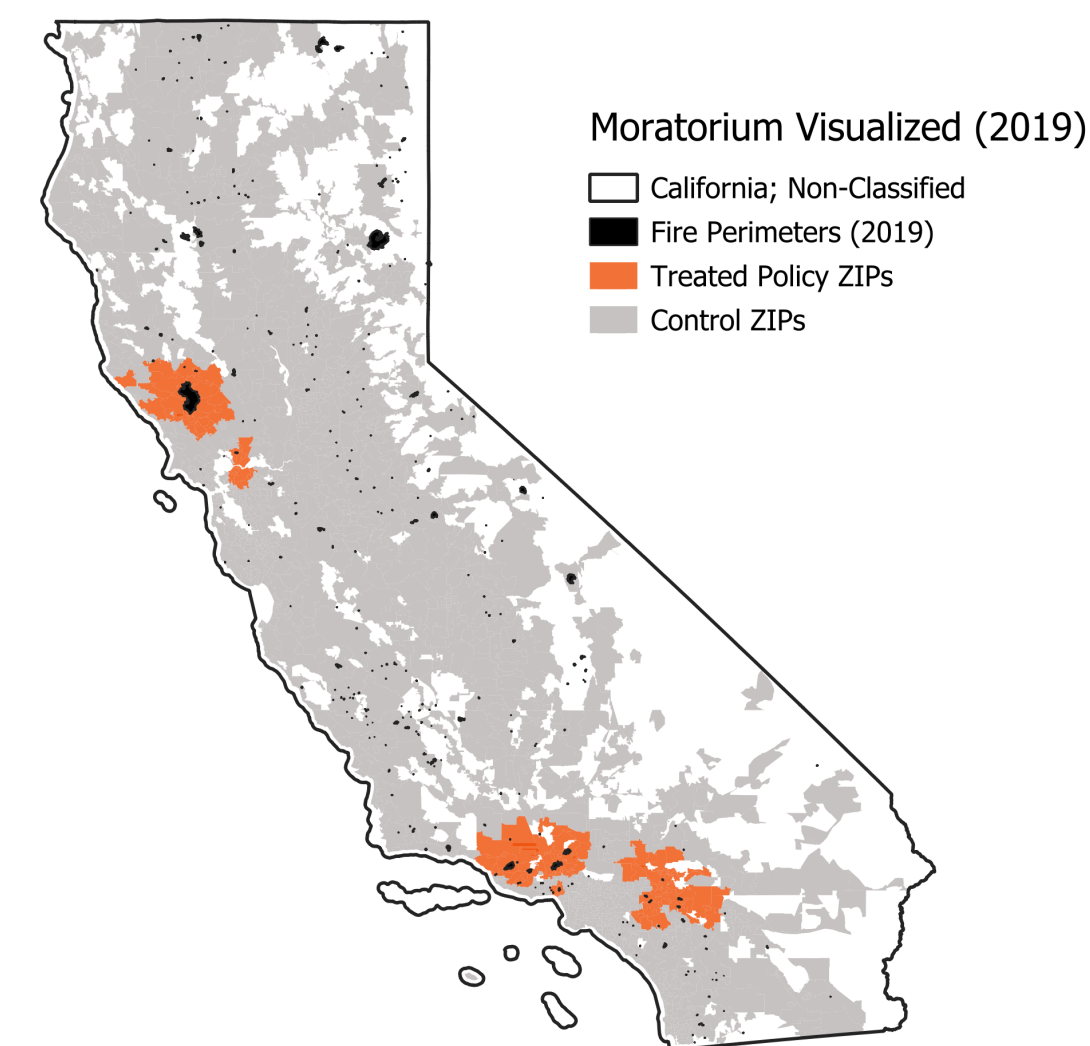
2.1% of market (2019), 2.7% (2020), 3.0% (2021), increases still a serious problem in 2023

- ~1M homes (2019)
- Consumer enforced

Definition: Exposure ~ number of FAIR plans in a ZIP

## Data Sources

Unit of observation: ZIP codes. Data has 95% coverage until cleaning gives 80% coverage.



**Cal Dept of Insurance:** Moratorium ZIP codes, non-renewals (ZIP), FAIR plan exposure (ZIP)

**Risk Factor:** Wildfire risk level (ZIP)

**ACS:** Structures in ZIP (for rates), appendix controls

**IMPUS GIS:** Mapping data

## Research Questions

- Did the policy cause non-renewal rate suppression?
- Was there an increase in firm non-renewals after the policy terminated?
- Were there spillover effects to the FAIR plan?
- Did we see stronger suppression effects in non-renewals or exposure for higher risk treated ZIP codes?

## Methodological Overview

**Treated:** ZIP code had Moratorium policy in 2019  
**Control:** ZIP codes that never had a Moratorium policy  
**Post:** After the policy,  $\geq 2019$

**Difference in Differences (DD):**  
Key interaction: overall policy effect where null implies policy full compliance

**Difference in Difference in Differences (DDD):**  
Key interaction: negative implies increased suppression effects in extreme risk areas

## DD Results

- Significant interaction term shows an increase in non-renewals and FAIR plan exposure even with the policy
- Suppression did occur though (see final panel)
- Notation: Vector  $X$  below collapses other DD terms

$$Rate_{zt} \{t \leq 2019|2020|2021\} = \delta Treated_z \cdot Post_t + X_{zt}\beta + \alpha risk_z + \omega_{city} + \epsilon_{zt}$$

$$X_{zt} = [1, Treated_z, Post_t]$$

	Panel: 2015-2019		Panel: 2015-2020		Panel: 2015-2021	
	NR (%)	FAIR Plan (%)	NR (%)	FAIR Plan (%)	NR (%)	FAIR Plan (%)
Non-Renewal= NR Mean	1.766 %	1.502 %	1.766 %	1.502 %	1.766 %	1.502 %
Treated	0.165 (0.184)	0.437* (0.165)	0.122 (0.167)	0.453 (0.273)	0.057 (0.165)	0.524 (0.338)
Post	0.847* (0.043)	0.537* (0.039)	0.552* (0.033)	1.038* (0.054)	0.557* (0.030)	1.432* (0.062)
Treated x Post	0.487* (0.154)	0.328* (0.138)	0.336* (0.117)	0.506* (0.191)	0.709* (0.108)	0.586* (0.222)
City Fixed Effects	✓	✓	✓	✓	✓	✓
R-squared	0.534	0.813	0.535	0.657	0.520	0.610
Number of Obs.	6965		8358		9751	

Note: FAIR Plan is the rate of FAIR plan policies by ZIP code and the NR is the non-renewal rates by ZIP code. Time effects seen by the panels, 6 regressions included with respective R squared reported. Policy occurred in 2019. \* denotes 5% significance.

## Key Findings

- Moratorium policy in 2019 had non-perfect compliance, but we still see a suppression of non-renewals during policy year
- Higher risk areas saw significant suppression of non-renewals relative to treated lower risk areas and the higher risk control group; more risk more policy gain
- Higher risk areas saw a significant reduction in FAIR plan adoption which sustained after the policy ended

## DDD Results

- Significant triple interaction shows suppression of rates in extreme risk ZIPs (compare to *Treated x Post*)
- Increase in non-renewals after the policy seen, however coefficient is still negative and significant
- Significant reduction in FAIR plan exposure, which continues growing after the policy concludes (compare triple interaction to *Post x Extreme*)
- Notation: Vector  $X$  below collapses other DDD terms

$$Rate_{zt} \{t \leq 2019|2020|2021\} = \delta Treated_z \cdot Post_t \cdot Extreme_z + X_{zt}\beta + \alpha risk_z + \omega_{city} + \epsilon_{zt}$$

$$X_{zt} = [1, Treated_z, Post_t, Extreme_z, Treated_z \cdot Post_t, Treated_z \cdot Extreme_z, Post_t \cdot Extreme_z]$$

	Panel: 2015-2019		Panel: 2015-2020		Panel: 2015-2021	
	NR (%)	FAIR Plan (%)	NR (%)	FAIR Plan (%)	NR (%)	FAIR Plan (%)
Non-Renewal= NR Mean	3.339 %	4.640 %	3.339 %	4.640 %	3.339 %	4.640 %
Post x Extreme	3.227* (0.149)	2.634* (0.134)	2.455* (0.114)	4.704* (0.184)	2.068* (0.107)	6.011* (0.214)
Treated x Extreme	0.335 (0.396)	-0.899* (0.357)	0.484 (0.364)	0.004 (0.587)	0.508 (0.364)	0.848 (0.731)
Treated x Post	0.611* (0.165)	0.517* (0.148)	0.475* (0.126)	0.901* (0.203)	0.844* (0.118)	1.105* (0.237)
Treated x Post x Extreme	-2.475* (0.385)	-2.460* (0.347)	-2.103* (0.294)	-4.680* (0.475)	-1.866* (0.276)	-6.054* (0.553)
City Fixed Effects	✓	✓	✓	✓	✓	✓
R-squared	0.568	0.825	0.562	0.686	0.539	0.643
Number of Obs.	6965		8358		9751	

Note: FAIR Plan is the rate of FAIR plan policies by ZIP code and the NR is the non-renewal rates by ZIP code. Time effects seen by the panels, 6 regressions included with respective R squared reported. Policy occurred in 2019. \* denotes 5% significance.

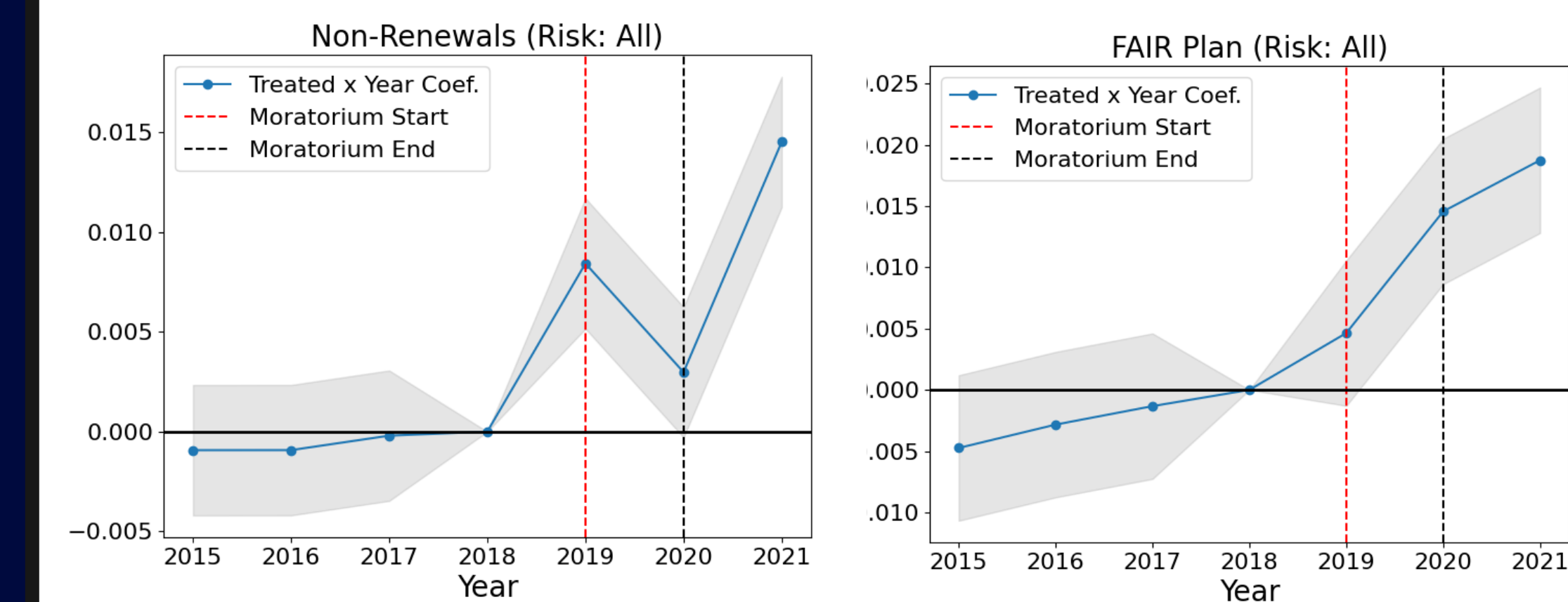
## Event Study

Using the equation below, we see common trends hold under all categories with 2018 set as the reference year

$$Rate_{zt} = \beta_0 + \beta_1 Treated_z + \sum_{t=2015}^{2021} \delta_t (Treated_z \cdot Year_t) + \alpha ve risk_z + \lambda_t + \omega_{city} + \epsilon_{zt}$$

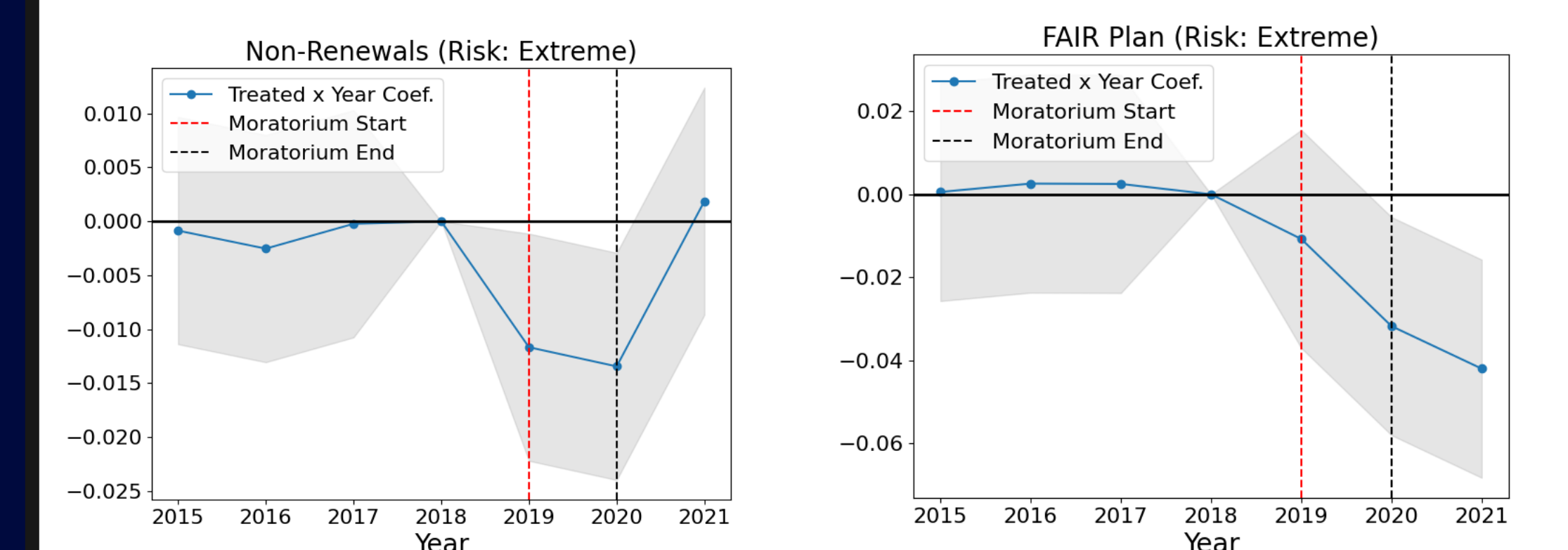
### All risk levels event study

- Non-renewals have no trends before the policy, then distinct changes after
- Oscillating nature of post policy for non-renewals indicated the need for panels
- FAIR plan rates pre-trends hold weakly



### Extreme category event study

- Non-renewal and FAIR plan rates have very consistent common trends before the policy shock
- Very different trends than the *All* categories pictured above, indicating need for partitioned DDD
- Evidence of significant suppression of the non-renewals during the policy year
- Evidence of continued reduction in FAIR plan exposure of treated ZIP codes past policy expiration



## Summary Statistics

Understanding Non-Renewal and FAIR Exposure by Risk Level

Risk Category	ZIPs	Policy ZIPs	Non-Renewal (%)	FAIR Plan (%)
Extremely Low (0-2)	352	3	1.015	0.605
Low (2-4)	419	26	1.536	0.639
Medium (4-6)	279	24	1.916	1.700
High (6-7)	112	19	2.359	2.630
Very High (7-8)	100	16	2.231	2.345
Extreme (8-10)	131	22	3.339	4.640
All Categories	1393	110	1.766	1.502

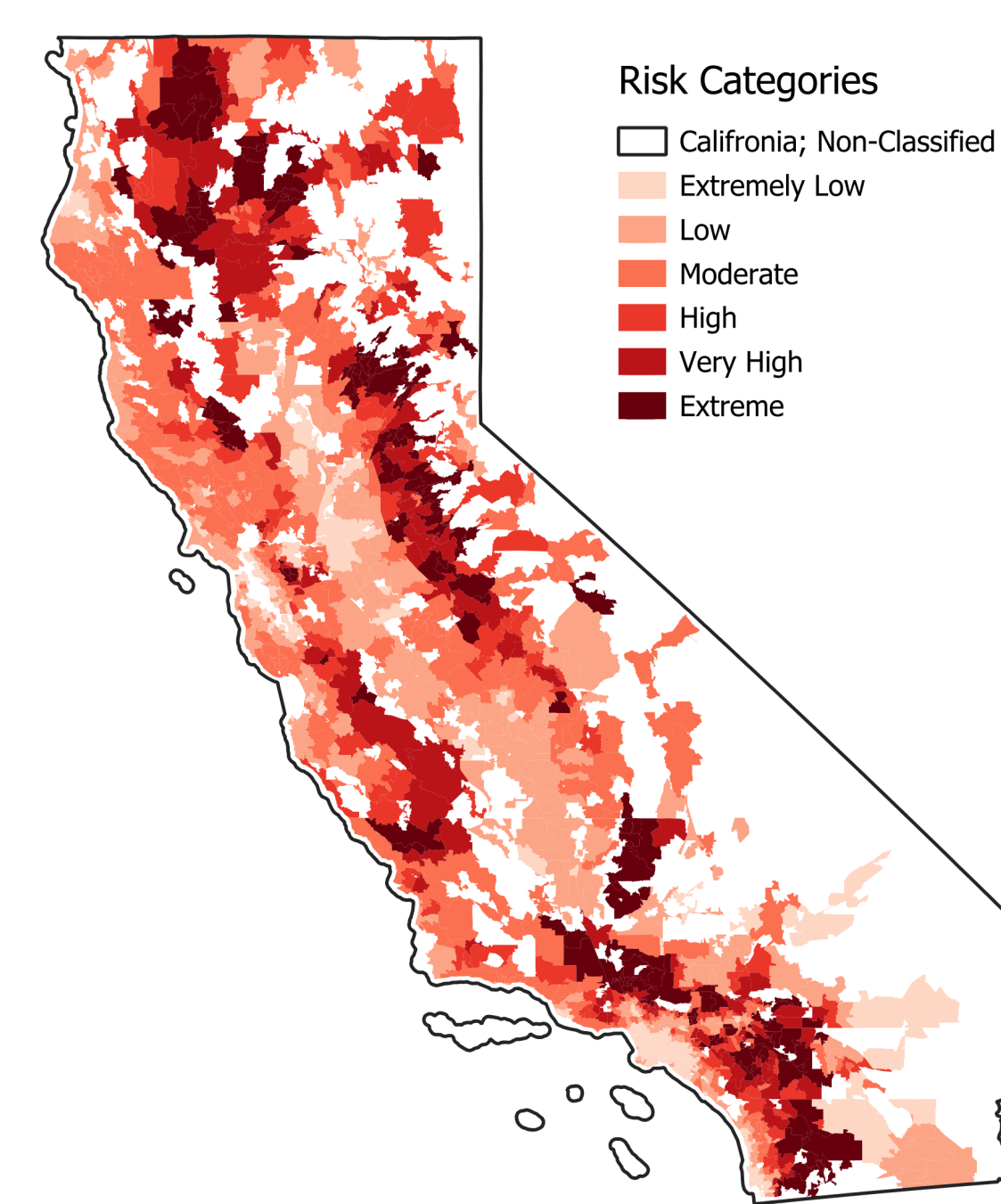
Note: Summary statistics use the Risk Factor ZIP code classifications aggregated to a ZIP code average risk level from 0-10. The overall non-renewals and exposure rates are a weighted average of the six categories.

Change in Outcomes: Risk levels before/after the Moratorium

Risk Category	ΔNon-Renewal Rate (%)		ΔFAIR Plan Rate (%)	
	Control	Treated	Control	Treated
Extremely Low (0-2)	-3.93	4.39	-13.13	-7.00
Low (2-4)	9.21	22.66	70.22	-0.34
Medium (4-6)	42.15	139.87	288.50	186.91
High (6-7)	77.39	102.36	212.71	208.35
Very High (7-8)	75.69	96.03	195.17	166.25
Extreme (8-10)	98.28	82.89	388.86	61.43
All Categories	37.03	85.56	181.42	112.79

Note: A raw calculation of before the policy 2015-2018 and after the policy 2019-2021 in average non-renewals and FAIR plan exposure levels. The formula used was (after rate - before rate)/before rate. You can see the effect in the Extreme category without any econometric techniques.

## Understanding Risk Categories



## DDD Placebo

- No significance seen in key interaction when policy falsely assumed to occur in 2017

Extreme Triple Diff-in-Diff Placebo Assuming 2017 Policy

	Panel: 2015-2017		Panel: 2015-2018	
	NR (%)	FAIR Plan (%)	NR (%)	FAIR Plan (%)
Non-Renewal= NR Mean	2.363 %	2.026 %	2.363 %	2.026 %
Post x Extreme	-0.008 (0.124)	0.531* (0.114)	-0.006 (0.098)	0.764* (0.094)
Treated x Extreme	-0.222 (0.395)	-1.246* (0.364)	-0.264 (0.344)	-1.156* (0.328)
Treated x Post	0.081 (0.137)	0.139 (0.126)	0.089 (0.108)	0.190 (0.103)
Treated x Post x Extreme	0.096 (0.320)	-0.107 (0.295)	0.179 (0.253)	-0.298 (0.242)
City Fixed Effects	✓	✓	✓	✓
R-squared	0.652	0.874	0.596	0.873
Number of Obs.	4179		5572	

Note: Placebo results assuming the policy falsely occurred in 2017 for the treated (actually occurred 2019). Note that all the first-order coefficients were included though omitted here for space and relevance reasons. \* denotes 5% significance.

## Additional Robustness

- Multi-category DDD to see moderate risk category is driving the increases we see in the original DD
- Income and non-mortgage ownership county controls on DD/DDD (no change in key interaction terms)
- DD Placebo

## Conclusions

- Holding periods proved an effective policy, achieving suppression goals; helped vulnerable ZIPs most
- Results for extreme risk fire areas show importance of looking at heterogeneity in policy effects
- FAIR plan exposure reduction was an unintended positive for consumers and the government
- More economic research needed to help California policymakers with rising FAIR plan subscription rates to ensure a sustainable private insurance market