

# Only You Can Prevent Wildfires? The Effectiveness of Policy to Induce Risk Mitigating Expenditures

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# Summary

- Study the issue of how policy can get private homeowners to mitigate wildfire risk
- Create an experimental setting where incentives mirror the real world application
- Find evidence of crowding out

# Background: The Wildfire Problem

- Number of wildfires is increasing
- Costs of suppression are outlandish
- An attempt is being made to shift the burden to homeowners

# Risk Mitigation

- Activities that decrease risk exposure:
  - Fuel Reductions
  - Flame retardant
  - Fuel breaks
  - Removing ladder fuels

# Mitigation as a solution?

- Wildfire risk mitigation is characterized by externalities
- Too much land for government to treat

# Our Research Question:

- How effective are several potential policy tools at inducing private expenditures on wildfire risk mitigation?

# Method

- Experimental Analysis
- A policy wind-tunnel
- Parallelism is important

# Basics of the Experiment

- Participants get a “home asset” that is used to determine their income in each round
- At the end of each round, a drawing determines whether a wildfire event occurs
- If a wildfire event occurs, each participant’s “home asset” decreases in value
- Participant’s spending determines the probability and severity of wildfire.



# Spending Options

- **MITIGATION:** reduces the probability of the group experiencing a wildfire event, and diminishes the severity of the loss
- **INSURANCE:** diminishes the severity of the loss if a wildfire occurs, only for the individual
- **SAVINGS:** increases the payment a subject gets for participating in the experiment

# Experiment Interface

http://76.24.162.1 - series\_subjectpage.cfm - Microsoft Internet Explorer

**Subject 2** Training

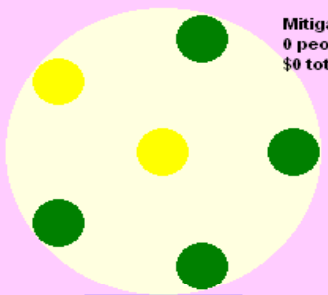
**Current Information**

Current Round: 1  
 Asset Value: 150,000  
 Income This Round: 15,000  
 Cumulative Income: 0

**Previous Round Information**

	Your Spending	Group Spending
Insurance	0	0
Mitigation	0	0

**Mitigation Summary:**  
 0 people participated  
 \$0 total spending



[Enlarge Image](#)

**Wildfire Outcome: N/A**

**Your Spending On:**

Insurance   What's this ?

Mitigation   What's this ?

**Net Income: 15,000**

**Click Submit When Ready!**

**Your Best Guess Of:**

Number of People Mitigating   What's this ?

Total Group Spending on Mitigation in \$LAB   What's this ?

Estimated values of your ASSET VALUE based on your spending and your guess about what others will spend	
No Wildfire	150,000
Wildfire	43,500
Estimate of a WILDFIRE based on your spending and your guess about what others will spend	
Chance of Wildfire	40%

• No special information available now

Done Internet

# The Treatments

- Treating Public Land
- Cost-Sharing
- Contingent Cost-Sharing
- Contingent Insurance

# Data

- 26 sessions, 2790 observations
- $X_{\text{Treatment}}$  = Variables describing the treatment invoked
- $X_{\text{Demographics}}$  = Variables describing demographically each participant
- $X_{\text{Attitudinal Characterization}}$  = Variables characterizing participants by preferences for risk and attitudes about social capital
- $X_{\text{Non Treatment Session Characteristics}}$  = Variables measuring experiment differences not attributed to changes in the treatment

# Modeling Approach

- Risk Mitigation= $f$ ( treatment invoked, attitudinal characterization, demographics, inter/intra game differences not attributed to treatment change)
- Issues:
  - What is the correct decision to model?
  - Correlation between covariates
  - Independence of observations

# 4 Models

- 4 alternative dependent variables:
  - MITIGATION ( lab dollars a participant allocates to the good “mitigation”)
  - PROTECTIVE\_SPENDING (MITIGATION +lab dollars a participant allocates to the good “insurance”)
  - MITIGATED( 1 if a participant allocated at least 1 lab dollar to “mitigation”, 0 else)
  - LOR\_MITIGATION/PROTECTIVE\_SPENDING (log odds ratio of MITIGATION to PROTECTIVE\_SPENDING)

# Results

	1 (MITIGATION)	2 PROTECTIVE_ SPENDING	3 (MITIGATED)	4 LOR_ MITIGATION/ PROTECTIVE_ SPENDING
PL_TREATED	-746.52 (-5.32)***	-199.33 (-9.51)***	0.38 (1.66)*	0.93 (4.57)***
COST_SHARE	-229.76 (-1.89)*	-794.03 (-4.37)***	0.46 (2.82)***	0.53 (3.03)***
CONTINGENT_ CS	39.55 (0.28)	-439.75 (-2.07)**	0.22 (1.12)	1.14 (5.50)***
CONTINGENT_ INSURANCE	-385.89 (-1.58)	-645.17 (-1.77)*	-0.21 (-0.74)	-0.44 (-1.24)

# Results

	1 (MITIGATION)	2 PROTECTIVE_ SPENDING	3 (MITIGATED)	4 LOR_ MITIGATION/ PROTECTIVE_ SPENDING
INFORMATION	-62.59 (-0.67)	120.05 (0.86)	0.29 (2.10)**	-0.21 (-1.55)
INCOME	0.22 (13.34)***	0.37 (15.02)***	0.00 (5.36)***	0.00 (4.46)***
GROUP_ SIZE	-221.55 (-4.73)***	-376.26 (-5.37)***	-0.10 (-1.39)	-0.05 (-0.79)
ROUNDS_SINCE _FIRE	-69.31 (-3.22)***	-117.44 (-3.65)***	-0.02 (-1.16)	-0.05 (-1.56)
FIRE_ PREV_ ROUND	-70.83 (-0.65)	19.23 (0.12)	-0.04 (-0.48)	-0.25 (-1.60)
PREV_ ROUND_ TOTAL	0.01 (3.44)***	0.03 (4.44)***	-0.00 (-0.27)	-0.00 (-0.54)



# Results

	1 (MITIGATION)	2 PROTECTIVE_ SPENDING	3 (MITIGATED)	4 LOR_ MITIGATION/ PROTECTIVE_ SPENDING
TRUST2	-404.98 (-3.38) <sup>***</sup>	-580.19 (-3.23) <sup>***</sup>	0.10 (1.06)	-0.13 (-0.76)
TRUST_ELSE	-268.12 (2.25) <sup>**</sup>	-273.19 (-1.53)	0.23 (2.40) <sup>***</sup>	-0.21 (-1.21)
FAIRNESS_1	199.79 (1.38)	261.69 (1.21)	0.09 (0.75)	0.23 (1.11)
FAIRNESS_ELSE	1.70 (0.01)	-36.51 (-0.21)	0.13 (1.40)	0.11 (0.65)
HELPFUL1	-42.96 (-0.34)	87.00 (0.46)	-0.15 (-1.45)	0.06 (0.32)
HELPFUL_ELSE	446.20 (3.94) <sup>***</sup>	750.37 (4.43) <sup>***</sup>	-0.14 (-1.52)	-0.14 (-0.88)

# Punch Lines

- Real world policy should take care not to crowd out private expenditures
- The mitigation goal is especially important
- The point where crowding out begins emerges as an important question
- Mixed support for “social capital” indicators predicting laboratory behavior

Thank You  
Questions?