Inequality and Government Responsiveness: Evidence from Salient Wildfire Events

Sarah Anderson, Andrew Plantinga, and Matthew Wibbenmeyer

Resources for the Future

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This paper

How does government responsiveness vary across communities?

▶ Use wildfires as an exogenous shock to public demand for local public projects to reduce wildfire risk
  — People overemphasize salient states of the world and neglect non-salient states
    (Bordalo, Gennaioli, & Schleifer 2012)
  — Salience frequently affects responses to natural disasters (eg. McCoy & Walsh 2018, Dessaint & Matray 2017)
  — Projects are more likely to be implemented near communities that recently experienced wildfire (Wibbenmeyer, Anderson, and Plantinga 2019) Evidence

▶ Focus on responsiveness among appointed officials/bureaucrats

▶ Following fire events, responses concentrated near less poor, less diverse communities.

Motivation

Responsiveness & inequality
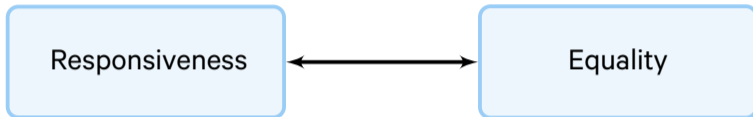
Greater responsiveness can lead to greater inequality if:

1. Policy preferences vary across groups
2. Groups yield varying influence over policy outcomes

Motivation

Responsiveness & inequality

▶ Groups may yield varying influence over policy outcomes due to:
  — Varying levels of participation or pressure
  — Varying responsiveness to demands among decision-makers

▶ Previous literature
  — Responsiveness among elected officials and policymakers (Gilens 2005; McCarty, Poole, & Rosenthal 2009; Gilens 2011; Ura & Ellis 2009; Wlezien & Soroka 2011)
  — Cross-sectional or time-series evidence

Theory

Model set-up:

▶ Government agency provides a local public good

▶ Community lobbies government for more, and incurs a cost of lobbying

▶ Agency incurs a cost of not meeting community's demand

Community lobbies more and receives more when:

▶ Perceived benefits of the public good are greater

▶ Lobbying costs are lower

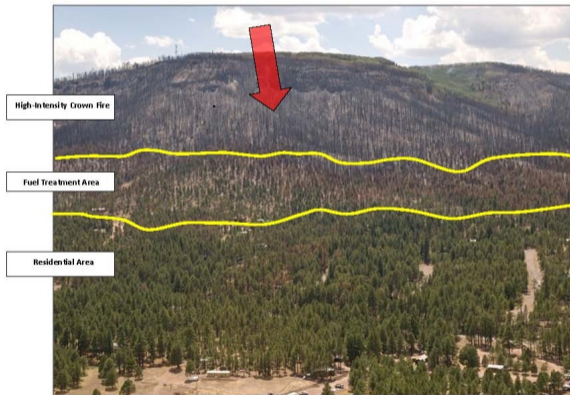▶ Penalties to government for not meeting demand are greater

More

Empirical setting

Projects on public lands reduce risk to nearby homeowners

- ▶ Public land management affects wildfire risk facing homeowners

- ▶ Fuels reduction projects reduce wildfire hazard

- ▶ Need for fuels projects exceeds budgets

How Fuel Treatments Saved Homes from the Wallow Fire
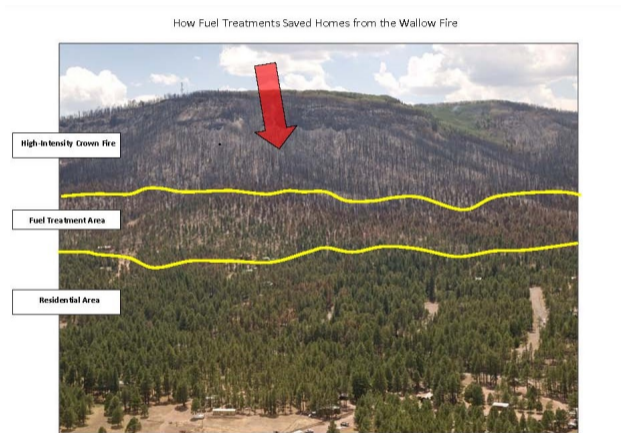
Empirical setting

Project locations can be influenced by public input

Fuels project locations are determined based on (Hakanson 2010):

— Program targets and funding

— Compliance with laws and regulations

— Technical knowledge

— Public input

How Fuel Treatments Saved Homes from the Wallow Fire

High-Intensity Crown Fire

Fuel Treatment Area

Residential Area

Empirical strategy

Data sources

1. Census block data
   — Locations of wildland urban interface (WUI) blocks throughout western U.S. (Source: SILVIS)
   — Demographic variables observed at the Census block group level (Source U.S. Census, 2000)
2. Fuels project data, 2003-2011
   — Source: NFPORS
3. Wildfire data, 2000-2011
   — Source: USGS Monitoring Trends in Burn Severity

Summary statistics

Fuel projects by demographic characteristics

Table 1: Demographic and political characteristics for the entire sample of WUI blocks, and for WUI blocks receiving nearby fuel reduction projects

	Full sample		Block-years with fuels projects within distance		
			2 km	5 km	10 km
Pop. dens.	1527.2	[4282.8]	734.9	1097.0	1270.9
Per cap. income	21485.5	[11309.0]	22460.3	21933.2	21600.8
Pct. below poverty line	0.13	[0.10]	0.12	0.12	0.12
Pct. rent place of residence	0.26	[0.17]	0.25	0.27	0.27
Pct. high school grad.	0.84	[0.12]	0.87	0.87	0.86
Pct. college or greater	0.23	[0.16]	0.26	0.26	0.25
Pct. white non-Hispanic	0.77	[0.22]	0.87	0.85	0.83
Pct. Hispanic	0.14	[0.18]	0.080	0.089	0.10
Pct. 65 or older	0.14	[0.089]	0.14	0.14	0.14
Pct. younger than 25	0.34	[0.087]	0.30	0.31	0.32
Number of WUI blocks	364,689		9,791	21,266	28,218
Number of block-year obs.	4,376,268		117,160	350,475	786,863

Note: Standard deviations are included within brackets.

Empirical strategy

Estimating equation

$$y_{ist} = \alpha_i + \gamma recentfire_{it} + recentfire_{it} \times \mathbf{x}_i'\delta + \eta_{st} + \varepsilon_{it}. \tag{1}$$

where:

▶ $y_{ist} = $ {indicator for project within c km, percent public land receiving projects within c km}

▶ $recentfire_{it} = \mathbb{1}\Big(\sum_{\ell=t-3}^{t} \mathbb{1}(firedist_{i\ell} < d) > 0 \Big)$

▶ $\mathbf{x}_{it}$ is a $k \times 1$ vector of demographic variables

▶ ε_{ist} are spatially correlated within Census tracts but not across Census tracts

Summary statistics

Demographic variables are highly correlated
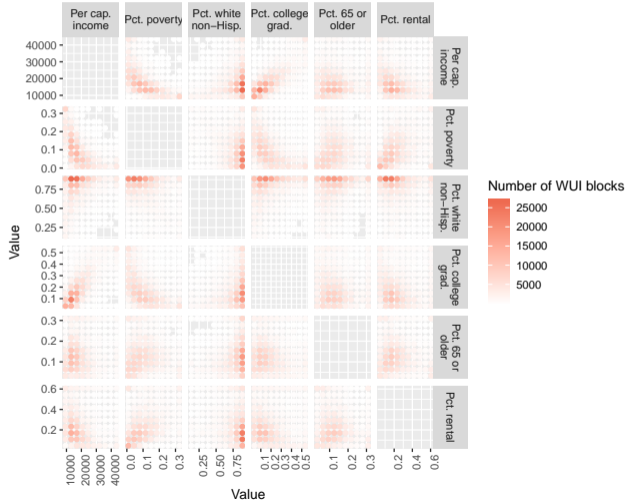
Summary statistics

Fuel projects by demographic characteristics

Table 2: Estimations results for equation 1 using percent of nearby public land receiving projects as dependent variable and using threshold distances $c = 5$ and $d = 5$.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Fire within 5 km	.0042**	.0042**	.0043**	.0041**	.0042**	.0041**	.0041*	.0044**
	[.0016]	[.0016]	[.0016]	[.0016]	[.0016]	[.0016]	[.0016]	[.0016]
Pop. dens.		-.00023						
		[.00019]						
Per cap. income			-.0014					
			[.0012]					
Pct. below poverty line				-.0005				
				[.0012]				
Pct. college or greater					.000023			
					[.0015]			
Pct. white non-Hispanic						.0043**		
						[.0016]		
Pct. 65 or older							-.00099	
							[.0012]	
Pct. rent place of residence								.0028*
								[.0012]
Distance to fuel project	5	5	5	5	5	5	5	5
Distance to fire	5	5	5	5	5	5	5	5
Block fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County-year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of WUI blocks	213,398	213,398	213,385	213,385	213,378	213,391	213,398	213,398
Number of county-years	4,250	4,250	4,250	4,250	4,250	4,250	4,250	4,250
Number obs.	2,133,980	2,133,980	2,133,850	2,133,850	2,133,780	2,133,910	2,133,980	2,133,980

Results

Table 3: Estimations results for equation 1 with varying dependent variables and threshold distances.

|	(1) Any projects nearby	(2) Any projects nearby	(3) Pct. pub. land treated	(4) Pct. pub. land treated
Fire within 5 km	.011	.0048	.0043	.0043**
	[.0096]	[.0076]	[.0048]	[.0016]
Interactions with nearby fire				
Per cap. income	-.0065	-.0076	-.00073	-.0025
	[.0081]	[.0077]	[.0038]	[.0016]
Pct. below poverty line	-.024**	-.011	-.0093*	-.0022
	[.0095]	[.0069]	[.0041]	[.0015]
Pct. college or greater	.021*	-.0071	.0087	.00045
	[.011]	[.0089]	[.0051]	[.0019]
Pct. white non-Hispanic	.026*	.038**	.0076	.0061**
	[.011]	[.0083]	[.0051]	[.0017]
Pct. 65 or older	-.015**	-.02**	-.0053	-.0018
	[.0058]	[.0062]	[.0035]	[.0013]
Pct. rent place of residence	.031**	.018**	.012*	.0045**
	[.0096]	[.006]	[.0052]	[.0015]
Distance to fuel project	2	5	2	5
Distance to fire	2	5	2	5
Number of WUI blocks	108,209	213,372	108,209	213,372
Number of county-years	3,970	4,250	3,970	4,250
Number obs.	1,082,090	2,133,720	1,082,090	2,133,720

Conclusions & future work

▶ Following wildfire events, public land managers are more likely to place fuel projects near communities that are:
  — Less diverse
  — Younger
  — Contain a lower percentage of people below the poverty line
  — Contain greater numbers of rental properties

▶ Differences in rates of fuel treatment may be due to:
  i. Differences in intensity of demand
  ii. Differences in responsiveness per se

▶ Further work will investigate how public engagement changes after fire

Thank you.

Evidence

From Wibbenmeyer, Anderson, & Plantinga 2019
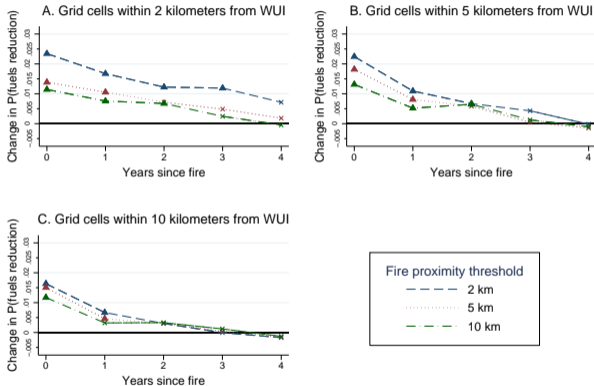
Note: Coefficients marked with a solid triangle are significantly different from zero at a 5% significance level when standard errors are clustered by unit. Coefficients marked with an x are not significantly different from zero.

Back

Theory

▶ Government has costs $C(Q) = \frac{1}{2}\eta Q^2$, initially provides Q_0 units of public good.

▶ Community receives benefits $B(Q) = bQ$, where perceived benefits $\tilde{b} \neq b$.

▶ Community lobbies government for level of public good $Q_L > Q_0$ at cost:

$$C_L(Q_L) = \frac{1}{2}Q_L^2 \tag{2}$$

▶ Government incurs costs of not meeting community's demands:

$$C_A(Q_A) = \frac{1}{2}\alpha Q_L^2 \tag{3}$$

Theory

Community and government choose lobbying and additional public good in a
leader-follower game. Community solves:

$$max_{Q_L} \tilde{b}(Q_0 + Q_A(Q_L)) - \frac{1}{2}\alpha Q_L^2 \tag{4}$$

Government solves:

$$min_{Q_A} \frac{1}{2}\eta(Q_0 + Q_A)^2 - \frac{1}{2}\eta Q_0^2 + \frac{1}{2}\gamma(Q_L^* - Q_A)^2 \tag{5}$$

Theory (Back)

Community lobbies the government more, and receives more of the public good when:

▶ Perceived marginal benefits are greater

$$\frac{dQ_L^*}{d\tilde{b}} = \frac{1}{\alpha}\frac{\gamma}{\eta+\gamma} > 0, \quad \frac{dQ_A^*}{d\tilde{b}} = \frac{1}{\alpha}\left[\frac{\gamma}{\eta+\gamma}\right]^2 > 0 \tag{6}$$

▶ Costs of lobbying are lower

$$\frac{dQ_L^*}{-d\alpha} = \frac{\tilde{b}}{\alpha^2}\frac{\gamma}{\eta+\gamma} > 0, \quad \frac{dQ_A^*}{-d\alpha} = \frac{\tilde{b}}{\alpha^2}\left[\frac{\gamma}{\eta+\gamma}\right]^2 > 0 \tag{7}$$

▶ It imposes higher costs on government

$$\frac{dQ_L^*}{d\gamma} = \frac{\tilde{b}}{\alpha}\frac{\eta}{(\eta+\gamma)^2} > 0, \quad \frac{dQ_A^*}{d\gamma} = \frac{2\tilde{b}\gamma\eta}{\alpha(\eta+\gamma)^3} + \frac{\eta Q_0}{(\eta+\gamma)^2} > 0 \tag{8}$$

Results

Table 4: Placebo test results.

	(1) Any projects nearby	(2) Any projects nearby	(3) Pct. pub. land treated	(4) Pct. pub. land treated
Fire within 5 km	-.0053	.014	-.002	.0014
	[.013]	[.0091]	[.0064]	[.0022]
Interactions with nearby fire				
Per cap. income	-.015	-.02*	-.0034	-.0014
	[.0098]	[.0097]	[.0049]	[.0022]
Pct. below poverty line	-.0012	-.013	.0072	-.00078
	[.014]	[.0092]	[.0065]	[.0019]
Pct. college or greater	.021	.017	.009	-.0002
	[.015]	[.011]	[.0078]	[.0024]
Pct. white non-Hispanic	.019	-.0042	.0036	-.00017
	[.01]	[.01]	[.0044]	[.0018]
Pct. 65 or older	-.016**	-.0033	-.0012	.0011
	[.006]	[.0069]	[.0032]	[.0015]
Pct. rent place of residence	.0073	.01	-.0016	-.00031
	[.0095]	[.008]	[.0052]	[.002]
Distance to fuel project	2	5	2	5
Distance to fire	2	5	2	5
Block fixed effects	Yes	Yes	Yes	Yes
County-year fixed effects	Yes	Yes	Yes	Yes
Number of WUI blocks	108,209	213,372	108,209	213,372
Number of county-years	3,970	4,250	3,970	4,250
Number obs.	1,082,090	2,133,720	1,082,090	2,133,720