Incentivizing Self-Protection From Wildfires

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Abstract

We report on a pilot program to incentivize residents in a high wildfire risk area in Southern Oregon to reduce their exposure to future fires. In partnership with Jackson County Fire District 3 (JCFD3), we compare the effectiveness of several randomized interventions designed to encourage homeowners to contact the district to improve their wildfire preparedness. While information-only outreach had little effect on the rate at which homeowners contacted the fire district, financial incentives led to significant increases in the response rate. Surprisingly, doubling the financial incentive (from $250 to $500) did not lead to an increase in contact rates. Residents of higher value homes and in wealthier areas were more likely to contact the district, but wildfire risk did not predict differential contact rates. These findings help inform the development of a scaled-up program to be rolled out before the upcoming fire season.

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1 Introduction

Like other climate-related catastrophes, the occurrence of severe wildfires is growing throughout North America. This escalating risk can be mitigated through efforts by property owners to manage vegetation and other flammable material near homes. Despite the cost-effectiveness of these investments, takeup is low. Local governments are increasingly deploying information and incentive programs to encourage investment in "defensible space." There has been little empirical validation of these programs or the underlying economic frictions that limit takeup. Experimental evidence in this setting will be invaluable for guiding adaptation to climate-related disasters.

In the face of increasingly severe wildfires, it is vital to understand which technologies and behaviors can most effectively – and cost-effectively – "harden" homes and other valuable assets against exposure. This question is made even more important by the array of potential market failures that complicate takeup of such investments. These issues include spatial risk spillovers across property lines (Shafran 2008, Costello et al 2017, Baylis and Boomhower 2021), insurance market frictions that cause resilience investments to be imperfectly rewarded by insurance prices (Kousky et al 2006, Deryugina 2017, Baylis and Boomhower 2023, Kunreuther and Michel-Kerjan 2011), and consumer myopia and limited information about disaster risk (Gallagher 2014, McCoy and Walsh 2018, Wagner 2022).

In general, defensible space programs in the West have enjoyed mixed success in altering homeowner behavior. To the best of our knowledge, there are no systematic evaluation of these programs to date, and none that involve randomization. Rigorous scientific evidence on what works (and what does not) when it comes to encouraging homeowners in the adoption of defensive practices should be of value to the many governmental agencies and policymakers across

the American West (as well as in other wildfire-prone jurisdictions around the world).

We ran a randomized field experiment to evaluate the effects of potential interventions on encouraging homeowners to invest in defensible space. Homeowners (N = 4,662) were assigned at random to either a control group or one of several treatment groups. In this experiment, we assigned treated homeowners to one of four treatment groups: A) An "Information" group that received a letter encouraging them to contact JCFD3, B) a "Moral Suasion" group that was also reminded of their community obligations to protect their homes, C) a "$250 Subsidy" group that was offered a $250 reward if they contacted JCFD3 and passed a defensible space assessment, and D) a "$500 Subsidy" group that was similarly offered a $500 reward.

Contact rates are nearly zero in the absence of our experimental outreach. The two non-financial intervening (Information and Moral Suasion) have slightly increased response rates relative to the control group, but neither is statistically different. By contrast, nearly 10% of the subsidy groups get in touch with JCDF3. Surprisingly, the $250 group initiates contact a slightly higher rate than the $500 group.

Residents of homes with higher assessed values were more likely to respond to the treatment offers, as well as residents in areas that ranked lower on Oregon's Social Vulnerability Index (i.e., wealthier areas). However, residents of higher wildfire risk areas were no more likely than residents in lower wildfire risk areas. Preliminary estimates of an additional neighbor nudge treatment indicate that additional mailings targeted specifically at neighbors of those who had previously contracted the district were not effective at encouraging more participation.

This paper contributes to work identifying drivers of self-protection from

natural disasters. Most previous work examining the determinants of mitigation behavior uses observational data and reports correlations between homeowner characteristics and mitigation behavior. For example, Brenkert-Smith et al (2006) conducted interviews with homeowners to identify determinants of mitigation behavior, finding that social and community norms played an important role in determining mitigation choices. McGee et al (2009) find that wildfire experiences shape mitigation behavior. Brenkert-Smith et al. (2012) find some positive effect of exposure to information and discussions with neighbors on mitigation behavior. Olsen et al. (2017) find that a higher perception of risk leads to more mitigation activity. We are aware of only one previous study that has used a randomized evaluation to study barriers to wildfire mitigation (Meldrum et al 2021) using a survey on hypothetical mitigation choices.

The findings of this pilot will be used to design a full-scale experiment with a larger set of participating wildfire agencies across Oregon and (potentially) other areas in the west.

2 Context

Worldwide natural disaster losses averaged $218 billion per year during 2016–2020, a 60% increase in real terms over the preceding 30 years. The increasing burden of weather-related catastrophes creates an urgent need for research to guide adaptation. This is particularly true for wildfires, which are predicted to continue to increase due to climate change and other factors (Feo et al 2020, IPCC 2012).

These risks have been shown to disproportionately affect disadvantaged populations (Davies et al 2018, Baylis and Boomhower 2023). At the same time, some mitigation measures that could protect homes from destruction in a wildfire can be costly to implement. Choosing fire-resistant building materials is

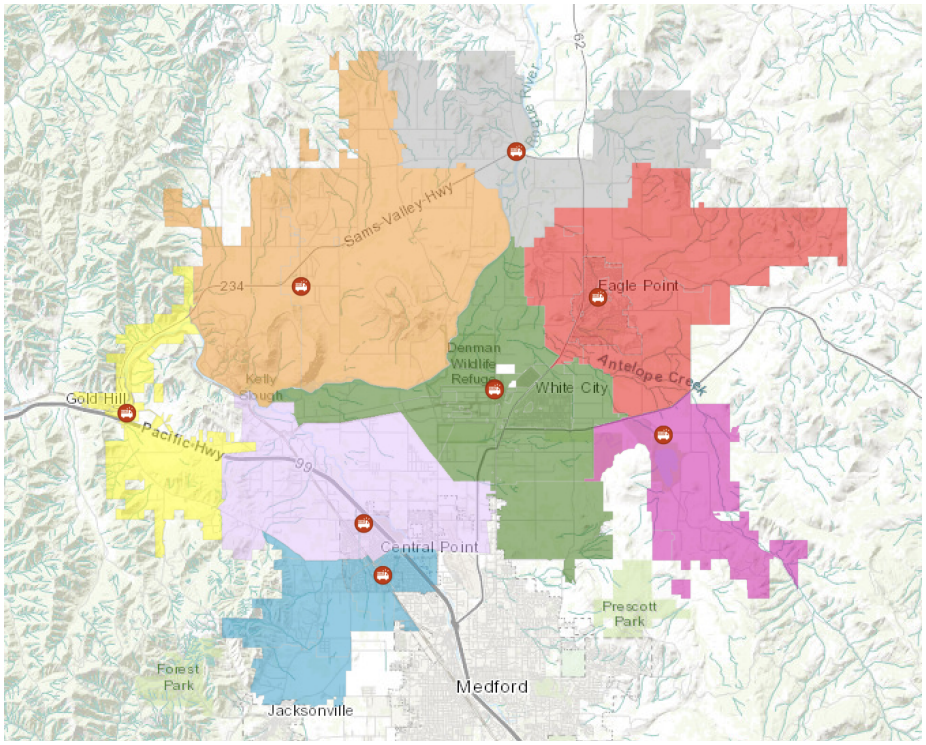
relatively inexpensive at time of construction, but if a home has already been built using conventional wood siding, eaves, decking, or roofs, the cost to retrofit to a fire-resistant standard can be prohibitively high (Baylis and Boomhower 2021).

Among the mitigation approaches that are comparatively inexpensive, the pursuit of defensible space has been a priority for state and local governments in the American West. Defensible space is defined as the buffer around a home where grass, shrubs, wooden structures, and other flammable materials could ignite a home during wildfire conditions, and the creation of defensible space is associated with higher home survival rates during wildfires (Syphard et al. 2014). Federal, state, and community programs encourage homeowners to ensure that their home has adequate defensible space, but the success of these programs has been mixed. Even in California, one of the few jurisdictions where compliance is required by law, compliance rates range from 30% in Marin County to nearly 100% in Santa Barbara County (Petek 201).

Our study location is the jurisdiction of JCFD3 in Jackson County, Southern Oregon. District 3 includes the area surrounding Medford, though not the urban core of Medford itself. Figure 1 maps the different areas administered by JCFD3 staff. Jackson County was the home of the highly destructive Almeda Drive and Obenchain fires in 2020 that destroyed hundreds of structures and very nearly included the city of Medford itself.

In Oregon, creating defensible space has become a legislative priority. Senate Bill 762, an omnibus wildfire bill, included provisions for a new hazard map that would require homeowners to clear space in specific areas. The map is expected to be implemented in 2023 after a period of public feedback. Conversations with the Oregon State Fire Marshal's office indicate that a large number of properties would not be compliant with proposed defensible space requirements.

Figure 1: Map of Jackson County Fire District 3



Notes: Map of Jackson County Fire District 3 (JCFD3). Colored areas are included in JCFD3, which covers most of area north of Medford, OR. Different colors represent different Fire Management Zones within the District. Constructed using JCFD3 data.

As in California, policymakers believe that programs that assist homeowners in providing defensible space will be essential to achieving public support. The existing evidence to guide the design of such programs is limited.

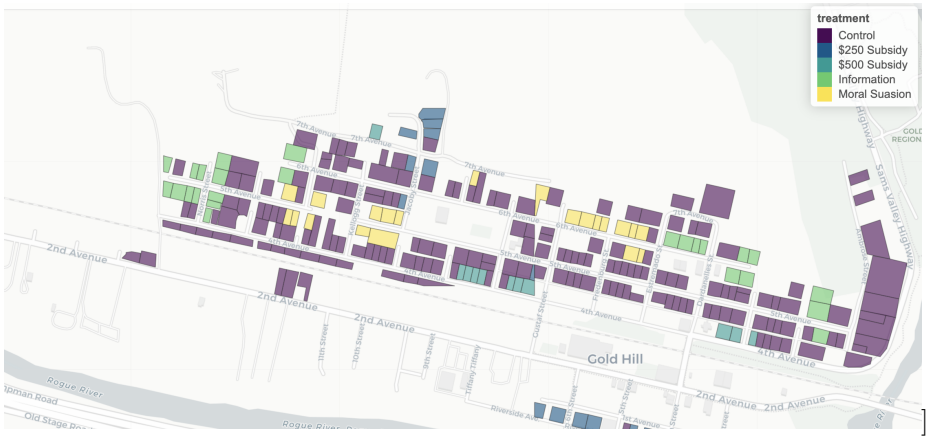
3 Experiment Design

The evaluation tests the effectiveness of information and price-based interventions in increasing investment in defensible space. The study sample for the pilot includes homes in high fire-hazard areas of Jackson County. A key focus of this pilot study is to refine measurement methods and identify promising interventions to be tested at larger scale in a full experiment.

3.1 Treatment Group Assignment

. In the spring and summer of 2023 and in partnership with staff from JCFD3, we tested the following pilot interventions: (1) an "Information" treatment delivered by mail that includes information on wildfire risk and suggested actions to improve wildfire resilience, as well as an offer of a free home assessment; (2) a "Moral Suasion" treatment that included the same information as the Information group, but language that emphasized the moral responsibility of the residents to protect their homes in order to reduce spillover risk to their neighbors, (3) a "$250 Subsidy" group that received a similar letter as the Information group, except that it also included an offer of $250 for successfully passing a defensible space inspection (to be confirmed on a follow-up in person inspection), and (4) a "$500 Subsidy" group that received a similar offer but with a larger subsidy of $500. The flyers and letters sent to each group were virtually identical aside from the changes needed to convey either the moral suasion element or the subsidy offer. The Appendix includes reproductions of all of the materials sent to treated households. The remaining households were

Figure 2: Map of Gold Hill



Notes: Map shows treatment assignment for parcels in Gold Hill, a neighborhood on the western edge of JCFD3. Colors indicate treatment assignment, which is randomized by home clusters (10 adjacent homes on the same streets).

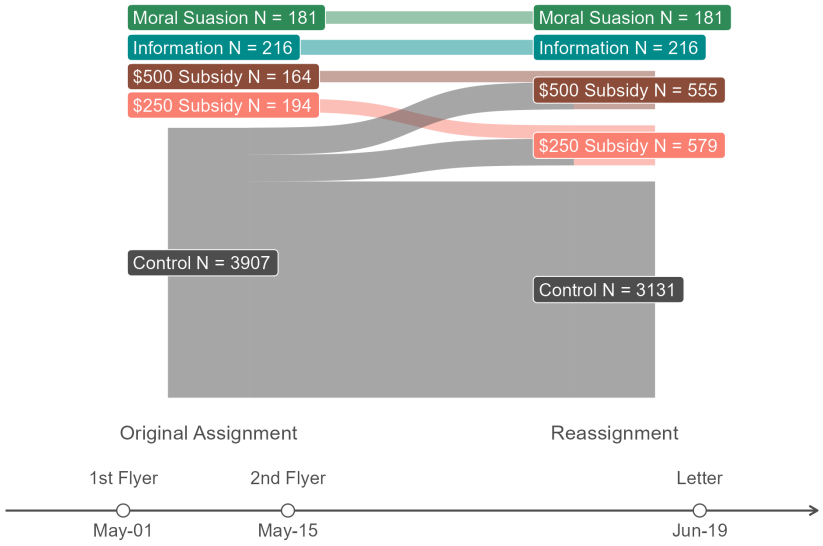
the control group, and did not receive any additional contact but remained free to get in touch with JCFD3 of their own accord.

To ensure that relatively few neighbors received different treatment assignment, we randomized among home clusters, which we defined as sets of 10 adjacent homes on the same street. Figure 2 zooms in on a neighborhood in our study area called Gold Hill. Parcels are shaded according to their treatment assignment.

3.2 Timeline

Section 3.2 documents the experimental groups and the timeline of the experiment. We sent flyers to each treated household in both April and May, and a final followup letter in July. In June, since we had sufficient budget available, we increased the size of the treatment group by enrolling additional households at random from the control group into the subsidy groups. No additions were made to the Information or Moral Suasion groups. The analysis presented below considers a household to be in the treatment group if it was either assigned to

Figure 3: Experiment Timeline



Notes: Figure shows timeline of experiment and randomization of homes into treatment groups. Initial assignment of homes is given by the boxes on the left and second assignment on the right. Originally treated homes remained in their treatment groups during the re-assignment, and a subset of control households were added to the $500 and $250 subsidy groups. Originally assigned treatment group homes received the first and second flyers as well as the letter, while the reassigned homes only received the letter.

that group initially or during the reassignment. A household is in the control group only if it only was never assigned to a treatment group.

3.3 Neighbor Nudge Treatment

In addition to overall treatment group assignment, the field experiment also incorporated a "Neighbor Nudge" treatment that was based on a just-in-time randomization of neighbors of homes in the treatment group that contacted JCFD3 during the study period. Once a household contacted JCDF3, their neighbors (other homes in the same home cluster) became candidates for an additional followup letter noting that their neighbors had been in touch with JCFD3 and encouraging them to get in touch as well. 25% of homes in the

candidate home clusters actually received the followup letter. We include a copy of the follow up letter in the Appendix.

3.4 Summary Statistics

The experiment included 4,662 households, 3,131 of which were in the control group throughout the study. **??** reports summary statistics for the entire sample. The study sample included only residential properties that faced "high" or "very high" wildfire risk. The average home in the sample was 3.8 acres and worth around $490,000, and had a Social Vulnerability Index (SVI) of 0.4.[1] In the Appendix, we document that these observables were well-balanced across control and treatment groups.

1. Following Senate Bill 762, researchers at Oregon State University created a wildfire-specific Social Vulnerability Index for the state of Oregon. That dataset is available here: .

Table 1: Descriptive Statistics

	Mean	SD	P5	Median	P95
Variables (Homes = 4,662)					
Risk value	0.372	0.227	0.148	0.301	0.741
Assessment value	488	291	222	415	947
SVI	0.402	0.267	0.0193	0.34	0.805
CBG Owner prop.	0.824	0.0808	0.716	0.828	0.925
CBG Median age	50.3	11.5	34.8	47.1	67.2
CBG Bachelors+ prop.	0.252	0.125	0.0775	0.263	0.408
CBG Median earnings	40995	9358	33689	39780	48136
Treatment Groups					
Group	N				
Control	3,131				
$250 Subsidy	579				
$500 Subsidy	555				
Information	216				
Moral Suasion	181				

Notes: Table shows descriptive statistics for the sample. Fire risk score is the level of wildfire risk for the home. Assessment value is the total home assessed value, in thousands of dollars. SVI is the Social Vulnerability Index for the Census Block containing the home (TODO: Check this). CBG owner prop. is the proportion of people who own their homes in that Census Block Group (CBG). CBG Median age is the median age of the Census respondent and, CBG Bachelors+ prop. is the proportion of people with a Bachelor's degree or higher in the CBG, and CBG median earnings is the median household (TOOD: Check this) earnings in that CBG.

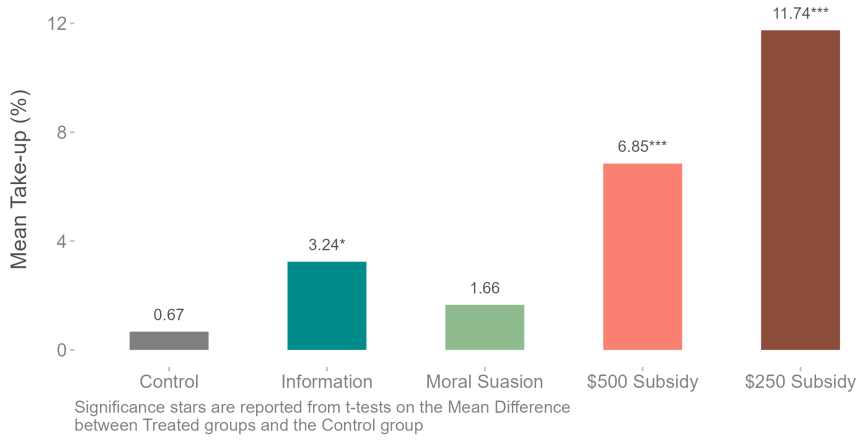
4 Findings

This section describes the findings of the experiment.

4.1 Effects of Treatment on Takeup

The primary outcome in this experiment is an indicator for whether households got in touch with JCFD3 during the treatment period. Whenever a household contacts JCFD3, either by web form or by phone call, their contact information is stored in a database managed by JCFD3 staff. We match between that database and our original list of assigned household to identify which households got in touch with JCDF3. Although we focus specifically on whether contact

Figure 4: Takeup by Treatment Group



Notes: Figure shows average takeup rates by treatment group. The height of each bar is the mean takeup rate (in percentage points) among that group, where takeup is measured as contacting JCFD3 after the treatment period began. Stars indicate statistical significance for a t-test between the control group and the given treatment group. *** p<0.01; ** p<0.05; * p<0.10.

occurred, the vast majority of contacts by households led to home assessments (TODO: CONFIRM THIS IN THE DATA AND PROVIDE NUMBERS).

Figure 4 summarizes takeup by treatment group. Each bar plots the average takeup rates among each set of homes.

Fewer than 0.6% of control homes, who did not receive a letter or a flyer, contacted JCFD3 during the treatment period. This is consistent with the prior experience of JCFD3 staff. Homes that received the baseline information treatment contacted JCFD3 significantly more, although their contact rate was still low at about 3%. Less than 2% of the homes that received the additional moral suasion element in their contact materials got in touch with JCFD3, and their rate was not statistically distinguishable from the control group. Homes in the subsidy groups were much more likely to contact JCFD3. 12% of the homes who received the $250 subsidy offer contacted JCFD3 during the treatment period. This estimate is statistically sharply different from the control group

takeup rate. Finally, 7% of the homes in the $500 subsidy offer group contacted JCFD3. This estimate is also statistically different from the control group at well below conventional p-value cutoffs, and statistically different – and importantly, lower – than the contact rate among the $250 group. That a lower offer yielded a higher contact rate is a puzzling finding and one we discuss in detail in Section 5.

We next document the timeline of responses to the treatment group contacts. Figure 5 shows the cumulative takeup rates by group during the treatment period. In this figure, we separate the originally assigned treatment group homes from the subset of homes (originally in the control group) that were reassigned to the subsidy groups in late June. As we describe above, this latter group did not receive the initial two flyers, only the followup letter.

The top panel shows cumulative takeup rates for the originally assigned treatment homes. Response rates remain low throughout the sample for the Control, Information, and Moral Suasion groups, though the Information group seems to respond most strongly to the flyers. The Subsidy offer groups show an analogous but more pronounced pattern: relatively muted responses to the first and second flyers, and a sharp uptick with the receipt of the letter. Most of the contacts occur within a fairly short (one to two week) period after the receipt of the letter, with only a handful of households contacting JCFD3 in August and none after the start of September. One explanation for the larger effect of the letter on takeup rates than the flyers is that the letter was viewed as more credible by households. Several individuals who requested an assessment commented that they found the letter, which was signed by JCFD3 chief, more credible than glossy flyers they originally received.

The bottom panel shows the evolution of cumulative response rates for households that were assigned into the subsidy groups in June (the reassigned treatment households). Since reassigned households did not receive either the first

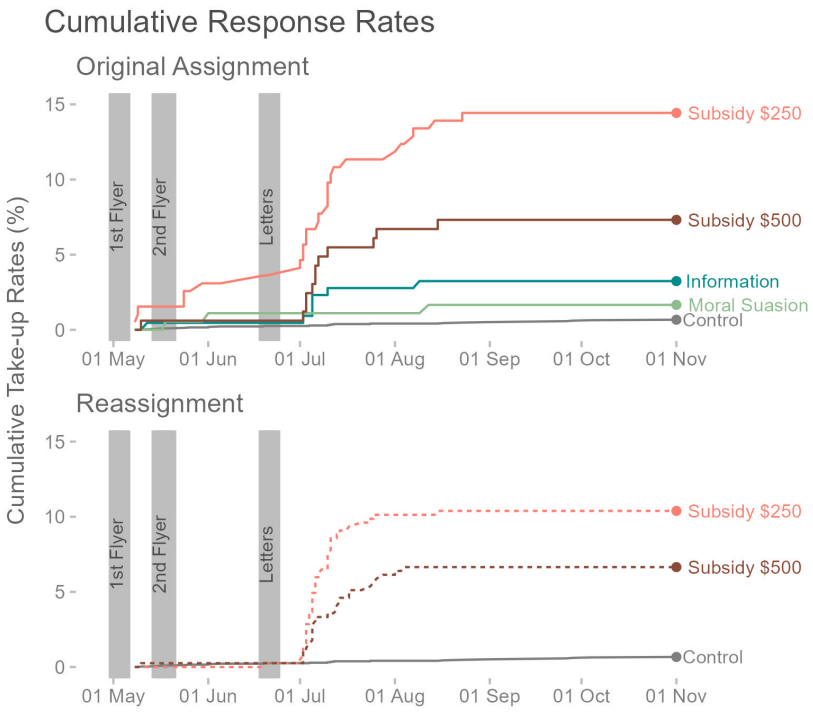


Figure 5: Cumulative Take-up Rate over Time

Notes: Figure shows takeup rates by date, where takeup is measured as contacting JCFD3 after the treatment period began. The top panel follows the set of households originally assigned to treatment groups, and the bottom panel follows the households reassigned to the subsidy groups later in the experiment. The control group in both panels are households that were always assigned to control.

or second flyer, it is unsurprising that they also did not respond during the first period. Once they received the letter, response rates again increased rapidly up in the few days after the letter was sent out and plateau by the start of August.

4.2 Heterogeneity in Subsidy Takeup

This section considers differential takeup rates by observable household characteristics. Since takeup rates were highest among the subsidy groups, we focus this analysis on the subsidy group and combined the $250 and $500 groups for parsimony. For this exercise, we define categorical variables for households as follows: "Large Parcel" indicates homes with above-median lot size, "High Risk" indicates homes facing above median wildfire risk score among the sample, "High Value" indicates homes with above-median total assessed value, and "High SVI" indicates homes in Census Block Groups (CBGs) with an above-median SVI (i.e., these homes are in areas that are more socially vulnerable). We estimate versions of the following model, where H stands in for the catogorical indicator variables defined above:

$$\begin{aligned} \text{Takeup}_i = &\text{Subsidy}_i + \sum_H \text{Subsidy} \times H_i + \\ &\text{Information}_i + \text{Moral Suasion} + \sum_H H_i + \varepsilon_i \end{aligned} \tag{1}$$

Table 3 documents the findings. Column (1) estimates a model without interactions for comparison. The findings are similar to those shown in Figure 4, except that the subsidy groups are combined. As before, the subsidy groups respond most strongly relative the control group, followed by the Information group, followed by the Moral Suasion group (whose response is small and not statistically different from zero).

Table 2: Effect of Subsidy Offer on Takeup

	(1)	(2)	(3)	(4)	(5)	(6)
Subsidy	8.71***	9.93***	9.22***	6.62***	11.4***	10.0***
	(1.08)	(1.47)	(1.37)	(1.24)	(1.94)	(2.11)
Subsidy × Large Parcel		-2.03				-2.98
		(1.95)				(2.07)
Subsidy × High Risk			-0.667			0.638
			(2.17)			(2.24)
Subsidy × High Value				4.49**		5.16***
				(1.90)		(1.97)
Subsidy × High SVI					-4.39*	-4.54*
					(2.28)	(2.32)
Moral Suasion	1.16	1.43	1.31	1.21	1.24	1.30
	(1.24)	(1.25)	(1.26)	(1.26)	(1.25)	(1.23)
Information	2.95**	2.79**	2.76**	2.92**	2.67**	2.89**
	(1.37)	(1.33)	(1.34)	(1.34)	(1.35)	(1.34)
Large Parcel		-0.235	-0.690	-0.652	-0.790	-0.086
		(0.577)	(0.615)	(0.610)	(0.609)	(0.524)
High SVI		-1.23*	-1.22*	-1.28*	-0.224	-0.238
		(0.671)	(0.670)	(0.663)	(0.468)	(0.463)
High Risk		0.738	0.874	0.824	0.752	0.737
		(0.643)	(0.544)	(0.653)	(0.640)	(0.477)
High Value		1.51**	1.51**	0.370	1.54**	0.253
		(0.648)	(0.646)	(0.424)	(0.645)	(0.419)
City FE	✓	✓	✓	✓	✓	✓
Risk class FE		✓	✓	✓	✓	✓
Property class FE		✓	✓	✓	✓	✓
Observations	4,662	4,624	4,624	4,624	4,624	4,624
R^2	0.05	0.06	0.05	0.06	0.06	0.06
Dependent variable mean	2.9	3.0	3.0	3.0	3.0	3.0

Notes: Table shows the effect of receiving a subsidy offer on takeup. Takeup is measured as contacting JCFD3 after the treatment period began. Subsidy is an indicator for a household receiving either the $250 or $500 subsidy offer. Large Parcel is an indicator for a parcel with above median lot size. High Risk is an indicator for a home with above median wildfire risk. High Value is an indicator for a home with above median assessed value. High SVI is an indicator for homes in Census Tracts with above median SVI, i.e., are measured as more socially vulnerable. City fixed effects control for the city of the home address, Risk class is the categorical wildfire risk class, and Property class is the property type. Standard errors clustered by home cluster. *** p<0.01; ** p<0.05; * p<0.10.

Column (2)–(5) add controls for all of the dimensions of heterogeneity, and each one includes one of the indicators of heterogeneity. Column (2) interacts the subsidy offer with an indicator for having an above-median lot size, since

larger lot sizes may make adherence with defensible space requirements more challenging. We observe slightly less takeup (around 2%) in percentage terms for these households, but the difference is not statistically difference. Column (3) interacts the subsidy offer with having a home facing above-median wildfire risk. Perhaps surprisingly, these households are no more likely to contact JCFD3 when they receive a subsidy offer.

Column (4) estimates the interaction effect of having a home with high assessed value. Here we find a large differential effect for the subsidy offer on high home value households: these households are around 4.5% more likely to respond, roughly an 80% increase on the response rate for lower value homes. This could be for several reasons, including that higher value homes are likely to be occupied by households with more financial resources and that the potential cost of the loss of the home is larger for these households.

Column (5) interacts the indicator for Subsidy offer with the High SVI indicator, which, as a reminder, refers to a home being in a CBG where social vulnerability is measured as above median, i.e., homes in these areas are more socially vulnerable. In our study region, this roughly corresponds to areas within JCFD3 that are less wealthy and older on average. Similar to the previous estimate, we find here that it is the less socially vulnerable homes that respond more strongly to the subsidy offer. Homes in above-median SVI areas are around 4.4% less likely to respond.

Finally, column (6) includes all interactions in the same regression to test for whether correlations between one or more of these dimensions could help explain what we find. In this case, the estimates are relatively stable when we include all of the interactions together. Larger and higher risk parcels are not statistically any more or less likely to take up, while households in higher value home and in areas with lower levels of social vulnerability are considerably more

likely. If anything, the magnitudes of the interacted effects are slightly larger in column (6) than in columns (4) and (5).

4.3 Effects of the Neighbor Nudge

The final analysis we conduct focuses on the subset of homes who were eligible for the neighbor nudge treatment described in detail in Section 3.3. As a reminder, these are already-treated homes in the same home cluster as a neighbor who took up the treatment. Of these homes, around one quarter received a separate follow-up letter noting that one of their neighbors had contacted JCFD3 and inviting them to do so as well. Table 3 documents the results.

Column (1) estimates the effect of a nudge without any additional controls. We do not see any additional effect of the neighbor nudge treatment on takeup. Column (2) includes controls for SVI, acreage, risk, and home value. Again, we do not observe a statistically significant effect of receiving a neighbor nudge.

Table 3: Neighbor Nudge Treatment on Takeup

	Takeup (percentage)	
	(1)	(2)
Neighbor nudge	-0.310	1.53
	(2.75)	(2.87)
SVI		-3.39
		(5.21)
Acreage		0.027
		(0.285)
Risk value		19.0*
		(11.1)
Assessment value		0.009
		(0.006)
City FE		✓
Risk class FE		✓
Property class FE		✓
Observations	531	526
R^2	0.00003	0.04
Dependent variable mean	6.0	6.1

Notes: Table shows the effect receiving the neighbor nudge treatment on takeup. The sample for these regressions is the set of homes who were eligible to receive an additional letter notifying them that their neighbors had been in contact with the fire district. The outcome variable is an indicator variable for the respondent contacting the district. Neighbor nudge is an indicator for whether they were actually contacted. SVI is the Oregon Social Vulnerability Index, Acreage is the lot acreage, Risk value is the wildfire risk, and assessment value is the assessed value of the parcel. Standard errors clustered by home cluster. *** p<0.01; ** p<0.05; * p<0.10.

5 Discussion

The field experiment we report on here was originally conceived as a pilot to test the possibility of employing randomized evaluation to compare outreach strategies for wildfire preparedness. We briefly summarize the findings of this field experiment in hopes of assisting researchers, policymakers, and wildfire professionals as they consider their options for incentivizing fuel management in the many areas facing increasing wildfire risk.

The first and broadest interpretation of what we find is that financial incentives matter when it comes to encouraging takeup. Interestingly, this is in direct contrast to anecdotal claims made by several of the households in the experiment, who reported that their decision to contact JCFD3 was not in response to the financial offer but because it was, to paraphrase, the right thing to do.[2] Nevertheless, on average, the group of household who received the incentive offer were considerably more likely to respond.

Secondly, the larger takeup rate for households who received the smaller ($250) subsidy offer compared to those who received the larger ($500) subsidy offer is a perplexing finding. We speculate that this may reflect a credibility effect: $500 is a large, round number, and could be more likely to be interpreted as a sum that indicates some kind of "catch". This credibility explanation is consistent with the much larger response rates we observed after sending out the letter (signed by the JCFD3 Fire Chief) in comparison to the previous glossy flyer. Whether such a difference in response rates between subsidy offers is likely to persist for other contexts or for similar types of offerings is not obvious. If the credibility problem could be adequately solved, we expect that households would become more likely to respond to the larger financial incentives.

Finally, that takeup of the subsidy offer appears to be higher among wealthier households and households facing lower levels of social vulnerability highlights a key area of concern for wildfire damage mitigation in lower-income and higher vulnerability areas. It suggests that policymakers interested in targeting households in these categories, who likely have fewer available resources (financial and otherwise) for fuel management may need to expend additional effort to reach them.

In the upcoming fire season, the team plans to expand the pilot to a wide-

2. One respondent directly requested that their incentive be redirected to efforts to support firefighters facing hardship.

reaching experiment across other locations in the west. With additional experience and capacity, we plan to leverage what we have learned in the pilot and further develop the knowledge base for improving homeowner and community resilience to wildfires.

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Online Appendix to "Incentivizing Self-Protection From Wildfires"

Patrick Baylis, Judson Boomhower, and Bob Horton

A Contact Materials

A.1 Flyers

A.2 Letters

Figure A.1: Information Flyer

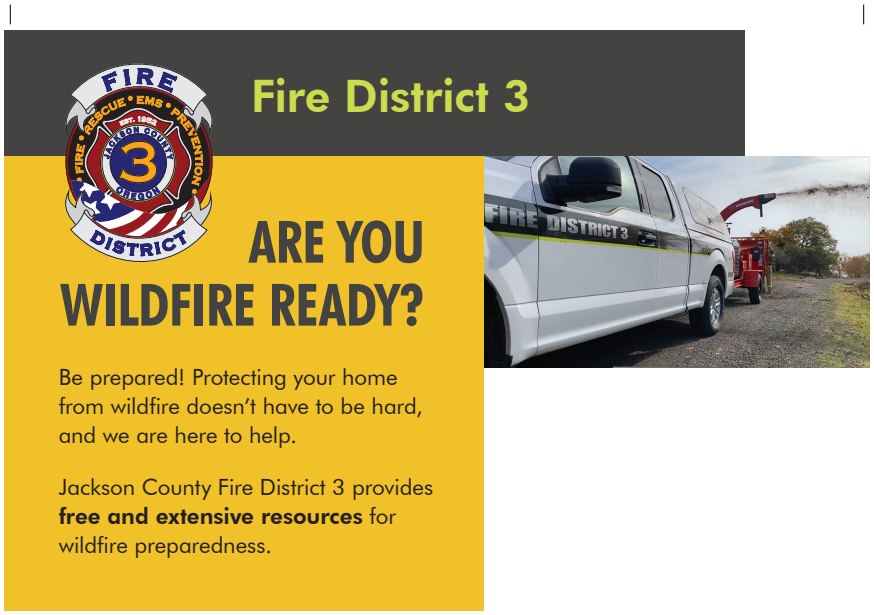

Figure A.2: Moral Suasion Flyer

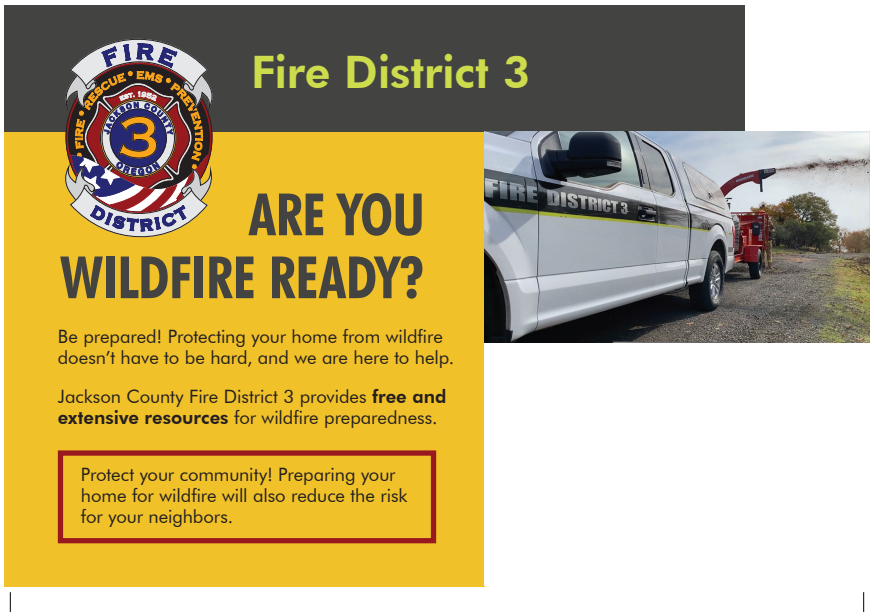

Figure A.3: $250 Subsidy Flyer

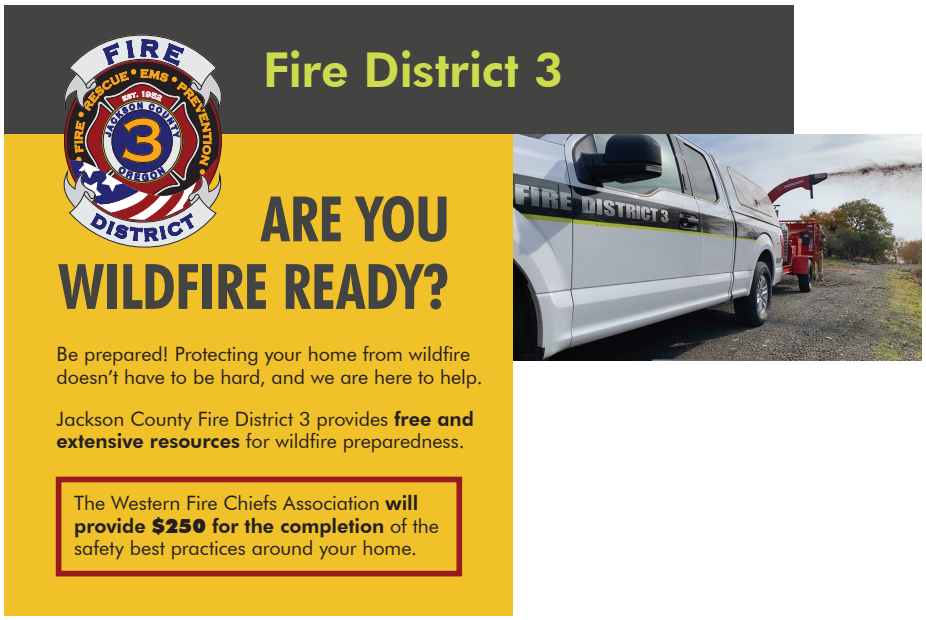

Figure A.4: $500 Subsidy Flyer

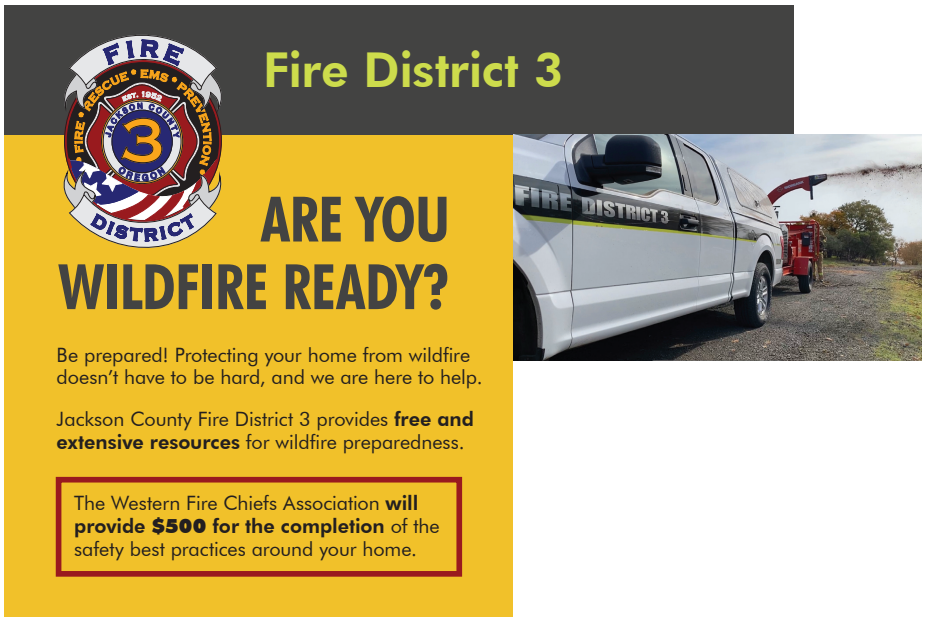

Figure A.5: Information & Moral Suasion Letter

Are you wildfire ready? Jackson County Fire District 3 is here to help!

June 2023

Dear Jackson County Resident,

Wildfire season is just around the corner, and *communities have to work together to reduce risk from wildfires.* Jackson County Fire District 3 **offers free resources** to make it easier for residents to protect their homes.

These include the following:

- **Wildland home assessment** for recommendations about how to prepare your property
- **Fuels reduction trailer** delivered and picked up by FD3 to remove flammable vegetation
- **Community wood chipper** brought to your property and operated by trained FD3 crew to remove larger bushes and branches

Reach out today to request that Jackson County's risk reduction team assess your property, or to learn about other wildfire preparedness resources.

call (541) 826-7100
email crr@jcfd3.com

sign up by web form
jcfd3.com/FuelsReduction

Safely maintaining vegetation and other materials around your home is one of the best things you can do to protect against wildfire, and communities are safest when everyone does their part. Reach out today to get wildfire ready!

Sincerely,

Mike Hussey
Fire Chief
Jackson County Fire District 3

Figure A.6: $250 Subsidy Letter

Are you wildfire ready? Jackson County Fire District 3 is here to help!

June 2023

Dear Jackson County Resident,

Wildfire season is just around the corner, and *communities need to work together to reduce risk from wildfires.* Homes in your neighborhood are **eligible to receive $250** for the completion of fire safety best practices.

Here's how it works:

- **Step One:** Schedule a **free assessment** of your property, and Jackson County Fire District 3's trained risk reduction team will let you know what you need to do to get wildfire ready. If your home is already wildfire ready, you will receive the $250 benefit after the assessment.
- **Step Two:** Take the recommended actions to prepare your home for wildfire season.
- **Step Three:** The risk reduction team will conduct a **free follow-up assessment** and provide the $250 benefit for completing recommended actions.

This one-time offer is funded by a grant program from the Office of the State Fire Marshal. The benefit payment comes from the Western Fire Chiefs Association and is available as long as funds last. Reach out today to request that Jackson County's risk reduction team assess your property, or to learn about other wildfire preparedness resources.

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email crr@jcfd3.com

sign up by web form
jcfd3.com/FuelsReduction

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Sincerely,

Mike Hussey
Fire Chief
Jackson County Fire District 3

Figure A.7: $500 Subsidy Letter

Are you wildfire ready? Jackson County Fire District 3 is here to help!

June 2023

Dear Jackson County Resident,

Wildfire season is just around the corner, and *communities need to work together to reduce risk from wildfires.* Homes in your neighborhood are **eligible to receive $500** for the completion of fire safety best practices.

Here's how it works:

- **Step One:** Schedule a **free assessment** of your property, and Jackson County Fire District 3's trained risk reduction team will let you know what you need to do to get wildfire ready. If your home is already wildfire ready, you will receive the $500 benefit after the assessment.
- **Step Two:** Take the recommended actions to prepare your home for wildfire season.
- **Step Three:** The risk reduction team will conduct a **free follow-up assessment** and provide the $500 benefit for completing recommended actions.

This one-time offer is funded by a grant program from the Office of the State Fire Marshal. The benefit payment comes from the Western Fire Chiefs Association and is available as long as funds last. Reach out today to request that Jackson County's risk reduction team assess your property, or to learn about other wildfire preparedness resources.

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Sincerely,

Mike Hussey
Fire Chief
Jackson County Fire District 3

B Balance

Table B.1: Balance

		Information		Moral Suasion		Subsidy 250		Subsidy 500	
	Control	Mean	SMD	Mean	SMD	Mean	SMD	Mean	SMD
Acreage	4.1	3.5	0.09	2.4	0.21	3.8	0.04	3.3	0.13
Fire risk	0.38	0.37	0.07	0.32	0.30	0.37	0.04	0.34	0.18
Social vulnerability index	0.38	0.38	0.00	0.40	0.06	0.44	0.21	0.48	0.37
Land value (1k$)	220	240	0.22	170	0.63	240	0.14	220	0.08
Improvement value (1k$)	270	310	0.14	250	0.07	260	0.04	230	0.15
CBG owner prop.	0.82	0.81	0.11	0.83	0.14	0.83	0.04	0.83	0.03
CBG median age	51	50	0.03	48	0.24	51	0.01	48	0.27
CBG bachelors+ prop.	0.25	0.29	0.29	0.22	0.25	0.25	0.04	0.24	0.07
CBG median earnings	41000	45000	0.32	39000	0.28	40000	0.12	39000	0.24
Distance to S. Obenchain	15000	17000	0.27	17000	0.31	14000	0.07	13000	0.17

SMD is the Standardized Mean Difference of each treated group compared to Control groups

C Sensitivity

Table C.1: Regression Results - Effects of Pooled Treated on Takeup Rate

	Takeup (percentage)					
	(1)	(2)	(3)	(4)	(5)	(6)
Treated	7.02***	7.62***	7.41***	5.29***	8.67***	7.45**
	(1.04)	(1.70)	(1.64)	(1.43)	(1.57)	(2.22)
× Above median Lot Size		-0.97				-1.60
		(2.00)				(1.60)
× Above median Fire Risk			-0.55			-0.07
			(1.54)			(0.97)
× Above median Home Value				3.60**		3.97**
				(1.49)		(1.27)
× Above median Social Vulnerability					-2.93	-2.95*
					(1.78)	(1.51)
Above median Lot Size		-0.17	-0.46	-0.45	-0.58	-0.06
		(0.41)	(0.34)	(0.34)	(0.38)	(0.38)
Above median Social Vulnerability		-0.96**	-0.94**	-0.96**	-0.01	-0.04
		(0.29)	(0.29)	(0.28)	(0.65)	(0.57)
Above median Fire Risk		0.54	0.71	0.65	0.56	0.73**
		(0.49)	(0.56)	(0.50)	(0.46)	(0.29)
Above median Home Value		1.35**	1.34**	0.16	1.37**	0.07
		(0.43)	(0.44)	(0.34)	(0.41)	(0.28)
Observations	4,662	4,624	4,624	4,624	4,624	4,624
Adjusted R^2	0.04	0.04	0.04	0.04	0.04	0.04

Notes:
*** p<0.01; ** p<0.05; * p<0.10
Standard errors clustered by Street.
Additional control variables include Property Class and Risk Class.

D Additional Findings

Table D.1: Summary Statistics

	Failing Fraction
Flammable vegetation remove	0.63
Debris removed	0.42
Trees spaced	0.75
Debris spaced	0.67
Fire-resistive plants spaced	0.75
Firewood and lumber spaced	0.65
Combustible vegetation spaced	0.98
BBQ tanks spaced	0.96
Observations	57

Frailing Fraction is calculated for the first round of assessment only.
Everyone passes in the second round.