The Effects of Information Framing on Willingness-to-pay for a Wildfire Management Program to Reduce Wildfire Risks in a Contingent Valuation Survey

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Motivation

Validity of WTP from CVM relies heavily on the information conveyed to the respondents

Full and unbiased information is recommended by the NOAA Panel (Arrow et al., 1993)

Mixed evidence about the effect of information on WTP

Information provided in the survey may be all the information a respondents might be able to use

Objectives and Research Questions

- Estimate WTP for wildfire management program
- Identify and examine determinants of WTP
- Understand the impact of information framing

Relevant Literature

- Information influence the outcome of the valuation studies (Samples et al., 1986))
- No significant difference in mean WTP values because of small change in the information presented to the respondents (Boyle, 1989)
- Differences in respondents' prior knowledge interact with the level of information provided in the survey (Tkac, 1998)

Relevant Literature

- Information increases restoration values for some respondents while reducing it for others because of the level of prior information level (Hoehn and Randall, 2002)
- Both appearance of an interviewer and degree of information provided have significant impact on stated WTP (Bateman and Mawby, 2004)
- Inclusion of the reminder raises WTP for less highly educated respondents, and decreases it for more highly educated respondents (Alberini et al., 2005)

Research Methodology

In-person survey

- Pre-survey letter to 2058 households, 169 returned
- Questionnaires to 1889 households
- 1155 households completed
- Response rate 60%

Contingent Valuation

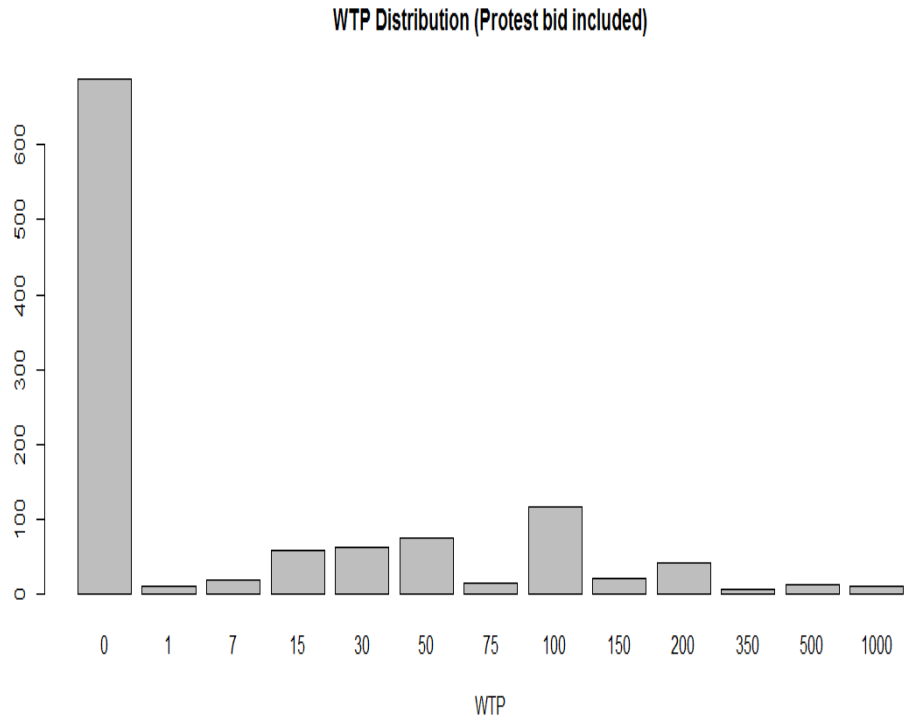
- Payment card
- Annual increase in tax

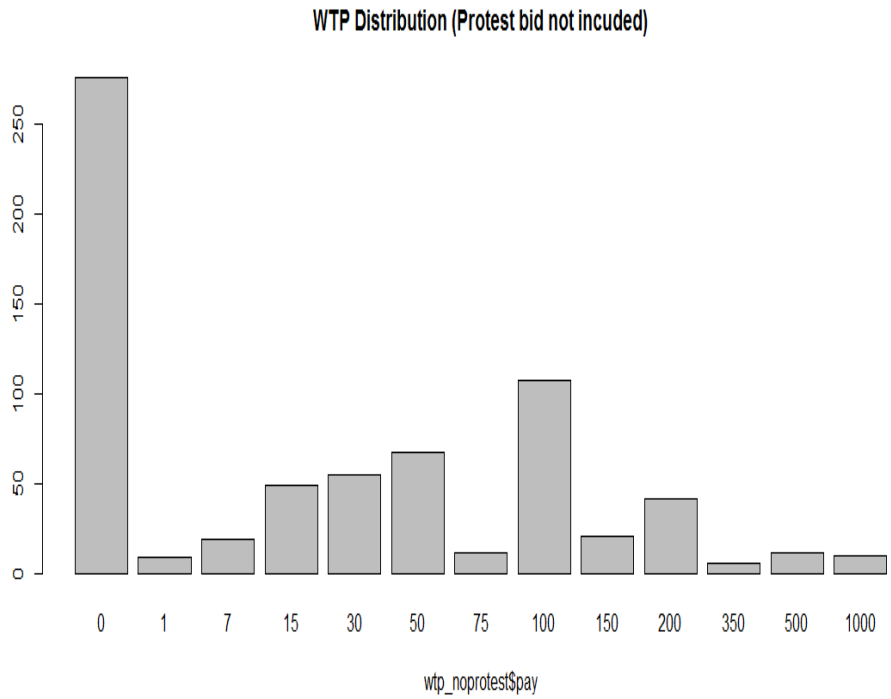
Econometric Approach

$$L = \sum_{i=1}^{n} \left(d_L \ln\left(1 - F(\beta_M C_L - X\beta)\right) + \sum_{k=1}^{h-2} d_k \ln\left(F(\beta_M C_{K+1} - X\beta) - F(\beta_M C_K - X\beta)\right) + d_M \ln\left(F(\beta_M C_h - X\beta)\right) \right)$$

$$WTP_{mean} = \frac{ln\left(1 + e^{X\beta}\right)}{\beta_p}$$

WTP Distribution





Different Level of Information

Level1 *(info_evacuation):* In recent year, about 130 homes have been evacuated annually due to wildfire in the Flathead County. Evacuated homes are considered to be in danger of being damaged or destroyed by wildfire

Level2 *(info_evacnodest): 1*+ although wildfire has not destroyed a home in Flathead County since 1988

Level3 (info_evacdest): 2+ Many thousands of homes are evacuated each year in the United States each year and, on average, 1,156 U.S. homes have been destroyed by wildfire each year since 1999. Other parts of western Montana have experienced home losses due to wildfire in more recent years. For example, the Bitterroot fires of 2000 threatened 1070 homes and destroyed

Destruction Vs Evacuation

WTP for County Vs Neighborhood

Destruction: Please circle the maximum amount that you would be willing to pay to fund an expanded wildfire management program that would reduce by half the likelihood that wildfire will **destroy** homes in **Flathead County / (your home and homes of your immediate neighbors**) during the next 10 years. Remember to consider your available income and other things you have the money to spend on:

Evacuation: Please circle the maximum amount that you would be willing to pay to fund an expanded wildfire management program that would reduce by half the likelihood that homes in **Flathead County**/ **your home and homes of your immediate neighbors**) will be **evacuated** during the next 10 years. Remember to consider your available income and other things you have to spend money on:

Descriptive Statistics

Variables	Mean	Std dev	Max	Min
destruction	0.5	0.5	1	0
wtp_neighbourhood	0.5	0.5	1	0
info_evacnodest	0.33	0.47	1	0
info_evacdest	0.34	0.48	1	0
income_000	88.21	57.49	200	5
edu	11.32	4.35	20	3
ege	9.02	12.49	93	23
eale	0.61	0.49	1	0
no_ofyear_movedin	17.22	13.26	72	1
res_fulltime	0.74	0.44	1	0
seek_less	0.8	0.4	1	0
evacnodest_seek_less	0.28	0.45	1	0
evacdest_seek_less	0.26	0.44	1	0

Exploratory Analysis

Information level	Destruction	Evacuation	All
info_evacuation	81.78	88.23	85.12
info_evacnodest	105.28	55.15	82.39
info_evacnodest	91.48	88.99	90.22
pooled_all	93.19	78.78	86.06

Exploratory Analysis

Information level	Wtp_county	Wtp_neighbourhood	All
info_evacuation	70.85	102.19	85.12
info_evacnodest	86.66	78.93	82.39
info_evacnodest	74.17	106.26	90.22
pooled_all	76.57	95.47	86.06

Exploratory Analysis

Information level	Destruction	Evacuation	All
Wtp_county	86.34	67.13	76.57
Wtp_neighbourhood	99.63	90.98	95.47
pooled_all	93.19	78.78	86.06

Explanatory Variables

Model1;

pay, destruction, wtp_your_neighbour, info_evacnodest, info_evacdest

Model2;

Model1+

income_000, age,male, no_ofyear_movedin, res_fulltime

Model3;

Model2+seek_less, info_evacnodest_seek_less, info_evacdest_seek_less

Maximum Likelihood Estimation Result

Variables	Model1	Model1	Model1
pay	0.0102***	0.0109***	-0.0111***
constant	0.1956	-1.541***	-0.5665
destruction	0.1292	0.1644	0.167
wtp_your_neighbour	0.1406	0.1329	0.125
info_evacnodest	-0.1219	-0.1683	-0.7835*
info_evacdest	-0.1312	-0.1201	-0.6595*

Maximum Likelihood Estimation Result

Variables	Model1	Model1	Model1
income_000		0.0065***	0.0062***
edu		0.0527***	0.048***
age		0.0162**	0.0152**
male		-0.0053	-0.0295
no_ofyear_movedin		-0.0121**	-0.0124**
res_fulltime		-0.1979	-0.2655
seek_less			-0.9783***
info_evacuation_seek_less			0.817*
info_evacdest_seek_less			0.6926*

Conclusion

- Mean WTP~$80
- Effect of different level of information inconclusive
- Level of information affect WTP positively for the respondents who sought less information

Future Research

- Mitigation behavior for home ignition zone
- Simultaneous estimation of WTP and mitigation behavior

Thank you!

For comments and suggestions:

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