

Is Willingness to Pay for a Public Good Sensitive to the Elicitation Format?

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ABSTRACT. *This study uses actual payments toward the provision of a public good to compare dichotomous choice and payment card formats. The public good in question is the environmental improvement from wind generation of electric power. We find that willingness-to-pay estimates vary with the elicitation format. Based on this result, we argue that elicitation effects found in contingent valuation studies may not be due the hypothetical nature of decision-making, as has been suggested in previous studies. (JEL H41, Q51)*

I. INTRODUCTION

Contingent valuation studies often yield different values for the same environmental good when different elicitation formats (dichotomous choice, open-ended, payment card, etc.) are used (see Table 1). The conventional wisdom would have us believe that this is evidence of a lack of validity of the method. After all, aren't different elicitation formats all trying to get at the same underlying Hicksian surplus value? But what if people respond differently to different elicitation formats when making real money commitments? This paper presents a case study where people were offered real opportunities to purchase wind-generated electricity. We found that values differed depending on whether the question used a dichotomous choice or payment card format. As all decisions were about making actual payments, the elicitation effects cannot be attributed to the hypothetical nature of contingent valuation. Perhaps, as Bohara et al. (1998) have suggested, elicitation effects occur if respondents think differently about the information implied by the two formats.

In the next section we summarize the literature on the effects of elicitation formats. We then describe the hypotheses we set out to test. Section 4 describes the wind power program and the data collection effort. In the last two sections, we summarize the results of our empirical study and explore their implications for the validity of the contingent valuation method.

II. BACKGROUND

In the survey research literature, there is extensive discussion of the effects of posing a question with an "open" versus "closed" response format (Sheatsley 1983). An open-response format does not provide any information to the respondent about possible answers to the question, whereas a closed-response format provides answer categories from which a response is chosen. Research on elicitation formats in contingent valuation has focused on open- versus closed-response formats and on differences between responses to various closed-response formats.

Two of the most prevalent closed-response formats used in contingent valuation are dichotomous choice format and payment card format. Each of these formats has strengths and weaknesses in

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TABLE 1
RECENT ELICITATION STUDIES SINCE 1990

Authors	The Good	Public or Private Good	Response Formats	Results
<i>Actual Payment Studies</i>				
Frykblom and Shogren (2000)	A Swedish national atlas	Private	DC, OE	$WTP_{DC} = WTP_{OE}^a$
Cadsby and Maynes (1999)	Tokens that are converted into Canadian dollars	Public	DC, OE	$WTP_{DC} < WTP_{OE}$
Lunander (1998)	Preview of a movie	Private	DC, OE	$WTP_{DC} > WTP_{OE}$
Loomis et al. (1997)	Art print	Private	DC, OE	$WTP_{DC} = WTP_{OE}$
Brown et al. (1996)	Road removal in the North Rim of the Grand Canyon	Public	DC, OE	$WTP_{DC} > WTP_{OE}$
<i>Contingent Valuation Studies</i>				
Blaine et al. (2005)	Curbside recycling	Public	DC, PC	$WTP_{DC} > WTP_{PC}$
Ready, Navrud, and Dubourg (2001)	Avoidance of an episode of illness	Private	DC, PC ^a	$WTP_{DC} > WTP_{PC}$
Cameron et al. (1999)	Green Power program	Public	DC, OE, PC	$WTP_{DC} > WTP_{PC} > WTP_{OE}$
Reaves, Kramer, and Holmes (1999)	Recovery of an endangered species	Public	DC, ^b OE, PC	$WTP_{DC} = WTP_{OE} = WTP_{PC}$
Bohara et al. (1998)	Protection of instream flows	Public	DC, OE	$WTP_{DC} \geq WTP_{OE}^c$
Lunander (1998)	Preview of a movie	Private	DC, OE	$WTP_{DC} > WTP_{OE}$
Welsh and Poe (1998)	Reduced fluctuations in Glen Canyon Dam releases	Public	DC, PC	$WTP_{DC} > WTP_{PC}$
Kramer and Mercer (1997)	Tropical Rain Forest Protection	Public	DC, PC	$WTP_{DC} = WTP_{PC}$
Loomis et al. (1997)	Art print	Private	DC, OE	$WTP_{DC} = WTP_{OE}$
Donaldson, Thomas, and Torgerson (1997)	A bone mineral density scan	Private	OE, PC	$WTP_{PC} > WTP_{OE}$
Boyle et al. (1996)	Moose hunt permit;	Private	DC, OE	$WTP_{DC} = WTP_{OE}$
	Moose hunt permit;	Private	DC, OE	$WTP_{DC} > WTP_{OE}$
	local response center to clean up oil spills	Public	DC, OE	$WTP_{DC} = WTP_{OE}$
Brown et al. (1996)	Road removal in the North Rim of the Grand Canyon	Public	DC, OE	$WTP_{DC} > WTP_{OE}$
Ready, Buzby, and Hu (1996)	Food safety improvements	Private	DC, PC	$WTP_{DC} > WTP_{PC}$
Holmes and Kramer (1995)	Protection of a forest ecosystem	Public	DC, PC	$WTP_{DC} > WTP_{PC}$
McFadden (1994)	Wilderness preservation	Public	DC, OE	$WTP_{DC} > WTP_{OE}$
Kriström (1993)	Protection of forest areas in Sweden	Public	DC, OE	$WTP_{DC} > WTP_{OE}$
Kealy and Turner (1993)	Candy bar;	Private	DC, OE	$WTP_{DC} = WTP_{OE}$
	reduction in acid rain damage in Adirondacks	Public	DC, OE	$WTP_{DC} > WTP_{OE}$
Johnson, Bregenzler, and Shelby (1990)	Permit for one whitewater recreation trip on the Rogue River	Private	DC, OE	$WTP_{DC} > WTP_{OE}$

^a Ready, Navrud, and Dubourg refer to the payment card treatment as open ended. However, the treatment was like a payment card in that respondents were shown a card with offer amounts and asked to check the amount they would like.

^b The DC question used a double-bounded format where respondents who said "yes" to the initial offer were asked a follow-up question with a higher offer amount and respondents who said "no" to the initial offer amount were asked a follow-up question with a lower offer amount.

^c $WTP_{DC} > WTP_{OE}$ when a log normal distribution was used and $WTP_{DC} = WTP_{OE}$, when a Weibull or Gamma distribution was used.

terms of cognitive burden on the respondent, statistical efficiency, incentive compatibility, and anchoring effects. The benefits of the dichotomous choice format, which

was endorsed by the NOAA panel (Arrow et al. 1993), include a relatively low cognitive burden on respondents as the format replicates real life decision-making

(purchases in markets and voting) and incentive compatibility under some circumstances (Carson, Groves, and Machina 2000). The drawbacks of the dichotomous choice format include the difficulty in choosing the appropriate offer amounts (Alberini 1995) and the need for large sample sizes due to the statistical inefficiency imposed by the data. There is also the issue that the dichotomous choice format only allow respondents to express positive expressions of support for a program by saying "yes" to the stated offer amount; some individuals may say "yes" at offer amounts above their maximum willingness to pay in order to show support for the program.¹ By comparison, the payment card format and the open-ended format allow for efficient estimation of statistical parameters with smaller sample sizes than the dichotomous choice format. However, choosing an amount from the payment card or filling in the blank in an open-ended response format may be more cognitively burdensome relative to responding "yes" or "no" to a given offer amount. Incentive compatibility can also be an issue with these formats. There have been concerns about the effects of the range and increments used on the payment card, although Rowe, Schulze, and Breffle (1996) showed that, at least for their study, the range of the dollar values was not an issue when a sufficiently large range was used on the payment card. The bottom line is that, on *a priori* grounds, one elicitation format is not unequivocally better than the others. The circumstances of a particular study may dictate the appropriateness of the elicitation format. For example, the payment card format is more consistent with how actual donation programs are usually implemented and may be a better choice if a donation vehicle is to be used. Table 1 summarizes recent studies of elicitation formats. Many of these studies concluded that different for-

mat elicit different values and this held true in both actual payment and contingent valuation studies. Some of the comparisons implemented different statistical approaches to estimate the willingness-to-pay values for the various treatments.² It is possible that some of the differences in reported results are statistical rather than data generated, a point argued by Huang and Smith (1998). Likewise, a failure to account for differing variances between models could also result in erroneous conclusions about the statistical differences across response formats (Haab, Huang, and Whitehead 1999, Cameron et al. 2002).

There are a few notable patterns in the study results from contingent valuation studies listed in Table 1. Willingness-to-pay estimates based on the dichotomous choice format and the payment card format tend to be larger than those based on open-ended questions. Furthermore, dichotomous choice estimates tend to be larger than payment card estimates. These results are consistent whether the study involved a private or a public good. There are a few cases (Reaves, Kramer, and Holmes 1999; Bohara et al. 1998; Loomis et al. 1997; Boyle et al. 1996; Kealy and Turner 1993) where the willingness-to-pay estimates were found to be equivalent across elicitation formats.

All the actual payment studies listed in Table 1 compare dichotomous choice formats and open-ended formats. Results have been mixed. Loomis et al. (1997) and Frykblom and Shogren (2000) did not find any difference between willingness-to-pay estimates for private goods. One study (Cadsby and Maynes 1999) found open-ended willingness to pay for a public good to be larger. That study differed from standard CV studies in that it was conducted in a controlled laboratory setting with a threshold good and a money back guarantee. In the

¹ Some dichotomous choice formats can allow for negative WTP. Clinch and Murphy (2001) model both positive and negative willingness to pay based on a CV design that explicitly allowed for negative bids.

² For example, with open-ended data, mean willingness to pay is sometimes calculated as the simple mean of the responses, while with dichotomous choice data, willingness-to-pay estimates are usually based on a parametric models (i.e., logit or probit).

dichotomous choice treatment, study participants had to contribute all or nothing from their initial endowments. In the open-ended treatment, the participants could choose how much of their initial endowment to contribute. Two studies (Lunander 1998, Brown et al. 1996) found willingness-to-pay estimates based on dichotomous choice data to be larger relative to estimates based on open-ended data. Of the few actual payment elicitation studies, the Brown et al. (1996) and Cadsby and Maynes (1999) studies are the most similar studies to the present study in that they involved public goods. We might expect elicitation effects to be more prevalent with public goods as respondents often have less experience paying for public goods. In such situations, alternative elicitation formats may send different signals to the individual about the value of the good. For example, the offer amount in the dichotomous choice format might be viewed as a signal about the value of the good.

III. HYPOTHESES

In this study we test two hypotheses: (1) Are mean willingness-to-pay estimates based on the payment card data and dichotomous choice data equivalent? and (2) Are the underlying distributions for the dichotomous choice and payment card models equivalent? Before testing these hypotheses, we need to review data-gathering procedures and compare the response rates and item non-response for the two treatments. Taking these factors into consideration may allow us to comment on which elicitation format is preferable (Reaves, Kramer, and Holmes 1999).

IV. THE STUDY DESIGN

Our larger study had several treatments. Previously published results (Champ and Bishop 2001) compared actual payments and contingent values from dichotomous choice treatments. Here we turn attention to comparing the actual payment dichotomous choice results with those from a special treatment where actual payments were collected using a payment card format.

We implemented a split-sample design in which the survey instrument and all survey materials were identical for the two treatments except the response format. The good described in the surveys was a voluntary pilot program for residential customers to purchase wind-generated electricity from the Madison Gas and Electric Company (MG&E), a local private provider of gas and electricity in Madison, Wisconsin. The sample frame was MG&E residential electric customers who had been customers for at least one year.³ Survey development involved a series of focus groups where we confronted the challenges of describing the wind power program and why wind power is more expensive than electricity generated from coal.

The final versions of the survey explained that MG&E had an opportunity to purchase a limited amount of power from wind turbines being built in northeastern Wisconsin. If enough customers were willing to pay the extra cost of wind power, MG&E would purchase 430,000 kilowatt hours of power from the wind turbines, which would displace electricity that would otherwise be generated from coal. Regardless of how much wind power customers chose to purchase, they all received the same benefits from the 430,000 kilowatt hours of wind generated electricity. If more than enough customers wanted to pay the extra cost of the 430,000 kilowatt hours, they would be put on a waiting list for future opportunities. The environmental drawbacks of coal were explained. The benefits of wind-generated electricity compared to coal were described as well as the disadvantages such as the sound of the wind turbines, bird kills, and the appearance of the wind turbines themselves. It was made clear that the environmental

³ Madison, Wisconsin, is a university city and many of the customers are students who live together in a dwelling for the academic year. Participation in the program required a twelve-month commitment to avoid students who would be moving sometime during the twelve months. We also removed multiple-unit dwellings from the sample frame in our effort to avoid the student population.

benefits from burning less coal would not be substantial; however, if the program were successful, MG&E would offer more wind power in the future.

Following the informational part of the scenario, survey respondents were asked if they would purchase wind-generated electricity. In one treatment, a single-bounded, dichotomous choice format was used. Here, the amount of wind power respondents were asked to consider was independent of their current electricity usage and randomly assigned from one of the seven amounts described below. In the payment card treatment, the respondents were asked to choose the amount of wind-generated electricity they would like to purchase, if any, from a menu of amounts. For both treatments, the amounts were expressed in kilowatt-hours per month, cost per month, and total cost for the year. The additional cost of wind-generated electricity was four cents per kilowatt-hour.⁴ Offer amounts started at 50 kilowatt-hours per month. The next amount was 100 kilowatt-hours per month and the amount increased in 100 kilowatt-hour increments up to 600 kilowatt-hours per month (which corresponded to \$24, \$48, \$96, \$144, \$192, \$240, or \$288 per year, respectively). Payment card subjects could choose from a menu with these seven levels while each subject in the dichotomous choice treatment was randomly assigned one value from this same menu. If respondents agreed to purchase the wind-generated electricity, their monthly electricity bill would include the extra cost for twelve months. The text of the willingness-to pay-questions is shown in Figure 1. Those who agreed to participate signed up right in the survey booklet and their names were passed on to MG&E for processing.

The surveys for both treatments also elicited measures of attitudes toward wind-generated electricity, MG&E, renewable energy, the environment in general, and

demographic characteristics. These measures allowed us to conduct multivariate analyses.

Both versions were administered by mail with customers in the two sub samples randomly assigned to either the dichotomous choice or payment card treatment. For further details on overall survey design and execution see Champ and Bishop (2001).

V. RESULTS

In this section, we first compare the response rates and item non-response for the two treatments then focus on the responses to the willingness-to-pay question.

Overall Response Rates

The initial sample sizes were 1,260 for the dichotomous choice treatment and 500 for the payment card treatment. Response rates were 56% and 50% respectively giving final samples sizes of 700 for the dichotomous choice treatment and 251 for the payment card treatment. The response rate for the dichotomous choice treatment was significantly higher than for the payment card treatment ($\chi^2 = 4.134, p = .042$). Because the response rates were significantly different for the two treatments, we investigated whether the respondents in the two treatments had statistically similar responses to attitudinal and socio-demographic questions. We concluded that the two treatments are representative of very similar respondent populations.

Item Non-Response

One might expect that more survey respondents would skip the willingness-to-pay question in the payment card treatment if indeed responding to that format is more difficult. However, that was *not* observed in this study. Of the 700 surveys returned in the dichotomous choice treatment, 648 had valid responses to the willingness-to-pay question (i.e., 7% of the returned surveys did not have any response circled for the willingness-to-pay question).

⁴ Residential customers currently pay about 7 cents per kilowatt-hour, so the total cost of wind-generated electricity is approximately 11 cents per kilowatt-hour.

Dichotomous Choice

Are you willing to purchase a [insert kw amount] kilowatt hour block of wind generated electricity each month for twelve months at an additional cost of \$ [insert dollar amount] per month (that is \$ [insert dollar amount] for the year)? (**CIRCLE ONE NUMBER**)

- 1 No
2 Yes

Payment Card

MG&E is currently able to offer you wind generated power according to the terms listed in this table.

Size of block	Extra cost per month	Extra cost per year
50 kilowatt hours	\$2	\$24
100 kilowatt hours	\$4	\$48
200 kilowatt hours	\$8	\$96
300 kilowatt hours	\$12	\$144
500 kilowatt hours	\$16	\$192
600 kilowatt hours	\$24	\$288

Are you willing to purchase any of the blocks or wind generated electricity at the cost which are described in this table? (**CIRCLE ONE NUMBER**)

- 1 No
2 Yes ----> Circle the particular kilowatt block you wish to purchase and fill out the form below:

50 100 200 300 400 500 600

FIGURE 1
WILLINGNESS-TO-PURCHASE QUESTIONS

In the payment card treatment, twelve of the 249 returned surveys (5%) did not have a response to the willingness-to-pay question. The difference in the item non-response for the two treatments is not statistically significant ($\chi^2 = 1.98; p = .159$).

Given the mixed results for overall non-response and item non-response, it was relevant to look at the *aggregate* non-

response to help us sort out the net effect, if any. We calculated the aggregate non-response by starting with all the individuals who were sent a survey (1260 for the dichotomous choice treatment and 500 for the payment card treatment) and considering how many of those individuals provided a usable response to the willingness to pay question (648 for the dichotomous choice

and 237 for the payment card). We found no statistical difference between the dichotomous choice and payment card treatments in terms of aggregate non-response ($\chi^2 = 2.324, p = .127$). This result suggests that we cannot make a claim based on response rate and item non-response that one treatment was unequivocally better or worse than the other when it came to respondent burden.

Response to the Willingness-to-Pay Question

When comparing responses to the willingness-to-pay question across treatments, it is important to keep in mind that the two formats were fundamentally different. In the dichotomous choice treatment, the question was whether the individual would participate at the specified payment level, whereas in the payment card treatment, the question asked if the individual would participate at any one of the payment levels offered on the payment card. This difference led us to expect that more individuals would respond positively to the willingness-to-pay question in the payment card treatment, as the respondent could choose the participation and payment level. As shown in Table 2, we found that to be the case, with a significantly higher percent of the respondents agreeing to pay for the wind-generated electricity in the payment card treatment (37%) relative to the dichotomous choice treatment (24%) ($\chi^2 = 14.29; p < .001$). However respondents in the dichotomous choice treatment agreed to purchase larger quantities of wind power than the respondents in the payment card treatment at all the dollar amounts (Table 3 and Figure 2).

TABLE 2
RESPONSE TO WILLINGNESS-TO-PAY QUESTION

	Percent of Dichotomous Choice (N = 649)	Percent of Payment Card (N = 237)
Yes	24	37
No	76	63

TABLE 3
RESPONSE DISTRIBUTIONS

Offer Amount	Dichotomous Choice	Payment Card
	Percent "Yes" at Each Offer Amount (N = 649)	Distribution of WTP Amounts (in Percent) (N = 237)
\$0	—	63
\$24	47	12
\$48	35	12
\$96	23	3
\$144	18	5
\$192	18	3
\$240	16	1
\$288	7	1

The willingness-to-pay models based on the payment card and dichotomous choice data were estimated using a maximum likelihood interval approach (Welsh and Poe 1998; Cameron and Huppert 1989). In the payment card case, an individual chose the highest dollar amount she was willing to pay from the menu of amounts. It was inferred that her true willingness to pay (WTP_i) was in the interval between the amount circled and the next highest dollar amount on the payment card. Formally, let X_{iL} be the maximum amount that the i th person would pay and X_{iU} be the lowest dollar amount that the individual would not pay. Then, WTP_i must lie in the interval $[X_{iL}, X_{iU}]$ ⁵ If $F(X_i; \beta)$ is the statistical distribution function for WTP_i with parameter vector β , then the probability that WTP_i would lie between any two dollar amounts is $F(X_{iU}; \beta) - F(X_{iL}; \beta)$ and the relevant log-likelihood function is

$$\ln(L) = \sum_{i=1}^n \ln[F(X_{iU}; \beta) - F(X_{iL}; \beta)] \quad [1]$$

The likelihood function for the dichotomous choice data can be expressed in this same form.

Using consistent statistical modeling for the two types of data allowed for statistical

⁵ If the individual circles the highest amount on the payment card then $X_{iU} = \infty$. If the individual chooses the smallest amount on the payment card then $X_{iL} = -\infty$.

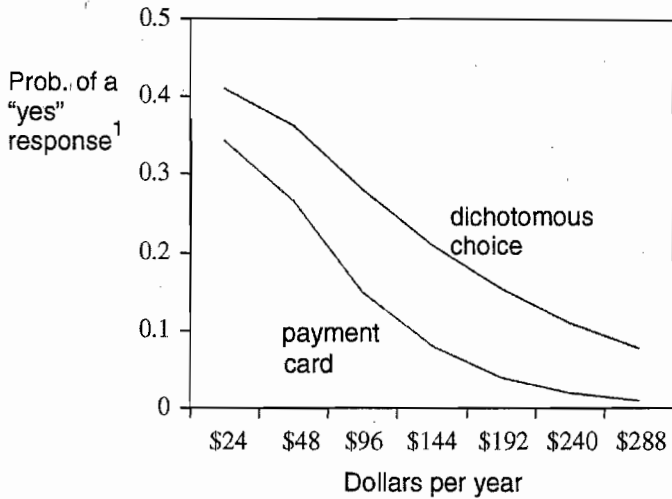


FIGURE 2

PROBABILITY OF A "YES" RESPONSE

¹PROBABILITY OF A "YES" RESPONSE IS ESTIMATED USING PARAMETER ESTIMATES FROM TABLE 4 (MODELS 1 AND 2).

comparisons between the treatments using logistic regressions. Models 1, 2, and 5 in Table 4 suggest the underlying distributions differ significantly between the payment card and dichotomous choice treatments. A likelihood ratio test confirms that the distributions are significantly different ($LR = 33; \chi^2_{\alpha = .05; 2} = 5.99$). The lack of a change in $-2 \log$ likelihood between Models 3 and 4 suggests the intercept coefficients are not significantly different between the dichotomous choice and payment card models. Comparing models 4 and 5 suggests that the hypothesis of common slopes between the two treatments is *not* supported. The lack of a change in $-2 \log$ likelihood between models 6 and 4 suggests that the dispersion parameters between the dichotomous choice and payment card models are *not* different. We also considered log logistic models and found similar results.⁶

Not surprisingly, as shown in Table 5, the estimates of mean willingness to pay for wind-generated electricity based on the logistic models were also significantly different for the two treatments with the mean

for the dichotomous choice treatment (\$81) more than double that of the payment card treatment (\$36). Likewise, the nonparametric estimate of mean willingness to pay based on the dichotomous choice data is more than twice the estimated mean willingness to pay based on the payment card data.

The multivariate models (Tables 6 and 7) also suggest that the distributions of willingness to pay were significantly different for the two treatments ($LR = 27; \chi^2_{\alpha = .05; 9} = 16.93$). The stark difference in the coefficients on the offer amount is noteworthy. Otherwise, with exception of three coefficient estimates, the other estimated coefficients have similar signs, magnitudes, and levels of significance for the dichotomous choice and payment card models. The three exceptions occurred for the variables Idea, Conserve, and Gender. While the signs of the coefficients matched for all three of these variables, significance levels did not. For Idea ("I like the idea of wind power"), the signs were positive, suggesting individuals who strongly agreed with this statement were more likely to actually purchase wind power. However the coefficient is not significant for the payment card model. For Conserve ("I would rather encourage conservation of electricity than

⁶ Consideration of the dispersion parameter and the log logit model were suggested by one of the reviewers.

TABLE 4
LOGIT MODELS

	Models					
	1	2	3	4	5	6
<i>Dichotomous Choice (N = 648)</i>						
Constant	-0.174		-0.174	-0.241	-0.142	-0.215
(Std. error)	(0.16)		(0.16)	(0.10)	(0.09)	(2.043)
Offer amount	-0.008		-0.008	-0.007	-0.010	-0.009
(Std. error)	(0.00)		(0.00)	(0.00)	(0.00)	(0.090)
Dispersion	1		1	1	1	1.232
(Std. error)						(11.71)
<i>Payment Card (N = 248)</i>						
Constant		-0.292	-0.292	-0.241	-0.142	-0.215
(Std. error)		(0.14)	(0.14)	(0.10)	(0.09)	(2.043)
Offer amount		-0.016	-0.016	-0.016	-0.010	-0.0114
(Std. error)		(0.00)	(0.00)	(0.00)	(0.00)	(0.108)
Dispersion		1	1	1	1	0.736
(Std. error)						(7.009)
-2 Log likelihood	659	617	1,276	1,276	1,309	1,276

Notes:

- Model 1 is separate model for the dichotomous choice sample.
- Model 2 is separate model for the payment card sample.
- Model 3 is pooled model with separate parameters for each sample.
- Model 4 is pooled model with common intercept, but separate slope parameter for each sample.
- Model 5 is pooled model with common intercept and slope parameters.
- Model 6 is Model 4 with added parameters for dispersion.

pay to develop renewable energy sources”), individuals who strongly agreed were less likely to actually purchase wind power and the estimated coefficient is significant in the payment card model but not the dichotomous choice model. The sign on Gender in both models suggested that females are more likely than males to purchase wind power. In both models we do not find the income variable to be significant, suggesting that support for wind power was independent of income. Overall, comparisons of the multivariate models suggest substantial

difference between the elicitation formats. Respondents seem to have based their responses on similar preferences as reflected in the various attitudinal variables. However, they reacted in a very different way to the offer amounts depending on whether they were asked a dichotomous choice or payment card question.

VI. CONCLUSION

This study offered a rare opportunity to observe elicitation effects in an actual

TABLE 5
ESTIMATED WILLINGNESS TO DONATE

	Dichotomous Choice (N = 649)	Payment Card (N = 249)
Hanemann's Estimate of the Mean (95% confidence interval)	\$81 (\$69, \$100)	\$36 (\$29, \$45)
Turnbull Lower Bound Estimate (95% confidence interval)	\$59 (\$47, \$70)	\$28 (\$12, \$72)

TABLE 6
DESCRIPTION OF VARIABLES

Variable	Definition	Mean (Std. Dev.)	
		Dichotomous Choice	Payment Card
Afford	1 = strongly agree with "I can't afford to pay the extra cost of wind power"; 0 = otherwise	.37 (.484)	.34 (.476)
Good idea	1 = strongly agree with "I think it is a good idea for MG&E to use wind power to meet the growing demand for electricity in the Madison area"; 0 = otherwise	.67 (.470)	.71 (.455)
Idea	1 = strongly agree with "I like the idea of wind power"; 0 = otherwise	.77 (.421)	.79 (.409)
More renew	1 = strongly agree with "I felt if I said I would buy the wind power, more renewable energy sources like wind, solar, and biomass are likely to be used in the future"; 0 = otherwise	.52 (.500)	.51 (.501)
Conserve	1 = strongly agree with "I would rather encourage conservation of electricity than pay to develop renewable energy sources"; 0 = otherwise	.27 (.447)	.33 (.472)
Sacrifice	1 = strongly agree with "I am willing to make personal sacrifices for the sake of the environment"; 0 = otherwise	.73 (.446)	.75 (.433)
Gender	1 = male; 0 = female	.65 (.477)	.64 (.482)
Income	Measured in dollars	56,196 (26,825)	57,097 (27,518)

TABLE 7
MULTIVARIATE MODELS

Independent Variables	Coefficient (Standard Error)		
	Dichotomous Choice (N = 518)	Payment Card (N = 190)	Pooled (N = 708)
Constant	-4.713 ^a (.824)	-2.882 ^a (1.050)	-4.073 ^a (.635)
Offer amount	-.015 ^a (.001)	-.024 ^a (.002)	-.017 ^a (.001)
Afford ^a	-2.400 ^a (.390)	-2.782 ^a (.589)	-2.531 ^a (.323)
Good idea ^a	1.201 ^a (.444)	1.123 ^a (.568)	1.110 ^a (.337)
Idea ^a	1.241 ^a (.605)	1.185 (.913)	1.322 ^a (.496)
More renew ^a	1.966 ^a (.334)	1.831 ^a (.418)	1.792 ^a (.247)
Conserve ^a	-.420 (.336)	-.926 ^a (.426)	-.469 (.252)
Sacrifice ^a	1.318 ^a (.446)	1.076 ^a (.534)	1.199 ^a (.337)
Gender	-.490 ^a (.248)	-.442 (.376)	-.477 ^a (.203)
Income	.000 (.000)	.000 (.000)	.000 (.000)
-2 log likelihood	837	381	1245

Notes: LR = 27; $\chi^2_{\alpha=.05,9} = 16.93$.

^asignificant at $\alpha = .05$ level.

payment situation for a public good. We were able to solicit willingness to pay for a public good using a mail survey in a way that was very similar in design to many contingent valuation studies. Our results are consistent with those of Brown et al. (1996) in that we found evidence of elicitation effects when individuals were making a real donation. In this study we found that the dichotomous choice data provided larger estimates of values compared to the payment card data. Brown et al. found a dichotomous choice format yielded larger value estimates than an open-ended format. These results lead us to suspect that elicitation effects associated with contingent values may not be a result of the hypothetical nature of the willingness-to-pay questions. The conclusion that elicitation effects are evidence against the validity of the contingent valuation method is not warranted. Actually, we should be encouraged when subjects are sensitive to elicitation format in contingent valuation studies, since subjects involved in actual valuation exercises are also sensitive to format.

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