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Consumer versus citizen preferences in contingent valuation: evidence on the role of question framing*

Ville Ovaskainen and Matleena Kniivilä[†]

Rather than individual consumer preferences, responses to referendum-style contingent valuation surveys on environmental goods may express citizen assessments that take into account benefits to others. We reconsider the consumer versus citizen hypothesis with a focus on the role of framing information. Survey data on conservation areas in Ilomantsi, Finland, are used. Different versions of the valuation question were used to encourage the respondents to take the consumer or the citizen role. The citizen version expectedly resulted in substantially fewer zero-WTP responses and protests and higher mean and median WTP, suggesting that the framing information has a major effect on the preferences expressed. The findings support the idea of multiple preferences. For a more confident interpretation of contingent valuation responses, future studies should recognise their intended use in survey design and gain information about respondents' motives to determine the presence and type of altruistic motives.

Key words: altruism, benefit–cost analysis, conservation areas, contingent valuation, multiple preference orderings, referendum, spike model.

1. Introduction

Contingent valuation (CV) originated as a means to estimate environmental benefits and/or costs for the benefit–cost analysis (BCA) of development projects and public goods. For CV surveys to provide information on individual willingness to pay (WTP), the responses are interpreted as expressions of consumer preferences. However, this interpretation has been questioned (e.g., Stevens *et al.* 1991, 1993; Kohn 1993), particularly with the now standard referendum format. The referendum model has more in common with voting (political choice) than with a consumer's market-place decisions (the pseudo-market setting). This may encourage respondents to express citizen values based on ethical and political judgements rather than pure consumer preferences over bundles of goods (Blamey *et al.* 1995).

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[†] Ville Ovaskainen (email: ville.ovaskainen@metla.fi) is a Senior Research Scientist at the Finnish Forest Research Institute (METLA), Unioninkatu 40 A, Helsinki and Matleena Kniivilä is a Research Scientist at the University of Joensuu, Faculty of Forestry, Joensuu, Finland.

If CV surveys are viewed as surrogates for voting, it is no longer obvious that the results can be incorporated in a BCA. It has been argued that altruistic values should be excluded from a BCA because including WTP because of altruistic reasons results in a double counting of benefits (Bergstrom 1982; Milgrom 1993; Diamond and Hausman 1994). If the respondents take into account the benefits to others, aggregate benefit measures may be double counting, undercounting, or meaningless (Blamey *et al.* 1995). For a proper interpretation, one should know whether the respondents are expressing consumer preferences or citizen assessments. If the responses are a mixture of personal and social values, aggregation may amount to adding 'apples and oranges' (Nyborg 2000).

Sagoff (1988) sees the individual consumer's self-interested choices as entirely separate from the choices people make as citizens for the 'good of the community'. The view that individuals may have multiple, possibly conflicting preference orderings associated with different roles and contexts has been advocated by several other authors (Arrow 1951; Harsanyi 1955; Sen 1977; Margolis 1982; Hausman and McPherson 1996; Nyborg 2000). There is also evidence of the possibility of affecting the respondents' motivations by the context and framing information given. Ajzen *et al.* (1996) found that under low personal relevance, WTP for a public good was significantly higher when an altruistic, as opposed to an individualistic, orientation was activated. Russell *et al.* (2001) suggest that altruistic, as opposed to private, preferences can be triggered by small framing changes. This raises a challenge to the design of CV surveys.

Curtis and McConnell (2002) have argued that the motives manifested in choices for public goods can be explained through the model of the citizen or through consumer preferences with altruism, and that the two models are essentially indistinguishable, especially empirically. Therefore, what matters is whether different motives imply differences in the WTP for public goods. Curtis and McConnell found in a CV study that there was no difference in WTP between those with citizen or altruistic preferences and those with presumably purely private consumer preferences.

The preceding comments paint two rather opposite views on the citizen versus consumer issue and its implications. While Blamey *et al.* (1995) question the use of CV results for the BCA of public goods, Curtis and McConnell (2002) suggest that since mean WTP does not differ, it is effectively irrelevant which preferences prevail. In their view the citizen versus consumer distinction hardly represents a real problem.

This paper reconsiders the consumer versus citizen hypothesis with a focus on the role of framing information. Two different valuation questions accordingly were used. The consumer version used a standard discrete-choice WTP question asking the respondents to consider the impacts of a nature conservation project on their own welfare only, while the citizen version encouraged them to take into account impacts on the whole society's welfare and used a voting question. We provide evidence on the following questions. First, does the framing information guide the respondents to choose a particular role so that this could be used to control the type of preferences expressed? The impact of framing is considered in terms of mean and median WTP, as well as zero-WTP and protest responses. Second, based on factors affecting project acceptance, does a given type of framing guide the respondent to take a purely private or purely social point of view? Third, we test for the impact of explicit information

on development benefits. In estimating the mean and median WTP, we use the spike model (Kjström 1997), which allows for the possibility of zero WTP. The public debate around our empirical case, conservation areas in eastern Finland, actually suggests that a part of the population obtains no personal benefits from preservation of these areas.

Our findings differ from the relatively unproblematic view suggested in Curtis and McConnell (2002) and support the suggestions by Ajzen *et al.* (1996), Nyborg (2000) and Russell *et al.* (2001). According to our results, the distinction between 'citizen' (e.g., altruistic) and 'consumer' preferences is essential, and the framing and context information has a predictable effect on which role the respondent takes. Respondents exposed to a citizen-oriented voting question expressed a substantially higher mean WTP, as well as fewer zero-WTP and protest responses, than those who were asked to consider a standard dichotomous WTP question from the purely personal point of view. Thus, while CV instruments that fail to specify the desired type of responses will result in ambiguous results with unknown applicability to BCA, a more confident interpretation is available through an appropriate framing and orientation of the CV question. Further, it seems important for CV studies to gain information on respondents' motives in order to determine the presence and type of altruism (McConnell 1997). The finding that respondents may consider economic impacts regardless of the information presented also lends support to the view that it could be appropriate to focus on citizen responses and the voting interpretation (Blamey *et al.* 1995).

The background and hypotheses are more fully discussed in Section 2. Section 3 describes our empirical application, data and modelling approach. The estimation results are presented in Section 4. Section 5 considers the use of the results in the BCA versus the majority-voting context, and Section 6 concludes the paper.

2. Background and hypotheses

2.1 Theoretical background

Nyborg (2000) stresses that even though the preferences manifested in social choices may look similar to consumer preferences with altruism, there is an important conceptual difference between social preferences and personal well-being functions, however altruistic. Thus, altruism (broadly, utility derived from other people's welfare) is just one possible source of public or citizen, as opposed to private or consumer, preferences. On the other hand, Curtis and McConnell (2002) argue that the 'citizen' and altruistic consumer models are essentially indistinguishable. Based on this argument, we consider 'citizen preferences' as synonymous to preferences with altruism.

Altruism has received special attention because of its potential implications for BCA. It has been argued that altruistic components of WTP should not be included in BCA (Bergstrom 1982; Milgrom 1993; Diamond and Hausman 1994). According to Blamey *et al.* (1995), the standard use of CV results assumes that respondents act as consumers and consider only the project's environmental impacts on themselves (category 1). If CV provides an estimate of total costs and benefits (category 2), BCA reduces to CV. If respondents consider benefits to others (category 3), aggregate measures may

be double counting, undercounting, or meaningless. If the respondents also consider economic impacts such as implications for jobs (category 4), a double counting of preservation costs takes place (Blamey 1996). Blamey *et al.* (1995) argue that category 3 or 4 responses are not valid for BCA unless consumer preferences can be extracted. If the CV survey is interpreted as a referendum surrogate, personal appraisals of the project's total net benefits are precisely what is required.

Other authors (Johansson 1992; McConnell 1997) have stressed that the implications of altruism depend on its specific type. Purely non-paternalistic altruism (getting utility from others' overall well-being) would not affect the BCA outcome, but this is not the case for more plausible types of altruism (McConnell 1997). Mixed altruism, with the altruist valuing others' consumer surplus from a natural resource, may influence BCA, and purely paternalistic altruism (caring about the quantity of natural resource services used by others) raises the benefits and enhances the prospects for project approval. In realistic cases, different types of altruism are likely to coexist.

2.2 Hypotheses

A question that merits further investigation because of its implications for CV surveys is whether, as suggested in Ajzen *et al.* (1996) and Russell *et al.* (2001), responses of a particular type can be activated by an appropriate framing and orientation of the CV question. To test for this, we compare WTP for a preservation program using three different questions. These seek to activate private (consumer) preferences, activate 'citizen' (altruistic) preferences, and provide additional information on development benefits, respectively. An individual's WTP for such a program can be defined for each case as follows.

In a discrete-choice CV survey the respondent is asked to accept or reject a public project with a given monetary cost (A) and a given impact on the environment. In line with our empirical application, consider a prospective deterioration in environmental quality so that WTP to prevent the change measures the equivalent variation (e.g., Johansson 1993). Then, WTP by individual i to prevent a decrease in the provision of environmental goods from z^0 to z^1 can be defined by

$$V_i(y_i - \text{WTP}_i, z^0) = V_i(y_i, z^1), \quad (1)$$

where $V_i(y_i, z)$ is the indirect utility function for individual i , y_i is income, z^0 is the initial level of environmental goods with the preservation program, and z^1 is the final level without the program (note that $z^0 > z^1$). This represents our first case with standard consumer preferences (category 1 in Blamey *et al.* 1995).

By the above reasoning, our second case with 'citizen preferences' (category 3 in Blamey *et al.*) can be simply represented by assuming altruism, such that individual i derives utility from benefits accruing to others. By letting individual i 's utility function include the utility of 'others', denoted by subscript j , a non-paternalistic or mixed altruist's (see McConnell 1997) WTP is given by

$$V_i(y_i - \text{WTP}_i, z^0, V_j(y_j, z^0)) = V_i(y_i, z^1, V_j(y_j, z^1)). \quad (2a)$$

Whenever citizen i considers z as a public good, WTP_i in case (2a) is likely to be higher than that for the consumer case (1). The same holds even more clearly for the case of a purely paternalistic altruist, described by

$$V_i(y_i - WTP_i, z_i^0, z_j^0) = V_i(y_i, z_i^1, z_j^1). \quad (2b)$$

For our third case (cf. category 4 in Blamey *et al.*), assume that individual i also takes into account the costs accruing to others in terms of increased taxes and forgone development benefits. Denoting the costs by c_j , (2a) may be extended to

$$V_i(y_i - WTP_i, z^0, V_j(y_j - c_j, z^0)) = V_i(y_i, z^1, V_j(y_j, z^1)). \quad (3)$$

For case (3), it is no longer clear if WTP_i is higher or lower than for case (1), because this depends on whether individual i expects benefits to others to be greater or smaller than the respective costs.

3. Empirical application and data

3.1 The scenario and valuation problem

Our empirical CV application deals with conservation areas located in Ilomantsi, the province of North Karelia, eastern Finland. These include two national parks, one strict nature reserve, and protection areas for mires and old-growth forest with a total of 20 000 hectares (7.2% of the land area in Ilomantsi) of strictly protected forest and peatland, 33 per cent of which is productive forest land. The case deals with a pure public good that has been an issue of public debate, which could make citizen values most likely to be expressed (Blamey *et al.* 1995).

Since existing conservation areas are considered, the suggested change would mean a loss to those who value preservation, so a willingness to accept compensation (WTA) question could be relevant. Because of the well-known problems with WTA questions, however, WTP questions were used following Arrow *et al.* (1993). The respondents were asked about their WTP to support the sustained preservation (i.e., avoid the loss) of the conservation areas as opposed to a development alternative, or about their willingness to vote for a program that implies a specified tax increase to guarantee this aim.

Conservation may not contribute to some people's welfare at all, and some may actually dislike preservation. Thus, some respondents may have zero or negative WTP. Alternative approaches for modelling heterogeneous preferences with zero and negative as well as positive WTP exist (Keith *et al.* 1996; Haab and McConnell 1997; Krström 1997; Hanemann and Kanninen 1998; Huhtala 2000; Clinch and Murphy 2001; MacMillan *et al.* 2001; Saz-Salazar and Garcia-Mendez 2001). However, a credible WTP question for respondents with negative preferences was difficult to formulate here. Thus, all respondents were presented with the same WTP question and a follow-up question was used to identify zero or negative WTP and protest responses. Those who refused to pay (voted against the program) at both the initial bid and the lower follow-up bid were asked about their main reason for refusal. The reported reasons

were used to classify the responses as positive, zero or negative WTP or protest. This allowed us to explicitly account for positive and zero WTP, but because the bid vector contained only positive values, the actual distribution of negative WTP is unknown. The few cases representing negative WTP were therefore coded as zero WTP, which seemed justified for our data.

3.2 Questionnaire and sample

The respondents were first given information on nature conservation in Finland and facts on the specific conservation areas. To avoid the part-whole bias the area in concern was compared to the total protected area in North Karelia and in Finland, and the respondents were reminded that only Ilomantsi's conservation areas were being considered. Maps were used to clarify the valuation object. The respondents were reminded about their budget constraint and the other projects they might support.

After a description of the conservation areas two alternatives for their future use were presented. The preservation alternative would maintain the present conservation network. This would ensure the survival of valuable habitats and threatened species in the area, but require higher taxation to cover the costs. The development alternative involved abolishing conservation and using the areas for timber production, or possibly for peat production or development for tourism. The tax increase would be avoided, but habitats and species could be lost. The questionnaire also included questions about the respondent's socioeconomic background, attitudes towards nature conservation and environmental issues, and motivations for valuing the conservation areas. The questionnaire was pre-tested four times using small samples.

3.3 The valuation questions

The basic difference between the consumer and citizen versions was in the framing and format of the valuation question. To exclude payment vehicle effects, a tax change was used as the payment mechanism even for the consumer version.¹ All versions used the same bid vector.

The consumer version asked the respondent to consider the impacts on her own welfare only, used the standard discrete-choice WTP question, and cited only the personal tax change as the cost. The introduction to the WTP question was: 'Consider the pros and cons of the alternatives solely from the point of view of your own welfare. Should it be necessary to collect additional funds for sustaining the conservation areas in Ilomantsi, would you be willing to pay a yearly extra tax for this purpose?' The actual WTP question was: 'Would you personally be willing to pay FIM X yearly as an extra tax to safeguard the sustained preservation of conservation areas in Ilomantsi also in the future?'

¹ Taxation is the conventional mechanism of raising funds for conservation in Finland. Taxation can also be expected to satisfy incentive compatibility, particularly the conditions that the payment is compelled and decoupled (see Green *et al.* 1998). In the Finnish context, taxation is likely understood to refer to income taxation, unless otherwise stated. Our target population was of tax-paying age. Reference to taxation also indicates implicitly that the payments are shared independently of any individual response.

Citizen version 1 encouraged the respondent to take a citizen view and consider the impacts on her own as well as the whole society's welfare, used the surrogate referendum (voting) question, and similarly cited only the personal tax change as the cost. The introduction read: 'Consider the pros and cons of the alternatives as a citizen from the point of view of your own welfare as well as the whole society. If such a referendum were arranged, would you support the sustained preservation of conservation areas in Ilomantsi, if that meant to you an extra yearly tax?' The actual question was: 'If the sustained preservation of existing conservation areas in Ilomantsi would cause you an extra yearly tax of FIM X, would you vote for preservation?' Citizen version 2 differed from version 1 only in providing additional information on the economic impacts of the development alternative. These included the estimated increases in the area for timber production, jobs and stumpage revenue in forestry, and a possible loss of jobs and income in nature-based tourism.

The bid vector used was FIM 50–100–250–400–600–900 (corresponding to EUR 8.4–16.8–42.0–67.3–100.9–151.4) per person per year, and each lower follow-up bid was half the initial bid. In addition to 'yes' and 'no', a 'Don't know' option was offered (see Arrow *et al.* 1993). In all, 25.1 per cent of the respondents of valuation questions chose that option and were not included in the analysis. Item non-response to the valuation question was 2.8 per cent. Further, 7.8 per cent of the responses to the valuation questions were classified as protests. The protest responses were excluded from the analysis.

3.4 The sample

We used a mail survey with a sample of 2400 people aged 18 to 75 years in the province of North Karelia. Each version was sent in October 2000 to 800 respondents drawn from the census of Finland by systematic random sampling. A reminder was sent to non-respondents in three weeks. This produced an overall response rate of 58.4 per cent. To examine the impact of non-response, a sample of non-respondents was interviewed by phone three months later. Since no difference was found between respondents' and non-respondents' attitudes towards nature conservation, there seems to be no sample selection bias. When compared with respect to age, income and opinions on the importance and desirability of conservation (based on questions asked prior to the WTP question, thus unaffected by differences in framing and information given), no significant differences were found between the consumer version and two citizen versions combined.

4. Results

4.1 Initial descriptive results

The proportions of 'yes', 'no' and 'Don't know/Wouldn't vote' responses differed significantly between the consumer versus citizen versions (Table 1). For the consumer version, more than 60 per cent of respondents refused to pay the initial bid and only 20 per cent accepted it. This differs significantly ($P = 0.000$) from the citizen versions, which both had 34–37 per cent of 'yes' and 'no' responses. Another difference appeared

Table 1 Proportions of 'yes', 'no' and 'Don't know/Wouldn't vote' responses to the initial bid by version, per cent (protest responses not excluded)

	Consumer (<i>n</i> = 459)	Citizen 1 (<i>n</i> = 448)	Citizen 2 (<i>n</i> = 450)
Yes	20	36	36
No	61	37	34
Don't know/Wouldn't vote	19	27	30

in the proportion of 'Don't know/Wouldn't vote' answers. For the citizen versions, almost every third respondent chose this option. While the respondents could easily choose the best option for their own welfare, voting on behalf of the whole community seemed more difficult. The difference between the versions shows in the survival functions (Figure 1).

The frequencies of different reasons for refusal to pay for those who responded 'no' at both bids are shown in Table 2. In total more than 50 per cent of the reported reasons fell into categories suggesting that the respondent could not afford to pay, did not receive any benefits from the areas, or had already paid enough (options 2, 3 or 6). All these responses were interpreted to indicate indifference, or zero WTP. Few respondents agreed with the propositions that conservation areas contribute negatively to welfare so that conservation should be abolished (option 4) or compensation should rather be made (option 5). Options 4 and 5 actually indicate negative WTP, but the observations were few (6.2, 3.6 and 4.4% by version) and had little effect on mean and median WTP. Therefore, they were coded as zero WTP for the analysis. Options 7–10 (15.7–24% of all reported reasons for refusal) were interpreted as protest responses. The protests accounted for 4.2 and 4.7 per cent of all WTP responses for the citizen versions, but as much as 14.4 per cent for the consumer version. Respondents reporting option 11 were classified one by one into positive, zero, or protest responses.

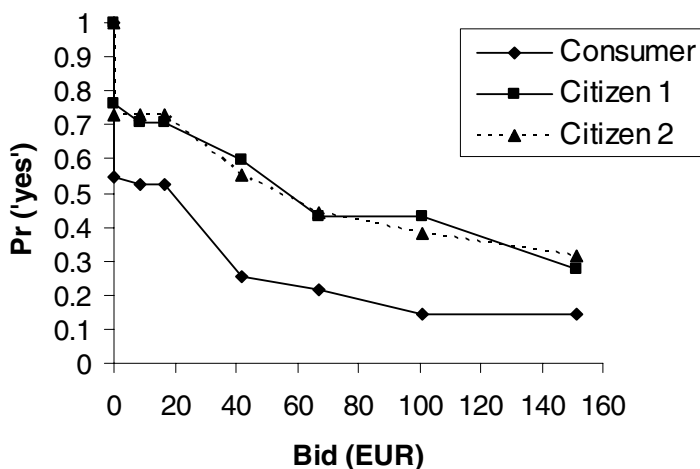
**Figure 1** Empirical survival distributions, with smoothing procedure due to Ayer *et al.* (1955).

Table 2 Frequencies of reasons for refusal to pay, per cent of all reported reasons for refusal

	Consumer	Citizen 1	Citizen 2
1. The bids are too high	7.5	11.2	6.4
2. I cannot afford to pay anything	21.8	24.6	19.7
3. I receive no benefit from the existence of the conservation areas in question	13.2	12.7	14.8
4. Conservation areas in Ilomantsi cause only disadvantage, and conservation should be abolished	3.0	3.0	2.8
5. Conservation areas in Ilomantsi cause losses, and compensation should be paid because of their existence	3.4	6.7	5.6
6. I support the existence of conservation areas in Ilomantsi, but I have/people in North Karelia/Ilomantsi have already paid enough for them	14.3	17.1	21.8
7. If conservation in Ilomantsi were abolished, I would be entitled to compensation	0.4		
8. I would be willing to pay, but not through taxation	3.0	1.5	3.5
9. The benefits of nature conservation cannot be measured in monetary terms	10.5	7.5	10.6
10. The question is not credible	10.1	6.7	5.6
11. Some other reason	12.8	9.0	9.2

4.2 The spike model

Given a substantial number of respondents with zero WTP, we use the 'simple' spike model (Kjiström 1997) to estimate the mean and median WTP. Denoting the probability that an individual's WTP for the preservation project does not exceed a given bid A by $F_{\text{wtp}}(A)$ and assuming that WTP is distributed as the logistic, the model can be written as

$$\begin{aligned}
 F_{\text{wtp}}(A) &= [1 + \exp(\alpha - \beta A)]^{-1} & \text{if } A > 0 \\
 F_{\text{wtp}}(A) &= [1 + \exp(\alpha)]^{-1} & \text{if } A = 0 \\
 F_{\text{wtp}}(A) &= 0 & \text{if } A < 0,
 \end{aligned} \tag{4}$$

where α and β ($\alpha, \beta > 0$) represent the marginal utility of environmental goods and the marginal utility of income, respectively.

The spike model requires information for two choices: first, whether the respondent is willing to pay at all; and second, whether she accepts a given bid. To generate an indicator of whether the respondent's WTP is positive or zero, we used the responses to both bids and the reasons for refusal to pay anything. The values for the indicator S_i were defined as follows:

$$S_i = 1 \text{ if WTP} > 0; S_i = 0 \text{ if WTP} = 0. \tag{5}$$

WTP was classified as positive if the response was 'yes/would vote for the project' for the initial or follow-up bid, or 'no/would vote against' for both proposed bids but

Table 3 Proportions of respondents with WTP=0 and WTP > 0, per cent (protest responses excluded)

	Consumer (<i>n</i> = 306)	Citizen 1 (<i>n</i> = 309)	Citizen 2 (<i>n</i> = 296)
WTP = 0	45.1	23.9	28.4
WTP > 0	54.9	76.1	71.6

WTP, willingness to pay.

the respondent would accept a lower bid (option 1 in Table 2). WTP was classified as zero (including cases with WTP < 0) if the response to both bids was 'no/would vote against' based on one of options 2–6 in Table 2.

The second choice is whether the respondent is willing to pay the price A , or vote for the program at the price. The indicator for this is denoted by T_i with values defined by

$$T_i = 1 \text{ if } WTP \geq A \quad (0 \text{ otherwise}). \quad (6)$$

In our application $T_i = 1$ if the respondent accepted the initial bid.² The log-likelihood for the sample is as follows (Krisström 1997):

$$\ln L = \sum_{i=1}^N S_i T_i \ln[1 - F_{\text{wtp}}(A)] + S_i(1 - T_i) \ln[F_{\text{wtp}}(A) - F_{\text{wtp}}(0)] + (1 - S_i) \ln[F_{\text{wtp}}(0)]. \quad (7)$$

The proportions of respondents with zero and positive WTP are presented in Table 3 (also, Figure 1). The observed proportion of zero WTP, or Prob('no') at zero, varied considerably. For the consumer version, the proportion of zero-WTP was 45 per cent, suggesting that many respondents feel that the conservation areas do not contribute to their personal welfare. For both citizen versions, this proportion was much lower, 24–28 per cent. The consumer version differed very significantly ($P = 0.000$) from the citizen versions, which did not differ from each other ($P = 0.215$).

4.3 Estimation and results

The parameter estimates for the spike model, based on parametric estimation with user-defined optimisation in Limdep (Greene 1998), are presented in Table 4. The 'spike' is defined as Prob(WTP = 0), that is, $F_{\text{wtp}}(0) = [1 + \exp(\alpha)]^{-1}$. The estimated values of the spike (Table 4) are very close to the observed proportions of

² While the WTP question in the survey was formulated in the double-bounded manner, the estimation in this paper is single-bounded and uses only the initial bid for T_i . The follow-up bid is used, along with the reasons for refusal to pay, to determine whether WTP is positive or zero. Thus, it replaces a direct screening question that was not included in this survey.

Table 4 Estimated parameters and spike values for the spike models (*t*-ratios in parentheses)

	Consumer (<i>n</i> = 306)	Citizen 1 (<i>n</i> = 309)	Citizen 2 (<i>n</i> = 296)
α	0.1501 (1.29)	1.0576 (7.90)	0.8771 (6.77)
β	3.1090 (10.90)	2.6127 (10.25)	2.0338 (8.19)
Prob(WTP = 0)	0.463	0.258	0.294

WTP, willingness to pay.

zero-WTP responses (Table 3). Notably, the probability of zero WTP is substantially higher for the consumer version. Even for this, the spike is below the 0.5 level. The citizen version suggests a much higher marginal utility of environmental goods.

Mean WTP for the spike model is obtained from the formula $\ln[1 + \exp(\alpha)]/\beta$ (Kriström 1997; Hanemann and Kanninen 1998). Median WTP equals α/β if $[1 + \exp(\alpha)]^{-1} = \text{Prob}(\text{WTP} = 0) < 0.5$ and zero otherwise. The estimated mean and median WTP by version are presented in Table 5.

Mean WTP is in the range of EUR 42–101, with a highly significant difference between the consumer version and the citizen versions ($t = 5.40$, significant at the 0.1% risk level). In line with the lower proportion of zero WTP (Table 4), respondents who were encouraged to take a citizen role had a substantially higher mean WTP for preservation. This is consistent with the idea that respondents exposed to the ‘citizen’ orientation are more likely to consider benefits to others. With no evidence that their personal benefits are higher, and with no initial differences in attitudes or demographics between the subsamples, the findings support the hypothesis that the framing and context information, *ceteris paribus*, has an influence on the type of preferences expressed and is reflected in WTP, as suggested in Equations (1) versus (2a) and (2b).

The median is lower than the mean, especially for the consumer version. Median WTP estimates still remain positive for all versions, and support the conclusion on the role of framing. The mean WTP for citizen version 2 appears higher than the mean for citizen version 1, but the difference is not significant ($t = 1.06$). The result suggests that the additional information on economic impacts had no effect, or that various impacts cancel out.

Table 5 Mean and median WTP for the spike models, EUR/person per year[†]

	Consumer	Citizen 1	Citizen 2
Mean WTP	41.71	87.27	101.30
Standard error of mean‡	4.19	7.32	11.07
Median WTP	8.12	68.08	72.53

[†]Original values in FIM were transformed into EUR by dividing with 5.94573; [‡]Computed by the Gauss approximation in Limdep (Greene 1998). WTP, willingness to pay.

4.4 Factors affecting WTP

Factors affecting the probability of supporting preservation were compared across versions. Following Blamey *et al.* (1995), we used 'consumer variables' (income, prices), 'citizen variables' (attitudes towards environmental vs. economic issues, attitudes towards conservation) and 'mixed' variables (age). The consumer variables should be important in both models, as the standard assumptions of CV suggest that CV responses can be interpreted to express consumer preferences. If respondents making choices on environmental public goods always act to some extent as citizens (Sagoff 1988; Blamey *et al.* 1995), citizen variables should also be significant in the consumer model.

All responses were first treated as a single dataset with dummy variables for the citizen versions, CITIZEN1 and CITIZEN2 testing for the effect of information. Separate models for the consumer version and the citizen versions combined were then estimated. BID is tax change, and INCOME is the household's annual gross income per family member. POLICY2 received value 1 if the respondent wished public decision-making to focus more on the environment, while POLICY3 had value 1 if she was happy with the current situation. The reference case was 'decision-making should focus more on economic issues'. CONSATT had value 1 if the respondent considered nature conservation necessary. Protest and 'Don't know' answers were excluded, and the standard logit model was used for simplicity.

The odds for accepting the bid among respondents to the citizen versions were more than three times that of the consumer version (Table 6). The two citizen versions did not differ significantly, meaning that explicit information about the development alternative had no effect. People may take economic impacts into account even spontaneously because the costs of preservation are discussed in public. Also, respondents often ignore the information given in the mailed survey and base their choices on their

Table 6 Logit models explaining willingness to accept the preservation program (whole sample, consumer version and citizen versions combined)

Variable	Whole sample [†]			Consumer model [‡]		Citizen model [§]	
	Coefficient	Probability	Odds ratio	Coefficient	Probability	Coefficient	Probability
CONSTANT	-1.54	0.000	0.215	-2.16	0.006	-0.003	0.996
BID ($-\beta_1$)	-0.0027	0.000	0.997	-0.0032	0.000	-0.0025	0.000
INCOME	0.00001	0.000	1.000	0.000018	0.000	0.0000068	0.004
CITIZEN1	1.19	0.000	3.286				
CITIZEN2	1.25	0.000	3.484				
POLICY2	1.31	0.000	3.699	1.37	0.002	1.29	0.000
POLICY3	0.86	0.000	2.368	1.01	0.019	0.75	0.005
CONSATT	1.22	0.000	3.371	1.32	0.001	1.15	0.000
AGE	-0.02	0.007	0.983	-0.02	0.168	-0.02	0.016

[†]Whole sample: 72.6 per cent predicted correct; Hosmer–Lemeshow test significance 0.203; log L -401.24; $n = 769$. [‡]Consumer model: 79.9 per cent predicted correct; Hosmer–Lemeshow significance 0.202; log L -113.83; $n = 254$. [§]Citizen model: 71.3 per cent predicted correct; Hosmer–Lemeshow significance 0.467; log L -283.73; $n = 515$.

prior knowledge. In our questionnaire, this information was one of many items in the description of the alternatives. Further, economic impacts may have been considered negligible because the impacts on timber production and nature-based tourism work in the opposite direction.

For the separate models, consumer variables BID and INCOME entered the consumer model in line with standard expectations. On the other hand, both variables were statistically significant in the citizen model as well. The odds ratios for income are close to 1, indicating that the actual effect of income was relatively small.³ Positive attitudes towards environmental issues and conservation also had significant effects on both models.

According to the first model, the respondents can be guided to consider preservation from a given viewpoint. However, the separate models suggest that even if the viewpoint taken can be affected, the responses tend to be a mixture of different considerations. Although the respondents were asked to consider only their personal benefits, environmental attitudes were still significant; and the bid and income were still significant when the citizen view was emphasised.

5. Interpreting the results: benefit–cost analysis versus majority voting

Our empirical findings strongly suggested that the WTP measures based on the citizen orientation have an altruistic component. Different types of altruism are likely to be involved. However, the framing information in this study did not discriminate between types of altruism. Concerns about double counting would be justified if the responses were used for aggregation, since plausible types of altruism enhance the possibility of project approval (McConnell 1997). For BCA, individuals' valuations of their personal benefits would be desirable. If the survey is interpreted as a surrogate referendum, assessments of benefits and costs to the whole society are sought. Thus, our consumer version seems more appropriate for BCA, while the citizen version is most naturally interpreted in the majority-voting context.

A related issue is that for BCA, mean WTP is appropriate since the mean is consistent with the Kaldor–Hicks compensation principle underlying BCA (e.g., Blamey *et al.* 1995; Hanemann and Kanninen 1998). For the majority-voting interpretation, the natural choice is median WTP, which indicates the cost level at which 50 per cent of respondents believe the net benefits are non-negative and would vote for the program.

Accordingly, the appropriate measure for BCA would be the mean WTP based on the consumer version. The aggregated benefits of conservation in Ilomantsi clearly exceed the opportunity costs (Kniivilä *et al.* 2002). For majority-voting, the appropriate median WTP from the citizen version was EUR 68.1–72.5/person per year (Table 5). The decision rule, however, depends on how the respondents perceived the benefits and costs (Blamey *et al.* 1995). This is not unambiguous since the additional information, intended to encourage personal BCAs, did not have the expected effect. Assuming the respondents recognised the benefits to others but not the costs, median WTP should

³ As one reviewer remarked, income would not be among the covariates if the theoretical logit model is strictly followed. Since the utility function underlying the model $\Pr(\text{yes}) = [1 + \exp(\alpha - \beta A)]^{-1}$ is linear in income, income is differenced out.

exceed the estimated opportunity cost (EUR 10.05/person per year), as is clearly the case. If the respondents readily considered all costs as well, it would suffice that the median be positive. To sum up, the proposed application of the consumer mean WTP in BCA and the citizen median in the voting context led to the same policy conclusion.

6. Conclusion

To test for the observability of the consumer–citizen division and the role of survey design therein, we considered a conservation issue in Finland using a referendum-style survey with two different types of CV questions. One encouraged the respondents to consider only the impacts on their own welfare using a standard dichotomous WTP question, while the other used a voting question and asked them to take into account benefits (and costs) to others as well.

The results were consistent with the consumer–citizen distinction, and strongly supported the expectation that the framing and orientation of the CV question have a major effect. Our results confirm earlier findings by Ajzen *et al.* (1996) and Russell *et al.* (2001) concerning the effects of framing and motivational orientation on the WTP for public goods and, more generally, support the idea of multiple preference orderings (e.g., Sagoff 1988; Nyborg 2000). For the latter issue, more detailed information about the respondents' actual motives would further strengthen the conclusion (e.g., McConnell 1997). The significantly higher mean WTP for those who were encouraged to take a citizen or altruistic consumer role is in contrast with Curtis and McConnell (2002), where no difference in WTP was found between these and the presumably self-interested respondents.

The implications for the design and use of CV surveys are as follows. First, for a more confident interpretation of CV responses the researcher should recognise whether expressions of individual consumer preferences or citizen assessments are desired. The orientation of CV questions should be consistent with their intended use and explicit in what impacts the respondents are supposed to consider. For BCA, mean WTP based on the consumer orientation is appropriate, while for the majority-voting interpretation the citizen-oriented median WTP is natural. Second, CV studies should gain direct information about respondents' motives and be explicit about how costs are shared. This would help determine whether altruistic motives are likely to be a problem for BCA (see McConnell 1997). Third, the responses seemed to be a mixture of consumer and citizen considerations even when the CV questions made a sharp distinction. Persuading respondents to take a private view on environmental issues can also be problematic (Nyborg 2000). The finding that explicit information on the development alternative had no effect may suggest that respondents consider economic impacts regardless of the information. If this is the case, focusing on citizen responses and the majority-voting interpretation could be appropriate.

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