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# The citizen versus consumer hypothesis: Evidence from a contingent valuation survey

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This paper examines the criticism of contingent valuation put forth by Blamey, Common and Quiggin (*Australian Journal of Agricultural and Resource Economics*, 1995, vol. 39, pp. 264–288). They argue that households have consistent preferences over private goods but not jointly consistent preferences over public and private goods and, hence, contingent valuation cannot uncover meaningful responses for the valuation of public goods. In this paper we argue that the motives that are manifested in choices for public goods can be explained in two ways. One is the model of the citizen, proposed by Blamey *et al.* (1995). The second is a model of neoclassical preferences with altruism. Given these alternative and competing explanations of choices for public goods, what matters is whether they imply differences in willingness to pay for public goods. We provide statistical evidence from a contingent valuation study of the control of deer in the USA that there is no difference in willingness to pay between those who profess 'citizen' or altruistic preferences and the rest of the presumably purely private respondents.

## 1. Introduction

Most researchers have concluded that contingent valuation (CV) methods or, more generally stated, preferences approaches, work satisfactorily when used to value private goods and public goods with discernable services. Whether these same methods work to value public goods that provide non-use values is more debatable. The literature has provided two broad arguments against CV. One argument, espoused for example by Diamond and Hausman (1994), holds that responses to CV questions and the implied willingness to pay are too noisy and contradictory to stem from well-defined preferences. A second argument, best developed by Tversky and Kahneman (1991), poses a psychological model of behaviour as an alternative to the neoclassical model, and interprets particular anomalies such as the embedding effect and the divergence between the willingness to pay and the willingness to accept, as evidence in support of the psychological model. In a recent paper, Blamey, Common and Quiggin (1995) provide a third and more complex criticism:

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that households have consistent preferences over private goods but not jointly consistent preferences over public and private goods and, hence, CV cannot uncover meaningful responses for valuation of public goods.

Blamey *et al.* (1995, p. 264) argue that when respondents answer CV questions they 'may be expressing social or political judgements rather than preferences over consumption bundles'. Their argument is supported by statistical evidence showing that responses to dichotomous choice CV questions are better explained by socioeconomic variables indicative of a citizen's political views, than by the standard economic variables that would explain consumer behaviour. The Blamey *et al.* (1995) critique is more damaging to CV because it implies that the preferences that allow trade-offs between public and private goods cannot be constructed, no matter how good the CV mechanism, and no matter how cleverly researchers avoid the pitfalls implied by psychological models. Furthermore, the Blamey *et al.* (1995) model provides an alternative explanation of the empirical regularities, something that cannot be said for the Diamond and Hausman (1994) critique nor the psychological model.

In this paper we argue that the motives that are manifested in choices for public goods can be explained in two ways. One model is based on the 'citizen', as proposed by Blamey *et al.* (1995). The second is a model of neoclassical preferences with altruism. Given these alternative and competing explanations of choices for public goods, what matters is whether they imply differences in willingness to pay for public goods. We provide statistical evidence from a CV study of the control of deer in the USA that there is no difference in the willingness to pay between individuals who profess 'citizen' or altruistic preferences to some of the aspects of deer control and the rest of the respondents. The latter respondents, those who do not reveal themselves as altruistic in the sense of the question asked may, nevertheless, be more narrowly altruistic and citizen-minded. In the end, what matters is whether the valuations differ because the motives differ because, ultimately, collective choice must cope with the cost of public goods. Whether the preferences are those of citizens or consumers, the willingness to pay for the public good does not differ in our example.

## 2. Background

Debate about the nature of preferences has been stimulated by the use of the dichotomous choice CV model that is put in the form of a referendum. Often the question is posed so that the respondent 'votes' yes or no, rather than chooses a commodity bundle with a price. The strategy of using mechanisms such as referenda and payment devices such as taxes may change both the setting and the incentives for responding in comparison to private good

settings (Rolfe and Bennett 1996). Blamey *et al.* (1995) argue that when contingent valuation addresses public rather than private goods, respondents will answer not in their best private interest but as citizens. A 'citizen' response considers the wider interest of the community. An example used to lend support to this hypothesis is evidence that willingness to pay (WTP) for wildlife preservation is generated in part by the ethical belief that wildlife has the right to exist independent of human preferences or activities (Stevens *et al.* 1991, 1993). Blamey *et al.* (1995) also argue that their empirical results show evidence of 'citizen' responses.

The issue is posed clearly by Blamey *et al.* (1995): contingent valuation provides information on how the political process would respond when the focus is on public goods, but not information that can be used in benefit–cost analysis. This is contrary to the valuation use of CV, which purports to provide responses that can be used to estimate mean WTP for benefit–cost analysis. Blamey *et al.* (1995) argue that responses are meaningful but should be interpreted within the referendum metaphor as expressions of voters' preferences for public goods. We argue that the responses are consistent with altruistic preferences, and that the WTP measures can be used in benefit–cost analysis.[1] This is similar to the argument of Rolfe and Bennett (1996). They use the example of the purchase of a birthday present as a choice that is not explained by a consumer model of pure self-interest, but then suggest that the child's utility in the parent's preference function can explain the choice (Rolfe and Bennett 1996, p. 130).

The model constructed by Nyborg (2000) puts the argument formally. Individuals respond with one set of preferences for public decisions and another set for private decisions.[2] Nyborg (2000) suggests that preferences on social choices may look similar to private preferences with altruism, but cautions that the two sets of preferences are conceptually different. By interpreting the 'citizen' response as altruism, one can see that the social welfare function of Nyborg (2000) can be made to behave precisely the same as an individual's personal preference function with altruism.

The Nyborg (2000) model may be considered a special case of a broader understanding of preferences. In general, individuals are likely to have different preferences for different motives — a consumer may not like rock

[1]As long as the altruism is not purely non-paternalistic altruism. Numerous authors (see, for example, Madariaga and McConnell 1987) have shown that with non-paternalistic altruism, the benefit–cost outcome will be independent of whether altruism is included in the benefits. Blamey *et al.* (1995) note this on page 270.

[2]Sagoff (1988) also sees a dichotomy; for example, individuals act as citizens when making 'hard' decisions concerning the environment and as consumers when concerned with 'personal or self-regarding wants and interests'.

music personally but may purchase the music as a gift for a son or daughter. In the public goods case, there are several reasons why it may not make a difference what kinds of preferences prevail. First, the individual may be acting out of altruism but assessing a completely private preference function, rather than a citizen's function. Survey evidence cannot tell us which kind of preference function prevails. Second, the WTP may not differ.

A growing volume of literature suggests that the demand for private goods is motivated not only by private interest, following classical economic theory, but also by altruistic motives. Most attention has focused on the provision of public goods, such as environmental preservation (Johansson 1987; Loomis 1988). Kalt and Zupan (1984) have suggested that altruistic motivation influencing choice can be economically rational and not a reflection of 'non-economic' behaviour. Holmes (1990) finds that both altruistic motivations, as well as a narrow self-interest, influence choices related to environmental health risk by individuals. On the magnitude of influence he finds that regard for others' safety has about the same impact as regard for one's own safety in voting concerning environmental regulations. Altruistic preferences partially derive from ethical beliefs. For example, an ethical belief that assistance should be given to the poor in society gives rise to satisfaction from having some form of social support for the indigent. Is the individual a 'consumer' or 'citizen' when he/she demonstrates a willingness to give part of his/her own income for such a social support system? For Sagoff (1988) this would be a 'hard' decision and therefore the individual acts as a citizen. But one's ethical beliefs often determine decisions that are clearly 'consumer' decisions: whether to eat meat, wear fur, or wear clothes made with child labour. These private decisions induce social consequences, and consumers often modify their consumption behaviour to reflect social values. Community-minded survey responses can simply be a reflection of altruistic motivations. For example, concern for safety in environmental regulations as discussed by Holmes (1990), some of which he attributes to altruism, would be considered 'citizen'-type voting under the Blamey *et al.* (1995) hypothesis.

In the empirical section of this paper we investigate whether respondents who apparently respond to a referendum-type CV question from the perspective of citizens, express a willingness to pay which is different from those who respond based on their private preferences. This empirical task does not test whether someone is a citizen or consumer but, rather, given that we have identified from other sources a designation for citizen or consumer, whether the individuals behave differently. The citizen hypothesis is not an empirically testable hypothesis but is a maintained hypothesis because the citizen hypothesis concerns the individuals' underlying motives and these motives are never conclusively revealed in actual behaviour or survey responses. Rather, we will show that respondents who could be interpreted as

having a citizen perspective do not have preferences (or willingness to pay for the public good), different from others answering the contingent valuation questionnaire. Being unable to distinguish between respondents with altruism and citizen-type respondents is an indication that community-minded respondents might be mistakenly interpreted as 'citizens' instead of individuals with certain kinds of altruistic motives and the fact that their willingness to pay does not differ makes the distinction insignificant, at least for this application. Consequently, it is reasonable to proceed with the measurement of WTP, even when the choices are not motivated by purely private benefits from the purchases.

The empirical analysis proceeds as follows. Data from a contingent valuation proposal eliciting potentially community-minded responses was chosen. This dataset also contained questions that helped to identify respondents with altruistic preferences. An indirect utility function, which incorporates a parameter for altruistic respondents, was estimated. The empirical test involved testing for statistical significance of the parameter associated with the altruistic individuals. Willingness to pay was also calculated for comparison across different types of individuals.

## 3. The survey data on willingness to pay for deer control

Our analysis was based on a telephone survey of Maryland households that principally reside in the suburbs of Washington D.C. and in the greater metropolitan area of Baltimore. The survey was designed to collect information on preferences for future deer management policies in Maryland. Large deer populations in the State afforded many benefits to residents of Maryland but also caused considerable damage to property.[3] Extensive populations of deer destroyed household shrubs and gardens, caused numerous traffic accidents and consumed large quantities of agricultural crops, especially corn. The control of deer could have been considered a public good because it extended benefits to many people at once. The benefits of deer control are Lyme disease control, protection of landscaping and reduction in automobile encounters with deer. Deer control also provided negative utility to some — those who liked to see or hunt deer and individuals especially concerned with animal rights. It was not a pure public good, because not everyone gained from having deer control. But deer control is very much like a public good in that the benefits are pervasive and exclusion from the benefits is not feasible. Because of the public and private services, deer management provided an ideal subject for the investigation of the

[3]In many ways the issues facing deer management in Maryland mirror those faced in the management of kangaroos in Australia.

'citizen versus consumer' issue. The deer management options had implications for the community that could be conceivably dwarfed by the implications for the individual.

The surveying was done by the Survey Research Centre at the University of Maryland, MD, USA. A random sample totalling 1531 households across Maryland residents was drawn. A response rate of 65 per cent was achieved. An additional 14 per cent of households had miscellaneous problems which prevented them from answering the survey, including surveyors being unable to contact the appropriate household respondent. There were 971 usable records leaving an effective response rate of 63 per cent. Further details of the survey are contained in Curtis (1998).

Interviewers for the survey first asked respondents whether they wanted continued deer population growth. Continued growth of the deer population would lead to increased levels of property damage and be a threat to public safety. Control of deer would reduce the threat of damage to almost all households in the study area. Hence, there were both public and private returns to the control of deer. Continued deer growth also has some positive effects. More deer would provide increased hunting and viewing opportunities for some. For the animal rights supporters, the control of deer would provide negative utility. An individual who considers the interests of the wider community may have been expected to vote in favour of population control. A total of 512 respondents voted in favour of population control and when they were subsequently asked a WTP question for a population control program it could have been assumed, if we agree with the citizen hypothesis, that they would respond as citizens. Our alternative hypothesis was that individuals who voted in favour of population control may not have been citizens, as defined by the Blamey *et al.* (1995) hypothesis, but individuals acting in their own self-interest. Under the latter hypothesis public-minded behaviour could be explained by altruistic motivations of these self-interested individuals.

The following question, asked to sort out respondents with zero WTP for deer control, began the contingent valuation component of the instrument:

> **Question A:** Ten years ago, there were about 150,000 deer in Maryland. Now, there are twice as many deer in Maryland – about 300,000. This growth means that deer are now easier to see in areas where people can enjoy them. But, it also means deer now cause more crop losses, damage to private landscaping, as well as damage to cars from collisions. And, it has led to the spread of Lyme disease among people. Would you like to see the deer population continue to increase?

Under the Blamey *et al.* (1995) hypothesis, respondents would have answered question A in their 'citizen role' considering the best interests of the

community; that is, this had public and private returns, and it would have invoked the respondent as citizen, and not just as a consumer. A citizen may have responded either yes or no to this because some of the public action (such as deer hunting or the viewing of deer) are positive, while others, and this seems to be the preponderance of services, are damages. For similar reasons a consumer with altruism may have responded either yes or no to question A depending on whether the consumer would have benefited from population control.

Following question A, the respondents were confronted with a CV proposal (question B in the appendix) and, subsequent to this, respondents were again asked if they wanted more deer (question C), but to consider only themselves in answering:

> **Question C**: If you consider only yourself, and not what has happened to your friends or others, would you prefer that there were more deer?

This question was designed to determine whether respondents expressed a different choice for direction of deer population change when asked not to consider the interests of others. A respondent may have answered yes or no to this question and still be a consumer, depending on how he/she viewed the services from deer. Several points concerning the design of question C are worth mentioning. The wording of the actual question in A and C differ; that is, 'would you like to see the deer population continue to increase?' versus 'would you prefer that there were more deer?'. The same exact question wording was not used for two reasons. First, we wished to avoid irritating respondents by appearing to ask a similar question again and consequently losing respondent interest in the remaining survey questions. Second, the design of question C was such that it forced them to consider their response rather than summarily give a previous answer. We achieved this by using slightly different but simple wording, which ultimately asks the same information, and reversing the wording relating to the direction of population change; that is, in the response to question A in which respondents said they did not want continued population growth, question C asks whether they wanted more deer.[4]

We used the responses to question C to identify those who would answer differently strictly in their private interest than as consumers with altruism [the latter of which are indistinguishable from the Blamey *et al.* (1995) citizen respondents]. In question A respondents presumably assessed their altruistic preferences as well as their preferences as consumers in choosing for deer

[4]The detailed debriefing of interviewers after the pilot survey gave no indication that respondents had difficulties interpreting question C and that respondents understood question C pertained to themselves only.

population change. In question C respondents were only to consider their immediate personal interests and ignore any altruistic preferences. We can identify respondents with altruism when the responses to questions A and C differ. But not all individuals with altruistic preferences will be identified. Only cases in which the altruism varies from A to C will be revealed. Other forms of altruism, such as altruism for one's family, may be constant across A and C.

Question C was asked after the contingent valuation proposal (question B in the appendix) so not to influence the respondent in answering the WTP question. Therefore, between questions A and C the respondent heard a considerable amount of information on deer populations and their management. It is feasible that this information could also have influenced the response to question C. All 512 observations to be used in the empirical analysis initially expressed a preference against continued deer population growth. Therefore, to test whether the same decision process was used to respond to question C as to the CV question, we estimated a bivariate probit model in which the first equation explains the response to the dichotomous choice WTP question and the second equation relates to question C. The model estimated is as follows:

$$\text{Prob(yes to CV question)} = x^1\beta^1 + \varepsilon^1$$
$$\text{Prob(yes to question C)} = x^1\beta^2 + \varepsilon^2$$

where $\varepsilon^1$ and $\varepsilon^2$ are normal with mean zero, constant variances and correlation coefficient $\rho$. An estimate of $\rho$ equal to zero would indicate no unexplained correlation between the two equations and, except for common covariates, the responses to the two questions would appear to be uncorrelated. Therefore, if estimated $\rho$ equals zero it seems reasonable to assume that when respondents were expressly asked to consider only their private best interest they responded accordingly.

The covariates in the bivariate probit model are the bid price, a dichotomous variable taking the value 1 when the respondent heard the sharp shooting proposal, and an 'order of information' variable. The sharp shooting proposal is one of two means proposed for controlling deer. The other control method is a more innocuous (but more hypothetical) deer birth control program. We expect the dichotomous variable to account for differences between the two control methods. The order in which deer services were described in the survey may have affected responses. To enable a test of whether this occurred, the order in which the information was provided was switched randomly between respondents. Some respondents heard about the benefits of more deer first followed by the lengthier list of damage caused by deer, others the reverse order. The 'order of information'

variable takes a value of 1 for those who heard about the benefits of more deer first.

The estimated bivariate probit model is contained in table 1. As the order of information variable is not significant, we infer that individuals do not appear sensitive to the order in which information was presented in the CV questions. The bid price is important in the CV question but has no explanatory power in question C, where we would expect the magnitude of the bid price to be irrelevant. The coefficient of most interest in this model is $\rho$ and the hypothesis that $\rho$ equals zero cannot be rejected ($\chi^2_1 = 0.078$). Reassured that respondents perceived the distinction between questions A and C and answered in accordance with their preferences, we can use the data from this survey to examine the consumer–citizen issue.

The responses to questions A and C are shown in table 2. Approximately 7 per cent of respondents appear to draw a distinction between what they would choose initially compared to what they would choose if considering only their private benefit excluding any altruistic benefits. The motives behind the initial response are not revealed and could be due to concern for the community or altruistic preferences. The issue tackled in the remainder of the paper is whether we can statistically distinguish preferences of respondents with altruism (36) from other respondents (476).

**Table 1** Bivariate probit model

| | | Estimate | Std. Err. | Est./s.e. |
|---|---|---|---|---|
| Equation: Prob(yes to CV question) | | | | |
| | Order of information | 0.13 | 0.12 | 1.09 |
| $\beta^1$ | Heard sharpshooting proposal | −0.24 | 0.12 | 1.92 |
| | Bid price | −5.60 | 1.79 | 3.13 |
| | Constant | 0.89 | 0.17 | 5.30 |
| Equation: Prob(yes to question C) | | | | |
| | Order of information | 0.12 | 0.17 | 0.74 |
| $\beta^2$ | Heard sharpshooting proposal | 0.02 | 0.18 | 0.14 |
| | Bid price | −1.02 | 2.55 | 0.40 |
| | Constant | −1.49 | 0.24 | 6.30 |
| $\rho$ | | −0.03 | 0.11 | 0.28 |

**Table 2** Response to questions A and C

| | | Chose more deer | Chose fewer deer |
|---|---|---|---|
| Question A | $N = 512$ | N/A | 512 |
| Question C | $N = 512$ | 36 | 476 |

## 4. The model

The model is a standard dichotomous choice CV model. The respondent is confronted with a proposal for deer population control at cost $A$. The respondent's utility function is $u(q, y; x)$ where $q$ is the deer population control program, $x$ is a vector of respondent characteristics and $y$ is income. Deer control is represented by $q = 1$ with a cost of $A$, and no deer control is specified by $q = 0$. A respondent that accepts the proposal receives utility $u(1, y - A; x)$. When the respondent declines, utility is $u(0, y; x)$. We specify a linear indirect utility function:

$$u(q, y; x) = \alpha_{0q} + \alpha_{1q}D + \alpha_{2q}x + \beta y + \varepsilon_q$$

where $\varepsilon_q$ is a random mean zero part of preferences, and the parameters change from the status quo scenario to the scenario with deer control (except for $\beta$, the marginal utility of income). Because only differences matter with a linear utility function, the income variable plays no part in the analysis:

$$\begin{aligned}\text{Prob(yes)} &= \text{Prob}(\alpha_{01} + \alpha_{11}D + \alpha_{21}x + \beta(y - A) + \varepsilon_1 \\ &\quad > z\alpha_{00} + \alpha_{10}D + \alpha_{20}\text{x} + \beta y + \varepsilon_0) \\ &\quad = \text{Prob}(\alpha_0 + \alpha_1 D + \alpha_2 x - \beta A + \varepsilon > 0).\end{aligned}$$

This expression gives the probability of answering yes to the contingent valuation question. The parameters are $\alpha_k = \alpha_{k1} - \alpha_{k0}$.

The variable $D$ represents a 1–0 dummy, identifying respondents who revealed altruistic preferences. The estimate of the constant term in the indirect utility function is $\alpha_0$ plus $\alpha_1$ depending on whether the respondent revealed altruistic preferences. The error term $\varepsilon = \varepsilon_1 - \varepsilon_0$ represents what appears to be the random component of utility as observed by the researcher, although not random to the individual. The $\alpha$ and $\beta$ are the parameters to be estimated.

The objective of the analysis is to determine if the respondents identified as having altruistic motives have preferences for deer management that are different than other respondents. To find a statistically insignificant coefficient on the altruistic consumer parameter $\alpha_1$ would suggest that consumers with revealed altruistic motives do not have preferences distinct from others in the sample. The null hypothesis is that these preferences are the same; that is, $\alpha_1 = 0$.

In a world where one admits altruism into preference functions, one may expect that self-interested consumers with altruistic preferences make choices that appear to be community-minded decisions. Our conjecture is that the revealed behaviour of consumers with altruism cannot be distinguished from the Blamey *et al.* (1995) citizen-minded behaviour. We can test whether the preferences for individuals who have expressed no altruism are different from

consumers who have professed altruism. This is tested in our model by testing the null hypothesis, $\alpha_1 = 0$. Being unable to reject the null hypothesis in this instance means two things for the citizen hypothesis. The first is that drawing on the citizen hypothesis to explain community-minded behaviour might not be correct. Self-interested consumers make community-minded choices and if the empirical test is unable to distinguish their preferences from others, such as the Blamey *et al.* (1995) citizen respondents, then the citizen hypothesis cannot solely be relied upon to explain community-minded behaviour. Second, the empirical result would suggest that model parameters and estimates of WTP of community-minded individuals are not different from completely self-interested respondents in this scenario of deer management. In such a case it does not matter which preferences prevail and contingent valuation is a suitable method for assessing preferences for public goods.

## 5. Empirical results

For estimation we assume that utility has an extreme value distribution so that the difference in utility is distributed as a logistic.[5] Table 3 contains the parameter estimates and estimates of mean willingness to pay for the deer management proposals are presented in table 4. We are interested in the estimate of $\alpha_1$ as well as the central tendency of WTP. Parameters for socio-economic variables and project characteristics are not estimated, as they are superfluous to the thesis of the paper and would clutter the tables of estimates.[6] The parameter estimate on the 'with altruism'[7] parameter ($\alpha_1$) is insignificantly different from zero and the $\chi^2$ statistic for the likelihood ratio test that respondents identified as having altruistic motives express choices for deer management that are different from other respondents is 0.0003. This test shows that respondents who revealed themselves as having altruistic motives do not have preferences for deer management that are different from other respondents. Hence, while Nyborg (2000) shows that WTP values can be different for these preferences, in our case there is no difference, and so the distinction is not important. One interpretation is that choices apparently made in the interests of the wider community may be due to self-interested individuals with certain kinds of altruistic motives. The citizen respondent

[5]We also estimated the same model with a normal distribution, with virtually identical results.

[6]Models with these variables included were also estimated, the results of which do not adversely impinge upon the conclusions of this paper.

[7]Alternatively, this may be interpreted as a parameter that distinguishes between preferences for social welfare and personal preferences.

**Table 3** Parameter estimates and willingness to pay

| | | | | |
|---|---|---|---|---|
| Log-likelihood | | −0.77448 | | |
| Constrained log-likelihood | | −0.77463 | | |
| No. observations | | 512 | | |
| Parameters | Estimates | Standard error | Est./s.e. | Pr \|Est.\| > 0 |
| $\beta$ | 0.02996 | 0.00344 | 8.71 | 0.00 |
| $\alpha_0$ | 2.94 | 0.31 | 9.53 | 0.00 |
| $\alpha_1$ | −0.16 | 0.39 | −0.41 | 0.68 |

**Table 4.** Mean willingness to pay

| | No. observations | Estimate | 90% Confidence interval |
|---|---|---|---|
| Individuals identified with altruistic motives | 36 | US $ 90.6 | 70.1–117.3 |
| Individuals not identified with altruistic motives | 476 | 98.3 | 92.6–105.0 |
| All respondents | 512 | 97.7 | 92.3–104.1 |

hypothesis, while not rejected by this test, is not the only explanation of community-minded choices in contingent valuation surveys.

Willingness to pay is calculated as $\alpha/\beta$ because the assumed distribution was not truncated during estimation.[8] Due to the insignificance of the 'with altruism' parameter, $\alpha_1$, we find that there is no statistical difference between the estimates of mean willingness to pay for deer management by identified altruistic respondents and others. One issue raised by the Blamey *et al.* (1995) hypothesis is whether it is appropriate to conduct benefit–cost analysis. We have made three estimates of mean WTP conditional on the type of respondent; that is, altruistic motives or not.[9] In the first row of table 4 we estimate mean willingness to pay US$90 by the 36 respondents who were identified as having altruistic motives, which will be compared to welfare estimates for the rest of the sample. Even with the small number of observations the confidence interval is quite narrow. For comparison we estimate mean WTP for 476 respondents not identified as having altruistic motives. The estimate of US$98 lies in the confidence interval of the estimate for the 36 respondents identified as having altruistic motives. In the third row of table 4 we present the estimate of mean WTP for all respondents in the

[8]The confidence intervals were calculated over 100,000 drawings from the parameter vector according to the variance–covariance matrix estimated. This method is similar to the simulation approach suggested by Krinsky and Robb (1986).

[9]The model was re-estimated without the altruistic parameter $\alpha_1$ for the three different samples and conditional WTP subsequently calculated.

sample and it too lies in the confidence interval for mean WTP of the respondents identified as having altruistic motives. We conclude that those responding without revealed altruistic motives would pay approximately the same as those who had revealed altruistic motives, who in turn, are indistinguishable from 'citizen-type' respondents. It is effectively irrelevant which preferences prevail as estimated mean WTP does not differ.

The failure to reject the hypothesis that $\alpha_1 = 0$ is something of a surprising result. One would think that respondents who are otherwise equal would behave differently if they were more altruistic. One possibility is that respondents are altruistic towards members of their family, and this motive is considered non-altruistic by some and altruistic by others. Regardless of the reason, it highlights the importance of the issue raised by Blamey *et al.* (1995). It would be fruitful to pursue this issue with a careful questionnaire design.[10]

## 6. Conclusion

Understanding the motives of CV survey respondents is central to the task of debating the legitimacy of CV. This should lead to a wider set of models for responding to dichotomous choice questions. Blamey *et al.* (1995) address the empirical problem by arguing that 'citizen-type' variables had greater explanatory power for dichotomous responses than 'consumer-type' variables. Our hypothesis is that evidence for the citizen hypothesis is observationally equivalent to responses from individuals with neoclassical preferences with altruism. We discover through the survey process some respondents that were acting with altruistic motives but could find no statistical difference between these and other respondents in the survey.

In addition to the empirical analysis, we argue that it is not simply a matter of deciding which hat, the citizen or consumer hat, a respondent wears when faced with a decision. Sagoff (1988) and Blamey *et al.* (1995) argue that an individual responds as a citizen in the best interests of the community when the decision relates to public goods. But in many situations there is not a clear dichotomy. The impetus for the eco-labelling movement comes from the potential for individuals to combine their preferences for private and public goods. The consumption of all market goods has implications for the community, be it through employment, government services, morals or some other avenue. Altruistic motives provide a rational explanation of why self-interested people make choices that appear to be more beneficial to the

[10]Our survey for Maryland deer management was completed after we became aware of the Blamey *et al.* (1995) paper.

community than to the individual. At least in the case we have studied, there is no difference in the WTP for respondents who could be reasonably classified as citizens and consumers.

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## Appendix

CV Questions — Question B comprised of either a sharpshooting or birth control proposal.

### (1) Sharpshooting proposal

A proposal being considered to control the deer population is to hire professional hunters as sharpshooters. These sharpshooters will be instructed

to reduce the deer population in specific areas where deer damage is highest. The sharpshooters will be safe to use in areas where people live nearby. The objective will be to reduce [your county's] deer population by 10 per cent in total for the next 5 years.

If this were to be used in [your county], it should reduce deer damage to cars, crops and landscaping. On the other hand, there will be fewer deer and the likelihood of seeing deer will decrease.

This proposal to reduce [your county's] deer population by 10 per cent using sharpshooters would cost your household [$15, $30, $50, $75 or $100] dollars in higher state income taxes for 1 year. Keeping in mind that you would have [$15, $30, $50, $75 or $100] dollars less to spend on other things, would you vote for it or vote against it?

**(2) Birth control proposal**

A proposal being considered to control the deer population is to use deer birth control. This method of control can be used in areas where people live nearby. Qualified personnel will be hired to administer the contraceptive by methods that will avoid pain to the deer. This birth control will be used to control the population in specific areas where damage is highest. The objective will be to reduce [your county's] deer population by 10 per cent in total for the next 5 years.

If this were to be used in [your county], it should reduce deer damage to cars, crops and landscaping. On the other hand, there will be fewer deer and the likelihood of seeing deer will decrease.

This proposal to reduce [your county's] deer population by 10 per cent using birth control would cost your household [$15, $30, $50, $75, $100 or $125] dollars in higher state income taxes for 1 year. Keeping in mind that you would have [$15, $30, $50, $75, $100 or $125] dollars less to spend on other things, would you vote for it or vote against it?