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Comparing Payment-Vehicle Effects in Contingent Valuation Studies for Recreational Use in Two Protected Spanish Forests

Pablo Campos
Institute of Economics and Geography
Spanish Council for Scientific Research
Alejandro Caparrós
Institute of Economics and Geography
Spanish Council for Scientific Research
José L. Oviedo
Institute of Economics and Geography
Spanish Council for Scientific Research

We compare two alternative payment-vehicles for contingent valuation studies to estimate economic recreational values. We analyze the potential effects of each wording to determine the most appropriate vehicle. Four contingent valuation surveys, carried out in two different protected Spanish forests, are compared. In each forest, one contingent valuation survey used entrance-fees and the other used an increase in trip-expenditures as payment-vehicles. As expected, results show statistically significant differences and great divergences between estimations, some three times higher in the second type. These differences remain, regardless of the format and the estimation technique used. The tests suggest that the second type approximates better welfare values for recreation.

KEYWORDS: *Contingent valuation, recreational use, payment-vehicle, trip-expenditures, entrance-fee.*

There are many studies (Roach, Boyle, & Welsh, 2002) comparing the impact of different question formats (open-ended, simple-dichotomous, double-dichotomous and so forth) in contingent valuation (CV) but only a few papers have compared different payment-vehicles (see below). However, one of the crucial elements for the validity of CV studies is the payment-vehicle since it provides the context for payment, implying that differences in cultural and institutional factors can affect results (Morrison, Blamey, & Bennett, 2000).

Address correspondence to: Alejandro Caparrós, PhD, Department of Economics, Institute of Economics and Geography (IEG)—Spanish Council for Scientific Research (CSIC), Pinar 25 - 28006 Madrid. Phone: 914111098. Fax: 915625567. Email: acaparros@ieg.csic.es.

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The good valued in this study is a one-day recreational visit to two Mediterranean forests. This value is estimated using two different payment-vehicles: (a) an entrance-fee to access the area for one day (*entrance-fee CV survey*), and (b) an increase in trip-expenditures, specified as an increase in gasoline prices (*trip-expenditures CV survey*).

Establishing entrance-fees to protected forests is not a common practice in Spain and people do perceive free access as a right, although this is not always legally so (private owners have the right to exclude free access although they do not generally use this right). Despite this institutional setting, virtually all CV studies that have sought recreational use values of Spanish forests have used entrance-fees as the payment-vehicle. Therefore, this paper analyzes the use of increases in trip-expenditures as an alternative payment-vehicle to avoid the possible culturally induced context effects associated with entrance-fees.

If it is assumed that an individual ought to be indifferent to the payment-mechanism, a question positing an entrance-fee or its alternative, based on a hypothetical increase in trip-expenditures, should bring forth similar results. However, there are reasons that can explain divergence between these payment-vehicles, as will be discussed below.

To analyze these issues, this paper compares four CV surveys conducted for two different protected forests in Spain: the Scotch Pine Forests of *Sierra de Guadarrama* (Madrid) and the Cork Oak Forests of *Alcornocales* Natural Park (Cádiz-Málaga). For each forest, one survey framed the valuation question in terms of an entrance-fee whilst the other survey posed the valuation question in terms of an increase in trip-expenditures. As expected, the results show relevant differences between the estimations obtained with the two payment-vehicles and the different tests made suggest that the trip-expenditures CV survey approximates better welfare values for recreation.

The rest of the article is structured as follows. The next section reviews related literature. The Methodology section describes the survey and estimation methods used, payment-vehicle effects and the tests used to estimate their significance. The subsequent section sets forth the results and the conclusions are given in the final section.

Literature Review

Although CV has often been used to value the recreational benefits of natural areas in monetary units, the payment-vehicles used for this purpose have received little attention, being chiefly entrance-fees (Bateman, Brainard, & Lovett, 1995a; Richer & Christensen, 1999) and increased trip-expenditures (Bishop & Heberlein, 1979; Boyle, Welsh, & Bishop 1993; Cooper & Loomis, 1992; Teisl, Boyle, McCollum, & Reiling, 1995). In Spain, researchers have used the entrance-fee option almost exclusively (e.g., Campos, de Andrés, Urzainqui, & Riera, 1996; González, González, Polomé, & Prada, 2001).

Table 1 shows the different CV studies that have compared payment-vehicles. As can be seen, payment vehicles for recreation have not yet been

TABLE 1
Literature Review of Studies Related with Payment-Vehicle Comparisons

Authors	Application	Payment-vehicles	Results
Greenley, Walsh, and Young (1981)	Water quality	Water-sewer fees and sales taxes	Water fees report only one-fourth of the WTP of sales taxes
Jakobsson and Dragun (2001)	Conservation of endangered species	Tax mechanism and donations	Donations totaled 35% of the value obtained with the tax
Bergstrom, Boyle, and Yabe (2004)	Ground Water quality protection	New tax and reallocation of existing taxes	WTP 18 times higher with the tax reallocation than with the new tax
Kontoleon, Yabe, and Darby (2005)	Non-genetically modified food	New tax and reallocation of existing taxes	No statistically differences in mean WTP
Champ, Flores, Brown, and Chivers (2002)	Open space land purchase	Individual contribution, provision point and a tax	Potential differences between payment-vehicles that may occur due to incentive structures
Morrison et al. (2000)	Damage prevention for wetlands	Levies on income tax, land and water rates, and levies on abattoirs	No difference in mean bids and protest rates between rates and taxes
Brookshire, Randall, and Stoll (1980)	Wildlife related amenities	Utility bill and hunting license fee	12% protest-response with utility bill and no protest-response with the fee
Bateman, Langford, Turner, Willis and Garrod (1995b)	Flood defense work	Donation to an unspecified fund, contribution to a specified fund and a tax	46% protest-response with the first, 23% with the second and 12% with the third

compared. Other studies have analyzed the different effects caused by payment-vehicles. Blamey (1995) suggests that unfamiliarity with institutional procedures taken from CV studies applied in USA can lead to plausibility problems if used in Australia. Likewise, Morrison et al. (2000) conclude that, in countries other than the USA, the use of tax levies and referenda as payment-vehicles in CV studies reduces their plausibility. Kontoleon, Yabe & Darby (2005) argue that the differences with Bergstrom, Boyle and Yabe's (2004) results (Table 1) are related to different institutional and cultural factors between the UK and the USA.

Jorgensen, Syme, Bishop, and Nancarrow (1999) and Strazzera, Genius, Scarpa, and Hutchinson (2003) discuss the problems associated with the presence of protest-response, concluding that respondents who have stated a positive WTP may hold beliefs that can be considered as some kind of protest (implying a deviation from their maximum WTP).

Chase, Lee, Schulze, and Anderson (1998) and Richer and Christensen (1999) have analyzed the differences between the maximum WTP and the price considered by respondents as fair or appropriate, when using entrance-fees for recreation. Bateman et al. (1995a) conducted a meta-analysis of extant studies in the UK on the valuation of the recreational use of forests and found that the intercept was the most powerful explanatory variable. The authors' explanation of this fact is that individuals may have stated what they thought was a fair value, and not their maximum WTP. The authors added that the use of entrance-fees as payment-vehicles may provide respondents with a pointer about what a fair value is (for example, the price of nearby parking facilities). Similarly, Hanley and Ruffell (1993, p. 226) found that the price paid for parking at over 60 recreational areas studied was a good predictor of stated WTP. As suggested by Santos (1997, p. 294), this may be caused by the use of the parking price paid as a pointer when stating their WTP.

Methodology

Contingent Valuation Surveys Performed and Data Treatment

The Scotch Pine Forests of *Sierra de Guadarrama* (PSG) cover about 100,000 hectares (ha) and are in a high mountain area with a Mediterranean-Continental climate. Visiting rates are high, at 15 visits per ha per annum, due to the forests' proximity to Madrid (60 to 100 km). This area is currently protected as a ZEPA (*Zona de Especial Protección para las Aves*; a protection category for birds, since the area has one of the largest black vulture colonies in the world) and partially as a Natural Park.[1] The Cork Oak Forests of *Alcornocales* Natural Park (ANP) are in a typical Mediterranean area in the south of Spain. ANP covers about 170,000 ha, it is in the humid part of the Andalusia region and its mountains are not very high. Although it has significant environmental assets, visiting rates are relatively low, about 0.5 visits per ha per annum.

As stated in the introduction, the good valued in this study is a one-day recreational visit. The wording used in the case of each forest and for each payment-vehicle can be found in Appendix 1.[2] The Spanish word for entrance-fee (*entrada*) originally referred to a ticket to a show and people undoubtedly understand that it refers to a one-day visit (and not to a pay-

[1] Similar to the International Union for the Conservation of Nature and Natural Resources (IUCN) V protection category of protected natural areas (International Union for the Conservation of Nature and Natural Resources [IUCN], 1994).

[2] The full questionnaire is available from researchers upon request.

ment to grant access for a full year, for example, which would be called *abono*). Furthermore, respondents were being asked for the WTP for that day's visit.[3]

The entrance-fee CV survey at PSG (not in the case of ANP) started with an introductory paragraph which explained that the funds obtained would be used (together with current public funds) to ensure the area's conservation. This probably means that some of the respondents included in their response a value for conservation and not only the intended recreational value. Nevertheless, this strategy has been used in previous studies in Spain to reduce the rejection of the entrance-fee and the study's focus group also showed that this can reduce rejection of this payment-vehicle (if differences are found with this formulation, they should appear even clearer without this introduction).

Respondents' awareness of their expenditures during the day was guaranteed by asking them, in a question immediately prior to the valuation one, to specify their per person expenditures during the day (Table 8 footnote 'c'). In the PSG survey, respondents were asked to give separate values for *transport, food,* and *others* and were then asked to add them up. In the case of ANP they were merely asked to give an overall value, although they were explicitly requested to take into account the three kinds of expenditure described above. Interviewers were requested to remind respondents that per person values should be given.

At PSG, a double-dichotomous question was posed, without giving a prior indication of the second question, followed by an open-ended question. At ANP, a simple-dichotomous question was used followed by an open-ended question. For PSG, the vector of values was designed to be offered independently for each survey type,[4] whilst for ANP the same vector of values for both main surveys[5] (both based on two pre-test surveys) was used.

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[3]This is probably clearer in both trip-expenditures CV surveys and in the ANP entrance-fee CV survey, since the PSG entrance-fee CV survey did not refer to 'your visit today' but to 'your visit' (see Appendix 1).

[4]We used the operational design proposed by Alberini (1995) to situate the values offered in dichotomous questions in the four quintiles of estimated a priori log-normal distribution (with the open-ended pre-test survey data) and the values of the second question at the median of truncated log-normal distribution. Use of this method for the entrance-fee survey produced a group of very low vectors (the median was 400 pesetas (€2.40) and percentiles 25 and 75, respectively, were 200 and 500 pesetas (€1.20 and €3.00)). As it is one of the requirements for double-dichotomous surveys to be meaningful that values differ sufficiently for the respondent to appreciate a real difference, we chose to increase the values to be offered (following the criterion suggested by Duffield and Patterson (1991) of separating values so that the logarithmic differences are approximately equal). This probably entailed increasing the estimates obtained with the entrance-fee survey due to the *yea-saying* effect (acceptance of any value, and even all the more ready acceptance of greater values). As the bias tends towards increasing estimates produced by the entrance-fee survey, accepting the hypotheses described with this criterion assures that they would also have been accepted if lower values had been posited.

[5]We followed the criterion suggested by Duffield and Patterson (1991) of separating values so that logarithmic differences are approximately equal and tried to obtain a vector of values to be offered that would cover the responses obtained from the trip-expenditures and from the entrance-fee question in the pre-test surveys.

In the case of PSG, the trip-expenditures CV surveys were conducted from October 1998 to September 1999, whilst the entrance-fee CV surveys were conducted from September to November 1999.[6] At ANP, surveys were performed simultaneously from June 2002 to May 2003 and the survey-type to be applied to each respondent was decided randomly. All questions were put to visitors by an interviewer. At PSG, different numbers of trip-expenditures and entrance-fee CV surveys were conducted. Nevertheless, relative errors obtained were 8% for the trip-expenditures survey and 10% for the entrance-fee survey. This similarity in the surveys' precision allows for comparison. At ANP, the same number of entrance-fee and trip-expenditure interviews was conducted. Relative errors were 6% for the trip-expenditures survey and 9% for the entrance-fee survey. Table 2 shows the main characteristic of the four surveys made.

Statistical Treatment

Simple-dichotomous modeling. Of the various suggested ways to calculate estimators based on data from simple-dichotomous surveys, the methods proposed by Cameron (1988, 1991) were used. The following model was assumed:

$$WTP_i = x_i'\beta + u_i \tag{1}$$

Where u_i is the stochastic component which follows logistic distribution with zero mean and dispersion parameter k; x_i' is a vector of explanatory variables for which observations are available; and β is a vector of parameters to be estimated. The response given by each individual i to the offered value t_i enabled the following variable to be constructed: $I_i = 1$ if $WTP_i \geq t_i$; otherwise $I_i = 0$. Thus, the probability of an affirmative response to the question can be expressed as: $\Pr(I_i = 1) = \Pr(WTP_i \geq t_i) = \Pr(x_i'\beta + u_i \geq t_i) = \Pr(u_i \geq t_i - x_i'\beta) = \Pr[u_i/k \geq (t_i - x_i'\beta)/k]$. The associated log-likelihood can be written and optimized directly using a non-linear iterative optimization algorithm (Cameron, 1988).

However, Cameron (1991) proposes an alternative that allows programming and computation time to be reduced by making it possible, through a change of variable, to use conventional logit procedures such as those provided in most statistical packages. The procedure consists of carrying out a logit that includes among the explanatory variables the value offered to respondents. In the new logit, $\gamma^* = (\beta'/k, -1/k)$ is the vector of increased parameters and $x^* = (x_i', t_i)$ is the new vector of explanatory variables. After estimating this conventional logit model, the censored logit's values are recovered by undoing the reparametrization. The confidence intervals were also estimated following Cameron (1991). A conventional logit was estimated to obtain point estimates for γ^* and the associated variance-covariance ma-

[6]To study the influence of different time intervals, we created the dummy variable *Time* (0 for the six summer months and 1 for the six winter months) for the trip-expenditures survey. The results show that *Time* is not statistically significant (*t-ratio* = −0.1979).

TABLE 2
Description of the Contingent Valuation Surveys

Class	Scotch Pine Forests of *Sierra de Guadarrama*		*Alcornocales* Natural Park	
	Trip-expenditures CV survey	Entrance-fee CV survey	Trip-expenditures CV survey	Entrance-fee CV survey
Pre-test (n)	139	91	56	59
Main surveys (n)	559	242	479	479
Refusals to participate[a] (n)	39	21	29	29
Final answers (n)	520	221	450	450
Invalid answers[b] (n)	31	92	21	110
don't know/don't answer (*n*)	15	14	6	8
protest-response[c] (*n*)	16	78	15	102
Protest-response rate	3%	35%	3%	23%
Bid[d] simple-dichotomous (€/visit)	(3.61; 5.41; 7.81; 12.62)	(1.80; 2.40; 3.61; 5.41)	(1; 2; 4; 8; 15; 30)	(1; 2; 4; 8; 15; 30)
Lower bid double-dichotomous (€/visit)	(2.40; 3.61; 4.21; 5.41)	(0.60; 1.20; 1.80; 2.40)	—	—
Upper bid double-dichotomous (€/visit)	(7.81; 9.62; 12.62; 18.03)	(3.61; 4.81; 7.21: 10.82)	—	—

Note: n: number of surveys
[a] Only for the main surveys and not for the pre-test.
[b] Only for simple-dichotomous questions.
[c] Only for DS_Γ model. The main reasons considered as protest-response are: *Natural areas should have neither boundaries nor limitations, It is a public area and we do not have to pay, We should not have to pay to enjoy natural areas* and *We already pay enough taxes.*
[d] The bids in the PSG were in *pesetas.*

trix (Σ_{γ^*}). This information yields the parameter variance-covariance matrix (Σ_β) after some manipulations of Σ_{γ^*} and its related information and transformation matrix.

Double-dichotomous modeling. The approach developed by Cameron and Quiggin (1994), which allows for the first and second question to stem from different valuation functions, was used. Cameron and Quiggin's (1994) model assumes the existence of two unobservable values (WTP_1 and WTP_2), one for the first valuation question and the other for the second. They are the function of a vector (x_1 and x_2) of observable respondent attributes plus an unobservable random component (ε_1 and ε_2) distributed in accordance with two related normals ($N(0, \sigma_1^2)$ and $N(0, \sigma_2^2)$). Unlike in the case of other models, it is not necessary for WTP_1 to be equal to WTP_2. They are allowed to differ and both values are estimated jointly using a bivariate normal.

Following Cameron and Quiggin (1994), a *censored regression* was implemented, defining the following variables (for $j = 1, 2$): $I_{ji} = 1$ if $WTP_{ji} \geq t_{ji}$; $I_{ji} = 0$ if $WTP_{ji} < t_{ji}$. Possible combinations of these values for a given individual are (1,1), (1,0), (0,0) and (0,1). Since only models without additional explanatory variables were estimated, the underlying model is $WTP_i = \beta_i + u_i$, with β_i being a scalar (one for each valuation function). Assuming a bivariate normal distribution BVN (β_1, β_2, σ_1^2, σ_2^2, ρ) and omitting subscript i, which indicates the individual in question only, the likelihood function logarithm is as shown in equation (2) (to simplify notation the density function of the standard bivariate normal is expressed as $g(z_1, z_2)$ where $z_1 = (t_1 - \beta_1)/\sigma_1$ and $z_2 = (t_2 - \beta_2)/\sigma_2$). The Newton-Rapson optimization method was used to estimate β_1, β_2, σ_1, σ_2, and ρ.

$$\begin{aligned}\log L = \sum_i \Bigg\{ & I_1 I_2 \log \left[\int_{z_1}^{\infty} \int_{z_2}^{\infty} g(z_1, z_2)\, dz_2 dz_1 \right] \\ & + (1 - I_1) I_2 \log \left[\int_{-\infty}^{z_1} \int_{z_2}^{\infty} g(z_1, z_2)\, dz_2 dz_1 \right] + \\ & + (1 - I_1)(1 - I_2) \log \left[\int_{-\infty}^{z_1} \int_{-\infty}^{z_2} g(z_1, z_2)\, dz_2 dz_1 \right] \\ & + I_1 (1 - I_2) \log \left[\int_{z_1}^{\infty} \int_{-\infty}^{z_2} g(z_1, z_2)\, dz_2 dz_1 \right] \Bigg\} \end{aligned} \tag{2}$$

Payment-Vehicle Effects

Table 3 shows the different reasons why WTP with the entrance-fee (WTP_E) and with trip-expenditures (WTP_T) surveys may differ. Although the analysis focussed on the *reject, fair, substitutes, round-trip* and *other areas* effects, which imply $WTP_T > WTP_E$, Table 3 also reflects effects that can cause $WTP_T < WTP_E$. However, if H_0: $WTP_T = WTP_E$ is rejected, and the direction of the inequality is $WTP_T > WTP_E$, it can be assumed that the effects that imply $WTP_T > WTP_E$ are large enough to compensate the other effects.

The *reject* effect can appear due to the perception that expenditures associated with protected natural areas should be funded through taxes. In the study-cases in question, the current situation is free access even though a significant part of the two forest areas is privately owned. Thus, respondents may have an incentive to defend the current situation and to strategically bias their answer so as to prevent private owners from establishing an entrance-fee. Both if respondents are reluctant to there being an entrance-fee and if they have a strategic behavior, they can either refuse to pay or deviate from their maximum WTP (Jorgensen et al., 1999; Strazzera et al., 2003). The first strategy makes for a smaller and less representative sample (after eliminating protest-responses as usual). The second strategy would

TABLE 3
Reasons for Divergence between WTP_E and WTP_T

Reasons why WTP_E might be < than WTP_T
1. Opposition to the establishment of entrance-fees in natural parks (*reject* effect).
2. Strategic behavior. Respondents may see a more obvious relation between their answer and a future increase in the costs of a day trip to the forest if this cost is specified as an entrance-fee (*reject* effect).
3. The individual is stating a fair value and not the maximum WTP (*fair* effect).
4. The knowledge of close substitutes may origin that respondents feel that the entrance-fee will only be implemented in one particular area (*substitutes* effect).
5. Respondents have enjoyed the round-trip journey (*round-trip* effect).
6. Respondents have visited other areas in the daily visit (*other areas* effect).
7. The presence of a property right belief in the entrance to the park could imply the recommendation to use a minimum willingness to accept (WTA) question, and WTP_E would be smaller than WTP_T (this does not apply in our case).
Reasons why WTP_E might be > than WTP_T
1. An increase in gasoline prices has a larger impact on total income than entrance-fees, reducing WTP_T for people who drive a lot.
2. Some non-use value embedded in WTP_E but not in WTP_T.

modify the stated WTP in an amount that the researcher would be unable to determine.

The *fair* effect (stating a value considered fair and not the maximum WTP) is more likely to appear with the entrance-fee essentially for the same reasons discussed as for strategic behavior. That is, because people feel that they can have more influence on the price set for the entrance-fee than on gasoline prices.

The *substitute* effect arises if respondents know close substitutes and feel that the entrance-fee will only be implemented in one particular area whereas they will probably assume that the increase in trip-expenditures will apply to all areas visited.

If the respondent values the round-trip positively (*round-trip* effect) or if he or she visits several areas on the same day (*other areas* effect), stated WTP in the trip-expenditures survey will be higher than corresponds to the welfare reported for the visit to the site itself, since the wording includes the whole excursion in the valuation.

It is assumed, a priori, that the *reject, fair* and *substitutes* effects reduce the value obtained with the entrance-fee survey and that the *round-trip* and *other areas* effects tend to increase the value obtained with the trip-expenditures survey when compared with the true value of the good to be valued (the one-day visit to a particular forest).

Testing Divergence and Effects

Divergence between the results can be tested directly through a Convergent Validity Test, checking correspondence between WTP values estimated using the same theoretical model but with a different payment-vehicle (Morrison et al., 2000).

As pointed out by McFadden and Leonard (1993), the mean without explanatory variables is an unbiased estimator of the mean with explanatory variables, and it has the additional advantage that it permits to use the highest number of observations. In addition, some explanatory variables were significant in one study area and not in the other, making it difficult to perform a homogeneous comparison. Thus, the comparison is based primarily on the models without explanatory variables.

Three simple-dichotomous models without explanatory variables were estimated for each survey[7]: (a) one model with all valid responses (DSP model), (b) one eliminating protest-responses (DS model), and (c) a logarithmic version of the DS model (DSLN model). In all these models $x_i' = (1)$ and $\beta = (\beta_0)$ in equation (1). Open-ended versions of the first two models were also calculated using the information of the closing open-ended question (OP model and O model). A double-dichotomous model without explanatory variables (DD model) and with the same treatment of the protest-response as the DS model was also estimated, and the logarithmic versions of this model (DDLN).[8] The central model for the discussion is DS, by virtue of it being dichotomous, eliminating protest-responses and amenable to estimation for both forests studied. Further models that include other explanatory variables were based on the DS model.

The treatment of protest-response aims to identify, through a follow-up question (Appendix 1), the reasons that lead respondents to state a zero amount to the open-ended question. Respondents who gave reasons that implied a rejection of the scenario (and not a real zero) were eliminated in the O and DS models. The main reasons identified as protest-response were *Natural areas should have neither boundaries nor limitations, It is a public area and we do not have to pay, We should not have to pay to enjoy natural areas* and *We already pay enough taxes* (Table 2).

The means of the described models were compared and checked for overlapping confidence intervals. This comparison was carried out directly using the reported values but also using the reported values for the entrance-fee survey (since it was not possible to give precise estimates of the impact of the different effects considered) and adjusted values for the trip-expenditures survey to take into account the *round-trip* and *other places* effects.

[7] Trip-expenditures models are denoted by a $_T$ subscript; entrance-fee models are denoted by a $_E$ subscript.

[8] See Appendix 2 for the statistical information associated with these models.

The following procedure was adopted to deduct the *round-trip* and *other places* effects. Valuation of the journey itself assumed that respondents, who said they were valuing the entire journey or a part of it, placed an equal value on the time spent on the round-trip and on the time spent in the forest. The reduction in respect of the influence of visits to other locations was implemented by whichever of the following two methods brought about the largest reduction: (a) estimating the value only with respondents who had not visited any other site, and (b) reducing the value from the total sample by the percentage resulting from respondents' subjective valuation of the importance of the survey site as against the group of sites visited in their decision to go on the excursion.[9] However, all the tests below were done using reported values, without adjusting the values for the trip-expenditures CV survey.

Additional explanatory variables described in Table 4 were used to identify the studied effects. Variables *Efee, Other, Travel* and *Substitutes* were used, respectively, to analyze the *reject, other areas, round-trip* and *substitutes* effects. One model was estimated by pooling the data obtained with both payment-vehicles and these explanatory variables (following Carson et al. (2003) this model has been called the Valuation Function Approach). Furthermore, *Expectations* and *Income* were included to increase the model's explanatory power, since they are significant and not correlated with other variables. This model can be written substituting in equation (1) the following vectors:

$$x' = (1, \textit{Efee}, \textit{Other}, \textit{Travel}, \textit{Substitutes}, \textit{Expectations}, \textit{Income})$$

$$\beta' = (\beta_0, \beta_{\textit{Efee}}, \beta_{\textit{Other}}, \beta_{\textit{Travel}}, \beta_{\textit{Substitutes}}, \beta_{\textit{Expectations}}, \beta_{\textit{Income}})$$

A model was also estimated for each study area including only *Efee* as the explanatory variable and pooling the data obtained with both payment-

TABLE 4
Explanatory Variables Used to Test the Different Effects in the Regression Models

Efee[(a)]	Takes value 1 when the question is formulated as an entrance-fee
Other[(a)]	Takes value 1 when the interviewee has visited other places in the day
Travel[(a)]	Takes value 1 when the respondent has enjoyed the round-trip
Substitutes[(a)]	Takes value 1 when respondents know close substitutes to the study-area
Expectations[(a)]	Takes value 1 when the visitors expectations have been fulfilled
Income	Familiar monthly income
Protest[(a)]	Takes value 1 if the respondent states a protest to the scenario
Quota[(a)]	Takes value 1 when the respondent chooses a daily quota system (on a first come, first served basis) and 0 if they prefer an entrance-fee, as the best way to regulate congestion

[(a)] Takes value 0 otherwise

[9] Scored from *one* to *five*, with five being the maximum.

vehicles. Finally, models were prepared for both areas using the data of one of the payment-vehicles in each case and only one of the following explanatory variables: *Other, Travel* or *Substitutes*. All these one-variable models can be written explicitly substituting $x' = (1, \textit{Variable})$ and $\beta' = (\beta_0, \beta_{\textit{Variable}})$ in equation (1), where *Variable* stands for the variable under consideration.

Through a Protest-Response Rates Test (Morrison et al., 2000), another possible divergence between entrance-fee and trip-expenditures CV surveys was analyzed (testing the *reject* effect). This test compares the percentage of responses that has been qualified as protest. A larger ratio of protest-responses obtained with a concrete payment-vehicle is a factor that can make it inadequate to capture adequate welfare values, mainly due to possible selectivity bias (Strazzera et al., 2003). This is really just an indicator of the impact on the WTP of the individuals who entirely reject the payment-vehicle, but may also be an indirect indicator of the potential reduction of the valuation stated by individuals who would be willing to pay some price (Jorgensen et al., 1999; Strazzera et al.).

Measuring whether rejection to entrance-fees is maintained in the event of the hypothetical restriction of free access, respondents were asked to choose between there being an entrance-fee to regulate congestion and the introduction of a system of daily visitor quotas (on a first come, first served basis). A logit analysis (based on Jakus and Shaw (1997)) using *Protest* as the dependent and *Quota* as the explanatory variable (Table 4) makes it possible to identify whether the choice of a quota plays a significant role in the appearance of protest-response (it is assumed that the variable *Quota* is a proxy of rejection of the entrance-fee, that is, a preference for quotas even in a congestion context).

On the other hand, if the number of individuals preferring a quota to an entrance-fee is significantly higher than the number of people whose refusal to pay is identified as a protest-response, it can be said that some respondents not eliminated by protest-response treatment are influenced by their opposition to the introduction of an entrance-fee.

This assertion can be tested directly through a Procedural Variance Test[10] (Holmes and Kramer, 1995). Since this test focusses only on respondents who do not raise a protest, it is possible to analyze whether the rejection of an entrance-fee (in a congestion context) is one of the factors that leads individuals to state a different WTP for each payment-vehicle, even when they have not explicitly rejected the payment.

This test compares actual responses to the simple-dichotomous question of the entrance-fee survey with counterfactual responses. To do this, the WTP of the entrance-fee survey is first predicted by multiplying the entrance-fee survey data by the behavioral parameters of the trip-expenditures survey, plus an equation error randomly drawn from the error distribution. Once the simulated WTP for each respondent has been obtained, a counterfactual

[10]We are indebted to one of our anonymous referees for proposing this test.

response to the simple-dichotomous question for the entrance-fee survey is created by comparing the simulated WTP with the bid offered to each respondent of the entrance-fee survey (1 if WTP $\geq$ bid; 0 if not). Then a Maximum Likelihood Test for Binomial Probabilities is done by comparing actual and counterfactual responses. The χ^2 statistic indicates if there is a statistically significant difference between them. This procedure was applied to a model without explanatory variables (similar to DS) and to a model using the explanatory variables of the Valuation Function Approach (except *Efee,* which is meaningless in this sub-sample based only on entrance-fee questions). This procedure was repeated but predicting the responses to the trip-expenditures survey with the parameters of the entrance-fee survey.

In the event that these differences are statistically significant (that is, procedural variance exists), a new variable is created for each respondent that takes value 1 if the actual and counterfactual responses to the entrance-fee survey are different (that is, if procedural variance is present) and value 0 if not (for the trip-expenditures sub-sample this test is not relevant). With this binary variable as dependent, two logit regressions were made including the explanatory variables of each model used to obtain the counterfactual responses, plus *Quota* (Table 4) as an additional explanatory variable.[11] To obtain an empirical distribution of the regression coefficients, bootstrapping was carried out with 500 replacements for each model. A significant *t-ratio* indicates the origin of the procedural variance.

Following Bateman et al. (1995a) it was also possible to analyze the *fair* effect, at least to some limited extent, comparing the explanatory power of the intercept and trying to use the price of nearby parking facilities to predict stated WTP for each question type.

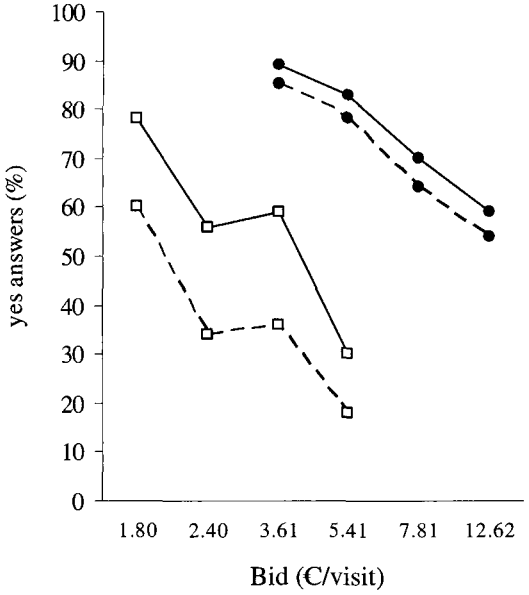
Finally, an analysis was made of whether the different samples compared differ in relevant socio-economic factors, since this can explain part of the divergence obtained.

Results

Figures 1 and 2 show the proportion of respondents who answered *yes* for each payment-vehicle, for the whole sample and for the sample obtained after eliminating protest-response. As can be seen, for both areas positive answers for entrance-fees are systematically lower (in percentage) than for trip-expenditure increases. Moreover, the exclusion of protest-response has a higher impact on the entrance-fee surveys in both areas.

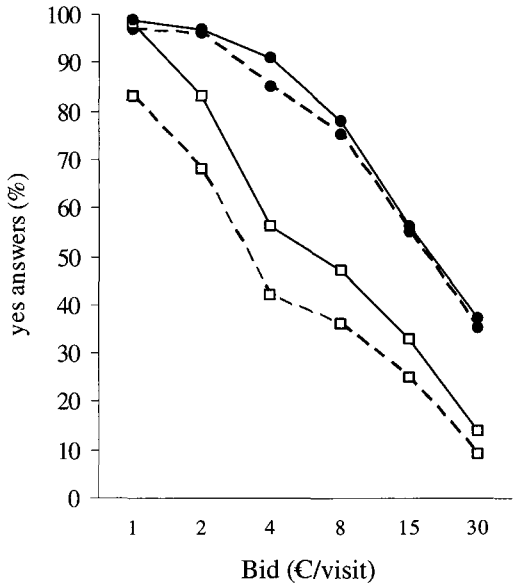
Table 5 provides relevant information for comparing the results obtained with each payment-vehicle, reporting mean values, with their respective confidence intervals, for models without explanatory variables and without logarithmic transformation. Appendix 2 shows the statistics associ-

[11] For the logit regression corresponding to DS model we used only *Bid* and *Quota* as explanatory variables and in the case of the model related with the Valuation Function Approach we used the variables *Bid, Other, Travel, Substitutes, Income, Expectations* and *Quota.*



Scotch Pine Forests of *Sierra de Guadarrama*

Figure 1



Alcornocales Natural Park

Figure 2

Figures 1 and 2. Percentage of affirmative answers to the simple-dichotomous question for each bid and for each forest studied. Values for the trip-expenditures CV surveys are shown with full circles and values for the entrance-fee CV surveys with squares. Full lines are used for the values eliminating protest-responses and dashed lines for the values including all the answers obtained.

TABLE 5
Elicited Values with Trip-Expenditures and Entrance-Fee Surveys (Estimations Without Explanatory Variables)

	Trip-expenditures CV survey (€/visit)				Entrance-fee CV survey (€/visit)				% Entrance-fee mean over trip-expenditures mean
Model[a]	n	Low[b]	Mean	Upp[c]	n	Low[b]	Mean	Upp[c]	
Scotch Pine Forests of *Sierra de Guadarrama* (PSG)									
OP	409	10.12	11.82	13.51	211	1.42	1.68	1.94	14%
			(17.51)				(1.94)		
O	392	10.58	11.56	12.54	130	2.42	2.73	3.04	24%
			(10.06)				(1.81)		
DSP	502	11.37	13.81***	16.25	207	1.39	2.20***	3.01	16%
			(1.24)				(0.41)		
DS	486	11.72	14.12***	16.53	129	3.44	4.28***	5.11	30%
			(1.23)				(0.43)		
DD	468	10.33	13.84***	17.35	123	3.49	4.20***	4.91	30%
			(1.79)				(0.36)		
Alcornocales Natural Park (ANP)									
OP	439	14.23	16.13	18.04	440	3.35	4.16	4.96	26%
			(20.28)				(8.59)		
O	423	14.52	16.27	18.03	338	4.29	5.06	5.81	31%
			(18.37)				(7.10)		
DSP	444	18.51	21.30***	24.09	442	4.73	6.46***	8.19	30%
			(1.42)				(0.88)		
DS	429	19.44	22.21***	24.98	340	9.05	11.03***	13.02	50%
			(1.41)				(1.01)		

Note: n: number of surveys; standard errors are shown in brackets.
[a] The OP model is open-ended and included all valid answers; the O model is open-ended and excludes protest-responses; the DSP model is simple-dichotomous and included all valid answers; the DS model is simple-dichotomous and excluded protest-responses; the DD model is double-dichotomous and excluded protest-responses (we show the values for the first log-normal).
[b] Lower bound of the confidence interval (95%)
[c] Upper bound of the confidence interval (95%)
$*p < .10$; $**p < .05$; $***p < .01$

ated with all these models. For PSG, the results of the entrance-fee survey amounted to 30% of the values estimated with the trip-expenditures survey for the mean of the preferred dichotomous models (DS and DD). For ANP, this percentage (for the DS model) was 50% (Table 5). A comparison of models OP, O and DSP brings out even greater differences, as do models with logarithmic transformation (Appendix 2). In none of the cases was there overlapping between confidence intervals (at 95%).

Taking into account the valuation of the round-trip and of other places visited made for a 13% reduction[12] of the estimated values at PSG (for the DS_T model the final value for the mean was €12.24) and 3.1% at ANP[13] (for the DS_T model the final value for the mean was €21.52). Moreover, confidence intervals do not overlap when applying the reductions described above in order to take into account the valuation of the round-trip and of the other places visited. For PSG, the lower limit of the trip-expenditures survey model that gives the lowest result (the OP_T model) was €8.80 for the minimum reduced value, whilst the upper end of the model comprising the highest values of the entrance-fee survey (the DS_E model) was €5.11. For ANP, the lower limit of the trip-expenditures survey model giving the lowest result (the OP_T model) was €13.78 for the reduced value, whilst the upper limit of the model comprising the highest values obtained with the entrance-fee survey (the DS_E model) was €13.02. The differences are still greater if models estimated in a similar manner are compared. That is, the Convergent Validity Test shows that the differences are statistically significant.

Another result shown in Table 5 is that WTP values are higher in the ANP than in the PSG case-studies. This may be surprising, since PSG is very close to Madrid, a high income area (individual income was also higher in our sample for PSG than in the sample for ANP, see Table 8 and note (b) within this table). However, this difference may be explained by the type of recreational use prevailing in both areas. In PSG, the typical visitor makes frequent visits (7.11 times per year) and stays for a relatively short period of time (5.11 hours per day on average). On the contrary, in the case of ANP, the typical visitor makes 1.65 visits, on average, and stays for 7.52 hours. In addition, and as reported in the Methodology section, the PSG survey was performed in 1998-99 and the ANP in 2002-03 (the Euro was introduced[14] in 2002). Compared with other studies, it can be said that entrance-fee values in PSG are amongst the lowest in Spain whilst the ANP values are amongst the highest. Entrance-fee values in other studies range from 4.96 to 12.24

[12]The average obtained for the subjective valuation question was 4.82, which means that 96% of total value can be ascribed to the survey site. The reduction in respect of the value attributable to the approach trip involved (a) not reducing the value for the 3% who said that they did not place a value on the trip, (b) reducing by 15% the value obtained for 45% of respondents who said that they valued the entire approach trip; and (c) reducing by 7% the value obtained for the 52% of respondents who said that they valued only that part of the journey travelled within the *Sierra de Guadarrama* area.

[13]The average obtained for the subjective valuation was 4.92 (98% of the value can be ascribed to the survey site). The reduction in respect of the value attributable to the approach trip involved (a) not reducing the value for the 11% who said that they did not place a value on the trip, (b) reducing by 4% the value obtained for 74% of respondents who said that they valued the entire approach trip; and (c) reducing by 1% the value obtained for the 15% of respondents who said that they valued only a part of the journey within *Alcornocales* Natural Park.

[14]The exchange rate is 166.386 pesetas/euro. The new currency brought a relatively important inflationary process, at least for low prices, since approximations were made systematically upwards.

€ per visit (Campos, Caparrós & Sanjurjo, 2005). In any case, the main objective of this paper is not to compare these two forests but to compare the results within each forest.

Another way to test the differences between WTP_T and WTP_E within each forest is through the dummy variable *Efee*. In the PSG study, the regression coefficient of variable *Efee* in the DSP model is significant at the 99% level (*t-ratio* = −12.8551). With the DS model, the value of the *t-ratio* is −9.6747 (99%). In the case of ANP, the DSP model has a *t-ratio* of −1.8044 (90%). For the DS model, the *t-ratio* is −1.3488 (thus, only statistically significant at the 80% level). Hence, in all cases signs are negative (higher values with the trip-expenditures wording) and in most cases these results are clearly statistically significant.

Concerning the Valuation Function Approach, the first step is to test the correlations among variables through a χ^2-Pearson Test. No significant correlation was found in the ANP selected variables but, in the case of PSG, *Efee* was strongly correlated with all the others. This is probably due to the different bids used for the different payment-vehicles in PSG. Since it was of interest to keep *Efee* in the analysis, it was decided to focus on the ANP case. As Table 6 shows, all the variables considered are significant, except *Travel*. Thus, the round-trip does not seem to have a strong impact on the valuation function. Visiting other places (*Other*) has a significant impact, although the regression coefficient is much lower than that of the *Efee* variable (also significant). *Income* is significant and has a positive impact, as expected, and *Expectations* and *Substitutes* also play a major role. The positive effect of the *Substitutes* variable is contrary to what intuitively may have been expected. However, this may have been caused simply by the fact that people who know substitutes have more knowledge and awareness of natural areas and consequently place more value on them.

The one-explanatory-variable models showed that *Other* and *Travel* are not significant in the trip-expenditures survey, either in PSG or ANP (variables *Other* and *Travel* are not relevant with the entrance-fee data). In other words, at least in the case-studies in question, the effects of the trip-expenditures survey (*other places* and *round-trip* effects) seem to be less important than those observed for the entrance-fee survey (see below), so that it is to be expected that better welfare measures will be obtained using the former survey. In addition, the *substitutes* effect is not relevant in the cases in question (probably due to the uniqueness of the Natural Parks analyzed in their respective areas), since the *Substitutes* variable is only significant in the case of ANP in the trip-expenditures survey (90% level). That is, in the one-explanatory-variable models it is never significant in PSG and it is not significant in ANP using (i) entrance-fee data only or (ii) entrance-fee data and trip-expenditures data together.

Regarding the Protest Response Rates Test and the *reject* effect, a highlight in Table 5 is the scant effect of protest-response treatment on WTP for the trip-expenditures surveys (2% for PSG and 4% for ANP on the DS_T

TABLE 6
Valuation Function Approach (Pooled Data in the Alcornocales Natural Park Case)

Variables	*Alcornocales* Natural Park DS model[a] Regression coefficient	*t-ratio*
Intercept	−29.0486	−4.9155***
	(5.9096)	
Bid (amount offered in the simple-dichotomous question)	−6.3210	−3.2120***
	(1.9679)	
Efee (1 if entrance-fee wording[b])	−9.9020	−4.6051***
	(2.1502)	
Other (1 if he/she visited other places[b])	2.2668	2.0803**
	(0.1283)	
Travel (1 if he/she enjoyed the round-trip[b])	6.8513	1.6146
	(4.2432)	
Substitutes (1 if he/she knew similar natural areas[b])	3.9745	2.9391***
	(1.3523)	
Expectations (1 if expectations were fulfilled[b])	4.3600	2.6011***
	(1.6762)	
Income (monthly familiar income[c])	0.0070	7.6561***
	(0.0009)	

Note: standard errors are shown in brackets.
[a] Dependent variable = 1 if yes to the simple-dichotomous question; = 0 if no.
[b] Takes value 0 otherwise.
[c] Continuous variable.
*$p < .10$; **$p < .05$; ***$p < .01$

model) due to the small number of responses deemed as protest (3% in both cases; see Table 2). For entrance-fee surveys, however, protest-response treatment does have a marked influence on the final outcome, which increased by 94% on eliminating protest-responses for PSG and by 71% for ANP in the DS_E model. This is due to the higher protest-response rates elicited with this survey-form (35% at PSG and 23% at ANP; see Table 2). That is, protest-responses are significantly higher with the entrance-fee surveys in both areas and the effect of the treatment of this kind of response has a greater impact on the result of entrance-fee survey. This fact indicates that the entrance-fee payment-vehicle raises more problems when obtaining adequate WTP values, whilst the scant effect of protest-response in the trip-expenditures survey makes it more suitable for measuring individual welfare values due to the absence of distorting factors.

The logit analysis of the protest-response shows that *Quota* is significant at the 99% level (*t-ratio* = 3.6444). The positive sign indicates that the elec-

tion of the quota increases the probability of the appearance of protest-response, supporting the idea of a relationship between the rejection of the entrance-fee and the protest response.

Continuing with the *reject* effect, it can be seen that the confidence intervals for the proportion of protest-responses in the entrance-fee survey is 29-41% at PSG and 19-27% at ANP, whereas the confidence intervals for the proportion of respondents preferring an admission quota is 77-85% and 75-83%, respectively. This significant difference indicates that some of the individuals whose response was not eliminated as a protest-response are against the introduction of entrance-fees, even if the alternative was to restrict free access.

Respondents probably oppose the idea of entrance-fees due to the perceived right to free access. This notion is supported by the fact that 79% of reasons identified as protest-response in ANP and 67% in PSG referred to people's right of free access to natural areas (the remaining percentage of protest-response was mainly related to the *We already pay enough taxes* reason). In addition, they may believe that their answer can influence future policies in the direction of establishing payments to enter protected natural areas.

The Procedural Variance Test was conducted only for ANP due to the correlation problems at PSG, mentioned previously. The χ^2-statistic shown by the Maximum Likelihood Test for Binomial Probabilities indicates that the differences between the actual and the counterfactual responses are statistically significant in the two models and for both payment-vehicles (99% significance level).[15] Table 7 shows the results for the procedural variance regression based on the DS model and Valuation Function Approach. In the DS model, *Quota* is not a significant variable and the intercept has all the explanatory power (Table 7). The reason is probably the high percentage of people choosing the quota (in the pooled sample but also in the entrance-fee and trip-expenditures sub-samples). In the case of the Valuation Function Approach, the results of *Quota* are similar to the previous one. In this model, only intercept (90%) and *Expectations* (95%) are significant explanatory variables (Table 7). Thus, when analyzing the reasons that lead to respondents that accept the payment to diverge the values elicited with each wording, the dissatisfaction of visitors' expectations is the factor that provokes the appearance of procedural variance.

To sum up, it has been shown that protest-responses are more frequent with the entrance-fee survey than with the trip-expenditures one. It has been shown that choosing quota (assumed to be an indicator of a rejection to the entrance-fee) increases the probability of a protest-response being given. It has also been shown that amongst respondents who did not give a protest-response, the two payment vehicles produced different results. It has also

[15] For the entrance-fee sub-sample the value of the χ^2-*statistic* is 43.9505 for DS_E model and 44.8997 for the Valuation Function Approach. These values are 109.5666 and 83.2501 respectively in the case of the trip-expenditures sub-sample.

TABLE 7
Procedural Variance Regression for Alcornocales Natural Park Study Case

Variable	Model DS[a]		Valuation Function Approach[a]	
	Regression coefficient	*t-ratio*	Regression coefficient	*t-ratio*
Intercept	−0.8527	−3.1988***	−0.8679	−1.8009*
	(0.2666)		(0.4819)	
Bid (amount offered in the simple dichotomous question)	0.0139	1.1897	0.0186	1.5087
	(0.0117)		(0.0124)	
Quota (1 if a quota was chosen[b])	−0.0500	−0.1829	0.0741	0.2508
	(0.2732)		(0.2955)	
Other (1 if he/she visited other places[b])			−0.1717	−0.2881
			(0.5961)	
Travel (1 if he/she enjoyed the round-trip[b])			−0.1866	−0.6439
			(0.2899)	
Substitutes (1 if he/she knew similar natural areas[b])			0.0014	0.0055
			(0.2565)	
Expectations (1 if expectations were fulfilled[b])			−0.4933	−2.0522**
			(0.2404)	
Income (monthly familiar income[c])			0.0001	0.7718
			(0.0002)	

Note: standard errors are shown in brackets. Bootstrapping values.
[a] Dependent variable = 1 if procedural variance is present; = 0 if no.
[b] Takes value 0 otherwise.
[c] Continuous variable.
* $p < .10$; ** $p < .05$; *** $p < .01$

been shown that, amongst those not eliminated as protest-response, a significant portion chooses quota. However, it was not possible to show that *Quota* is a good variable to explain the difference observed between the results obtained for those not eliminated as protest-responses (one reason may be that ANP does not have a congestion problem at present, as is the case at PSG; unfortunately, the Procedural Variance Test could only be applied to ANP).

As regards the identification of the possible *fair* effect through comparison of the intercept's explanatory power, nothing can be ascertained, because the intercept exerted the greatest explanatory power in all cases. Nonetheless, it may be pointed out that for the entrance-fee surveys the intercept is very similar to the value paid at fee-paying parking facilities in some areas of the forests, which was not the case for the trip-expenditures surveys. As suggested earlier, this may be due to the fact that respondents used that datum as a pointer for their answer. If so, this would compromise the validity of their response as a maximum WTP in the entrance-fee survey.

Table 8 shows the main socio-economic indicators for the two surveys, since a significant difference between these variables may explain the divergences observed. At PSG, the differences between *Age* and *Level of studies* are not statistically significant, unlike *Monthly net income* and *Total day-trip expenditure.* However, these two variables are higher in the entrance-fee subsample; hence, on the face of it, this divergence should tend to increase the value obtained with the entrance-fee survey. For ANP, there are no statistically significant differences for any of these socio-economic variables, except for *Age* at 95% of significance (however, *Age* is not significant if included as an additional explanatory variable in the models tested above). These variables were not included in the models described above due to correlation problems and because the aim was to focus on the effects studied (only income was included in the main analysis).

TABLE 8
Socioeconomic Characterization of the Samples

	Scotch Pine Forests of *Sierra de Guadarrama*			*Alcornocales* Natural Park		
Variable	Trip-expenditures CV survey	Entrance-fee CV survey	*t-test*	Trip-expenditures CV survey	Entrance-fee CV survey	*t-test*
Age	39	39	1.036	33	35	2.217**
	(12.25)	(11.78)		(9.12)	(9.79)	
Level of studies[a]	2.24	2.34	1.644	2.20	2.21	0.209
	(0.77)	(0.74)		(0.79)	(0.79)	
Monthly net income[b] (€)	1,177	1,315	2.548***	1,662	1,629	−0.631
	(596.32)	(607.36)		(778.55)	(757.50)	
Total day trip-expenditures[c] (€)	10.01	12.80	3.624***	19.37	19.36	−0.008
	(8.61)	(9.53)		(20.30)	(21.56)	

Note: standard errors (s.e.) are shown in brackets.

[a] 0: no studies, 1: primary education, 2: secondary education, 3: university degree.

[b] In the PSG we show personal income and in the ANP familiar income, since the questions were framed differently. Personal income in the ANP, calculated dividing familiar income by the number of members of the family stated, was 520 € and 542 € for the trip expenditures and the entrance-fee surveys respectively.

[c] In the PSG we asked respondents to specify their expenditures for transport, food and others. In the trip-expenditures survey, 443 respondents gave a value for transport (mean: 4.13, s.e.: 3.27), 411 gave a value for food (mean: 6.02, s.e.: 6.38), and 32 gave a value for 'others' (mean: 4.79, s.e.: 4.20), while 60 respondents gave only an overall value. In the entrance-fee survey, 214 respondents gave a value for transport (mean: 3.50, s.e.: 2.22), 195 gave a value for food (mean: 9.71, s.e.: 7.39), and 7 gave a value for 'other' (mean: 8.37, s.e.: 5.94), while 2 respondents gave only an overall value. In the ANP we asked respondents to give directly an overall value, but demanding them to take into account the three types of expenditures specified above.

$*p < .10$; $**p < .05$; $***p < .01$

Conclusions

The clearest conclusion to be drawn is that the values obtained for maximum WTP for recreational use of forests differ significantly depending on how the contingent valuation question is worded. The results obtained from a CV survey using entrance-fees as the payment-vehicle and another CV survey using trip-expenditures increases were compared and the means estimated on the preferred models are two to three times higher with the latter option than with the former (confidence intervals at no point overlap). These differences do not appear to be accounted for by any of the elements with a suspected influence on the result (socio-economic differences, valuation of the round-trip, influence of other places visited, substitute options).

The evidence assessed suggests that the increased trip-expenditures CV survey better approximates maximum WTP for, rather than forgo, recreational use. This is mainly due to the high number of protest-responses obtained with the entrance-fee CV survey, and the high impact on the final results of the treatment of this protest-response.

Although these results are not definitive, they may allow the use of trip-expenditures increases in CV surveys designed to value the welfare reported for the recreational use of forests to be recommended, at least in countries like Spain and most European countries where payment of entrance-fees to recreational areas is not common.

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APPENDIX 1
Contingent Valuation Questions Used

Scotch Pine Forests of* Sierra de Guadarrama *survey

- Entrance-fee question

[Imagine that, besides the funding already allocated by Government, conservation of nature in this area (PVL/PV_T) partly depended on money paid by visitors.]

10. In accordance with the extent to which you enjoyed your visit, would you pay an entrance-fee (ticket) of . . . pesetas per person for this natural area? Bear in mind that we are asking you to imagine a real payment and that you would be unable to spend the entrance-fee on other things. ☐ *yes (Q. 11)* ☐ *no (Q. 12)* ☐ *don't know (Q. 15)*

11. If yes: And would you be willing to pay . . . pesetas as an entrance-fee?
☐ *yes (Q. 13a)* ☐ *no (Q. 13b)* ☐ *don't know*

12. If no: And would you be willing to pay . . . pesetas as an entrance-fee?
☐ *yes (Q. 13c)* ☐ *no (Q. 13d)* ☐ *don't know*

- Trip-expenditures increase question

[As you know trip-costs have changed in the last decades (i.e. gas prices have gone up and down). Now we are going to ask you to imagine that total expenditures of your visit increase for this reason, even though you realize exactly the same activity you have done (same transport, same food . . .)]

10. If the per person total expenditures of your visit would have been . . . pesetas more than the quantity you have just calculated, would you still have come today? Bear in mind that we are asking you to imagine a real payment and that you would be unable to spend the entrance-fee on other things. ☐ *yes (Q. 11)* ☐ *no (Q. 12)* ☐ *don't know (Q. 15)*

11. If yes: And if the increase in total personal expenditures would have been . . . pesetas, would you still have come today?
☐ *yes (Q. 13a)* ☐ *no (Q. 13b)* ☐ *don't know*

12. If no: And if the increase in total personal expenditures would have been . . . pesetas, would you still have come today?
☐ *yes (Q. 13c)* ☐ *no (Q. 13d)* ☐ *don't know*

Alcornocales *Natural Park survey*

- Entrance-fee question

[Imagine that, besides the funding already allocated by Government for the management of recreation areas, reception centers and paths (maintenance and surveillance), these infrastructures partly depended on money paid by visitors.]
10. Would you pay an entrance-fee (ticket) per person of . . . euros (. . . pesetas) to access the recreation areas and paths rather than forgo the enjoyment provided by today's visit?
Bear in mind that we are asking you to imagine a real payment, and that whatever you spent you would then be unable to spend on other things, and if you didn't wish to pay an entrance-fee to access the recreational areas and paths you could still use public roads. ☐ *yes* (*Q. 11*) ☐ *no* (*Q. 11*) ☐ *don't know* (*Q. 12*)

- Trip-expenditures increase question

[As you know trip-costs have changed in the last decades (i.e. gas prices have gone up and down relatively independently of generalized increases in prices and live costs). Now we are going to ask you to imagine that total expenditures of your visit increase for this reason, even though you realize exactly the same activity you have done (same transport, same food . . .)]
10. If the total expenditures of your visit today would have been . . . euros per person (. . . pesetas) more than the quantity you have just calculated, would you still have come today? Bear in mind that we are asking you to imagine a real payment and that you would be unable to spend the entrance-fee on other things.
☐ *yes* (*Q. 11*) ☐ *no* (*Q. 11*) ☐ *don't know* (*Q. 12*)

In all questionnaires dichotomous questions were followed by an open-ended question. If the respondents replied 'don't know' or a zero amount to the open-ended question, the following follow-up question was made to identify the protest-response:

(If you answered zero, a negative value or don't know) Could you state the reasons why you don't know/you are not willing to pay any additional amount as **entrance-fee/current total expenditures** per person?

APPENDIX 2
Statistical Information of the Dichotomous Models for Scotch Pine Forests of Sierra de Guadarrama and Alcornocales Natural Park

							Variable WTP			Second variable [1]		
Survey	Model	Observations	Accept payment	Refuse payment	Correct percentage	−2 LOG L	Parameter value	Standard error	*t-ratio*	Parameter value	Standard error	*t-ratio*
PSG	DSP_T	502	366	136	73	556.910	2,297.8351	207.1378	11.0933***			
PSG	DS_T	486	366	120	75	511.560	2,350.2857	204.4584	11.4952***			
PSG	$DSLN_T$	486	366	120	75	509.445	7.8808	0.1549	50.8807***			
PSG	DD_T	468				136.340	2,302.2000	298.2553	7.7189***	−684.1422	11,286.0042	−0.0606
PSG	$DDLN_T$	468				135.823	7.8316	0.2211	35.4251***	−253.5700	1,727.7339	−0.1468
PSG	DSP_E	207	80	127	68	259.489	366.0674	68.2016	5.3674***			
PSG	DS_E	129	80	49	71	154.975	711.7757	70.7237	10.0642***			
PSG	$DSLN_E$	129	80	49	71	155.238	6.5155	0.1266	51.4848***			
PSG	DD_E	123				132.840	699.1600	60.0358	11.6457***	−25,933.1759	242,569.4766	−0.1069
PSG	$DDLN_E$	123				131.947	6.5080	0.1312	49.6110***	6.0364	0.4244	14.2244***
ANP	DSP_T	444	328	116	80	402.493	21.3005	1.4227	14.9719***			
ANP	DS_T	429	328	101	81	355.310	22.2148	1.4133	15.7181***			
ANP	$DSLN_T$	429	328	101	81	335.065	2.9543	0.1053	28.0551***			
ANP	DSP_E	442	194	248	70	508.842	6.4600	0.8804	7.3377***			
ANP	DS_E	340	194	146	74	364.935	11.0347	1.0127	10.8959***			
ANP	$DSLN_E$	340	194	146	74	337.591	1.9723	0.1047	18.8417***			

[1] The second variable is the second normal in the bi-variant normal models (DD_T, $DDLN_T$, DD_E and $DDLN_E$).
*$p < .10$; **$p < .05$; ***$p < .01$