Does institutional context affect preference formation? Evidence from a stated preference valuation study

Remoundou, Kyriaki and Kountouris, Yiannis and Koundouri, Phoebe

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Kyriaki Remoundou, 76, Patission Street, Athens 104 34, Greece

Yiannis Kountouris, Oxford Road, Manchester, M13 9PL, UK

Phoebe Koundouri, 76, Patission Street, Athens 104 34, Greece[*]

Kyriaki Remoundou, Miss , Phd Candidate, Department of International and European Economic Studies, Athens University of Economics and Business

Yiannis Kountouris, Mr, Post-Doctoral Associate Researcher, Department of Economics and Sustainable Consumption Institute, University of Manchester

Phoebe Koundouri, Dr, Assistant Professor in Economics, Department of International and European Economic Studies, Athens University of Economics and Business

Abstract

In this paper we employ a choice experiment to test the effect of the institution responsible for the management of an environmental good, on stated preferences. Specifically, we examine whether respondents' valuation of a forest restoration program in Greece is different under (a) European Commission and (b) National State management. Following a split sample approach and accounting for preference heterogeneity, we find that the institutional context is neutral to preference formation for the environmental good in question although there are significant differences in the trust levels reported for the two institutions considered.

Keywords: choice experiment, preference formation, institutional context, forest fires

2

Introduction

Neoclassical economic theory, where economic valuation is grounded on, considers preferences to be stable and well-defined, so that the characteristics of the value articulating process do not affect valuation estimates. However, this is often violated in environmental good settings (Schlapfer 2006; Fror 2008). There is substantial evidence in the stated preference literature that environmental goods and services cannot be considered and valued independently of the context in which they are offered (Randall 1986; Mitchell & Carson 1989). Unlike earlier studies considering only the attributes of the good under evaluation, it is now well-established that the different elements of the survey instrument, employed as a value elicitation mechanism, also affect the choice behavior (Kontoleon et al. 2005).

Values are found to be sensitive to the payment and delivery conditions (Bergstrom et al. 2004; Kontoleon et al. 2005; Johnston et al. 1999; Nunes and Travisi 2009), the description of the good to be valued (Kataria et al 2009), the contributions of the others (Alpizar et al.2008), the wording of the scenario (Carlsson et al. 2005, Rolfe et al. 2002) as well as the degree of anonymity (List et al. 2004).

Reasons are attributed to respondent's lack of experience with environmental goods, the demanding nature of the cognitive task at hand, but also to the common good characteristics these goods display which make normative issues especially important when preferences are formed (Vant 2005). Looking at the psychological underpinnings, some scholars attribute the effects of survey framing and wording on preferences and choices to the psychological motivations that define individuals perception of a given decision task (Tversky and Kahneman 1981; Horowitz and McConnel 2002). Following this line of reasoning, there is ample literature

questioning the assumption of given preferences and arguing that the value articulating process can endogenously determine which preferences are formed or evoked when environmental goods are being valued (Bowles 1998; Shapansky et al. 2008, Vant 2004)

If context does matter and the different characteristics of the value articulating process indeed influence preference formation it is important for stated preference practitioners to examine and understand the direction and magnitude of these influences. Otherwise, stated preference studies may fail to elicit the correct economic value of the good under consideration. To resolve this issue and gain insight on how respondents react to changes in the different elements of the valuation process as well as assess the robustness of the results when such changes are applied, split-sample experiments are recommended (Whittington 2002). To reduce biases in the valuation estimates and high protest responses, such experiments should ensure that respondents view the task as consequential; that is, believe that the survey will influence actual decision-making (Cummings and Taylor 1998) and agree with the information provided in the valuation scenario (Kataria et al. 2009).

The institution responsible for the provision of the public good under evaluation is a significant element of the value elicitation protocol since the implementation of an environmental policy involves the interaction of citizens and policy-makers. The choice of institution presents a particular challenge for stated preference practitioners especially when policies under evaluation are not planned to be implemented by existing institutions. In such cases researchers are called to decide on the institutional framework to present in the valuation scenario based on prior knowledge and personal judgement. In a meta-analysis of contingent valuation studies, Schlapfer (2006), reports that only in the 40% of the considered studies

authors are proposing existing institutions in the valuation scenario whereas in the remaining the institutions responsible for the provision of the public good are either hypothetical (31%) or not specified (29%). If, however, the institutional context affects the preference formation process, as other elements of the valuation scenario are found to, disregarding institutional issues, by arbitrarily proposing researcher-chosen institutions or not specifying the institutional framework in the valuation scenario may deter truthful preference elicitation and consequently lead to misinformed policy recommendations. We further argue that a non-credible institution may give rise to institutional bias that can be demonstrated by high protest response rates when this particular institution is employed. Put it differently, respondents may value and be in favour of the environmental good or policy under evaluation but nevertheless declare unwilling to pay because they object to the institutional framework. This is analogous to payment vehicle bias reported in the literature when implausible or objectionable payment mechanisms are selected (Morrison et al. 2000).

Against this background, this paper formally tests the effect of the proposed managing institution on preferences in a choice experiment setting. Specifically, we examine whether respondents' valuation of a forest restoration program in Greece, differs under alternative institutional authorities responsible for the design and management of the project. We discriminate among two institutions, namely an authority that will be under the supervision of an international body, the European Commission, and an authority that will be under the supervision of the national State. Citizens are familiar with both authorities since these are ultimately responsible for the design and management of various environmental projects in Greece. Our null hypothesis is that the institutional body responsible for the design and of the environmental good is neutral to the formation of preferences for the good in

question, whereas our alternative hypothesis is that preferences are sensitive to the institutional context. Following a split-sample approach that explicitly accounts for preference heterogeneity, we cannot reject the null of comparable preferences among the EU and the State samples, indicating that, at least in our case study, the managing institution does not affect choice behaviour. Likewise, WTP estimates were not found statistically different in the two sub-samples. However, higher variability in preferences in the State sample indicates greater uncertainty over preferences when the less trusted institution is employed. As an aside, we examine the presence of institutional bias, which may occur when objectionable institutions are selected,but low protest response rates and received answers to relevant debrief questions provided no such evidence.

Furthermore, the case study examined in this paper, is itself of timely interest, as it is implemented in a fire prone region in Eastern Mediterranean. Southern Europe is extremely vulnerable to fire hazards due to prevailing hot and dry summers, which favour the setting and spreading of fires. Forest fires represent the single most important threat to forest ecosystems in the area with approximately 450.000 ha of forest land being burned on average every year between 2000 and 2006 (European Parliament 2008). The resulting losses for human welfare from the reduction of forest ecosystems capacity to provide goods and services are substantial. However, there is a limited literature addressing welfare losses resulting from forest fires and valuation of relevant recovery policies in Southern Europe and worldwide. The first valuation study examining the impact of fires on forestry values was the one of Vaux et al (1984) while recent applications include Loomis (2004), Kaval et al (2007), Loomis and Gonzalez-Caban (1998), Riera and Mogas (2004) and Riera et al. (2007). Therefore, results under this study are further intended to assist in policy formulation

and promotion of relevant restoration projects in other Southern European countries and elsewhere.

The paper is organized as follows: in the next section we present details on the choice experiment application. Section 3 develops the econometric model while section four presents the results of the analysis. We provide a discussion of the results and the implications for future research in the concluding section of the paper.

2.   Empirical Application

2.1 The Case Study Area

The data we use are employed from a choice experiment study conducted in Athens, Greece to value the restoration of the forest of Parnitha Mountain, a natural area of 39.000 ha, that suffered a severe wildfire in the summer of 2007. The wildfire was of immense severity and its extent and duration were involved in heated political debates over the state of forest management as well as over the efficiency and the ability of the authorities to face emergencies. Figure 1 presents the afflicted area in relation with the Athens Metropolitan area.

[Figure 1 about here]

The forest's vegetation accounts for the one sixth of Greek flora, while its fauna includes many endangered species and is primarily noted for the population of the red deer (*Cervus elaphus*). Due to habitat and species richness, Parnitha Mountain belongs to the NATURA 2000 network (Forest Service of Parnitha). In addition to biodiversity sustenance, the forest provides recreational values for the citizens of

Athens and tourists, regulates the micro-climate of the city and protects from flooding events through regulation of the local hydrological system. (WWF Greece 2007a)

The wildfire of summer 2007 raged for a total of twelve days, from 27/06/2007 to 08/07/2007, and took a great toll on the forest ecosystem due to its immense extent. The fire consumed two thirds of the total forested area corresponding to approximately 4.900 hectares. It is further estimated that approximately 50 deer out of a total of 500 died, while those that survived continue to be under severe threat due to the destruction of their habitat that can no longer sustain their population (Forest Service of Parnitha). Apart from the direct impacts in the forest extent, its flora and fauna, the effect on the Athens Metropolitan area is expected to be substantial. The Forest of Parnitha Mountain was the last remaining natural forested area in proximity to Athens. Air quality in the Athens Metropolitan area is expected to deteriorate considerably over the years to come due to decreased carbon sequestration and emissions of microparticles from the burned areas. The wildfire also reduced the recreational capacity of the mountain and increased the risk of flooding for the nearby urban and industrial area due to the decrease of the vegetation cover pronouncing soil erosion. The micro-climate in the city of Athens and surroundings is also expected to be affected with higher average temperatures especially during the summer period. (European Parliament 2008). Aesthetic values related to the natural beauty of the forest ecosystem are also lost (WWF Greece 2007b)

2.2   Survey Design

Interviews with scientists from the Forest Service of Parnitha and focus groups with residents of the Athens Metropolitan area were conducted to identify the attributes of

a forest restoration program and the relevant levels that were used in the design of the choice experiment. We defined the good to be valued as "The Parnitha Restoration Project". The implementation of an extended restoration project in order to revitalize the area has been under consideration ever since the 2007 wildfires and has gained substantial publicity. The good under evaluation was therefore familiar to the population where the choice experiment was applied. The identified attributes were the area of reforested land, the wildlife restoration level defined in terms of the deer population, the flood risk and the recreation capacity of the forest. All attributes refer to the forest state in ten years time. To allow for welfare changes to be estimated a monetary attribute, in the form of one-off taxation for the residents of Athens Metropolitan Area, was also included. Pretesting of the questionnaire indicated no perceived correlation between attributes. Attributes and their levels are displayed in table 1.

[Table 1 about here]

The reforested area attribute refers to hectares of reforested land that the restoration program implies. The burned area was composed of two types of forest: the lower parts of the mountain were covered by pine forest while the higher parts where dominated by fir forest. The pine forest exhibits self regenerating properties after fire and a relatively short time is necessary for its regeneration. On the other hand, the fir forest in Parnitha is regarded as one of the last exhibits of its kind in Greece and is considered nearly impossible to rejuvenate without external support. The proposed reforestation programme thus considered only the fir forest and could involve the restoration of the entire burned area to its prior state (3.600 hectares) or

half of the affected area (1.800 hectares). At the other extreme, no reforestation could take place and the process would be left to nature.

The flood risk attribute refers to the predicted risk of flooding in the nearby and industrial area during the next decade. The burning of the lower part of the forest that was composed of pine trees removed an important part of the vegetation cover which resulted in increased risk of soil erosion and subsequently increased flooding risk. At present, the risk of flooding is high. If, however, surface barriers are established and maintained until the vegetation naturally recovers, water flow will slow down and the risk of flooding will be reduced. The material proposed for this improvement is wood from the burned trees that would not spoil the aesthetic beauty of the forest.

The recreation attribute refers to facilities that allow the general public to enjoy the forest such as footpaths, bird and wildlife watching centre, picnic areas and toilets. The wildfire destroyed the existing facilities and current infrastructure is low. Should the project be implemented the recreation facilities would be restored to their previous condition.

The wildlife restoration attribute relates to the population of the red deer in the mountain. As already indicated, Parnitha hosts one of the last surviving populations of red deer in Greece. Two levels were identified for this attribute. Red deer population could reach 500 (100% of the former population) or remain 450 (90% of their former population) in the next ten years. The improvement would take place through the establishment of a protected area for feeding and curing endangered species.

To finance the project under evaluation, respondents were told that municipal taxes in the municipalities of the Athens Metropolitan area would increase by a lump sum amount of €25, €50 or €100 in 2010 or remain constant. A pilot open-ended

contingent valuation study conducted before the actual choice experiment implementation guided the selection of the tax levels. The payment vehicle was further perceived as credible and familiar from the general public as focus groups indicated.

We generated a main effects orthogonal design consisting of 32 pair-wise comparisons of forest restoration project profiles which were randomly blocked into four versions. Respondents were faced with eight choice sets consisting of two forest restoration alternatives and a zero priced status quo option under which no management actions would be undertaken. An example of a choice set is provided in table 2. A cyclical design procedure was followed to avoid strictly dominated alternatives (Carlsson et al. 2003a)

The questionnaire comprised of three parts. The first part aimed to explore respondents' attitudes towards goods and services form the forest ecosystem and elicit their perceived threats for its integrity. Furthermore, respondents were asked to report their trust of alternative institutional authorities, namely, the European Union, the Greek State, the Local State and NGOs to manage the restoration project in a five point scale. In the second part the valuation scenario was presented. The current situation was described in terms of the red deer population, the flood risk, the reforestation area and the recreation opportunities. Subsequently respondents were presented with the levels of these attributes and were asked to state their preferred forest restoration alternative among three such alternatives in eight choice sets. Before answering the choice questions respondents were asked to keep in mind their disposable income and other payments they might be making for similar goods and services in order to reduce hypothetical bias. Meanwhile, to render the task more consequential respondents were also told that results can influence real policy-making

and they should thus be particularly careful when making a choice. The questionnaire concluded by collecting standard socioeconomic and demographic characteristics. Data collection took place in March and April 2009 through face-to-face interviews performed by well-trained personnel.

2.3 Managing Authority and Hypothesis

To examine whether the authority responsible for the design and management of the restoration project influences respondents' valuation we followed a split sample approach. In particular, the otherwise identical surveys administered to two separate samples of the population, differed only in the institutional authority that would undertake the design and management of the environmental good. Prior to the description of the attributes, the institutional framework was clearly presented to respondents. Specifically, the script in the case of an authority under EU supervision read as follows[1]: *"In order to restore the Forest of Parnitha Mountain there are plans for the establishment of an independent organization that will operate under the supervision of the European Commission. This organization will design the restoration programme and manage the associated fund with the sole purpose of improving conditions in the mountain for the next decade"*. Respectively, the script for the authority under State supervision read as follows: "*In order to restore the Forest of Parnitha Mountain there are plans for the establishment of an independent organization that will operate under the supervision of the Ministry of the Environment and Public Works[2]. This organization will design the restoration programme and manage the associated fund with the sole purpose of improving conditions in the mountain for the next decade"*. The national State supervised

authority version was administered on a random sample of 232 respondents while the EU authority version was implemented on a random sample of 163 respondents. The difference in sample sizes reflects only a smaller budget for the second round of interviews and not different response rates in the two treatments. The relevant response rates were 62% and 65% for the EU and State sample respectively which compares favourably to the typically reported response rates.

Our null hypothesis is that the responsible managing institution has no significant effect on preferences. Formally,

$$H_0 : \beta_{STATE} = \beta_{EU}$$
$$H_1 : \beta_{STATE} \neq \beta_{EU}$$

If the null can be rejected, practitioners should be cautious with regard to the choice of the institution responsible for the project or policy implementation in the valuation scenario. Focus groups and pretesting at the designing stage would then be needed to guide the choice of the institutional body to formulate a credible and realistic scenario and consequently provide incentives for truthful preference revelation.

3 Model Specification

To allow for unobserved preference heterogeneity among respondents, a random parameters logit model was estimated. This class of models does not exhibit the restrictive Independence of Irrelevant Alternatives hypothesis under which the stochastic part of the utility is not correlated over repeated choices. Under a random

parameters logit specification the utility a respondent i derives from an alternative j in each choice situation t is given by:

$$U_{ijt} = \beta_i X_{jt} + e_{ijt}$$

Where X is a vector of observed attributes associated with each alternative, e_{ijt} is the random component of the utility that is assumed to be independently and identically distributed (iid) and follow a Type 1 extreme value distribution and β_i is the vector of the coefficients for each i which varies in the population with density $f(\beta_i|\theta)$ with θ being the true parameters of the distribution to be estimated. The probability that an individual i chooses alternative j in a choice situation t is:

$$\Pr_{ijt} = \int \left(\frac{\exp \beta_i X_{jt}}{\sum_k \exp \beta_i X_{kt}} \right) f(\beta|\theta) d\beta,$$

which is the integral of a standard logit function over the distribution of the random parameters, $f(\beta|\theta)$. Since exact maximum likelihood function cannot be calculated analytically, simulation techniques are applied to approximate the above probability and thus the simulated log-likelihood is maximized.

An important issue that needs to be addressed in the context of a random parameter model is the choice of the mixing distribution to be assigned to the random parameters. The normal distribution is commonly used in the literature (Kataria 2009; Carlsson et al. 2003b; Hanley et al 2005). Nevertheless, assigning the normal distribution can result in behaviourally inconsistent WTP values since the individual specific parameters can carry a behaviourally meaningless sign (Campbell et al. 2009; Hensher et al. 2005). This is of extreme relevance for our study in which no attribute

is defined as deterioration relative to the status quo and thus we have strong priors that all attributes positively contribute to respondents' utility. Furthermore, the policy measures proposed in our study do not generate negative externalities that could justify willingness to accept compensation for their implementation. To guarantee a positive WTP for the entire range of the parameter distribution we assign a triangular distribution to all random parameters imposing the equality of the location parameter to the scale parameter (Hensher et al. 2003; Hensher et al. 2005; Campbell et al. 2008). To further facilitate the calculation of WTP, the tax coefficient was specified to be non random (Train 2003; Revelt and Train 1998). The models were estimated accounting for the panel nature of the data.

4   Results

4.1   Descriptive Statistics

In order to assess which managing authority is considered to be the most appropriate for managing the forest restoration project, we asked respondents to state in a five-point scale how suitable they think each of a number of institutions namely, the national government, the local government, NGOs and the European Commission is. The second column of Table 3 presents the corresponding ranking of the managing authorities while the third column reports the relevant percentages. The rankings of the different institutions are the same while the relevant percentages do not differ significantly as well for both the EU and the State samples (fourth column) NGOs and environmental organizations are the institutions that respondents consider to be the most suitable to undertake the design and management of the restoration project. The

European Union ranks second while the local government at the municipality level is the third most trusted institution. The central government is considered to be the least suitable.

Table 4 summarizes the socio-demographic characteristics of both samples. Testing suggests that the characteristics of the respondents in the two samples are not statistically different (right column of table 4). The subsequent analysis can therefore attribute potential differences in preferences in the two samples to the managing institution and not to differences in respondents' socioeconomic background.

[Table 3 about here]

[Table 4 about here]

4.2 Random Parameter Logit Estimation

The utility coefficients associated with the forest restoration project attributes from the RPL estimation of the EU subsample, the State subsample and the pooled dataset are reported in the first, second and third columns of table 5, respectively. The estimated coefficients are highly significant for all samples, indicating that the selected attributes are indeed important determinants of individual choice. The coefficients also have the expected positive signs. Respondents are more likely to select alternatives associated with higher reforestation, lower flood risk, higher red deer population and improved recreation facilities while, conforming to economic theory, are less likely to select alternatives with higher tax rate. The negative coefficient on the alternative specific constant indicates that respondents desire to move away from the status quo and in principle favour a restoration program. For the sample presented with the authority under EU supervision wildlife restoration appears

to have the largest impact on individual choice among the binary attributes, while flood risk and recreation follow. On the other hand, flood risk is the most important attribute for the sample presented with the authority under State supervision.

[Table 5 About Here]

In the estimated random utility models the standard deviations of the coefficients are statistical significant indicating that marginal utilities do vary in the population and are indeed correctly treated as random.

4.3 Are preferences sensitive to the institutional context?

To examine whether parameter estimates from the two datasets are systematically different, we employ the grid search procedure proposed by Swait and Louviere (1993). The test isolates scale factor differences of the RPL estimations of the two datasets before comparing the utility coefficients. Table 6 illustrates the Likelihood Ratio statistics for the hypotheses of equal utility parameters and equal scale parameters in the EU and State samples.

The results of the Swait-Louviere test suggest that preferences are not statistically different between the two samples. The hypothesis of equal marginal utilities between the two samples cannot be rejected at 5% level of confidence with a test value of 2.17. The hypothesis of equal scale parameters is, however, rejected with a test value of 4. Given that the surveys implemented on the two samples are identical in every respect but the managing institution we conclude that the authority responsible for the design and management of the public good is not, at least in our

case study, an important factor that influences the preferences formation process. This is an interesting result contributing to the literature on preferences sensitivity to the survey protocol. Findings under this study suggest that the choice of the institution responsible for the implementation of a public project does not influence respondents' preferences.Utility coefficient estimates from the scaled pooled sample (column four of table 5) should be thus considered as being the true values in the population and should subsequently guide policy formulation and cost-benefit analysis.

Drawing, however, the conclusion that researchers should not be cautious when selecting the responsible institution and that focus groups interviews and careful pretesting should not be carried out to confirm the suitability of the proposed institution before the actual survey is employed, is rather risky. We acknowledge that our results can largely be case-study specific given the significance of the proposed restoration program for the citizens of Athens. Indicative to that significance is the fact that the forest has long be know as 'the lungs of Athens' given its proximity to the city centre. The importance of the project to the citizens can be further inferred from the high reported levels of significance attached to the attributes of the forest ecosystem in a relevant attitudinal question as well as the high response rates in both samples. Respondents seem to highly acknowledge the value of the forest to sustain wild fauna and flora, regulate the microclimate in the Athens Metropolitan area and reduce the flood risk in the nearby areas. It is also noteworthy that the great majority, around 87%, has visited the forest at least once implying that the forest constitutes one of the favourite recreational escapes for the Athenians. We argue that results may differ for countries with different cultural and socio-political backgrounds, as well as for different public goods. Further research is clearly needed before firm conclusions are drawn.

Moreover, since the scale parameter is inversely related to the variance of the error term in each model ($\mathrm{var}(e_i) = \dfrac{\pi^2}{6\mu^2}$) we can infer that the noise in the State sample is 1.38 times larger indicating greater uncertainty over preferences when central government is the institution that undertakes the design and management of the restoration project.

With regard to protest responses, the proportion of respondents choosing the status quo option is low in both treatments (2, 15 % and 2, 04 % for the State and EU samples respectively) and the difference is not statistically significant at 95% level. We can therefore derive the conclusion that the managing institution does not affect the rate of acceptance of a management alternative.

[Table 6 about here]

4.4 WTP Estimations

We further examine the effect of the managing institution on the implicit prices that respondents assign to each of the attributes. Implicit prices can be calculated as the ratio of coefficient on each attribute to the coefficient on the monetary attribute, which represents the marginal rate of substitution between the price and the project attribute in question, or the marginal willingness to pay (WTP).Although utility coefficients are confounded by the scale parameter, which indeed differs in the two samples as the Swait-Louviere test suggests, implicit prices are not since the scale parameter is cancelled out in their calculation. Testing for equality in the WTP parameters can thus overcome the difference in variances in the two samples and

allow for conclusions to be drawn. Table 7 reports the marginal WTP values, for each of the forest management project attributes for the EU and State subsample. The standard errors and the corresponding confidence intervals are estimated using the Krinsky-Robb method (Krinsky and Robb 1986).

[Table 7 About Here]

The table reports that respondents in the European commission managed authority sample are WTP in the form of one-off taxation € 4.8 per hectare of reforested land, € 135 in order to adverse the current high flooding levels, € 135 to recover the red deer population and € 38 to restore the recreational capacity of the forest. Respondents in the State sample are WTP € 7 per hectare of reforested land, € 259 to hedge against the flood risk, € 197 to protect the red deer and € 54 for the establishment of facilities for recreational use. Higher WTP estimates under the State supervision scenario could be interpreted as an indication of hypothetical bias arising from low trust levels to the managing authority. Hypothetical bias is a common accuse to values elicited through hypothetical surveys since respondents may perceive the valuation task as being totally inconsequential and thus overstate their willingness to pay (Diamond et al. 1994). To formally examine whether or not marginal WTP are significantly higher in the State sample we apply the complete combinatorial test proposed by Poe et al. (2005). This non-parametric approach involves the calculation of all possible differences between the WTP vectors obtained by the Krinsky-Robb method and the determination of the proportion of negative values to identify the p-value for the hypothesis of WTP equality in the two samples. The null hypothesis cannot be rejected at the 95% level for all attributes (table 8). Poe test results therefore

further support the insensitivity of preferences to the institution that undertakes the design and management of the project under consideration.

[Table 8 around Here]

4.5 Testing for institutional bias

Institutional bias, defined as high protest responses arising from the selection of an objectionable or implausible institution, may occur in our study given the significant difference in the trust levels reported for the two institutions under examination. Even if preferences and implicit prices are not found to be statistically different in the two samples, differences in the protest rates may exist and, if so, should subsequently guide the selection of institution in future valuation studies. To examine the presence of institutional bias, respondents that consistently chose the status quo alternative were asked debriefing questions to identify their potential protestor status. Depending on the sample one of the statements to choose when declaring unwilling to pay read as follows:

'I don't think the EU/ State is to be trusted with the design and management of the restoration project '

Considering the answers in the debriefing statements, in total five protestors were identified in the State sample and three in the EU sample and were excluded from the subsequent analysis. Testing for differences in the protest response rates in the two samples, the null of equality in the rates cannot be rejected in 5% significance level. Besides, none of the protestors in any sample declared mistrust to the relevant institution to have motivated her protestor status implying that institutional bias is not present in this study. Once again an interpretation for this type of behaviour may

relate to the importance of the project for the citizens of Athens which entails the risk of results being largely case study specific.

If the null of equality in the response rates could be rejected and agreement with the statement of institutional mistrust was high there would be indication of institutional bias. Since the institutional framework is a crucial element of the scenario providing, together with the payment vehicle, the context of payment, institutional bias is possible to arise when institutional issues are disregarded by stated preference practitioners. Although not present in this study, authors believe that bias arising from the selection of the institution should be given greater attention and be of higher concern for future valuation studies. The inclusion of a statement in the debrief questions aiming at identifying objections with the institutional context can help in this direction. In the presence of institutional bias responses should be properly recoded to minimize the bias as proposed by Morrison et al (2000) to respond to payment vehicle bias.

5. Discussion- Concluding Remarks

This paper reports the results of a choice experiment aiming to identify whether the institution that undertakes the design and management of the public good according to the survey scenario has a significant impact on individual preferences and the implicit valuation of the good. To formally test the role of institutions in preference formation, two treatments that differed only with regard to the institutional body that would be responsible for the design and management of the proposed forest restoration project were presented to respondents. Testing for equality between the utility parameters of the two datasets we cannot reject the assumption that the managing institution is

neutral to individual choice and valuation when scale differences are accounted for. Specifically we find that individual preferences are not sensitive to whether the EU or the national government is charged as the managing institution. Furthermore, estimated WTP are not statistically different in the two subsamples for all the considered attributes.

However, attitudinal questions indicate that the EU achieves a higher trust score relative to the State for undertaking the design and management of the restoration project. Differences in the trust levels between the two institutions can be largely attributed to corruption as well as poor performance of the State in managing environmental resources. The Greek State is consistently considered to be inherently corrupt. In 2009 when the survey took place Transparency International in its Corruption Perceptions Index, ranked Greece 71th out of 180 countries in terms of transparency. Furthermore, bureaucracy is considered to be an important factor responsible for the mismanagement of public finances. Dissatisfaction with the past performance of the national government in sustainably managing environmental resources and, in particular, adequately responding to forest fires is also high. Wildfires in summer 2007 revealed significant weaknesses in the coordination of the fire-fighting forces from the central government as well as lack of fire-prevention measures and policies (European Parliament 2008). Corruption and poor performance seem to foster trust to the European Union for the design and implementation of environmental projects

One would thus expect higher trust levels in the EU to be translated in differences in preferences and WTP estimates between the two samples. However, the null hypothesis of similar preferences as implied by utility coefficients and implicit prices cannot be rejected in this study. Although a State supervised authority is

considered significantly less suitable for the design and management of the public good, choice behaviour is not found to be affected. We attribute this contradicting result to the importance of the restoration project under evaluation for the citizens of Athens given the intensity of the disaster they experienced that made them indifferent with regard to the institution that would undertake the project given that some action would take place.

To further investigate the role of institutional trust in preference formation a Random Parameters logit model including an interaction term of the price attribute with a dummy indicating trust to the relevant institution was estimated for both samples. The relevant coefficient was insignificant which further supported the conclusion that indeed institutional trust is not a significant determinant of choice[3]. Furthermore, low and statistically insignificant difference in protest response rates in both samples does not provide any indication of institutional bias in this study.

Additional research in this area is, however, clearly needed with case studies implemented in different cultural and institutional contexts to further investigate the effect that the management authority can have on the formation of preferences and implicit WTP for public goods in a choice experiment setting. Meanwhile, focus groups and careful pretesting of the survey should identify the most credible institution to be charged with the management of the good before a valuation study is launched.

Finally, from a valuation perspective, this paper also contributes to the rather limited literature addressing welfare losses from forest fires. Results suggest that the public holds positive and significant values for both use and non-use values generated by forest ecosystems and therefore the restoration of ecosystem functions, severely damaged from major wildfires, is an important task for policy-making.

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Tables

Table 1. Forest management attributes and their levels that were used in the Choice

Experiment

Forest management attribute	Definition	Levels
Wildlife restoration	Population of the red deer	High Low (sq)
Flood risk	Risk of flooding disasters	High (sq) Low
Reforestation	Hectares of proposed reforested land	3.600 hectares 1.800 hectares 0 hectares (sq)
Recreation	Infrastructure supporting recreation in the mountain	High Low (sq)
Monetary attribute	One-off taxation for the citizens of Athens in euros	0 (sq) 25 50 100

[*]sq: corresponds to status quo-current situation.

Table 2: Example of a choice set

Assuming that the following three management strategies were the only choices you had, which one would you prefer?

Management strategy Characteristics	Management strategy A	Management strategy B	Status Quo /Present situation
Reforestation	1800 hectares	3600 hectares	0 hectares
Flood risk	High	Low	High
Wildlife restoration	Low	High	Low
Recreational capacity	Low	High	Low
Tax	25 €	50 €	0 €
I prefer	❑	❑	❑

Table 3: Trust in institutions

Institution responsible to undertake the restoration	Ranking		Percentage of respondents declaring absolute trust (%)		P-value State vs EU
	EU Sample	State Sample	EU Sample	State Sample	
Government	4	4	36	39	0.55
Local government	3	3	48.9	47.2	0.75
NGOs (Greenpeace,	1	1	68	66.2	0.71

WWF)

European Union	2	2	59.4	52.2	0.18

Table 4: Socio-demographic characteristics of the samples

Socio-economics	STATE SAMPLE	EU SAMPLE	P-value
	Mean	Mean	State vs EU
	(Standard Error)	(Standard Error)	
Age (years)	31.84	34.37	0.057
	(12.7)	(13)	
Gender	0.52	0.59	0.14
(0=male,1=female)	(0.51)	(0.49)	
Household size	3.64	3.41	0.07
	(1.13)	(1.3)	
Children (1=child under	0.59	0.37	0.005
18 in household,	(0.84)	(0.68)	
0=otherwise)			
Education (1=tertiary	0.68	0.72	0.054
education and higher,	(0.46)	(0.44)	
0=otherwise)			
Employment (1=in full	0.56	0.63	0.15
time employment,	(0.49)	(0.48)	
0=otherwise)			

Household income (€ per month)	3282 (1671)	3016 (1398)	0.11	
Visit (1= has visited the mountain, 0=otherwise)	0.84 (0.48)	0.89 (0.38)	0.32	
Flooded (1= have been flooded, 0=otherwise)	0.12 (0.34)	0.064 (0.24)	0.58	

Table 5: Results of the RPL model estimation

Attribute	EU Sample	State Sample	Pooled	Pooled with scaling
		Parameter (St Error)		
Reforestation	0.028*** (0.003)	0.018*** (0.002)	0.022*** (0.002)	0.020*** (0.002)
Flood Risk	0.784*** (0.084)	0.661*** (0.061)	0.706*** (0.049)	0.659*** (0.046)
Recreation	0.222*** (0.072)	0.137** (0.055)	0.166*** (0.043)	0.155*** (0.040)
Wildlife restoration	0.787*** (0.080)	0.503*** (0.059)	0.614*** (0.047)	0.575*** (0.044)
Tax	-0.006*** (0.001)	-0.003*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)

Alternative Specific Constant	-1.350^{***}	-1.924^{***}	-1.693^{***}	-1.69735^{***}
	(0.184)	(0.160)	(0.120)	(0.11963693)
Log likelihood	-927.369	-1350.152	-2286.948	-2284.156

***Indicates significance at 1%, **Indicates significance at 5%, *Indicates significance at 10%.

Table 6: results of the Swait-Louviere likelihood test

Hypothesis	LR Statistic	Test Value	Critical Value for x^2 statistic at 5%
$H_1 : \beta_{state} = \beta_{eu} = \beta$	LR=-2 { LL$_{POOLED}$-(LL$_{STATE}$+ LL$_{EU}$)}	2.17	12.592
$H_2 : \mu_{state} = \mu_{eu} = \mu$	LR= -2 (LL$_{POOLED}$-LL$_{SCALED}$)	4	3.841

Table 7: Willingness to Pay Estimates

Attribute	EU Sample	State Sample	Pooled Sample	Pooled Scaled Sample
Reforestation (€/ha)	4.804	7.164	5.690	5.559
	(3.365-7.570)	(4.165-17.888)	(4.127-8.532)	(4.066-8.226)
Flood risk	134.912	259.259	185.190	179.281
	(97.303-210.504)	(160.751-633.393)	(138.842-271.712)	(135.616-260.454)

Wildlife restoration	135.335	197.442	161.017	156.482
	(97.937-208.090)	(121.497-474.037)	(120.430-234.445)	(118.127-225.509)
Recreation	38.103	53.6027	43.564	42.188
	(17.259-68.446)	(17.679-139.856)	(23.960-72.715)	(23.315-70.019)

95% Confidence intervals calculated using the Krinsky-Robb method in parentheses

Table 8: Results of the Poe et al. test

Attribute	P- value for WTP equality in the two samples
Reforestation	0.178
Flood risk	0.051
Wildlife restoration	0,173
Recreation	0.306

Figure Titles

Figure 1: The case study area

Footnotes

1. Translated from the Greek original

2. Has since been dissolved and its services have been allocated to the separate ministry of the Environment and Climate Change, the ministry of Public Works and the Ministry of Development.

3. Models with the interaction term are not presented here but are available from authors upon request