INVESTIGATING THE WILLINGNESS TO PARTICIPATE WITHIN A TARGET POPULATION WITH LOW OPPORTUNITY COST AS A CONTRIBUTION TO HISTORIC MONUMENTS PRESERVATION

O. KOPSIDAS[a*], L. FRAGKOS-LIVANIOS[b*]

[a] *Department of Civil Engineering, Alexander Technological Educational Institute of Thessaloniki, 17th Km Thessaloniki-Sindos, 57 400 Thessaloniki, Greece*

E-mail: *odykopsi@yahoo.gr*

[b] *Division of Natural Sciences and Applications, Hellenic Army Academy, 16 673 Vari, Attiki, Greece*

E-mail: *leonfragos@yahoo.co.uk*

Abstract. We present the results of a survey on a population of 200 conscript soldiers, probing their willingness to participate (WTP) voluntarily to the maintenance and beautification of an archaeological site - the Heraion of Samos- during their military service. The evaluation of this good is impossible in market terms; consequently, a modified version of the Contingent Valuation Method (CVM) was applied. The population was divided in two equal groups. The first group received a questionnaire and were asked to reply without any information on the significance of the particular site. The other half were given informative material. Subsequently, the first group was divided in two equal subgroups. One subgroup was asked to re-fill the same questionnaire following an update in the form of the same informative material (post-questionnaire update). The results indicate strong positive correlation between willingness to participate (WTP) and information. Further, WTP shows positive correlation against age, level of education and locality.

Keywords: ancient monument restoration, parametric approach, willingness to participate (WTP).

AIMS AND BACKGROUND

The Contingent Valuation Method (CVM) is an important tool for the evaluation of abstract non-marketable goods. This technique is basically subjective, attempting to

* For correspondence.

acquire objectivity by extracting opinion/attitude and information/knowledge from a stratified representative sample of interviewees, who are asked by means of a questionnaire to assign a value on a non-marketable (e.g. cultural or environmental) good or an externality (considered as transaction spillover by *laissez-faire* economists like Milton Friedman and Friedrich von Hayek), meaning a benefit or cost not related to market values[1-3]. The main objective of the questionnaire is to 'measure' the willingness of interviewees (i) to pay for a positive and/or (ii) to be paid in order to accept a negative externality (WTP and WTA, respectively)[2,4]. More precisely, WTP reflects the maximum amount in monetary units an individual would pay to acquire the non-marketable good or service under examination, while WTA corresponds to the minimum amount an individual would demand as compensation in order to relinquish this good or service. Conceptually, the CVM might be extended to (or considered to be part of) a corresponding cost-benefit method by relating expenditure (implying capital and operating cost) to benefit, including (but not limited to) externalities[5].

Archaeological sites on a tourist destination such as an island on the Aegean sea present potential both as a cultural as well as socio-cultural resource[6]. Such is the case of the Heraion of Samos, a place of cultural significance on a tourist destination. Cultural tourism can sustain the development of locations through the outlining of the material and immaterial cultural patrimony, emphasising at a superior level the natural potential of the given regions[7]. The Heraion was a large sanctuary dedicated to the goddess Hera, in the southern region of Samos, Greece, 6 km southwest of the ancient city, in a low, marshy river basin near the sea. The Late Archaic Heraion of Samos was the first of the gigantic free-standing Ionic temples, but its predecessors at this site reached back to the Geometric Period of the 8th century BC, or earlier. The site of the temple ruins, with its sole standing column, was designated a joint UNESCO World Heritage Site, along with the nearby Pythagoreion in 1992.

Regarding the opportunity cost of a soldier, in the case of conscripts, the individual soldier is forced to dedicate his time during his military service. By not receiving a salary for this service – or receiving a small, mostly symbolic compensation - he is actually 'paying' in terms of opportunity cost and time. Ignoring other parameters (their contribution to national defense, the acquirement of skills during their military training, opportunities to visit in remote locations, etc.) the conscripts lose the ability to pursue professional or other economic opportunities or to

further their education during their service (by Greek law, it is allowed to study while in service but it is rarely the case, being taxing and unpractical). In this sense, conscripts can be considered a low opportunity cost population.

EXPERIMENTAL

The respondents were soldiers in the area of Samos, serving mandatory military service. Conscripts cannot have professional activity. To them, the participation in the restoration of the archaeological site of the Heraion had no opportunity cost in terms of working hours. As the opportunity cost for labour is zero, the production possibility frontier of each soldier is stable and indicates their availability to participate in the redevelopment of the site with corresponding zero hours of participation in terms of work. Graphically, on a Cartesian plane, this would be represented by a line parallel to the axis of the WTP. In this case WTP is the time allocated to the soldier involved in voluntary work and *L* - the working time of a soldier. The antiquities are treated as public and non-market goods. Conceptually, it is assumed that the demand function for volunteering tends to infinity in the requested units, with voluntary work measured in time. The consent or non-consent of the interviewees in the activity does not involve a cost and the cost of transporting troops is zero as research is conducted *in situ*. The dependent variable WTP is the time dedicated in this activity by the respondents. All other variables are independent. This participation was not motivated. The evaluation of WTP is done *ceteris paribus* for alternatives and parameters that could affect this evaluation. The weather conditions as well as catering for the soldiers are postulated.

Due to the specificity of the responding population - conscript soldiers- the hypothetical appraisal method is applied to a hypothetical economy without money. Time is what was offered and spent. With WTP, the individual willingness for participation is measured, by means of personal work for the restoration of the site. The soldiers have to choose between standard military activities and participation in this voluntary activity.

The research was conducted on people aged between 18-30 years old, of the same sex and of the same nationality. The apparent homogeneity of the population is a systemic characteristic. All Greek male citizens that have completed their 18th year of age are obligated by law to enlist as conscripts. The military service may be

delayed on the excuse of educational responsibilities, undergraduate and postgraduate studies. This leads to a male population aged between 18 and 30. Further, in terms of sampling, all the soldiers in the barracks took part in the survey. Consequently, there was no sampling, the whole population was surveyed. The population was divided in two equal groups. The first group received a questionnaire and were asked to reply without any information on the significance of the particular site. The other half were given informative material ('informed' group).

The effect each factor has to WTP was analysed by means of analysis of variance (ANOVA). To examine the role of information, the Independent-Samples T-Test procedure was applied, comparing the means for two groups[8,9].

To further investigate the correlation of WTP and information, the first group of interviewees was divided into two subgroups, after filling the questionnaires. One subgroup was given informative material on the monument (post-questionnaire update, the same package as the 'informed' group). Then they were asked to refill the same questionnaire. The other subgroup was a control, with no information and no further action whatsoever. The willingness to participate between the two subgroups was analysed by means of the Paired-Samples T-Test procedure.

RESULTS AND DISCUSSION

To probe the opinion the interviewees have regarding the actual location of the archaeological site of site Heraion of Samos, they were asked on the adverse effects caused by the surroundings of the site, the measures taken by the authorities for the protection and maintenance of the site and their preference on the necessary intensity of intervention on the site (Fig. 1). The profile of the population was generated by means of descriptive statistics. The results are shown at Fig. 2. It is worth noting the substantially high percentage -52%- of respondents that have previous experience as volunteers to similar voluntary activity. Another interesting point is the notably high educational level of the population, with 22% having a university degree and 21.5% a postgraduate degree.

In Table 1, the effect of examined factors on WTP is reported, namely, adverse effects (p-value = 0.000 <a = 0.05), visit events (p-value = 0.000 <a = 0.05), age (p-value = 0.001 <a = 0.05), the educational level (p-value = 0.014 <a = 0.05),

and information (p-value = 0.000 <a = 0.05) at 5% significance level. The effect each factor has to WTP was analysed by means of analysis of variance.

To examine the role of information, the WTP between those who received informative material and those who did not was compared. The Independent-Samples t-test procedure was applied. The results of the analysis are shown in Tables 2 and 3. In Table 2, Group statistics is presented by means of descriptive statistical indicators: the size (N) of each group, the average (Mean), the standard deviation (Std. Deviation) and the standard error of the mean (Std. Error Mean). The WTP correlation on information is shown in Table 3. In particular, the updated soldiers (M = 5.9, SD = 3.329) show a greater willingness to participate compared to the soldiers, who were not updated (M = 0.88, SD = 1.241), t (126.013) = 14.130, p = 0.000 <a = 0.05.

At that stage, the t-test compares the means of two variables for a single group. The procedure computes the differences between values of the two variables for each case and tests whether the average differs from 0 (Table 5). As indicated by the t-test for dependent samples, WTP increased when the participants were educated on the significance of the site (M = 3.74, SD = 1.807), compared with when they were ignorant (M = 1.00, SD = 0.000), t (99) = -15.164, p = 0.000 <a = 0.05. In essence, the update caused a shift in opinion, positively affecting WTP (Table 4).

Summarising, the soldiers updated on the history and significance of the archaeological site show a greater willingness to participate than soldiers who do not have the same information (Tables 2 and 4 and Fig. 3*c*).

Educational level and age affect the variable WTP. Respondents with higher education show a greater willingness to participate than those of lower education (Fig. 3*d*). Older respondents show a greater willingness to participate than younger ones (Fig. 3*b*). Locality also plays a role. Interviewees originating from Samos and surrounding islands show a greater willingness to participate than others. The effect of locality on willingness to pay when environmental or cultural preservation is at stake has been shown in previous studies as well[10]. Further, respondents who have previous experience as volunteers are more willing to participate than those, who have not participated.

CONCLUSIONS

The willingness to participate of interviewees in volunteer activity for the redevelopment of the site of the Heraion of Samos verifies an optimum socioeconomic status. The Pareto condition is satisfied and everyone involved in the activity optimize their position without reducing the position of anyone else. The reconstruction of a monument of world cultural heritage is aided. The local community, with the advantage of a restored archaeological site strategically promoted benefits with additional revenue from tourism. The army enhances the acceptance enjoyed by the local community, demonstrates social and cultural sensitivity and strengthens the morale of the soldiers. Local authorities profit from savings and reputation from the end result. Such activities encourage companies to assist- for example by means of food provisions for the volunteers - thus demonstrating Corporate Social Responsibility. Downstream results include educational enhancement of those involved or the residents and visitors on the fields of history and archaeology. In conclusion, the end result constitutes an excellent social solution according to Pareto.

The findings are encouraging for meta-analysis and comparison with other regions. WTP shows a positive correlation against information, age, level of education and locality.

In previous studies, on the evaluation of WTP in monetary units for the redevelopment of the ancient walls of Piraeus[11], respondents showed significantly less willing to participate in voluntary activity, which was restricted from zero to two days with a strong preference for the one day. The two monuments - for the sake of comparison - are of equal cultural significance. Respondents of that previous survey belong to the country workforce. Consequently, any voluntary activity has an opportunity cost in terms of working days (time) for the respondent.

Voluntary activity includes renovation, cleaning and optimization of the archaeological site. The economic value of the monument is measurable, although no insurance company undertakes insurance responsibilities on archaeological monuments. The positive externalities generated by the reformation of an archaeological monument, even though abstract, are recognized by the public. They are an incentive that keeps the marginal propensity to WTP positive. The WTP is the only variable input in terms of volunteer labour. Capital and other factors are considered stable and exogenously defined. The interest and value that society attach

to heritage sites depend on the information the public receives, mainly by means of education and secondly by the media.

REFERENCES

1. A. BEDATE, L.C. HERRERO, J. A. SANZ: Economic Valuation of the Cultural Heritage: Application to Four Case Studies in Spain. J. Cult Herit, **5**, 101 (2004).

2. W. M. HANEMANN: Testing and Calibrating the Measurement of Nonmarket Values for Oil Spills Via the Contingent Valuation Method, Am Econ Rev, **81**, 635 (1991).

3. I. BATEMAN, A. MUNRO, B. RHODES, C. STARMER, R. SUGDEN: A test of the theory of reference-dependent preferences, Q. J. Econ, 112, 479 (1997).

4. J. K. HOROWITZ, K. E. MCCONNELL: Willingness to accept, willingness to pay and the income effect**,** J. Econ. Behav. Organ., **51**, 537-545 (2003).

5. T. C. BROWN: Loss Aversion without the Endowment Effect, and Other Explanations for the WTA–WTP Disparity. J. Econ. Behav. Organ., **57**, 367 (2005).

6. G. ARABATZIS, S. POLYZOS: Contribution of Natural and Socio-cultural Resources in Tourism Development of Mainland Greek Prefectures: a Typology. J Environ Prot Ecol, **9** (2), 446 (2008).

7. G. TIGUA, C. D. FURTUNAB, G. GHEORGHEB: Environmental Management Promotion of the Immaterial Cultural Patrimony for a Lasting Local Development. J Environ Prot Ecol, 14 (4), 1803 (2013).

8. T. F. LIAO: Interpreting Probability Models: Logit, Probit, and Other Generalized Linear Models. SAGE Publications Inc., 1994.

9. S. MENARD: Applied Logistic Regression Analysis, 2nd ed., SAGE Publications Inc., 2001.

10. A. KUBAS, I. H. INAN, H. HURMA, E. R. ERBAY: An Important Role of Local People to Joining Wetland Protection and Analysis of Contingent Valuation Methods. J Environ Prot Ecol, **8** (2), 352 (2007).

11. O. KOPSIDAS, F. BATZIAS: Improvement of Urban Environment and Preservation of Cultural Heritage through Experimental Economics by a Modified Contingent Valuation Method (CVM). In: Recent Research in Energy,

Environment, Devices, Systems, Communications and Computers (Eds S. Chen, N. Mastorakis). WSEAS Press, 2011, 157-162.

Received 18 February 2016
Revised 15 April 2016

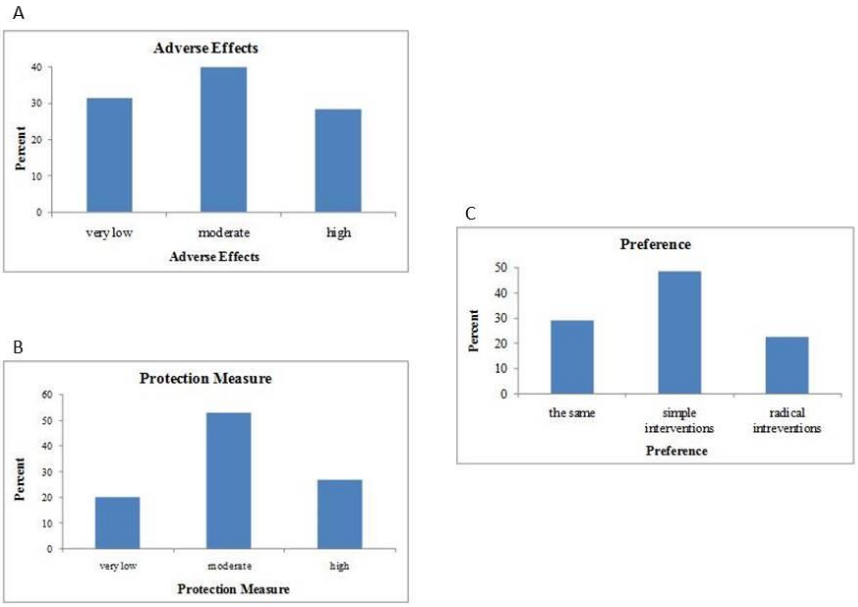

Fig. 1. Opinions regarding the archaeological site Heraion of Samos

A - bar chart for interviewees answers regarding the adverse effects on the monument due to the surrounding environment, natural and anthropogenic (land and buildings): 31.5% of the interviewees believe that the adverse effects are very low, 40% moderate, 28.5% believe they are high; *B* - bar chart for interviewees answers about the measures taken by the Authorities for the protection and maintenance of the site: 20%, 53%, 27% of the interviewees feel that the measures taken by the authorities for the protection and maintenance of the site are negligible, moderate, and high, respectively; *C* - bar chart on preference of intervention on the site: 29% of the interviewees prefer negligible, 48.5% simple/low, 22.5% radical (including further excavation and restoration with expropriations of surrounding properties) intervention

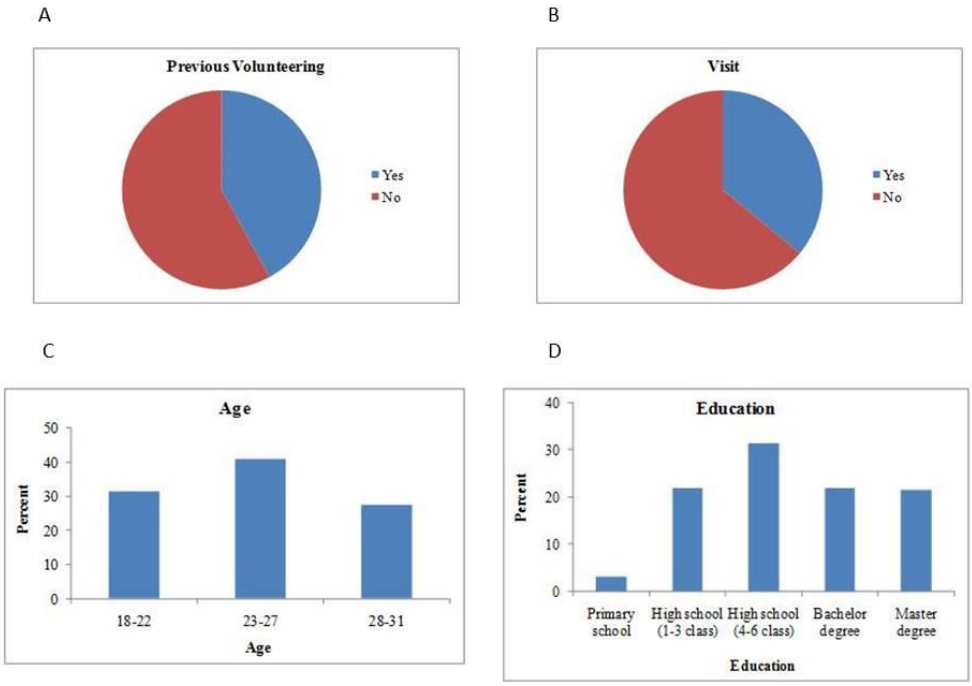

Fig. 2. Interviewees' profile

A - Pie chart for previous volunteering; *B* - Pie chart for previous visits on the site; *C* - Age classes. Interviewees answers regarding their age; *D* - Bar chart for interviewees answers regarding education level

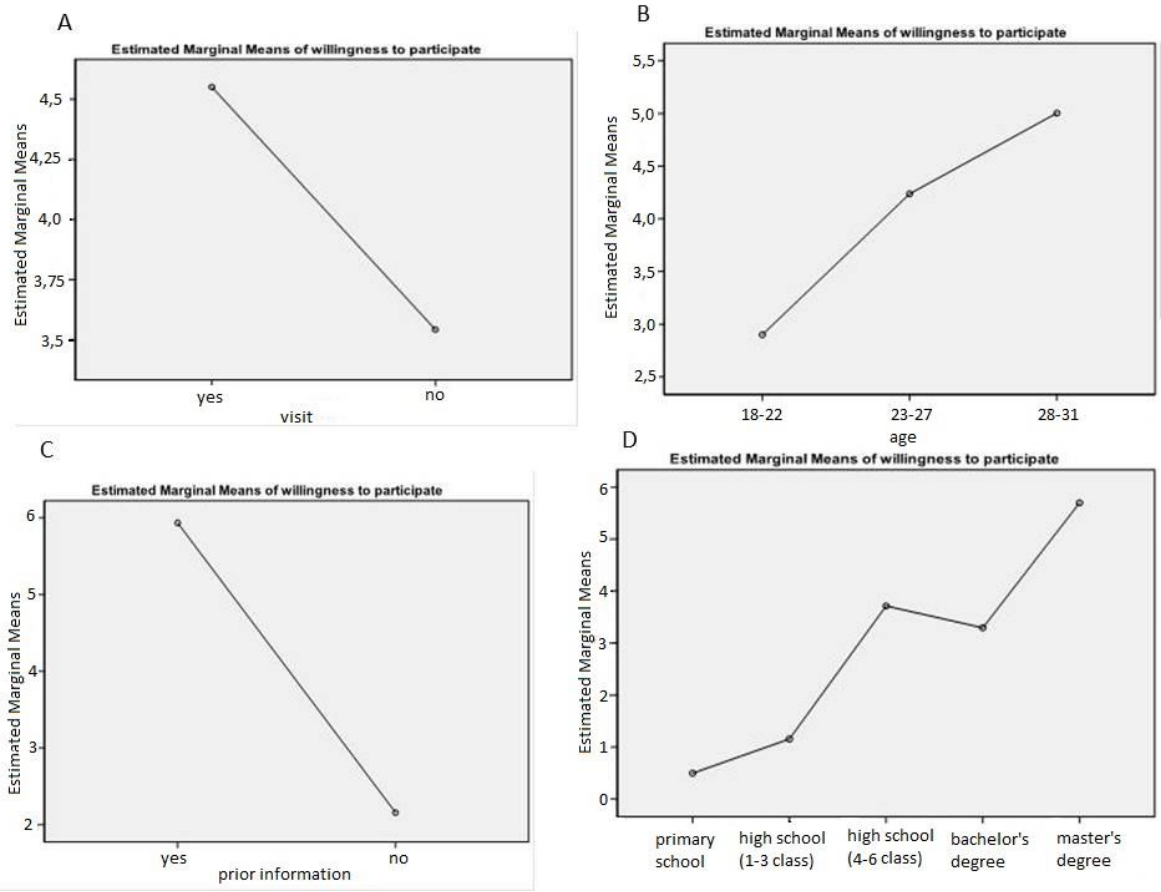

Fig. 3. WTP as a function of population factors (WTP is expressed in time units, namely days)

A - Means plot for interviewees WTP per visit level; *B* - Means plot for interviewees WTP per age level; *C* - Means plot for interviewees WTP before and after information; *D* - Means plot for interviewees WTP per education level

Table 1. Analysis of variance with the dependent variable WTP

Dependent Variable: willingness to participate			
Source	df	*F*	Sig.
Corrected model	15	51.14	0,000
Intercept	1	336	0,000
Protection measure	2	0.534	0.587
Preference	2	0.853	0.428
Adverse effects	2	24.82	0,000
Previous volunteering	1	2.494	0.116
Visit	1	7.598	0.006

Age	2	7.798	0.001
Education	4	3.208	0.014
Information	1	95.05	0,000
Error	184		
Total	200		
Corrected total	199		
R squared = 0.807 (adjusted *R* squared = 0.791)			

Table 2. Averages desire to participate per team update

WTP		N	Mean	SD	SE Mean
Level	Yes	100	5,9	3,329	0,333
	No	100	0,8	1,241	0,124

Table 3. Independent samples *t*-test of WTP by comparing information on whether they have been informed

WTP	*t*	d*f*	*p*-value	Mean difference	SE difference
	14.130	126.013	0.000	5.020	0.355

Table 4. Averages participation desire per information (before and after)

		Mean	*N*	SD	SE mean
WTP	before information	1	100	0.000	0.000
	after information	3.74	100	1.807	0.181

Table 5. Paired samples *t*-test of WTP before and after information

WTP	Mean	SD	SE Mean	*t*	d*f*	*p*-value
Before information - after Information	-2,74	1,807	0,181	-15,164	99	0