Contribution to Historic Monuments Preservation by Investigating the Willingness to Participate within a Target Population with Low Opportunity Cost.

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Abstract

The preservation of cultural heritage is entailing excessive cost (paid by people through taxation) while is a source of additional income for both, the State and the people, due to tourism. Since the evaluation of this good cannot be in market terms, we apply a modified version of the Contingent Valuation Method (CVM), which is frequently used in Experimental Economics, in order to investigate the significance that people put on this good and how much they might be willing to pay for supporting activities concerning the preservation of such antiquities, that also improves the urban environment.A survey where 200 soldiers took part in order to consider whether they wished to participate voluntarily in maintenance and beautification of the site during their military service. Half of them received a questionnaire uninformed about it and half of them were given an update. Then given the questionnaire with informative text and those who completed it previously without notice. This study aims to compare the willingness to participate (WTP) among those, who received the questionnaire uninformed and those, who received a briefing. In addition, it will be checked, whether the willingness to engage of those first given a questionnaire uninformed and those who took after a briefing.

Key-Word: ancient monument restoration, antiquities conservation, Logit model, parametric approach, Probit model, willingness to pay (WTP)

Introduction

The Contingent Valuation method (CVM) is an important technique of the recently established scientific field of Experimental Economics. This technique is basically subjective, attempting to 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 Hayek), meaning a benefit or cost not related to market values [1-3]. The main objective of the questionnaire mentioned above 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)[4-5]. More precisely, WTP reflects the maximum monetary amount an individual would pay to acquire the non-marketable good/ service under examination, while WTA corresponds to the minimum monetary amount an individual would demand as compensation in order to relinquish this good/ service [6-7]. 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 [8].

A survey where 200 soldiers took part in order to consider whether they wished to participate voluntarily in maintenance and beautification of the site during their military service. Half of them received a questionnaire uninformed about it and half of them were given an update. Then given the questionnaire with informative text and those who completed it previously without notice. This study aims to compare the willingness to participate (WTP) among those, who received the questionnaire uninformed and those, who received a briefing. In addition, it will be checked, whether the willingness to engage of those first given a questionnaire uninformed and those who took after a briefing.

Implementation

The respondents were soldiers in the area of Samos, who were serving mandatory military service. Soldiers cannot practice any other job. Therefore their participation in the promotion / restoration of the archaeological site of the Heraion had not for them, opportunity cost of working hours. As the opportunity cost for labor is zero, the production possibility frontier of each soldier is stable and measures how available they are to participate in the redevelopment of the site with corresponding zero hours of participation in terms of work. Graphically this curve is shown with a line passing through parallel to the axis of the WTP. Where WTP: the time allocated to the soldier involved in voluntary work and L: the working time of a soldier.

Due to the fact that the respondents were soldiers, the hypothetical appraisal method is applied to a hypothetical economy without money. Time is what we offered and spent. WithWTP, we try to measure the willingness for participation with personal work of every soldier in the restoration of the site. The soldiers have to choose between employment in military activities and participation in this voluntary activity.

Assessment of preferences revealed in a special class population and an economy without monetary transactions, such as the military. The independent variable WTP is the time involvement of the respondents in this activity. All other variables are dependent. This participation was not motivated. Therefore, the evaluation of WTP is in terms of ceteris paribus for alternatives and parameters that could affect this evaluation. The weather conditions as well as catering for the soldiers are postulated. The research was conducted on people aged between 18-30 years old, of the same sex and of the same nationality.

The antiquities are treated as public and non-market goods. The curve shows the WTP function voluntary work for the restoration of this non-market good. We believe that the demand function of volunteering tends to infinity in the requested units voluntary work measured in time.

The Heraion of Samos 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's ruins, with its sole standing column, was designated a joint UNESCOWorld Heritage Site, along with the nearby Pythagoreion in 1992.

Fig. 1: The ruins of the Heraion (sanctuary to the goddess Hera) on Samos island.

The core myth at the heart of the cult of Hera on Samos is that of her birth. According to the local tradition, the goddess was born under a lygos tree (Vitexagnus-castus, the "chaste-tree"). At the annual Samian festival called the Toneia, the "binding", the cult image of Hera was ceremonially bound with lygos branches. The tree still featured on the coinage of Samos in Roman times.

Fig.2: Ruins of Samia Hera

Many construction phases are known, identified in part through fragments of roof tiles, the first phase dating to the 8th century BC. The first temple, the Hekatompedos, was roughly 100 feet (30 m) long and narrow; it consisted of three walls and an interior central line of columns to support a roof structure. A much larger temple was built by the architects Rhoikos and Theodoros ca. 570-550 BC. The temple stood opposite the cultaltar of Hera in her walled and gated temenos. It was a dipteral temple, that is with a portico of two columns deep, which surrounded entirely ‘peripteral’. It had a deep square-roofed ‘pronaos’ in front of a closed ‘cella’. ‘Cella’ and pronaos were divided into three equal aisles by two rows of columns that went down the pronaos and through the temple. The result was that Hera was worshipped in a temple fitted within a stylized grove of columns, eight across and twenty-one deep. The columns stood on unusual torus bases that were horizontally fluted. The Rhoikos temple "must have had central significance for the development of monumental Ionic architecture", Helmut Kyrieleis observes.

Firstly, we applied descriptive statistics to examine the profile of the sample.

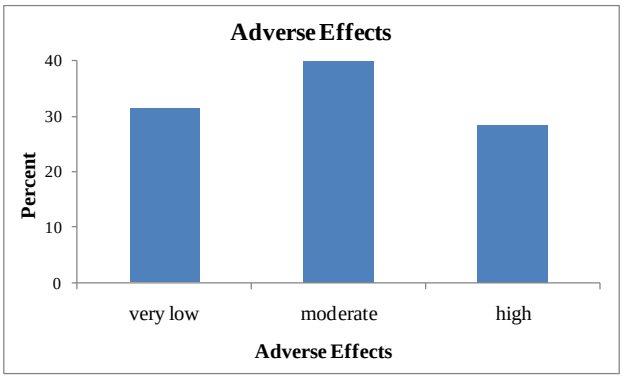

Fig 3: Bar chart for interviewees’ answers about the adverse effects described in the text.

In Fig. 3, it is shown that 31.5%, 40%, 28.5% of the interviewees believe that the adverse effects (on the monument) of the surrounding the archaeological site natural and anthropogenic environment (land and buildings) are very low, moderate, and high, respectively.

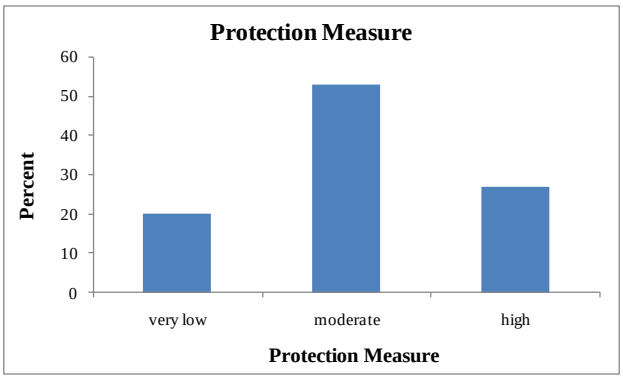

Fig.4: Bar chart for interviewees' answers about the measures taken by the Authorities for the protection and maintenance of the site.

In Fig. 4, it is shown that 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.

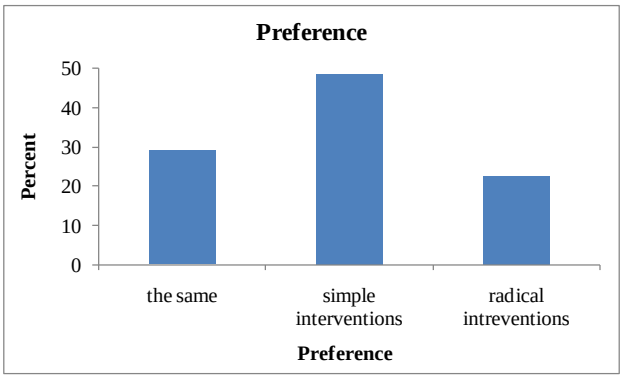

Fig.5: Bar chart for interviewees' answers about the preference.

In Fig. 5, it is shown that 29%, 48.5%, 22.5% of the interviewees prefer negligible, simple/low, and radical (including further excavation and restoration with expropriations of surrounding properties) intervention, respectively.

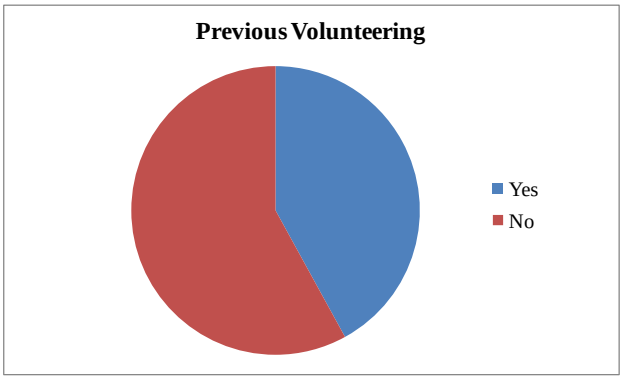

Fig.6: Pie chart for previous volunteering

It can be observed that 58% of the subjects have volunteered in the past to similar voluntary activity while 42% have not participated.

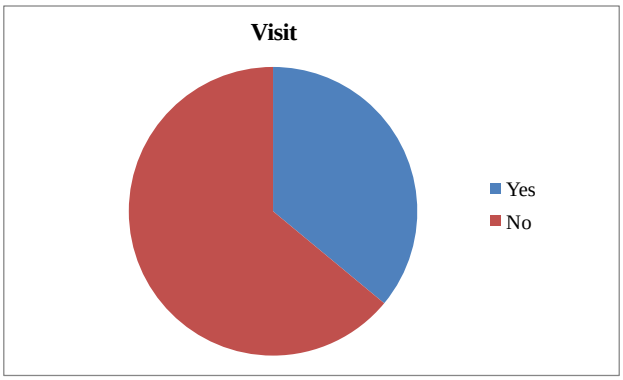

Fig.7: Pie chart for visiting

According to Figure 5, we observe that 36% of the subjects have visited this archaeological site while 64% have not visited it.

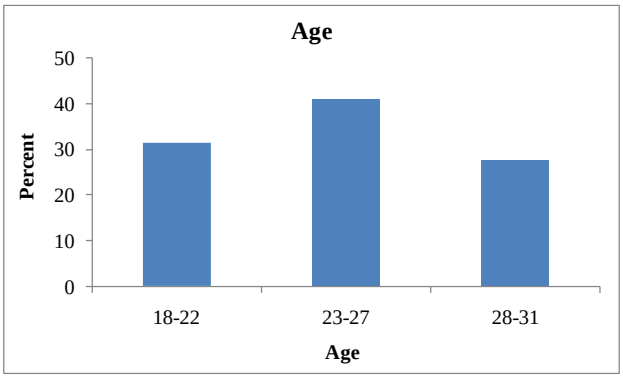

Fig.8: Bar chart for interviewees' answers as regards age.

In Fig. 8, it is shown that 31.5%, 41%, 27.5% of respondents were aged from 18 to 22years, 23 to 47 years and 28 to 31 years, respectively.

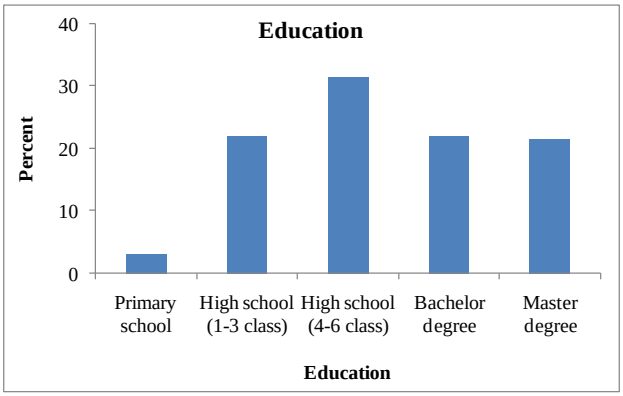

Fig.9: Bar chart for interviewees' answers regarding education level.

In Fig. 9, it is shown that 3%, 22% , 31.5%, 22% and 21.5% of the sample studied until elementary school, until high school (1-3 class), until high school (4-6 class), have a university or technological degree and have postgraduate studies, respectively.

Then we apply an analysis of variance to examine if the factors affect the WTP.

The Analysis of Variance (ANOVA) allows you to model the value of a dependent scale variable based on its relationship to categorical predictors. It is used in the ANOVA F-statistic, that is a ratio of the Between Group Variaton divided by the Within Group Variation. The F-Statistic is computed as follows:

$$F = \frac{Between}{Within} = \frac{MSG}{MSE} \quad (1)$$

Where, the MSG is the variation between groups and MSE is the variation within groups. The MSG is the difference between its group mean and the overall mean as it is shown below:

$$\left(\bar{x}_i - \bar{x}\right)^2 \quad (2)$$

and the MSE is the difference between that value and the mean of its group as it is shown below:

$$\left(x_{ij} - \bar{x}_i\right)^2 \quad (3)$$

where: is the mean for entire data set, xij is the value for individual j in group I and

$\bar{x}$

$\bar{x}_i$

is the mean for group i.

In Table 1, it is shown that the WTP is affected by adverse effects (p-value = 0.000 <a = 0.05), the visit (p-value = 0.000 <a = 0.05), the 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.

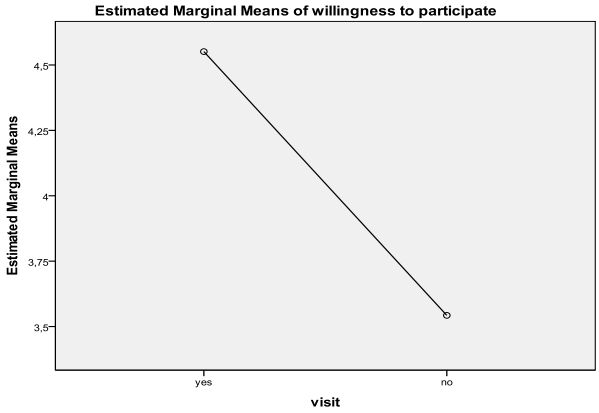

Fig. 10: Means Plot for interviewees' WTP per Visit Level.

In Fig.10, it is shown that those, who have participated in the past voluntary activity, are more willing to participate than those, who have not participated.

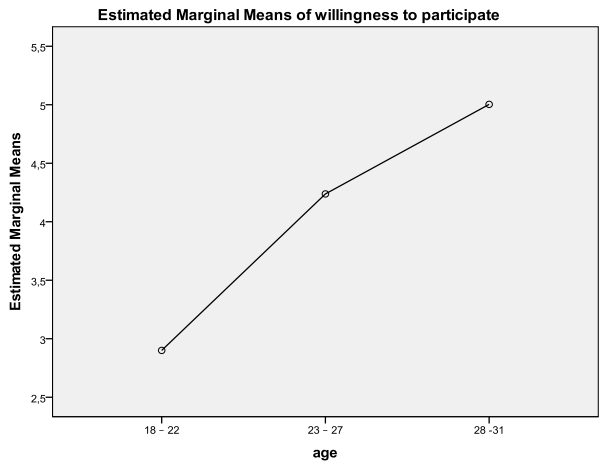

Fig.11: Means Plot for interviewees' WTP per age level.

In Fig.11, it is shown that as age increased; the interviewees are more willing to participate.

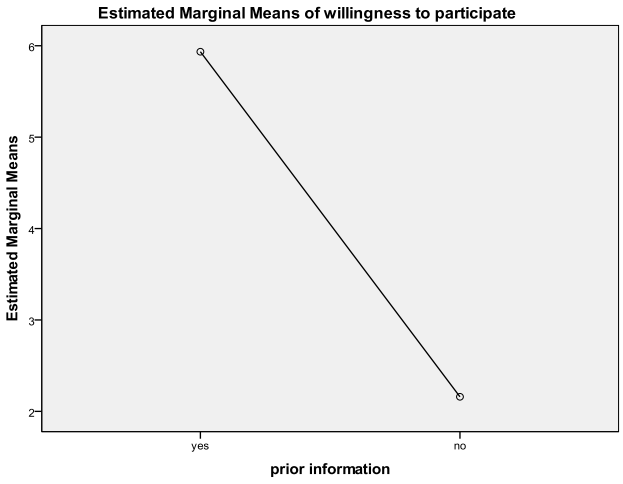

Fig.12: Means Plot for interviewees' WTP before and after Information.

In Fig.12, it is shown that those, who have been informed of the archaeological site, are more willing to participate than those, who are not informed.

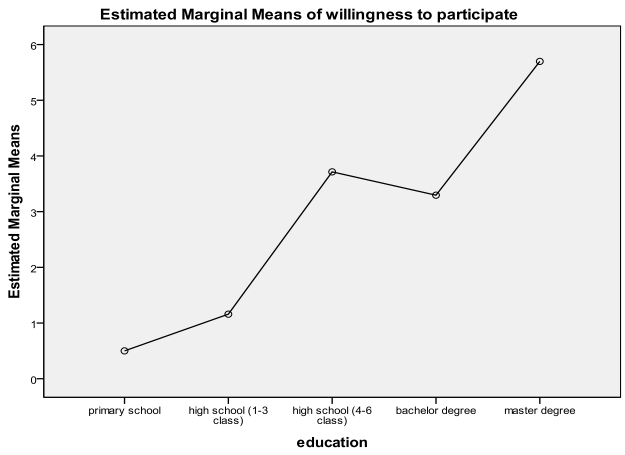

Fig.13: Means Plot for interviewees' WTP per Education Level.

In Fig.13, it is shown that as the educational level increased; the interviewees are more willing to participate.

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)			

Then we will check again when the willingness to participate (the WTP) varies between those who were given information and between those that were not given information. The Independent-Samples T-Test procedure is applied, that compares the means for two groups of cases. The T-Statistic is as follows:

(4)

$$t_{diff} = \frac{(\bar{y}_1 - \bar{y}_2) - (\mu_1 - \mu_2)}{est\sigma_{diff}}$$

where:

$$est.\sigma_{diff} = \sqrt{\frac{(N_1 - 1)s_1^2 + (N_2 - 1)s_2^2}{N_1 + N_2 - 2}\left[\frac{N_1 + N_2}{N_1 N_2}\right]}$$

(5)

The soldiers who were informed about the history and significance of the archaeological site show a greater willingness to participate than soldiers who do not have the same information.

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

The results of the analysis are shown in two tables. In Table 2, Group statistics appear 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).

Table 3:Independent Samples T - test of WTP by comparing information on whether they have been informed.

WTP	t	df	p-value	MeanDifference	SE Difference
	14.130	126.013	0.000	5.020	0.355

In Table 3, it is shown that the willingness to participate differs between those, who were given information and those, who were not given information. In particular, the soldiers were given information (M = 5.9 SD = 3.329) have a greater willingness to participate compared to the soldiers, who were not given information (M = 0.88, SD = 1.241), t (126.013) = 14.130, p = 0.000 <a = 0.05.
Then, we will compare the willingness to participate in those, who were not given information with those, who were given information. The Paired-Samples T-Test procedure is used.

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

		Mean	N	SD	SE Mean
WTP	BeforeInformation	1	100	0.000	0.000
	AfterInformation	3.74	100	1.807	0.181

In Table 4, descriptive statistics are estimated such as averages (Mean), sample size (N), standard deviations (Std. Deviation), standard error of the means (Std. Error Mean).

Table 5: Paired Samples T - test of WTP before and after Information

WTP	Mean	SD	SE Mean	t	df	p-value
BeforeInformation - AfterInformation	-2,74	1,807	0,181	-15,164	99	0

In Table 5, it is used the Paired-Samples T-Test procedure, that 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. The T-Statistic is estimated as follows:

$$t_{diff} = \frac{(\bar{y}_1 - \bar{y}_2) - (\mu_1 - \mu_2)}{est\sigma_{diff}} \quad (6)$$

where:

$$t = \frac{\overline{D} - E(\overline{D})}{est.\sigma_{MD}} \quad (7)$$

$$\overline{D} = \frac{\sum(D_i)}{N} \quad (8)$$

$$s_D^2 = \frac{\sum(D_i - \overline{D})^2}{N-1} \quad (9)$$

$$est.\sigma_{MD} = \frac{s_D}{\sqrt{N}} \quad (10)$$

As indicated by the t test for dependent samples, the willingness to participate was higher when they were given information (M = 3.74, SD = 1.807), compared with when they were not given (M = 1,00, SD = 0.000), t (99) = -15.164, p = 0.000 <a = 0.05.

The valuation of the participation in restoration of such an important archaeological monument is a marker for assessing the value included the ancient monuments of cultural heritage of the Greeks nowadays. The level of education and age affect the variable WTP. Thus respondents who have received higher education and are older, show a greater willingness to participate than those who have received less education and are younger. If the interviewees come from Samos and the surrounding islands this plays an important role. Thus, the interviewees originating from Samos and surrounding islands show a greater willingness to participate than others.

The willingness to participate of interviewees in volunteer activity for the redevelopment of the site of the Heraion of Samos verifies an optimal socioeconomic status. The Pareto condition is satisfied and everyone involved in the activity optimize their position without reducing the position of anyone. Thus interviewees participate in a reconstruction of the monument of world cultural heritage. The local community benefits by highlighting the monument because of tourism. The army in this activity enhances the confidence enjoyed by the local community and strengthens the morale of soldiers. Local authorities are gaining benefits from savings and from the demonstration project. Downstream, enhanced learning, knowledge of history, archaeology, and the emergence of classical antiquity. In conclusion, the system results in excellent socio solution in Pareto. Such activities reinforce companies to assist with food provisions for volunteers thereby enhancing their actions within a Corporate Social Responsibility.

The antiquities are treated as public and non-market goods. The curve shows the WTP function voluntary work for the restoration of this non-market good. We believe that the demand function volunteering tends to infinity in the requested units 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 findings are encouraging for meta-analysis and comparison with other regions. The maximization of local social welfare is a strong incentive to make the activity assumed in Method Hypothetical Assessment implemented. In a cashless economy , participation in voluntary activity involves an opportunity cost in terms of working time , the survey results would be different and hardly identifiable as the WTP is not determined uniquely in this case and does not apply to the theoretical condition *ceteris paribus*.

Conclusion

In previous research, we worked on for the evaluation of WTP in monetary units for the redevelopment of the ancient walls of Piraeus, respondents showed significantly less willingness to participate in voluntary activity, which was restricted from zero to two days with a strong preference for the one day. Monuments for the sake of comparison are of equal historical importance and respondents now belong to the category of the country's workforce. So any voluntary activity has an opportunity cost in terms of working day (time) for the respondent. Voluntary activity including renovation, cleaning and storage of archaeological monument.In the model, the economic value of the monument is measurable although no insurance company undertakes no insurance archaeological monument. The positive externalities that displays the reformation of an archaeological monument, an incentive to continue operating for this reason that the marginal propensity to WTP is positive. The regeneration of the archaeological monument, the WTP is the only variable input of volunteer labor, capital and other factors considered stable and exogenously defined.

Generally, the interest of society and the value they give to heritage sites supported by the education system and the media to inform the public. The rehabilitation and protection is everyone's responsibility.

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