Chapter 6: A Choice Experiment for the Estimation of the Economic Value of the River Ecosystem: Management Policies for Sustaining NATURA (2000) species and the Coastal Environment.

[1]Koundouri, P., [2]Scarpa, R., [1]Stithou, M.
[1]Athens University of Economics and Business, GREECE
[2]Waikato Management School, NEW ZEALAND

The valuation method of Choice Experiments (CEs) is often used for the economic valuation of natural areas with several nonmarket features that are either degraded or under-degradation. This method can be used to obtain estimates of Willingness-to-Pay (WTP) for the sustainability of several features of natural ecosystems. In particular, the CE method is a survey-based nonmarket valuation technique which can be used to estimate the total economic value of an environmental good in the form of a stock or a service flow as well as the value of its component attributes. Particularly, the bundle of improvements that have been valued in the Asopos water catchment and presented in this chapter is a mixture of use and non-use values. These include: (*a*) environmental conditions described in terms of ecological status in all water bodies of the catchment, (*b*) impact on the local economy in terms of tourism/recreation, demand for local production and cost of living for households and (*c*) impact on human health described as availability of water with a quality and quantity sufficient for satisfying different local uses. It should be also noted that the survey has been administered in samples of respondents from both the Asopos catchment area (more rural) and the Athens area (more urban), since there is the belief that residents of the Asopos River Basin (RB) are not the only ones who would benefit from the environmental improvements taking place in Asopos area. From a broader policy perspective the goal is to derive estimates of values to inform a cost-effectiveness analysis for the determination of the optimal program of measures as suggested in the content of Article 11 of Water Framework Directive (WFD).

1. Introduction

As described in Chapter 1 the river Asopos runs across the Eastern river basin district of Greece, which is located about 60 km north of Athens and it is one of the 14 water basin districts of the country. The catchment of the river Asopos covers an area of 724 km^2 and it is one of the 3 catchments of the Eastern river basin district. Chapters 2 of this volume offered a description of the socio-economic characteristics of current developmental pressures on the Asopos RB.

In this chapter it was discussed how the Asopos hydrometric area bears witness to the degradation which was mostly caused by unregulated human activity and took place despite the obviously high ecological value of the basin area. The Asopos River is a tributary to a sea-water lake of significant ecological importance which hosts rare habitats for protected fauna and for transient populations of migrating birds that use it as a temporary resort during their migration to and from distant locations. Therefore, in the Asopos estuary and in the nearby wetland of Oropos, which is the second most important wetland of Attiki, bird wildlife is particularly important. The wetland is to support a habitat which hosts an estimated number of more than 140 bird species, many of which are protected by EU legislation[1], and they comprise raptors, herons, waterfowl present during the winter (November to February), waders all year round, with their peak during migration in winter. Important is considered the presence of *Larus melanocephalus*

[1] 31 are listed in Annex I of Directive 79/409/EEC(1) while in the area the following reproduce: Charadrius alexandrinus, Himantopus himantopus, Sterna albifrons and Calandrella brachydactyla.

that is endangered according to the Red Data Book, among others. What makes the whole of this area an important migratory passage is its relative scarcity and difficult substitutability, since it is one of the few remaining wetlands of Attiki. In addition, the areas by the sea-water lake and the nearby coastal zone represent a significant tourist attraction where different recreational activities take place. As reported in Chapter 4 the tourist area of Asopos RB is mainly consisted of vacation or second residences. The number of vacation or second residences is 16,267 and is the 37.6% of the total residences in Asopos RB. It is worth noting that from the total of second or vacation residences most of them are located in the coastal areas of the Municipalities. A further impact is the decreased demand for the local agricultural production and the high cost of living that the households face as a consequence of not having access to clean water which have seriously affected the local economy.

The purpose of this chapter is to report the results of a multi-attribute stated preference choice survey specifically designed to estimate the use and non-use values that the two sub-populations of residents in Asopos and Athens hold for the general improvements that can be brought about in the Asopos catchment. Hence, the non-market valuation method of CEs was used to estimate the WTP for changes in selected attributes (environmental conditions, impact on the economy and changes in potential water uses) consistent with the major problems identified above under alternative future scenarios.

Apart from the need to evaluate the socio-economic and environmental impacts related to the basin's degradation, this study also aimed to explore how the two different populations, the rural population resident in Asopos and the urban population resident in Athens, value the same set of proposed improvements. Another reason apart from the socio-demographic composition that has motivated this sampling is the different way those populations experience the environmental degradation due to location and economic dependence on the area.

Residents of Asopos and of Athens differ in various ways making optimal policy design that can satisfy the needs of both populations challenging. Athens is the national capital city, with a population of 3 million while Asopos basin has a much smaller permanent population of only 70,575. In addition, the populations differ in their demographic composition. For example, in Asopos 24% of the resident population aged 15 or over is employed in the primary and secondary sector while only 18% in the tertiary sector. In Athens these proportions change by a factor of 2, with 11% of the equivalent aged population occupied in the primary and secondary sectors while 32% in the tertiary sector. In addition, different average educational attainments are expected in the two populations.

The allegedly polluting industrial facilities located in the area crossed by the Asopos River have been targeted by local people as the source of major environmental degradation and health problems. However, the economy of the local community is highly dependent on the functioning of such facilities to support the local industrial activity. Nevertheless, a big part of the population feels that the cost borne by the local community is intolerably high when compared with the benefits produced by the local industrial activity.

Up until 2004, drinking water qualitative analyses were limited to microbiological and chemical controls. At the same time, a local mobilization started with information reaching EU through reports and complaints and written questions by members of the European Parliament. Local people pressured the government to conduct more detailed chemical analysis because of fear of the water being polluted by the highly toxic hexavalent chromium. The rigidity of the government and local authorities to provide any official response, induced mistrust in the local population towards the so-called “expert knowledge” behind the official positions held on the issue by the government and by private companies. This eventually led to a widespread mistrust on the scientific validity of the technical reports which tended to underplay the severity of the water pollution problem (Passali, 2009). The government tended, at least at first, to deny the severity of the problem and appeared unwilling to embrace legal action against polluters and enforce adequate legislation. This in turn, reinforced public’s mistrust. Nowadays the Asopos River anti-pollution movement has attracted the attention of several media raising public awareness about the problem. As a result, the country has become aware of the actual dimension of the pollution problem in the area sympathising with the resident population.

Considering the socio-economic differences, the scale of the problem, the populations’ personal experiences, their economic dependence on the area as well as the political implications associated with the management of the Asopos RB, makes it interesting to explore how the two populations form their values related to the same set of proposed categories of improvement.

2. Data and survey design and description

Because the study’s objective was to investigate use and non-use values, the target population was defined as the residents in the survey location, the Asopos basin, as they will be affected by changes in water management as well the residents of Athens which is in close proximity to the basin. Interviews took place in households and one adult per house participated. Quota sampling was followed according to 2001 Census data in order for the samples to be as representative as possible of the targeted population and every forth residence was called.

The survey design followed the recommended five steps for the conduct of a CE survey for the purpose of non-market valuation. That is, the selection of attributes, the definition of attribute levels, the choice of the experimental design to allocate alternative scenarios to choice tasks to present to respondents, and the elicitation of preferences by asking respondents to rank the alternative scenarios in each choice task.

As it became evident from the extensive analysis presented in the early chapters of the book the main impacts of the degradation of the area affect the environment, the local economy and human health. As a result, when selecting the CE attributes these dimensions were those primarily considered in the development of the scenario descriptions to be used in the survey design. The attributes and their levels associated with different management options are presented in Table 1.

Table 1: Attributes and levels

Attribute	Some Policy action/improvement	*Status Quo* (Option A)	Variable Name
Environmental condition	Moderate, Good	Bad	
Impact on local economy	Improved by 2015, Positive by 2027	Negative today	
Human health	Water suitable for all uses (drinking, cooking and irrigation), water suitable for	Water not suitable for drinking, cooking and irrigation	

	some uses (drinking and cooking)	
Cost € (Tri-monthly water bill per household for the next 15 years)	2,4,6,8,12	0

Suitable showcards to depict each alternative scenario with pictures were prepared, each accompanied by simple descriptions that were read aloud during the questionnaire administration, which was administered by door-to-door interviews. So, this allowed enumerators to better illustrate policy outcomes to respondents in terms of attributes and levels. In particular, one showcard described the environmental condition of Asopos RB explaining the three water quality levels named as “Bad”, “Moderate” and “Good” with regard to the river, Oropos lagoon, coastline, and groundwater, respectively. The second card described in three levels (Negative, Improved by 2015, Positive by 2027) the situation of the local economy in terms of tourism/recreation, demand for local products and cost of living for households. Other material used was a map of the RB showing its geography.

All non-monetary attributes had two levels of policy action, while a third level was associated with the no action option (Option A) (Figure 1), which was used as the *status quo* outcome. This alternative was included in all choice sets and represented the outcome of no intervention and hence no cost to the residents. Five levels of cost were used. The payment vehicle proposed to respondents was an increase in the water bill to be paid per household and per year for the next 15 years. In addition it was stated that money will be collected in a fund run by an organisation specifically established for the improvement and conservation of Asopos’ catchment, while an independent body such as EU will assure that money will be spent for that purpose.A preliminary pilot study of 30 randomly selected residents in each site (Asopos and Athens) was carried out to test the questionnaire and collect the priors to be used in the experimental design for the final survey. For the priors the employed design had 6 blocks of 12 choice cards.

	Option A	Option B	Option C	Option D	Option E
Environmental condition	Bad	Bad	Good	Bad	Moderate
Impact on local economy	Negative today	Improved by 2015	Positive by 2027	Improved by 2015	Negative today
Human health	~~Drinking~~ ~~Cooking~~ ~~Irrigation~~	**Drinking Cooking Irrigation**	~~Drinking~~ ~~Cooking~~ ~~Irrigation~~	**Drinking Cooking Irrigation**	~~Drinking~~ ~~Cooking~~ ~~Irrigation~~
Cost (Tri-monthly water bill per household for the next 15 years)	0	4	6	6	4
1. Which option do you prefer most?	☐	☐	☐	☐	☐
2. Which option do you prefer least?	☐	☐	☐	☐	☐
3. Which one from the three remaining do you prefer most?	☐	☐	☐	☐	☐
4. Which one from the two remaining do you prefer least?	☐	☐	☐	☐	☐

Figure 1: Example of a choice card

The method used to extract from the full factorial the 36 choice tasks used in the experiment was based on the minimization of the expected D-error. The D-error is the determinant of the asymptotic variance-covariance matrix of the multinomial logit model (Sandor and Wedel 2001, Ferrini and Scarpa 2007, Rose and Bliemer 2009). For the standard multinomial logit the D-error is a function of the design matrix and of the values of the utility coefficients and the specification of the model, but not of the dependent variable defining choice. Starting from assumptions (Bayesian priors) on the values of the utility coefficients, as derived from the pilot study, and on their distributions (in our case multivariate normal) we computed this expectation and run a search to minimize the value of its determinant over the space of the design matrix values. This was executed using the Ngene Software, which is specialized software for stated choice design. Importantly, the design was obtained by assuming an indirect utility dummy coded, so that the design variables were not expressed on the levels.

The response task was framed as a sequential choice process, with respondents instructed to choose the most preferred alternative out of the initial 5 alternatives in the choice set. This best alternative was then excluded from the choice set. Then they were asked to select the least preferred out of the remaining 4, which was also excluded. This process was repeated for the remaining three alternatives from which the respondent selected the second most preferred out of the remaining 3, and finally the second least preferred out of 2. This approach is called the "repeated best-worst" approach and gives rise to a full preference ranking of the five alternatives in the choice set. Focusing on the preference extremes (best and worst) is believed to be less cognitively taxing for the respondent than alternative approaches (Scarpa et al, 2011).

Data for the final survey were collected from September to October 2011 by trained interviewers. The final useable samples collected consisted of 150 respondents from Asopos RB and 150 from Athens. The average completion time for an interview across those who completed the ranking tasks was 30 minutes.

3. Method

As stated before the objective of the study is that of estimating marginal WTP for different attribute and attribute levels as described in the scenarios presented to respondents for the two sub-populations of Athens and Asopos. In the analyses presented here we used only choices from the first and second best, rather than using the whole set of repeated best/worst observations. Selection of the best option gives rise to random utility maximization consistent logit probabilities (McFadden, 1974), while selection of worst alternatives does not. So, the pseudo-choice sets used here were 24 for each respondent, 12 pseudo-choice sets provided by the best selections from 5 alternatives (first round of bests) and the other 12 pseudo-choice sets by the best selections from 3 alternatives (second round of bests).

We used a piece-wise linear coding to capture the effects on utility of increasingly larger improvements on the three attributes of interest. Piece-wise coding allows the analyst to estimate coefficients related to marginal improvements on a scale of monotonic changes. Attribute levels here offered two sets of gradual improvements. The coding for a 2 step improvement, as the one adopted here, is as follows: baseline (0,0), first level of improvement (1,0), maximum improvement (1,1). As can be seen the maximum improvement recognises that a previous first level of improvement was already in place by maintaining a value of 1 in the first column. As a consequence the value of the beta coefficient associated with this extreme improvement captures only the further effect beyond that captured by the beta of the first level of improvement. This is in contrast with the standard dummy variable approach in which the coding of the maximum improvement would be (0,1), and therefore the utility coefficient would capture the jump in utility from the baseline. Piece-wise coding imposes consistency with weak monotonicity across coefficient estimates, while dummy coding does not. For example, consider the levels of the attribute Environmental Condition which are “Bad” (the current level), “Moderate” (a potential future level, in our language the first level of improvement) and “Good” (the extreme improvement level). Because the first level is in common between the coding of the “Moderate” and “Good” the coefficient on “Good” will capture only the utility effect that this further improvement produces beyond that captured in a “moderate” improvement.

In terms of the specification used, given our objectives, we estimated a linear indirect utility function for each of the two subsamples. We do this in two different selections of the sub-samples. The first includes all respondents, while the second excludes those that displayed a serial non-participation choice behaviour. That is, all those that consistently chose the status-quo condition across all 12 first best decisions on the full set choice tasks. For these respondents the alternative to the status-quo offering various improved scenarios were never sufficiently appealing to motivate a payment. So, we have two models, one estimated on a sample *with* and another *without* serial non-participants, for each of the two sub-populations of beneficiaries (Athens and Asopos). Estimates of WTPs for the different levels of policy attributes are then derived from each of these models. Finally, we look at overlapping confidence intervals across marginal WTP estimates between the two samples to see which of these are statistically different from each other.

4. Results and discussion[2]

The results of the analyses show that in both sub-samples the exclusion of serial non-participants produces an increase in the model fit and are reported in Tables 2 for Athens and 3 for Asopos (samples with all respondents) and in Table 4 for Athens and 5 for Asopos (samples without serial non-participants). This is shown by looking at the average AIC value that decreases from 2.326 to 2.095 in the Athens sub-sample and from 2.301 to 1.961 in the Asopos one. Furthermore, the ASC for the *status quo* is never significant in the models without serial non-participants. This indicates that when these respondents are removed there is no systematic effect to stay with the current condition and avoid the proposed alternative scenarios.

The cost coefficient is negative and significant in all models, allowing the derivation of welfare estimates. While our expectation was to find all positive signs in the utility coefficients, we note that for the extreme improvement of the local economy (positive in 2027) we obtain a negative and significant sign. What this sign tells us is that with respect to the utility impact of the intermediate improvement (0.465) an additional improvement is -0.206 utility unit smaller, which means that with respect to zero it still produces a positive improvement of 0.465 - 0.206 = 0.259 utility units.

[2] A broad prior for ENV_2 was used. As a result, the same priors for the means of the parameters were used except for ENV_2, here we assumed a uniform distribution with a large range.

Because the *z*-value significance is defined with respect to a null of zero, whereas the benchmark for a further notch in the scale of gradual improvements is in fact the value of the immediately previous improvement, we note that a test should be run with respect to the lower extreme of a confidence interval around the coefficient estimate for the local economy (improved 2015). Such lower extreme in the case of the model for Athens with all respondents is $0.465-1.96\times0.053 = 0.361$. Computing the cumulative probability at 0.361 for a random variable distributed $\Phi(\mu=0.259, \sigma=0.054)$ we find that it falls to the left of this value with very high probability. We conclude that the additional marginal effect for the 2027 scenario is actually valued less than what is the case for the proposed 2015 scenario. Maybe this is so because it was too far away in time for most respondents to be able to relate to it or perhaps because it was not clear in most respondents' mind that it implied the 2015 target. This result is found only for this attribute level and it is consistently negative across all models.

Turning the attention to the other two attributes, it is found that their utility effects jump up significantly in the moderate improvement levels, and also for the extreme improvements. The estimated marginal WTP effects are reported to the right columns of the tables and for the extreme improvement are to be interpreted as additional effects over the WTP for the first improvement levels. So, for example, the estimated marginal effect of €2.41 for "Env. Good" is to be interpreted as €2.41 over the €10.07 effect of "Env. Moderate". However, it is easy to see that when accounting for the variability implied by the approximate standard error of these estimate (obtained with the delta method) the upper extreme of a 95% confidence interval for the latter is $10.07+1.96\times0.7 = 11.44$ while the lower extreme for the $(10.07+2.41) -1.96\times0.52 = 11.46$, which is just a bit to the right of €11.44. This leads us to conclude that the marginal effect of moving from moderate to good in this model is estimated to be very low. In the model without serial non-participants this effect is not much higher. A similar conclusion is to be reached in the Asopos estimations.

On the other hand, the estimated marginal effect of extending water uses from “some uses” to “all uses” emerges as adding substantial value, nearly twice as much as the first level of improvement. This result is consistent across all models, and unsurprisingly, it reaches the level of “some uses” to be valued more by the local residents of Asopos (€7.29 in the sample with all respondents and €8.33 in that without serial non participants) than it is by those of Athens (€5.68 in the sample with all respondents and €5.82 in that without serial non participants). However, the Athenians show a higher WTP for the further step in improvement with €6.27 in the sample with all respondents versus €5.16 by the Asopos analogue sub-sample; and €8.94 in the Athens sub-sample without serial non participants versus €7.93 by the Asopos analogue sub-sample.

5. Conclusions

The water catchment of the Asopos River has witnessed a severe decline of environmental quality over the recent past. There is a clear interest to improve such conditions from both the resident rural population and the population of urban dweller that makes most use of it as recreationists.

The elicited monetary values from the set of choice collected in the survey demonstrate the importance of the improvements for both the residents of Asopos and Athens. Furthermore, it is regarded that these monetary values are policy relevant and in the absence of anything better they can be employed in order to assess the effectiveness of incurring the cost recovery of water resources in the area considering also the environmental cost involved. Cost effectiveness analysis for the determination of the optimal program of measures was suggested by Article 11 of WFD (CEC, 2000) and it represent the core principle driving public investment, especially in harden economic times as at present.

Aggregating results considering the models with all the respondents for the case for example of improvements in water available for all uses, we can see that in the case of Asopos the WTP is about €475, 000 per year (for the years 2012 to 2027) (23,000 households are permanently connected with the public system of water supply in Asopos RB) while for the Athens' sample is €45,144,000 per year (1,800,000 households). Moderate environmental improvements are valued at €882,200 per year in Asopos and at €72,500,000 per year in Athens.

Other evidence about the economic damage in Asopos basin is offered by the application of a Contingent Valuation Method (CVM) (Dimaras et al., 2010) aimed to elicit WTP of the catchment's residents for improvements in the area's groundwater. From a sample of 154 revealed that on average the households of the area were willing to pay €400 per year for the next 10 years to an independent management body entrusted with the remediation of the polluted groundwater within the 10 years period. Aggregating to the number of households that were willing to contribute to the voluntary scheme at a 3% discount rate resulted in 1M € annually (about € 8,5M in 10 years). In the same study it is reported that the construction of a new pipeline connection to provide Oropos area with clean water is estimated at € 9,400,000.

Similarly, Papadiochou et al., (2011) elicited the cost of the environmental damage based on Attica households' willingness to pay a yearly contribution, in voluntary basis, to a new organization that will take measures and will remediate groundwater pollution in the next 10 years. CVM answers were collected from a sample of 400 households by telephone interviews contacted randomly. Households were willing to pay, based on the lower bound average WTP, an annual contribution of €45 approximately in order to support the organization. Taking into account the population of interest, the annual aggregated value is about €60 M, which corresponds to a present value of €470 M (annual payments for 10 years, discounted at real interest rate of 5%). It is also noted that households' WTP covers the total of the services provided by the aquifer in question, including non-use values such as the protection of the function of ecosystem services.

Another study that focused on the estimation of the economic damage of groundwater degradation is that of Laoudi et al. (2011**).** The authors note that the least-cost approach for pollution abatement measures regarding public water supply would comprise of replacing groundwater with surface water for Inofyta area and of installing a central Reverse Osmosis water treatment system for Oropos area. The authors argue that the total cost of these measures estimated at €426K annually is considered a solid basis for valuing the economic damage by groundwater pollution in the area due to the loss of residential use of groundwater.

Finally, Loizidou's (2009) study suggested the construction of a Central Wastewater Processing Unit which would gave the possibility to the industries and the Municipality of Avlonas to dispose their wastes. The total construction cost of the Central Unit was estimated at € 33M with the construction cost of network connection at € 14 -15M. In addition, the annual running cost for an average daily provision of 16,762 m^3 was estimated as 0.611*365*16,762 ≈ € 3,738,177. Overall, the reported estimates in this chapter provide evidence of the importance of the Asopos RB for residents in both Asopos and Athens who are willing to contribute a considerable amount towards the cost of necessary mitigation measures.

References

Commission of the European Communities (CEC) 2000 Directive of the European Parliament and of the Council establishing a framework for Community action in the field of water policy. 1997/0067 (COD), C5-0347/00.

Council Directive 79/409/EEC of 2 April 1979 on the conservation of wild birds.

Dimaras, A., Mastrogiannis, F. and D. Damigos, 2010. *Estimation of the cost of pollution of Asopos River*. MSc dissertation, National Technical University of Athens, School of Mining and Metallurgical Engineering. (In Greek)

Ferrini, S. and Scarpa, R., 2007. Designs with a-priori information for nonmarket valuation with choice-experiments: a Monte Carlo study. *Journal of Environmental Economics and Management* 53 (3), 342-363.

Laoudi, A., Tentes, G. and D. Damigos, 2011. *Groundwater damage: A cost-based valuation for Asopos River basin.* Proceedings of the 3rd International CEMEPE & SECOTOX Conference Skiathos, June 19-24, 2011, ISBN 978-960-6865-43-5.

Loizidou, M., 2009. Environmental Impact Assessment for a Central Processing Unit for the Industrial Wastewater of Asopos Area and the Urban Wastewater of the Municipality of Avlonas. National Technical University of Athens, School of Chemical Engineering. (In Greek)

McFadden, D., 1974. Conditional logit analysis of qualitative choice behavior, *in* P. Zarembka, ed., 'Frontiers in Econometrics', Academic Press, pp. 105-142.

Papadiochou, O., Triandafyllou, M. and D. Damigos, 2011. *Estimation of the value of water in the Asopos basin using Contingent Valuation Method*. MSc dissertation, National Technical University of Athens, School of Mining and Metallurgical Engineering. (In Greek)

Passali, D., 2009. Industrial Pollution and Community-based Mobilization in the Asopos River. MA Dissertation, Department of Geography, King's College London.

Rose, J. M. and Bliemer, M. C. J., 2009. Constructing Efficient Stated Choice Experimental Designs. *Transport Reviews* 29, 587-617.

Sándor, Z. and Wedel, M., 2001. Designing Conjoint Choice Experiments Using Managers' Prior Beliefs. *Journal of Marketing Research* 38, 430-444.

Scarpa, R., Notaro, S., Louviere, J. and Raffaelli, R., 2011. Exploring Scale Effects of Best/Worst Rank Ordered Choice Data to Estimate Benefits of Tourism in Alpine Grazing Commons. *American Journal of Agricultural Economics* 93 (3), 813–828.

Table 2: Model for Athens (all respondents)

	RUM estimates				Marginal WTP estimates						
	Coeff.		St.err.	|*z*-value|	Coeff.		St.err.	|*z*-value|	*p*-value	95% conf. int.	
Status Quo ASC	0.840	***	0.090	9.3	7.28	***	0.97	7.5	<0.01	5.38	9.18
Env. moderate	1.162	***	0.061	18.9	10.07	***	0.70	14.3	<0.01	8.69	11.44
Env. good	0.279	***	0.057	4.9	2.41	***	0.52	4.7	<0.01	1.40	3.43
LocalEcon Improved2015	0.465	***	0.053	8.8	4.03	***	0.48	8.4	<0.01	3.09	4.97
LocalEcon Positive2027	-0.206	***	0.054	-3.8	-1.78	***	0.46	-3.9	<0.01	-2.69	-0.88
Water for some uses	0.655	***	0.062	10.5	5.68	***	0.60	9.5	<0.01	4.50	6.85
Water for all uses	0.723	***	0.063	11.4	6.27	***	0.67	9.3	<0.01	4.95	7.59
Cost	-0.115	***	0.007	-16.7							
Log likelihood function at Max. -4178.74 Inf.Cr.AIC = 8373.5 AIC/N = 2.326											

Table 3: Model for Asopos (all respondents)

	RUM estimates				Marginal WTP estimates						
	Coeff.		St.err.	|*z*-value|	Coeff.		St.err.	|*z*-value|	*p*-value	95% conf. int.	
Status Quo ASC	1.071	***	0.089	12.0	8.31	***	0.91	9.2	<0.01	6.53	10.09
Env. moderate	1.237	***	0.063	19.7	9.59	***	0.63	15.3	<0.01	8.37	10.82
Env. good	0.060		0.057	1.1	0.47		0.45	1.1	0.294	-0.41	1.34
LocalEcon Improved2015	0.220	***	0.053	4.1	1.70	***	0.41	4.1	<0.01	0.90	2.51
LocalEcon Positive2027	-0.145	***	0.055	2.6	-1.13	***	0.42	2.7	0.008	-1.96	-0.29
Water for some uses	0.941	***	0.066	14.3	7.29	***	0.60	12.2	<0.01	6.12	8.47
Water for all uses	0.665	***	0.064	10.5	5.16	***	0.58	8.9	<0.01	4.03	6.29
Cost	-0.129	***	0.007	18.2							
Log likelihood function -4133.05 Inf.Cr.AIC = 8282.1 AIC/N = 2.301											

Table 4: Model for Athens (serial non participants excluded)

	RUM estimates				Marginal WTP estimates						
	Coeff.		St.err.	|*z*-value|	Coeff.		St.err.	|*z*-value|	*p*-value	95% conf. int.	
Status Quo ASC	-0.174		0.119	-1.5	-1.629		1.098	-1.5	0.138	-3.78	0.52
Env. moderate	1.181	***	0.068	17.3	11.070	***	0.852	13.0	<0.01	9.40	12.74
Env. good	0.414	***	0.064	6.5	3.881	***	0.679	5.7	<0.01	2.55	5.21
LocalEcon Improved2015	0.573	***	0.058	9.9	5.367	***	0.613	8.8	<0.01	4.17	6.57
LocalEcon Positive2027	-0.227	***	0.059	-3.9	-2.124	***	0.54	-3.9	<0.01	-3.18	-1.07
Water for some uses	0.621	***	0.068	9.1	5.824	***	0.696	8.4	<0.01	4.46	7.19
Water for all uses	0.954	***	0.071	13.4	8.941	***	0.949	9.4	<0.01	7.08	10.80
Cost	-0.107	***	0.008	-14.2							
	Log likelihood function			-3134.40	Inf.Cr.AIC =		6284.8	AIC/N =	2.095		

Table 5: Model for Asopos (serial non participants excluded)

	RUM estimates				Marginal WTP estimates						
	Coeff.		St.err.	|*z*-value|	Coeff.		St.err.	|*z*-value|	*p*-value	95% conf. int.	
Status Quo ASC	-0.180		0.128	-1.4	-1.423		1.006	-1.4	0.157	-3.39	0.55
Env. moderate	1.448	***	0.075	19.2	11.476	***	0.794	14.5	<0.01	9.92	13.03
Env. good	0.124	*	0.068	1.8	0.982	*	0.549	1.8	0.074	-0.09	2.06
LocalEcon Improved2015	0.337	***	0.062	5.5	2.671	***	0.495	5.4	<0.01	1.70	3.64
LocalEcon Positive2027	-0.203	***	0.064	-3.2	-1.606	***	0.494	-3.3	0.001	-2.57	-0.64
Water for some uses	1.052	***	0.076	13.9	8.337	***	0.704	11.8	<0.01	6.96	9.72
Water for all uses	1.001	***	0.077	13.1	7.930	***	0.824	9.6	<0.01	6.32	9.55
Cost	-0.126	***	0.008	-15.5							
	Log likelihood function			-2698.42	Inf.Cr.AIC =		5412.8	AIC/N =	1.961		