

Interactive comment on “Non-market valuation supporting water management: the case study in Czestochowa, Poland” by Y. Kountouris et al.

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We sincerely appreciate your time in reviewing our manuscript. In the following letter we attempt to reply to the comments made in the referee reports.

Referee comment 1.

This paper uses a choice experiment to measure non-market benefits associated with improvements in groundwater quality a Polish region. While the paper is well written* and straightforward, and I am sure it is certainly of policy interest in Poland, it does not represent a significant academic contribution. It does not provide any particular new angle or innovation neither to the literature on environmental valuation (it uses a straightforward methodological design and the most basic modelling approach) neither

C4812

to the application of the disproportionality principle of the WFD (discussion and contribution to this literature is simply missing). Authors state that this is the first paper on the non-market valuation of groundwater in Poland, which as said, is interesting and valuable for Polish policy-makers, but does not represent a substantial contribution to scientific progress. As authors themselves report in the paper there is already an extensive literature looking at the valuation of groundwater quality in different countries and regarding a set of different angles and aspects, and I fail to see in which respect the valuation design developed in this case adds anything new to that. For example, authors do not comment on how their valuation scenario and choice and definition of attributes address any of the limitations that may have been encountered by previous applications.

Response

Thank you for this comment. This paper was not intended to add to the methodological toolkit of stated preference practitioners and choice modellers. The objective of the paper was to examine preferences and derive WTP for the improvement of water quality in the Czestochowa aquifer. While the paper is not methodological we believe that it adds to our knowledge on the value placed on the quality of water resources.

Referee comment 2.

Regarding the policy background of the study, authors state (page 7171, paragraph 5) that: “According to the WFD measures should be assessed by cost-effectiveness and cost-benefit analysis”. This is not exactly accurate. While the WFD does say that Member States shall make judgements on the most cost-effective ways of attaining GES, it does not prescribe the application of cost-benefit analysis. Cost-benefit analysis has been interpreted by the literature as the ‘natural’ way of addressing the disproportionality principle of the WFD, but it remains a political decision of Member States on what is to be considered proportionate or not. While agreeing with the authors on the fact that cost-benefit analysis is a necessary tool for the application of the WFD, I think they

C4813

need to acknowledge the complexity of the issue and the discussions that have taken place in the literature regarding this issue (for example, the actual term disproportionality is only mentioned at the end of the paper and it is not explained). Paragraph 15 of page 7173 seems to mix up the concept of effectiveness with benefits, mixing up cost-effectiveness and cost-benefit analysis.

Response

In the revised manuscript we modify this discussion. In particular in page 2 of the revised manuscript we write:

Measures aiming to achieve the good quantitative and chemical groundwater status have to be evaluated in terms of their economic performance. Tools that can be used for this purpose according to the Water Framework Directive (WFD) include cost-effectiveness and cost-benefit analysis. So far, in Poland sewerage investments were evaluated only by cost-effectiveness analysis. This paper aims to assist to the conduct of Cost-benefit analysis in Poland in the context of the WFD by providing estimates of the benefits from groundwater improvement. In particular, this paper reports the results of a choice experiment study conducted in the Czestochowa region aiming to the estimation of the general public's willingness to pay for groundwater quality conservation. We also removed the last paragraph of section 2.

Referee comment 3.

In general the conceptualization of the valuation design and its attributes is poor. Water pollution is defined as: no pollution, pollution at the safe level and pollution 20% higher than safe level. This specification is vague and leaves too much room for a broad range of interpretations from the side of respondents. Were they informed about the implications of each of these levels of pollution? How can authors be sure of the interpreted distinction between no pollution and pollution at the safe level? Were the attributes described in deeper level of detail to respondents (e.g. in terms of their implications, e.g. what does 20% more pollution mean (for the public)?). How was this

C4814

issue addressed by the literature before and why authors think this is the best way?

Response

We appreciate the significance of the point here, as respondents understanding of the attributes and their levels are important for the validity of the valuation. The choice of the attributes, their levels and their presentation to respondents were determined after careful consideration of the objectives of the exercise along with the complications of communicating the impact of pollution on a group of non-experts.

Specifically, the aim of this study was to estimate individual willingness to pay for the improvement of environmental quality through the reduction of nitrate concentrations in the Czestochowa aquifer. Given this aim, as we mention in the manuscript, we based the definition of the attributes on the limits set by the water framework directive. The complication that arises now in terms of communicating water quality to the general public in terms of nitrate concentrations will probably not be understood. For example, referring to concentrations of 10mg/l or 50mg/l would probably be meaningless for the typical respondent in the survey. For this reason we chose to present the levels of pollution using some keywords that would reflect the provisions of the WFD and the perceptions of policy makers regarding the impact of nitrate pollution on the population and at the same time be comprehensible for the respondents. In this context when we state that pollution will be at the "safe level" as specified by the EU directives, we imply that nitrate pollution will exist, but at concentrations are generally deemed safe from experts given the current state of knowledge on the matter. The "near zero" level of pollution is meant to correspond to the general attitude of the directive regarding the chemical status of groundwater. In particular, as stated in the introduction to the WFD: "The presumption in relation to groundwater should broadly be that it should not be polluted at all. For this reason, setting chemical quality standards may not be the best approach, as it gives the impression of an allowed level of pollution to which Member States can fill up. A very few such standards have been established at European level for particular issues (nitrates, pesticides and biocides), and these must always be ad-

C4815

hered to. But for general protection, we have taken another approach. It is essentially a precautionary one. It comprises a prohibition on direct discharges to groundwater, and (to cover indirect discharges) a requirement to monitor groundwater bodies so as to detect changes in chemical composition, and to reverse any antropogenically induced upward pollution trend. Taken together, these should ensure the protection of groundwater from all contamination, according to the principle of minimum anthropogenic impact.” (http://ec.europa.eu/environment/water/water-framework/info/intro_en.htm). In other words, the “near zero” level reflects a state in which ground water is uncontaminated. The levels were carefully explained to respondents. Pretesting revealed that the distinction was clear to potential respondents. Respondents heard descriptions on the origin of nitrate pollution and its potential influence of health and the environment. An alternative option would be to communicate the levels entirely in terms of health impacts. However this would change the focus of the study to a valuation of the health effects of pollution. Furthermore epidemiological data linking the incidence of illness with nitrate water concentrations in the area were scarce.

To examine whether respondents evaluated the “near zero” and the “safe” level of pollution differently we test for the equality of WTP using the method proposed by Poe et al. (2004). We cannot reject the equality of WTP between the two levels. This can imply some insensitivity to scope but may also suggest that respondents are only concerned about the improvement of pollution with respect to the status quo. To examine how this alters our results we estimate models that merge the two levels, and report the coefficient estimates along with the implied WTP. In particular in the revised manuscript we write:

Referee comment 4.

Minor issues: - *I have detected a number of small mistakes in the use of articles and prepositions. While generally well written, I would recommend another English check (e.g. the title “a case study in Czestochowa” or “the case study of Czestochowa”).
- Page 7171 paragraph 5 mentions what is considered to be a ‘cost’ (cost per one

C4816

person connected to sewerage). For completeness, I would recommend to also specify how effectiveness is measured. - Conclusions contain results that appear for the first time (aggregation and cost comparison). I would suggest moving them to the results section and focus the conclusions on the higher level discussion and contribution to the literature.

Response

We have extensively re-written the manuscript. We improved the use of English throughout the document as well as its structure.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 11, 7169, 2014.

C4817