Anglian Water

121. MAIN STAGE
WILLINGNESS TO PAY.
K WILLIS REVIEW

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PR19 Main Stage Willingness to Pay Study
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by
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Review by

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Introduction

The purpose of this research by eftec & ICS Consulting is to assess customer preferences and priorities for water and sewerage services; and to estimate customers' willingness-to-pay (WTP) for aspects of water and wastewater services provided by Anglian Water (AW), including understanding how values may differ for deterioration versus improvement in services.

Approach and methods

The research is based on stated preference (SP) methods. SP allows people's preferences and values for future or new goods to be estimated, something which revealed preference (which estimate the value of existing goods) cannot do. The Report (section 2.1.2) correctly mentions that SP methods can capture "non-use values" and altruism (e.g. WTP towards social tariffs, enhancing environmental quality, etc.).   Care must be exercised where altruism is concerned: pure altruism is an elusive concept to measure. It is open to double counting. And, much of what is termed altruism is in fact impure altruism or "warm glow effect". People only agree to altruistic expressions and statements because it makes them look good, or less bad in the eyes of others; and not, as many studies have shown, because they are really willing to donate is practice.   However, customers' preferences in the study did not seem to be overly driven by altruism, since the qualitative testing process (Table 2.5) revealed that in the choice tasks "respondents were primarily motivated by factors that were within expectations for the decision process involved in SP methodology: the bill, their personal experience, the service attribute and the service level". This is in line with economic theory.

The Main Stage WTP research follows good practice. It identified service measures, and provided clear text and diagrams describing and illustrating these measures. The qualitative testing through cognitive interviews, and Hall tests, ensured an excellent questionnaire was developed, which was successfully piloted as a field test, prior to the main survey.

The questionnaire structure followed standard practice of screening questions, followed by experience of service failures, as a prelude to SP questions, followed by validity questions to assess the legitimacy of choices, and ending with socio-economic questions about the household or non-household establishment.

The main DCE comprised eleven attributes, or service measures. Respondents would be unable to simultaneously trade-off 11 attributes, plus bill change, against each other, without adopting some simplifying heuristic which contradicts the axioms of choice theory. Thus the attributes were sensibly grouped into 3 blocks (4 water service attributes, 4 sewerage services, and 3 wider services). This allows respondents to consider and trade-off all attributes in a block against each other. To avoid overloading respondents with information, respondents were only presented with 2 of these 3 blocks (randomly chosen). This is common practice in discrete choice experiments (DCE). Respondents were given six choice cards from each (of the two) blocks: this allows a reasonable amount of information to be collected from each respondent, without the respondent becoming tired or bored with the questionnaire.

eftec &ICS rightly recognise that including the bill amount in each block of attributes, may lead to the over-estimation of WTP for each service measure across blocks, if some attributes in different blocks are partial substitutes for each other, or if the respondent's budget constraint becomes cognitively less binding. A contingent valuation (CV) dichotomous choice (DC) package experiment is therefore correctly included, where customers have a choice between the current situation, or status quo (SQ) position, and a specified improvement in all service measures across all blocks of attributes.

The inclusion of best worst scaling (BWS) as a SP method is innovative. BWS provides an alternative perspective and SP method to assess customers' preferences and priorities, and with the paired comparison (PC) DCE another way of estimating WTP values for each service measure. BWS plus PC also provides a triangulation point to validate the main SP DCE results and WTP values.

Sampling
Sampling quotas were expertly framed and constructed. Completed questionnaire responses and quotas are generally well match for households across all categories (age and SEG, and region)

Matching exact quota proportions is more difficult in small areas, and with increasing segmentation. So it is to be expected that the Hartlepool Water household sample might not be quite so well aligned with the quotas set, compared to the rest of the AW sample. And while the non-household sample was well aligned with the quotas set for the AW area, there was again some slight deviation in the Hartlepool Water area.

The sample sizes were large enough in the main survey to ensure that statistically significant results could be expected.

Customer preferences and econometric results

The Report (section 5.1) provides a very clear explanation of the choice models and their components.

However, what is slightly confusing are the results in Table 5.3. The reader might reasonably expect the coefficient for leakage (0.091) for example to be negative: as leakage increases (from 6% to 22%), utility would be expected to decrease (negative coefficient). The coefficients for unplanned interruptions, and discolouration, might similarly be expected to be negative in relation to the service level ranges presented in the Table. The sign on the coefficients in Table 5.3, for water services, and Table 5.4 for sewerage services, and Table 5.5 for wider services, only make sense in relation to the coding of the levels for each attribute, which are explained in Annex 11 (Appendix 2 Model Coding). Perhaps the text in the Main Report (section 5.2.1) should make this clear: as coding levels increase from negative values below the SQ to positive values above the SQ, utility (preference) increases.

The econometric analysis has been expertly undertaken. The mixed logit (MXL) models provide very good fits to the data for the household models for water, sewerage, and wider services, and the coefficients are all highly statistically significant. Similarly good models are derived for non-household customers, across the three DCE service area measures (water, sewerage, and wider services).

The MXL clearly shows some customer heterogeneity in preferences towards most service measures, with the exception of severe water restrictions (rota cuts).

The theory of diminishing marginal utility suggests utility of marginal increments of a good will decline as the quantity of the good increases. The usual way to assess this is to model utility provided by additional increments of the good, assuming that marginal utility of income is constant. This is the procedure adopted by eftec & ICS. Constant marginal utility of income is a reasonable assumption, since the additional change in income (+£35 for the maximum bill addition; and -£40 for the maximum bill reduction) is quite small in relation to total net household income of around £25,000 to £39,999.

Marginal utility of income is assumed to decline as income increases. This clearly affects the value of additional increments of a good. But it is probably better to investigate diminishing marginal utility of the good, than try to estimate diminishing marginal utility of income.

eftec & ICS also rightly explore non-linearity in preferences and values around the SQ point in the DCE models. It has been shown in may studies that asymmetry exists around the SQ point: people do not value gains and losses equally. eftec & ICS justly investigate this issue and show that customers do indeed value marginal losses (deterioration in service) more than they value marginal gains (improvement in services) (Annex 11, Table 11.20).

The DCCV package values are estimated from a logit model. Unfortunately, some of the model fits are not high: most pseudo R^2 values are low (<0.10), and whilst most bill

coefficients are statistically significant, those for BWS are not (Annex 11, section 4.4.2). The accuracy and robustness of the DCCV model estimates can be judged in relation to the Turnbull package estimates which are based on a distribution free estimator (Main Report section 5.4.2).

Validity

eftec & ICS judge validity in terms of construct validity (are results in line with economic theory and expectations); and content validity (the validity of the survey instrument: do respondents understand the survey material, are the tasks credible, and responses non-biased).

The DCE results derived by eftec & ICS have construct validity: models have theoretical validity: they provide a good fit to the data, have coefficients with the correct sign which are statistically significant. The non-linear models also conform to theoretical expectations: exhibiting diminishing marginal utility of benefits in service improvements, and asymmetry between gains and losses around the SQ. The results also have convergent validity: the marginal rates of substitution (MRS) between service measures are similar across the different SP methods: DCE, PC, and BWS (Tables 5.16).

The study also has content validity: few respondents (less than 7%) found the questionnaire very difficult, with the majority finding it easy or very easy to answer. A few respondents provided illegitimate motives for choosing the SQ, but the majority of respondents provided legitimate answers for choosing the SQ (e.g. satisfaction with current levels of service, and income constraints (affordability). Overall, only 2% to 3% of respondents found the survey not credible or unrealistic. AW can therefore be assured of the robustness of the survey instrument, and the survey results.

Conclusions

The eftec & ICS willingness to pay study research is an excellent, commendable, and professional piece of research. The study conforms to current best practice in SP and DCE. The analysis is meticulous and detailed, and provides accurate and reliable information about customers' preferences and values. It provides a wealth of information on customers' WTP values which can be used in a cost-benefit analysis of investment projects to improve water supply and water quality to Anglian Water customers.