Understanding Valuing Life Expectancy Gains from Air Pollution Reduction in the UK and Poland: A Qualitative Investigation And Validation

The first published empirical study using the Contingent Valuation Method estimated the recreational value of Maine woodlands (Davis, 1963). Since then the number of applications has exploded. Carson (2007) identifies over 5,000 studies in more than one hundred countries. The breadth of these applications is astonishing, ranging as they do from recreational use values through preservation values of the environment, health and more recently safety/value of statistical life. A quick perusal of this literature demonstrates an increasingly sophisticated level of practice and analysis as the nature of the goods we attempt to value become increasingly more complex.

Practitioners are well aware of the problems associated with stated preference methods and much effort has been put into developing various reliability and validity tests to apply to the data such as scope sensitivity (Carson and Mitchell, 1993), test-retest reliability (Boyle *et al*., 1995) and reducing hypothetical bias (Cummings and Taylor, 1999) to name but a few. Baker *et al*. (2008) note, in contrast, the relative paucity of in-depth, qualitative studies that have been carried out with the aim of better understanding willingness to pay (WTP) responses (and the reasons for inconsistencies or anomalies in quantitative data). They identified only 34 papers for review, of which only 21 papers satisfied their criteria.

In this paper, we adopt a qualitative approach to explore the rationales given for WTP values which were designed to elicit a Value of a Life Year (VOLY) from air pollution reduction (Chilton *et al*., 2007). This was a follow up to the quantitative survey and was designed to address three main issues:

1. Did respondents 'buy what we sold'?

2. What factors did they take into account in the construction of their WTP values?

3. How did wider concerns, such as fairness or concern for the environment, impact on the valuation process?

The concepts of life expectancy and changes in probability of survival are complex and it would be unreasonable to expect a 'word perfect', scientifically sophisticated explanation from respondents – indeed such a definition would be unlikely to be elicited from the CV researchers themselves. Nonetheless respondents should appreciate the main features of the 'good' for which they offer a WTP in order for the subsequent analysis and our interpretation to be in anyway meaningful

Any public policy that reduces the risk of death to people results in a number of health benefits, including life expectancy gains. These gains can be shown to accrue no matter when this risk reduction occurs e.g. a *ceteris paribus* increase in survival probability only for the coming year, or for the next n years

(a standard Value of a Prevented Fatality framework, such as road safety interventions [Carthy *et al*., 1999]), or over the whole of the individual's remaining lifetime (a Value of a Life Year framework, for example from a permanent reduction in air pollution [Chilton et al., 2004; Desaigues *et al*., 2007]) or in old age. While the magnitude of the gain to the individual remains uncertain, the gain in average life expectancy across the population as a whole can be identified. Establishing willingness to pay values for this type of health gain encounters a number of problems, not least people's understanding of what a gain in life expectancy means and how it arises.

We investigated respondents' accounts of:

- The way in which life expectancy gains are realised (i.e. cumulative changes in conditional survival probabilities over remaining lifetime, with more benefit accruing later in life);
- Uncertainty of two distinct types. First, whether you die prematurely of some other cause and, second, whether your expectation is that your gain will be the average, below average or above average;
- Their value construction processes i.e. what factors do they consider when deciding their WTP and which (*ex ante)* important factors they ignored;
- How wider concerns e.g. other-regarding preferences, environmental concerns or fairness impact their thinking or understanding of the good, if at all?

Respondents in this study were exposed to the same procedures, information and questions as those in the earlier quantitative study. These sessions were relatively intensive and were moderated by a member of the research team with assistance, lasting about 1 hour and 20 minutes, of which approximately 35 minutes was devoted solely to an explanation of a life expectancy gain and how it is derived. Early piloting had indicated that a graphical presentation fared best as an information presentation mode, provided they were accompanied by clear verbal descriptions of the information portrayed in the graph. Care was taken in relation to the associated exercises to ensure that all respondents in all groups had access to the correct factual information at the end of the process, irrespective of what might have been said in any one individual group. All WTP questions which would form the basis of the subsequent VOLY calculations were answered on a strictly individual basis. Following this, each respondent took part in an individual-in depth semi-structured interview, the results of which form the basis of this paper. Interviews were digitally recorded and transcribed. NVivo qualitative analysis software was used to index and interrogate the qualitative data. Analysis followed fairly typical steps of initial familiarisation with the data through reading and re-reading transcripts and applying broad codes, sorting and indexing the data, identifying patterns and regularities, and the building and mapping of themes.

Respondents were recruited in both the UK (n=22) and Poland (n=30), a transition country.

Preliminary analysis indicates that the protocol was successful in communicating the cumulative nature of the gains and the first type of uncertainty described above, but less so the second type. Our overall judgement is that the protocol worked very well in both countries in some aspects, most notably by helping respondents to move away from the "add-on" heuristic. But, as ever, further improvements could be made, in particular with respect to developing a more in-depth intuitive understanding of changes in underlying probabilities, the variable nature of the gain to individuals and more assistance in separating out wider concerns from their understanding of the good (at least for some respondents). These findings are common across the two countries, although a more in-depth analysis of any differences in the two data sets has yet to take place. Further analysis will also be carried out to investigate the relationship between the value construction process and wider concerns such as fairness. We will also examine the similarities and differences between the accounts of respondents who appeared to understand the good and those that did not i.e. those that persisted in viewing it as a 'certain' add-on at the end of their life.

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