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Temporal stability of preferences and willingness to pay for natural areas in choice experiments: A test–retest

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ABSTRACT

The main objective of this paper is to test the temporal stability of stated preferences and willingness to pay (WTP) values from a Choice Experiment (CE) in a test–retest. The same group of participants was asked the same choice tasks in an internet-based CE, conducted twice with a time interval of one year without interviewer interference. We examine choice consistency at individual choice task level and transferability of the underlying indirect utility function and associated WTP values. The results show that choices are consistent in 57 percent of the choice occasions. Comparison of the choice models over time shows that the estimated preference and scale parameters are significantly different, suggesting that choice behaviour changed between the two surveys. Differences between marginal WTP estimates for individual choice attributes are statistically significant only at the 10 percent level. However, we show that this can result in significantly different WTP values for policy scenarios. The instability of estimated mean WTP values for different policy scenarios asks for caution when including WTP values in cost-benefit analysis.

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1. Introduction

Among the different benefit transfer (BT) methods to assess the nonmarket value of environmental change and associated goods and services using existing stated preference (SP) study results, value function transfer has been argued to be more reliable than mean value transfer, because of the possibility to control for changes in choice contexts, i.e. differences in site and respondent characteristics (e.g. Johnston and Duke, 2010; Johnston and Rosenberger, 2010; Bateman et al., 2011). Mean value transfer is the simplest approach and is frequently used in practical decision making, but the valuation literature has shown that this approach generates significant transfer errors (Brouwer, 2000; Jiang et al., 2005; Johnston, 2007). Therefore, choice experiments (CEs) have been argued to be more suitable for BT than other SP methods such as contingent valuation (CV), because they are able to control for site and other relevant good or service characteristics in the indirect utility function (e.g., Morrison et al., 2002; Morrison and Bennett, 2004; Mallawaarachchi et al., 2006; Campbell et al., 2009). CV studies are often based on single sites and only allow control for differences in respondent characteristics in the willingness to pay (WTP) function. Furthermore, WTP values from CV studies often relate to only one or at most a few environmental policy changes, instead of explicitly measuring possible differences in the values attached to changes in multiple characteristics of environmental good or service provision.

One of the fundamental assumptions in BT studies is that stated preferences underlying WTP estimates are robust between the time the original study was conducted and the time the results are applied to the policy site (Brouwer, 2006). Changes in the choice context, such as changes in respondents' socio-economic characteristics, may alter the choice outcome. Nevertheless, underlying preferences are often assumed to remain stable in applied BT exercises. Based on this assumption, study results have been transferred in practice over long time periods to estimate non-market values of environmental goods and services at new policy sites. The validity and reliability of this assumption has been tested in different ways and over different time periods, mainly in CV studies, varying from just a few weeks or months to several years (e.g., McConnell et al., 1998; Whitehead and Hoban, 1999; Berrens et al., 2000; Brouwer and Bateman, 2005; Brouwer et al., 2008; Brouwer, 2012; Fetene et al., 2014), using either the same or different samples. These CV-based results do not necessarily hold for CEs for a number of reasons. Although CEs and dichotomous choice (DC) CV share the same random utility framework and the models have the same structure, the similarity of their results depends on the specific standard assumptions related to both the deterministic and stochastic component of the random utility model (Scarpa, 2000). Empirical studies tend to find similar WTP estimates for CE and DC–CV studies (e.g. Jin et al., 2006). Direct CV elicitation methods, including open-ended and payment-card formats, however, provide observations of the welfare measures directly rather than indirectly based on choices from which they are derived and use different types of models. These methods tend to result in lower WTP estimates than CE studies (e.g., Ryan and Watson, 2009). The equality of the welfare estimates of CE and CV studies depends on the CV design and the specification of the environmental good (Foster and Mourato, 2003). Practically, CEs are based on a series of repeated choices (typically varying between four and ten) reflecting trade-offs between multiple decision characteristics, including different prices for environmental good or service provision. This is different from a DC–CV elicitation format where respondents are asked for their WTP in at most one (single bound) or two rounds (double bound).[1]

[1] We make a distinction between ordering effects and temporal stability here. Ordering effects occur when preferences are constructed rather than well-defined and stable. They relate to framing effects, and represent a divergence from rationality assumptions when preferences and choices are unstable within a short-time interval over which the socio-economic context and other external factors remain constant, such as within a SP survey (Day et al., 2012). Temporal stability here refers to the assessment of preference and choice stability over a longer time interval (e.g. of one year), over which choices may change as a result of changes in external factors that influence individual preferences and choices. The order in which the choice tasks are presented in the CE to the same sample of respondents is identical in the first and second survey one year later. The tests in this paper only aim to provide guidance on preference and choice utility over time and are not intended to examine potential procedural framing effects.