



ANALYSIS

Survey protocol and income effects in the contingent valuation of public goods: A meta-analysis

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Received 27 January 2005; received in revised form 7 April 2005; accepted 25 April 2005

Available online 5 July 2005

Abstract

Income effects reported in contingent valuation (CV) studies tend to be much smaller than those found in the literature on collective choice. This disparity has received surprisingly little attention by environmental economists. The present study uses meta-analysis to explore determinants of the presence/absence of a significant income effect in a sample of CV surveys. The probability of significant income effects—controlling for the statistical power of the reported tests—was higher when ‘progressive’ payment vehicles were used and tended to be lower when cost distribution and institutions were well defined, when the choice was formulated as a policy referendum, or when ‘passive-use’ goods were involved. A simple explanation of this pattern in terms of respondent behaviour suggests that the low income effects in contingent valuation surveys may be an artefact of the survey method. Since empirical estimates of the income effect may have important policy implications, this issue deserves attention in future research.

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Keywords: Collective choice; Income elasticity; Meta-analysis; Stated preferences; Willingness to pay

1. Introduction

The ‘income effect’ in contingent valuation (CV) studies, as defined, e.g., in [Horowitz and McConnell \(2003\)](#), measures the change in stated willingness to pay for a proposed good associated with a change in income. Estimates of the income effect in CV are of interest for several reasons. First, the income effect is

widely perceived as a useful indicator of internal validity of survey responses. Lack of a positive income effect is commonly interpreted as an indication that respondents did not seriously consider their budget constraint when making hypothetical choices (e.g., [Mitchell and Carson, 1989](#)). Second, reported income effects (or income elasticities) play an important role in recent attempts to explain the gap between willingness to pay (WTP) and willingness to accept (WTA) ([Hanemann, 1991](#); [Sugden, 1999](#); [Horowitz and McConnell, 2003](#)). Third, the distribution of benefits by income is clearly important for policy design.

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Fourth, it has been argued that the income elasticities in CV surveys are too low to accord with economic intuition (McFadden and Leonard, 1993; McFadden, 1994). Finally, the few studies which actually compile income effects or income elasticities of WTP from stated preference surveys report values that seem to contradict those reported in studies on collective decision-making. Kriström and Riera (1996) who analyse six European CV datasets and Horowitz and McConnell (2003) who report elasticities for 12 datasets each find income elasticities of WTP in CV surveys to be around 0.1–0.4, if statistically significant at all. Hökby and Söderqvist (2003) compile 21 elasticity estimates from CV studies in Sweden and find values generally much below one. In contrast, the collective choice-based study by Borchering and Deacon (1972) finds *demand* elasticities for various public goods, including parks and recreation, to be greater than one. Similar results are reported in Bergstrom and Goodman (1973).

To resolve this issue, Flores and Carson (1997) examine the relationship between the ordinary demand elasticity and the elasticity of WTP in a theoretical paper. They find that the two measures may diverge on account of one or a combination of several factors (p. 294):

“First, a given environmental good’s income elasticity of willingness to pay depends upon the demand income elasticities of all other rationed goods. Second, the income elasticity of willingness to pay also depends upon the substitutability between the rationed goods. Third, the income elasticity of willingness to pay also depends upon the budget share factor which is always less than one and is potentially much less than one. Finally, there are expenditure adjustment factors which may also account for the divergence.”

The authors conclude (p. 287):

“[...] while the income elasticity of WTP and the ordinary income elasticity of demand are related, knowledge of one is insufficient to determine the magnitude or even the sign of the other. The income elasticity of WTP is influenced by additional factors which are generally unobservable.”

The apparent conflict thus seemed to be resolved. The theoretical result suggested that there would be no opportunity to directly compare the WTP elasticities

of CV studies with the demand elasticities of collective choice studies.

However, the issue re-surfaced in a recent study of voting behaviour in a public-good finance referendum in the Swiss Canton of Zürich. Schläpfer and Hanley (2003) provide what seems to be some of the first collective choice-based information on the income elasticity of WTP for environmental public goods. The authors find that income elasticity of WTP for the good (landscape amenities management) must have been substantially greater than one, since approval of the financing proposition increased with income in spite of a progressive tax schedule. Thus, the voting-based income elasticities of WTP in this study appear to be comparable in magnitude to the demand elasticities found in the median voter studies by Borchering and Deacon (1972) and Bergstrom and Goodman (1973) and much higher than those typically found in CV surveys. In contrast, a referendum-format CV study on the value of landscape amenities protection conducted 3 months prior to the referendum in the same Swiss Canton again yielded an income elasticity of WTP of about 0.35 (Roschewitz, 1999; Schläpfer et al., 2004a). This estimate is again within the range of those found by Kriström and Riera (1996) and Horowitz and McConnell (2003). Thus, the issue of low income effects in CV surveys does not yet appear to be settled.

To shed new light on this issue, the present study attempts to explore the determinants of the income effect in a sample of recently published contingent valuation surveys using meta-analysis regression. Previous studies have applied meta-analysis to consolidate results of contingent valuation surveys for individual classes of goods such as groundwater quality or recreation benefits. An overview of these studies is provided in Bateman and Jones (2003). Further, meta-analysis was used by List and Gallet (2001) to study determinants of the disparity of actual vs. hypothetical WTP for private goods and by Horowitz and McConnell (2002) to examine factors explaining the magnitude of WTA/WTP ratios.

This paper is organized as follows: The next section presents the conceptual and analytical framework. Section 3 defines the study sample and the study characteristics to be included as explanatory variables in meta-analysis regression models. The results are presented in Section 4. Discussion and an explanation

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