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Willingness to accept, willingness to pay and the income effect

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Abstract

The gap between willingness to pay (WTP) and willingness to accept (WTA) has previously been studied by searching for evidence of substitutability (the neoclassical hypothesis) or status quo bias, testing for neoclassical versus psychological theories of preferences. We study the gap differently, asking whether the observed pairs of WTA and WTP are consistent with neoclassical preferences. We use Sugden's [Alternatives to the neoclassical theory of choice, in: I. Bateman, K.G. Willis (Eds.), Valuing Environmental Preferences: Theory and Practice of the Contingent Valuation Method in the US, EU, and Developing Countries, Oxford University Press, Oxford, pp. 152–180, Chapter 6] result, showing that the effect of income on WTP can be approximated from information on the ratio WTA/WTP. Drawing inferences from a meta-analysis of 201 WTA/WTP ratios, we conclude that the data are not consistent with neoclassical preferences.

JEL classification: C91; Q0; D1; D9

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1. Introduction

The disparity between willingness to pay (WTP) and willingness to accept (WTA) is a well-known phenomenon that arises in experimental and survey settings. In a typical experiment, a subject is given a good, such as a coffee mug, and asked how much he would be willing to sell it for. This is his WTA. Another subject is not given a mug and asked how much he would be willing to pay for one, his willingness to pay. In a recent review, Horowitz and McConnell (2002) find that WTA is about seven times higher than WTP.

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Hanemann (1991) has provided the most cogent neoclassical explanation of this phenomenon. He demonstrates that the difference between WTP and WTA depends on the ratio of the ordinary income elasticity of demand for the good to the Allen-Uzawa elasticity of substitution between the good and a composite commodity. When the elasticity of substitution is low, this ratio will be large. The WTA/WTP ratio will then also be large.

The difficulty with this explanation lies in corroboration. As Bateman et al. (1997) put it, "in the absence of a direct measure of the price flexibility of income, or of the elasticity of substitution, it is difficult to decide whether an observed divergence between WTA and WTP is too large to be compatible with Hicksian theory" (p. 482).

Instead, to test the neoclassical explanation, we exploit a theoretical relationship between the WTA/WTP ratio and the WTP–income relationship due to Sugden (1999). Let $V(y, x)$ be the (indirect) utility where y is income and x is the rationed good. When the endowment is (y_0, x_0), the individual's willingness to pay for an increment $x_1 - x_0$ is defined by $V(y_0 - \mathrm{WTP}(y_0), x_1) = V(y_0, x_0)$. When income is y_1, we have $V(y_1 - \mathrm{WTP}(y_1), x_1) = V(y_1, x_0)$. Willingness to accept is defined by $V(y_0 + \mathrm{WTA}, x_0) = V(y_0, x_1)$. Set $y_1 = y_0 + \mathrm{WTA}$.

Our main observation comes from $V(y_0 + \mathrm{WTA} - \mathrm{WTP}(y_0 + \mathrm{WTA}), x_1) = V(y_0 + \mathrm{WTA}, x_0) = V(y_0, x_1)$. The first equality follows from the generic definition of WTP; the second from the specific definition of WTA. Equality of the first and third expressions implies $y_0 + \mathrm{WTA} - \mathrm{WTP}(y_0 + \mathrm{WTA}) = y_0$, or $\mathrm{WTP}(y_0 + \mathrm{WTA}) = \mathrm{WTA}$.

A first order approximation of $\mathrm{WTP}(y + \mathrm{WTA})$ yields $\mathrm{WTA} \approx \mathrm{WTP} + \mathrm{WTA}\ \partial\mathrm{WTP}/\partial y$, with all elements evaluated at y_0. This leads to the basic relationship derived by Sugden:

$$\frac{\partial \mathrm{WTP}}{\partial y} \approx 1 - \frac{\mathrm{WTP}}{\mathrm{WTA}}. \tag{1}$$

This expression allows a better appreciation of the implications of an observed {WTA, WTP} pair. The ratio WTP/WTA can be used to predict $\partial\mathrm{WTP}/\partial y$, which we label the *income effect*, the change in willingness to pay for the good in question when income increases. Eq. (1) can also be used to predict the income elasticity of WTP, $\eta = (y/\mathrm{WTP})\partial\mathrm{WTP}/\partial y$, if we have data on WTP and income.

Our key result is that while the components of Eq. (1) are well known, the Allen-Uzawa elasticity of substitution is unobservable or rarely measured. Economists have a body of market and survey evidence on the magnitude of the income effect but little evidence on the elasticity of substitution.

It follows that inferences about the "right" magnitude for WTA/WTP will be stronger when based on Eq. (1). A WTA/WTP ratio of two—a common finding for goods such as mugs—suggests that if someone won US$ 100 in a lottery, she would spend US$ 50 more on the good in question. Similarly, WTA/WTP ratio of two suggests that if a WTP experiment was repeated with respondents having US$ 100 more income, their average WTP for the experimental good would be US$ 50 *higher*. Neither result is credible.[1]

Thus, to test the neoclassical model, we look at observed values of WTA/WTP and the income effect ($\partial\mathrm{WTP}/\partial y$) or income elasticity of willingness to pay, η, and ask whether the

[1] This result is similar in spirit to the work by Rabin (2000), who demonstrates that risk aversion over small stakes implies implausibly high degrees of risk aversion when the stakes are large.