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The WTP/WTA Discrepancy: A Preliminary Qualitative Examination

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ABSTRACT

This paper explores the psychological foundations of the 'Willingness to Pay/ Willingness to Accept' discrepancy. Using a qualitative approach we find that the two response modes appear to invoke different strategies for completion. An examination of the heuristics used by respondents to answer questions concerning the buying and selling of the chance to play a straightforward lottery shows that only some could be taken as supporting current theories which aim to explain the discrepancy.

KEYWORDS

Willingness to pay, willingness to accept, heuristics

1. INTRODUCTION

The results to be reported below arise out of a wider research objective which aims to explore anomalies and violations of economic theory with special

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reference to decisions under uncertainty and over time.³ This particular paper describes preliminary results of a qualitative examination of the so-called 'willingness to pay/willingness to accept discrepancy' whereby willingness to accept (WTA) responses are observed to be systematically higher than willingness to pay (WTP) responses. The aim of such questions is to elicit the (monetary) worth of a particular good to the respondent. The WTA format asks a respondent to state the minimum amount they would be willing to accept to sell the good. Meanwhile, the WTP format requests the maximum amount she would be willing to pay in order to acquire the good.

This will be discussed in terms of economic theory in some more detail below but, in general, we might expect the gap to be small if the response (i.e. the 'worth') is procedurally invariant. Nevertheless, it is a well-known finding in both field contingent valuation studies (see Pearce and Turner, 1990 and Brown and Gregory, 1999 for comprehensive reviews of the literature in this area) and laboratory studies (Knetsch and Sinden, 1984; Kahneman et al., 1990) that this is not the case. This raises the question as to just what considerations besides 'worth' are working to generate such responses, with obvious implications for their use in economic decision making tools such as cost-benefit analysis.⁴

We decided at an early stage to opt for an experimental laboratory study in which respondents would 'buy' and 'sell' lottery tickets. While the type of analysis to be reported may in future be extendable to a contingent valuation field study of an environmental good, at this stage of the research our aim was somewhat more fundamental. We wished to identify an elicitation format capable of capturing the type of data we required i.e. information on the perceived difference between a buying and selling task *per se, from the perspective of the respondent*. Further, we needed to minimise the number of comments referring to the ethics of purchasing (selling) the good in question, hence our choice of a prospect, or lottery.⁵ The main benefit of the experimental approach is that it allows for a great deal of control over the conditions faced by those making decisions, an important consideration for this type of research.

The remainder of the paper is as follows. In Section 2 we present a very brief overview of the debate relating to the theoretical predictions regarding the size of the WTP/WTA discrepancy. We leave this behind in Section 3, in which we instead adopt what may be thought of as a 'back to basics' approach. Rather than concerning ourselves with the magnitude of the difference as such, we set up an experiment to capture qualitative evidence which could support current theories or, alternatively, to generate new evidence for which no current theories exist. Section 4 contains details of our method of analysis and the framework within which we analysed the qualitative data, while Section 5 contains the preliminary results. Section 6 concludes.

482

THE WTP/WTA DISCREPANCY

2. ECONOMIC THEORY AND THE WTP/WTA DISCREPANCY

WTP and WTA questions are at the heart of contingent valuation surveys of environmental change. WTP questions are usually asked when the valuation is of a potential benefit or incremental improvement in the environment. WTA questions, although more problematic in operationalising (see Mitchell and Carson, 1989 for an in-depth discussion of this issue), are suitable when the environmental change is in the form of a decrement and would incur a 'cost' on the recipient. From the perspective of cost-benefit analysis, one would require that the value of a unit of environmental change should be roughly the same under both methods. Otherwise, the question arises as to which, if either, is the 'correct' measure.

Economists have concentrated less on this issue and more on whether any observed discrepancy can be consistent with theory. While this is not the central concern of our paper, we briefly outline the main points of the debate. The question most prominent in the literature is whether the size, or magnitude, of the difference can, in any circumstances, be consistent with Hicksian theory.⁶ In this theory, the individual has preferences over all non-negative bundles of consumption goods and, assuming certain other conditions hold, these preferences (reflected by WTP or WTA) can be represented by one utility function.⁷ It turns out, in fact, that it is possible, for a normal good, that WTP < WTA. Table 1 summarises four empirically observable magnitudes of value. In a simple 2-good world, these are the different measures of value to an individual in units of one good, *j* (possibly money), of a change in consumption of the other good, *i*, from $x_i' to x_i''$ or from $x_i'' to x_i'$, given an initial endowment x_j' . Hicksian theory says only that Equivalent Loss (EL) = WTP and Equivalent Gain (EG) = WTA but does not imply WTP = WTA.

The question investigated by researchers has, as noted, been the size of this discrepancy. For example, Randall and Stoll (1980) showed that the divergence would be no more than a few percentage points provided two conditions held. Firstly, that WTP was only a small proportion of an individual's income and, secondly, their so-called 'price flexibility of income' (elasticity of the marginal valuation of good *i* with respect to x_i) was also 'small'. Hanemann (1991) showed that the price flexibility of income could be defined as the income elasticity of demand for good *i* divided by the elasticity of substitution between the two goods. He used this result to show that we could expect large empirical divergence (while still consistent with Hicksian theory) when good *i* is a public good for which private goods are an imperfect substitute. We note, in closure of this summary, that there are no direct measures of either the price flexibility of income or the elasticity of consumption.

An alternative theoretical analysis is outlined by Bateman et al. (1997), based on Tversky and Kahneman's (1991) reference-dependent consumer theory. Here, preferences are conditional on the individual's current endowment and the

individual is allowed to be loss averse. Essentially, individuals understand options in decision problems as gains or losses relative to a reference point. In reference-dependent theory, WTP and WTA are defined in relation to different utility functions and, thus, equality is not implied.⁸

	Initial endowment of good <i>i</i> (given <i>x</i> [/] _j)	Value of good <i>i</i> in terms of <i>j</i>	Final consumption level of good <i>i</i>
WTP	\mathbf{x}_i^{\prime}	Maximum j – give up to increase consumption of i	$\mathbf{x}_{i}^{\prime\prime}$
WTA	$\mathbf{x}_{\mathbf{i}}^{\prime\prime\prime}$	Minimum <i>j</i> – willing to accept for a decrease on consumption of <i>i</i>	$\mathbf{x}_{\mathbf{i}}^{\prime}$
EL	$\mathbf{x_i}''$	Maximum <i>j</i> – give up to maintain consumption of <i>i</i>	$\mathbf{X}_{i}^{\prime\prime\prime}$
EG	x'i	Minimum <i>j</i> – willing to accept in place of an increase in consumption of <i>i</i>	$\mathbf{X}_{\mathbf{i}}^{\prime}$

TABLE 1. WTP, WTA, EL and EG

Having reviewed the main issues of concern to economists, we turn to our particular study. We note at this point that, from a psychological perspective, Hicksian theory is untestable and the robustness and generalisability of alternatives such as reference-dependence have yet to be confirmed. Thus one of the purposes of the investigation to be reported below is to explore the psychological foundations of the two responses. By this we mean the strategies/reasons/ heuristics individuals might use to help them arrive at their two values. The aim is to determine whether the way in which respondents attempt these questions gives rise to a fundamentally different value.⁹ This process is outlined in the next section.

THE WTP/WTA DISCREPANCY

3. ELICITATION PROCEDURE

A simple questionnaire¹⁰ was devised (using the usual piloting procedures) to elicit a respondent's maximum WTP and minimum WTA (i.e. a within-sample design) for the prospect '50% chance of £40 or a £50% chance of £0' as follows:

WTP:

Qu 1[A] 'Consider this lottery:

Lottery D: A 50% chance of £40 or a £50% chance of £0

Imagine you have an opportunity to buy the chance to play Lottery D JUST ONCE. What is the LARGEST AMOUNT you would be just willing to pay to play the Lottery D?

Value.....

Qu 1[B] Please think about how you answered Part [A] above. In the space below, list the aspects of the question which influenced your answer (a sentence or a few words to identify each of them is perfectly adequate)...'

WTA:

Qu 1[A] 'Consider the lottery D again:

Lottery D: A 50% chance of £40 or a £50% chance of £0

Imagine someone has given you the chance to play Lottery D JUST ONCE. You now have the opportunity to sell this chance. What is the SMALLEST AMOUNT you would be just willing to accept to give up the chance to play Lottery D?

Value......

Qu 2[*B*] Please think about how you answered Part [A] above. In the space below, list the aspects of the question which influenced your answer (a sentence or a few words to identify each of them is perfectly adequate)...'

Figure 1 shows the quantitative discrepancy that arose out of these valuations from 61 respondents. As can be seen, in line with past work, in the majority of cases WTA > WTP. Each point plots an individual's WTP against their WTA; points on the 45° line imply equality; those above, WTA > WTP; and those below, WTP > WTA.¹¹

Before proceeding to a description of the analytical procedures and results we now present a sample of responses as written by respondents.

(WTP) 'There is a reasonable chance of winning £40. There is also a reasonable chance of losing my money'

(WTP) 'This gives me the chance to double my money or only lose ± 20 . 50/50 chance of winning'

(WTA) 'I'd want compensation for not playing. I'd want to make any money I would have lost if I'd lost the lottery'

(WTA) 'I would not take less than £10 when I had the chance of winning £40. A guaranteed £10 is more tempting than the possibility of losing money'.

(WTA) 'It is more than I would pay. It is half the expected winnings. It seems about right that some may pay'



FIGURE 1. Quantitative Evidence of the WTA/WTP Discrepancy

486

4. ANALYSIS

As is obvious even from the small selection of responses shown above, respondents appear to take into account a number of considerations while arriving at their value(s).

From the point of view of our wider research aims – to develop alternative descriptive economic models which better represent (at least some) people's decision making processes – we required a specific type of analytical technique. While not necessarily exhaustive in terms of identifying all the different strategies, it had to be robust enough to identify in a *reliable* manner a number of common or expected heuristics and strategies. As we had in effect a prior framework within which to analyse the data we adopted the technique of content analysis.

Content analysis (Krippendorf, 1980), like the closely related protocol analysis of Ericsson and Simon (1993), is used as a method of counting the occurrence of certain ideas within a piece of qualitative data. The method by which this is done is systematised so that the counting is done in as objective a manner as possible. Considering the requirements of a content analysis, the objectivity criterion aims to minimise the possibility that any findings reflect an analyst's subjective predispositions, rather than the content of the discussion under analysis. Objectivity requires that a set of explicitly formulated rules and procedures be followed during each step of the process. The objectivity criterion may be considered fulfilled if the categories to be tested are predetermined and the coding rules/procedures open and transparent. Further, independent coders must be able to replicate the results and interpret the findings to a satisfactory degree. The requirement of systematic design infers that the inclusion or exclusion of content and categories is carried out under consistently applied rules which are decided in advance. All these procedures were adhered to in the analysis to be reported below.

Two coders, using the coding frame in Figure 2, working independently, coded the responses to the questions. The frame was drawn up using *a priori* strategies from the literature and from a randomly selected 6 questionnaires. It was then tested for reliability and further refined on 12 more questionnaires, leaving 61 for the final analysis. The *a priori* codes were: 'Lose Dominates' and 'Win Dominates' (if noted, they could be considered as evidence in support of, or against, Lichtenstein and Slovic's [1971] conjecture that respondents anchor on the win payoff); 'Parametric Value (verbal evidence of expected utility type calculations); and 'Endowment(1)' and 'Endowment(2)'¹² (evidence in support of reference-dependent theory). Further codes derived from the questionnaires were 'Profit(1)', 'Profit(2)' and 'Regret' (evidence of consideration of the other state of the world, a necessary condition of regret theory [Loomes and Sugden, 1982]). 'None' was included simply to ensure we captured all the reasons in a response (respondents appeared to write at most 3 reasons, often fewer, but

Code	Label	Description
P1	Profit (1)	The subject adjusts the difference between the size of the prize and the price (i.e. buyer attempts to maximise the difference; seller to minimise it.
P2	Profit (2)	The subject is basing their price on strategic considerations about a potential buyer/seller (i.e. 'you buy cheap and/or sell dear').
R	Regret	Subject considers both states of the world when offering a price; the possibility of losing lowers the price offered or accepted.
L	Lose dominates	The possibility of losing the gamble dominates her reasoning. The implication of this code is something like 'anchoring' on losing (getting zero).
W	Win dominates	The possibility of winning the gamble dominates her reasoning. The implication of this code is something like 'anchoring' on the winning amount.
PV	Parametric value	The subject bases their value solely on the parameters of the gamble (i.e. probabilities and amounts – not just cost and benefits in general); neither win nor lose dominates.
Ν	None	No reason given.
0	Other	Reason other than those above.
М	Misunder- stood	Evidence that subject misunderstood the question.
E1*	Endow- ment 1	Subject takes ownership of lottery into account when arriving at an offered price.
E2**	Endow- ment 2	Subject takes ownership of her own money into account when arriving at an offered price.

FIGURE 2. The Coding Frame

* Valid for the sell (WTA) questions only

** Vaild for the buy (WTP) questions only

488

THE WTP/WTA DISCREPANCY

coders were instructed to always code 3 per respondent). 'Other' was included to ensure the coding scheme was exhaustive and picked up unidentifiable reasons or reasons which were not central to this particular analysis. Finally, 'Misunderstood' was included in case of obvious evidence that a respondent had misunderstood the task to a degree that rendered their responses meaningless.

5. RESULTS

Table 2 contains the final results of the content analysis after negotiation and resolution of outstanding differences between the two coders. A Krippendorf (1980) a statistic of 0.97 shows that the coding scheme was extremely reliable¹³. A $\chi^2_{(8)}$ of 92.82 between the two treatments indicates that there exists a significant difference between the (qualitative) strategies used when buying (WTP) and selling (WTA).

Treatment Code	Buy (WTP)	Sell (WTA)	Total	
Profit (1)	14	18	32	
Profit (2)	0	10	10	
Regret	1	23	24	
Loss dominates	8	5	13	
Win dominates	40	14	54	
Parametric value	7	2	9	
None	41	56	97	
Other	42	34	76	
Misunderstood	6	3	9	
Endowment (1)	0	18	18	
Endowment (2)	24	0	24	

TABLE 2. Results of the Content Analysis

Looking at specific codes in isolation, it is immediately clear that while 'Profit(1)' occurs at much the same rate in both treatments, 'Profit(2)' appears to be exclusively related to selling (as does, almost, 'Regret'). 'Lose Dominates' again occurs relatively equally across both treatments; however, 'Win Dominates' is used with much greater frequency in the buying treatment. There appears to be little (but some) evidence of expected utility type calculations ('Parametric Value'). 'Endowment (1)' and 'Endowment (2)' are mentioned on a reasonable number of occasions in both treatments.

6. DISCUSSION AND CONCLUDING COMMENTS

The main findings of our work so far are twofold. First, and unsurprisingly, the WTP/WTA discrepancy remains robust. Secondly, and more fundamentally, WTP and WTA tasks appear to invoke different strategies for completion. It remains to be proved, of course, whether this leads to the observed empirical difference.

In the future, we intend to move onto an analysis of more sophisticated qualitative data which will allow a wider range of statistical tests to be utilised. In particular, the interaction between codes probably merits examination. We hope that this will provide robust evidence in support of (or against) current theories. Alternatively, we may be able to identify new heuristics or strategies not currently considered by theory. The ultimate impact of findings such as those outlined above on conventional economic theory is as yet unknown, but may be far-reaching.

NOTES

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⁴ We leave aside the question of whether such tools are appropriate for such (environmental) decisions in the first place as this is clearly beyond the scope of this particular paper. ⁵ One could easily envisage extending such a study to an environmental good to identify

the type of additional considerations that this produced. It would probably be much more difficult, if at all possible, to disaggregate and identify the separate conditions from an initial study involving an environmental good.

⁶ The neoclassical theory of consumer choice (Hicks 1943, 1956).

⁷ Readers interested in a more in-depth, technical discussion of this theory and reference dependent theory (below) are directed to Bateman et al. (1997).

⁸ Neither does the theory imply WTP = EL or WTA = EG.

⁹ Further research is planned to investigate whether respondents can explain the gap themselves.

¹⁰ This procedure arose out of a previous attempt to generate qualitative data. A conventional experiment had been carried out in which respondents chose between and valued several lotteries. Respondents were placed into teams of two and asked to arrive at a consensus decision, speaking aloud their thoughts etc. as they progressed through the experiment. Due to the numerous issues discussed and the extraneous 'noise' in the subsequent transcripts, we were unable to generate usable data on buying and selling strategies *per se*.

¹¹ Although obviously of interest, an in-depth comparable (content) analysis of such a relatively small number of responses was not possible.

¹² Note: Endowment(1) and Endowment(2) are aspects of the same theoretical construct. ¹³ Observed agreement is 97% above chance.

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