Consistency of Willingness to Pay and Preferences in Auction Experiments

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Introduction

Experimental auctions are used to determine consumers' willingness to pay (WTP). The auction mechanism typically used is some variation of Vickrey's second price auction, where the weakly dominant strategy for subjects is to bid their true value for the goods offered. It is assumed that subjects will submit a higher bid for goods they prefer. One key underlying assumption for consistency between preference and WTP is procedure invariance (i.e., this says that ordering between two goods for a consumer should be the same whether determined by bidding in the auction or by asking them which they prefer).

Objective

This study was conducted to investigate whether preference violate procedure invariance in experimental auctions and, if so, under what conditions the violation occurs.

Methods

Measuring the consistency was done by asking experimental subjects their preference for the commodities being valued and then comparing these preferences with their WTP from the auctions.

Overview of Experimental Auctions

Scope: 6 sessions; 115 subjects;
6 items auctioned per session; one binding bid

Dates: June 2009

Locations: Beijing Normal University, Beijing, China

Payment: ¥25 (≈ $3) for one hour and a half

Items: a can Pepsi and a Coca cola (12 oz)
a pen and a ball-pen
a kg conventional and a kg organic apples

Auction methods: Fifth price

Table1 Contingency Analysis
a) Coca cola and Pepsi

Count	Prefer Coca cola	Prefer Pepsi	Total
Total %			
Bid more for Coca cola	30 48.39	3 4.84	33 53.23
Bid more for Pepsi	1 1.61	28 45.16	29 46.77
Total	31 50	31 50	62
Fisher's Exact Test	<0.0001		
McNemar Test	0.3173		

b) Pen and Ball-pen

Count	Prefer pen	Prefer ball-pen	Total
Total %			
Bid more for pen	68 64.15	32 30.19	100 94.34
Bid more for ball-pen	3 2.83	3 2.83	6 5.66
Total	71 66.98	35 33.02	106
Fisher's Exact Test	0.394		
McNemar Test	<0.0001		

c) Conventional and Organic Apples

Count	Prefer conventional apples	Prefer organic apples	Total
Total %			
Bid more for conventional apples	0 0	1 1	1 1
Bid more for organic apples	20 20	79 79	99 99
Total	20 20	80 80	100
Fisher's Exact Test	1		
McNemar Test	<0.0001		

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Fisher's Exact Test	no relationship between responses to the preference and bids.
McNemar test	the probabilities in the two-by-two table satisfied symmetry.

Table 2 Mean WTP for Entire and Consistent Respondents
a) Coca cola and Pepsi

	Entire group	Consistent respondent
Prefer coca cola	N=31	N=30
Mean WTP for Coca cola	2.9445	2.976
Mean WTP for Pepsi	2.4484	2.4467
Matched Pairs t-Statistic (P-value)	T=6.23, P<0.0001	T=-7.07 P<0.0001
Prefer Pepsi	N=31	N=28
Mean WTP for Coca cola	2.5177	2.5339
Mean WTP for Pepsi	3.0484	3.1536
Matched Pairs t-Statistic (P-value)	T=3.69 P=0.0009	T=4.15 P=0.0003

b) Pen and Ball-pen

	Entire group	Consistent respondent
Prefer pen	N=71	N=68
Mean WTP for pen	8.0604	8.2101
Mean WTP for ball-pen	4.1858	3.994
Matched Pairs t-Statistic(P-value)	T=-11.73 P<0.0001	T=-15.29 P<0.0001
Prefer ball-pen	N=35	N=3
Mean WTP for pen	7.9714	3
Mean WTP for ball-pen	4.6771	5.0667
Matched Pairs t-Statistic(P-value)	T=-7.37 P<0.0001	T=1.62 P=0.2460

c). Conventional and Organic Apples

	Entire group	Consistent respondent
Prefer conventional apples	N=20	N=0
Mean WTP for conventional apples	3.195	0
Mean WTP for organic apples	5.32	0
Matched Pairs t-Statistic (P-value)	T=6.4039 P<0.0001	N/A
Prefer organic apples	N=80	N=79
Mean WTP for conventional apples	3.137	3.0501
Mean WTP for organic apples	5.3151	5.3191
Matched Pairs t-Statistic (P-value)	T=9.5426 P<0.0001	T=10.70 P<0.0001

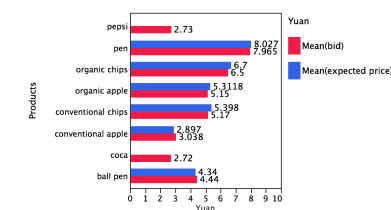### Figure 1 The mean bids and the means of expected prices

Products	Mean(bid)	Mean(expected price)
pepsi	2.73	
pen	8.027	7.965
organic chips	6.7	6.5
organic apple	5.3118	5.15
conventional chips	5.398	5.17
conventional apple	2.897	3.038
coca	2.72	
ball pen	4.34	4.44

Table 3 Marginal effects of Tobit model

5% significant level
10% significant level

	Pepsi	Coca cola	Pen	Ball-pen	Conventional Apple	Organic apple
Familiarity	-0.2355	-0.2029	0.2079	0.0496	-0.2899	-0.0011
Desirability	0.3200	0.3265	0.1720	0.2154	0.2254	0.3507
Price	n/a	n/a	0.5919	0.6525	0.8471	0.586

Results

Inconsistencies were found in all trials. These occurred least often in the Pepsi and Coca-cola pair. For pairs with differences in familiarity and expected prices, the inconsistencies increased. The highest frequency of inconsistency appeared in the pen and pencils pair suggesting the impact of different prices is larger than the different familiarity level in creating the inconsistency phenomenon.

Conclusions

A consumer bidding more for organic apples over conventional does not necessary mean the person prefer organic apple. Therefore, the implications of a higher WTP must be viewed with care.