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The WTP/WTA Disparity: Have We Been Observing Dynamic Values but Interpreting Them as Static?

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Abstract

This study advances, and experimentally tests, a new explanation for the disparity between willingness to pay (WTP) and willingness to accept (WTA)—a dynamic neoclassical theory based on the presence of commitment costs. While to date neoclassical models have not explained the observed data patterns well, we find that the commitment cost theory is able to explain adequately the causes and severity of the WTP/WTA value disparity. In particular, using data gathered from an actual marketplace, even the most stringent of our theoretical conjectures—cases where WTP values are predicted to exceed WTA values—oftentimes are met.

Keywords: field experiment, neoclassical theory, willingness to accept, willingness to pay, WTP/WTA disparity.

JEL: Q21, Q26

THE WTP/WTA DISPARITY: HAVE WE BEEN OBSERVING DYNAMIC VALUES BUT INTERPRETING THEM AS STATIC?

A fundamental tenet in neoclassical theory is the basic independence assumption: an individual's preferences are assumed to be measured over levels, not over changes. While most theoretical and applied economic models invoke this assumption, a wealth of data refutes this premise, as systemic empirical disparities have been observed between willingness to pay (WTP) and the compensation demanded, or willingness to accept (WTA), for the same good (e.g., Kahneman, Knetsch, and Thaler 1990). In an influential line of work, Hanemann (1991) shows that the large WTP/WTA disparities that have been observed in the literature can be reconciled with static neoclassical theory via income and substitution effects, but the empirical evidence to date has not conformed well to Hanemann's (1991), or any other, neoclassical-based model.[1] If the disparity is inconsistent with neoclassical explanations, then there are profound implications from both a positive and normative perspective: a lack of stationarity in preferences as implied by endowment effects suggests that much of neoclassical theory is in need of revision.

In this paper, we provide a different explanation for the WTP/WTA disparity—a dynamic neoclassical theory based on the presence of commitment costs. Our theory predicts that if agents are uncertain about the net payoff of a selling or purchasing transaction, and if they can obtain more information in the future, they will demand compensation to trade now (thereby giving up the option to trade at a later time with more information). WTP equals the good's intrinsic value minus its associated compensation, and WTA equals intrinsic value plus its compensation. Thus, the divergence can arise when the compensation, called commitment costs, exists and is consistent with stable preferences and optimizing behavior on the part of agents. The disparity therefore can be a logical outcome of optimizing behavior in a dynamic and stochastic setting.

If commitment costs are the primary sources of the disparity, then the basket of tools associated with Hicksian welfare measurement can be fundamentally preserved, albeit

with additional care given to the presence and interpretation of commitment costs and their welfare effects. We explore the predictive power of our theory by examining WTP and WTA statements of value from consumers behaving in a competitive marketplace: the sportscard market. The sportscard marketplace is a natural setting for an examination of preference structures, as it provides a rich pool of subjects making decisions in a familiar environment, with uncertainty and future information about the values of the traded good.

The empirical results are sharp. First, our data suggest that a disparity exists, even for those consumers who plan to purchase the good for resale. Second, we find that the comparative static predictions of the commitment cost theory perform quite well: WTP (WTA) increases (decreases) in the difficulty of delay and decreases (increases) in the difficulty of reversing the transaction. Further, the observed WTP/WTA divergence can, in part, be attributable to the asymmetries in the perceived reversal and delay difficulties between the buyers and sellers. We believe that this study is the first to document that a neoclassical-based theory can explain the causes and severity of the value disparity.

Theoretical Background

Zhao and Kling (2001) presented an explicitly dynamic theory of the formation of WTP and WTA and commitment costs under uncertainty and future learning. In this section, we extend that model to the important setting of actual market experiments. We show the conditions needed for commitment costs to arise and use these conditions to design tests for the presence of commitment costs.

Consider a situation in which subjects formulate their WTP or WTA facing a trading opportunity in an experiment, knowing that the same good (or a reasonable substitute) can be traded outside in a "regular" market. Let $v \in [v_l, v_h]$ be their own (uncertain) valuation of the good (hereafter "sportscard" or "card"), and let $R \in [R_l, R_h]$ be their information about the market price of the card. That is, they do not know v or R with certainty but know their distributions. For simplicity, we assume that they can learn both v and R with certainty later (i.e., after the experiment).[2]

Now, consider an experiment in which subjects can purchase the cards. If the subjects decide to purchase the card in the experiment but later (after learning v and R)

decide the card is not worth keeping, they can sell it at the realized market price, R. However, doing so incurs a transaction cost c_p^r, where subscript *p* denotes WTP, and superscript *r* denotes "reversing the trade." In contrast, if they decide not to buy the card in the experiment, they can purchase it later in the regular market, paying the market price *R* while incurring a transaction cost c_p^d, where the superscript *d* denotes "delay." In experiments where subjects can sell the cards, let c_A^r and c_A^d be the transaction costs of reversing the transaction (or buying the card back in the regular market) and delaying the decision (or selling the card later in the market).

Formulation of WTP and WTA

Subjects' WTP is defined as the maximum price they are willing to pay to buy the card in the experiment, knowing that they can later learn about their valuation *v* and the market price *R*. Suppose they buy at price *P*; if after the experiment the subjects' realized value of the card *v* is lower than $R - c_P^r$, they can sell the card and realize the gain of $R - c_P^r - v$. Thus their expected payoff of buying at price *p* in the experiment is

$$U_1 = E(v) + E_{v<R-c_P^r}(R - c_P^r - v) - p\,, \tag{1}$$

where the second expectation is taken over both *v* and *R* in the region $v < R - c_P^r$ and represents the option value of reversing the purchasing transaction. To facilitate discussion, we denote this option value by O_P^r, or

$$O_P^r = E_{v<R-c_P^r}(R - c_P^r - v)\,. \tag{2}$$

If subjects delay or decline to purchase at price *p*, they still have the option of buying the card later. They will then gain *v* but will pay the market price *R* plus the transaction cost c_P^d. Thus their expected payoff is

$$U_2 = O_P^d \equiv E_{v>R+c_P^d}(v - R - c_P^d)\,, \tag{3}$$

where the expectation again is taken over the region $v > R + c_P^d$, and O_P^d denotes the option value of buying the card later.

Subjects' WTP is the unique *p* that equates U_1 and U_2. Hence,

$$WTP = E(v) - (O_P^d - O_P^r) = E(v) + E_{v<R-c_P^r}(R - c_P^r - v) - E_{v>R+c_P^d}(v - R - c_P^d). \quad (4)$$

The term $O_p^d - O_p^r$ is the commitment cost, representing the net loss of option values in committing to the purchase now. Notice that *WTP* can be higher or lower than *E(v)*, the expected value of the card, depending on the value of the two options and thus the sign of the commitment cost. If agents expect that the cost of reversing c_P^r is high but the cost of delaying c_P^d is low, then O_P^r is low and O_P^d is high, yielding $WTP < E(v)$. If $c_P^r = c_P^d$, and the random value *R – v* (the negative of the consumer surplus) is symmetric around zero, then we expect the two option values to be equivalent, and $WTP = E(v)$. Equation (4) also suggests that WTP should be increasing in the cost of delay c_p^d but decreasing in the cost of reversal c_p^r.

The formation of WTA follows similar logic: subjects' WTA is defined as the minimum price subjects are willing to accept to give up the card in the experiment. Suppose subjects sell the card at price *P*. They still have the option of buying the card back in the regular market (i.e., reversing their trade) at the market price *R* plus the transaction cost c_A^r, the value of which is denoted as O_A^r. Thus, their expected payoff is

$$\pi_1 = P + O_A^r - E(v) = P + E_{v>R+c_A^r}(v - R - c_A^r) - E(v). \quad (5)$$

If they do not sell the card during the experiment, they retain the opportunity to sell at the market price, incurring transaction cost c_A^d. Thus, their expected payoff is

$$\pi_2 = O_A^d = E_{v<R-c_A^d}(R - c_A^d - v), \quad (6)$$

where O_A^d denotes the option value of selling the card later.

Again, equating π_1 and π_2, we obtain WTA as

$$WTA = E(v) + O_A^d - O_A^r = E(v) + E_{v<R-c_A^d}(R - c_A^d - v) - E_{v>R+c_A^r}(v - R - c_A^r), \qquad (7)$$

and $O_A^d - O_A^r$ is the associated commitment cost. Similar to WTP, WTA can be below or above *E(v),* depending on the magnitude of O_A^d and O_A^r. If subjects expect that there is a small cost of delaying the transaction but a high cost of reversing it, or c_A^d is small and c_A^r is high, O_A^d is high and O_A^r is low, leading to $WTA > E(v)$. Further, WTA is increasing in the cost of reversal c_A^r but decreasing in the cost of delay c_A^d.

WTP/WTA Divergence

From (4) and (7), we know that

$$WTA - WTP = (O_A^d - O_A^r) + (O_P^d - O_P^r). \qquad (8)$$

Therefore, the divergence between WTP and WTA equals the sum of the two commitment costs. Further, WTA > WTP if at least one of the commitment costs is (sufficiently) positive. If subjects believe that reversing a transaction is more costly than conducting the transaction, regardless of whether they are thinking about buying or selling, we would expect $O_A^d > O_A^r$ and $O_P^d > O_P^r$, and thus WTA > WTP. Notice, however, that reversing the selling decision is similar to delaying the buying decision: both involve buying the card later. In this case, we may have $c_A^r = c_P^d$. Similarly, reversing the purchasing decision is similar to delaying the selling decision: both involve selling the card on the regular market. Then, we may have $c_P^r = c_A^d$. In this case, $O_A^d = O_P^r$ and $O_P^d = O_A^r$, and thus WTP = WTA.

Experiment Design and Hypotheses

Our objectives in designing the field experiment were twofold: (*i*) to investigate whether subjects behave dynamically in forming their WTP and/or WTA values; that is, whether they take potential opportunities for delay or reversal into account when forming their bids or offers; and (*ii*) to examine whether conditions exist such that the dynamic formulation can explain the WTP/WTA divergence. Two distinct field experiments were undertaken to explore these issues. The first experiment uses data on subjects' perception of how difficult it would be to delay or reverse the proposed transactions. The second

experiment exogenously varies the degree of delay and reversal difficulties associated with the formation of WTA.

Field Experiment I: Perceptions Treatments

The first set of field treatments was carried out on the floor of a sportscard show in a large eastern city. In both treatments (WTP and WTA), the experience of the subjects typically followed four steps: (*i*) inspection of the card and learning the auction rules, (*ii*) actual bid (offer), (*iii*) survey completion, and (*iv*) debriefing. In step 1 of the WTP treatment, potential subjects approached the experimenter's table and inquired about the sale of the baseball card displayed on the table. For both treatment types, we chose a Cal Ripken, Jr. 1983 Topps baseball card, which has a book value of approximately $12. Both treatments displayed the same sportscard to all bidders—a Cal Ripken, Jr. PSA graded as "PSA 8 near mint/mint" baseball card. This particular choice of a good was appropriate as we conjectured that there would be a mix of subjects in this pool that would opt to sell or trade the card if they left the experiment with the card.

The experimenter then invited potential subjects to take about five minutes to participate in an auction. If the subjects agreed, in step 2 the monitor explained the rules of the random *n*th-price auction. As described in List and Shogren (1998), the random *n*th-price auction can be characterized by four simple steps: (*i*) each bidder submits a bid (offer); (*ii*) each bid (offer) is rank-ordered from lowest to highest; (*iii*) the monitor selects a random number (*n*) uniformly distributed between 2 and Z (Z bidders); and (*iv*) in the WTP case, the monitor sells one unit of the good to each of the ($n - 1$) highest bidders at the *n*th-price. In the WTA case, the monitor buys one unit each from the ($n - 1$) lowest bidders and pays the *n*th-lowest bid. The monitor informed participants that their bids would not be opened until after the show and that all bids would be destroyed when the research project was completed. In the WTA treatment, after physically giving subjects the card, the subjects made their offer.[3]

In step 3, the monitor asked the subjects to complete a confidential survey that would be used for "statistical purposes only." The survey, which is contained in the Appendix, was used to obtain important information about what subjects planned to do with the card if they won the auction (WTP) or did not sell in the auction (WTA). The choices included "keep," "trade," or "sell." The survey also obtained information about subjects' percep-

tions of such things as ease of trade or sale or ease of purchase. In the fourth stage of the experiment, the monitor explained to participants that they would be contacted within three days after the show if they were among the $n - 1$ highest (lowest) bidders (offerers). Subject were further informed that winners would receive the sheet after they had sent a check or money order for the amount of the nth highest bid. The random n chosen was 24 for the WTP treatment and 30 for the WTA treatment. Within three days, the winners of each auction were notified by phone or e-mail, and when the monitor received the check (card), he mailed out the card (check).

Field Experiment II: Exogenous Treatments

The second set of field treatments was also carried out on the floor of a sportscard show in a large eastern city. The same basic procedures were followed as described for the first set of treatments, with several key differences. First, instead of using a sportscard, we used an unopened pack of sportscards as the good. The pack of sportscards had a retail value of approximately $3 and had been introduced recently to the market, providing a sense of value uncertainty. Second, only WTA values were elicited and there were three distinct treatments, which differed by the degree to which the monitor offered to make reversal or delay of the transaction easier for subjects. The first treatment serves as a control and links these results to the perceptions treatments in that subjects simply were given the pack of sportscards and were asked to state their minimum WTA in an auction.

In the second treatment, subjects were informed that if they sold their pack at the auction, they would be allowed to return the following week and repurchase the pack from the monitor at the selling price (or upon receipt of payment the monitor would mail the pack, postage paid). We denote this treatment as the "goods-back-guarantee" (GBG) treatment; it is designed to reduce the cost to the subject of reversing a transaction, should the subject wish to do so.

In the third treatment, subjects were informed that if they did not sell their pack at the auction, they could return the following week and use space on the monitor's dealer table to attempt to sell the pack. We term this treatment the "table" treatment; it is designed to reduce the cost to the subject of delaying the transaction.

Hypotheses

With these field data, we are able to test two types of hypotheses. First, we examine whether subjects form their WTP and WTA values dynamically:

HYPOTHESIS 1: *WTP (WTA) increases (decreases) in the delay difficulty* c_P^d (c_A^d) *and decreases (increases) in the reversal difficulty* c_P^r (c_A^r).

In the first field experiment, we test this hypothesis in terms of the perceived delay and reversal difficulties. In the second field experiment, we study the effects of both the perceived and actual delay and reversal difficulties.

Second, we test whether the observed WTP/WTA values relate to the delay and reversal difficulties:

HYPOTHESIS 2: *(i) WTA>WTP if subjects in both WTP and WTA treatments perceive that it is more difficult to reverse than to delay the respective transaction:* $c_P^r > c_P^d$ *and* $c_A^r > c_A^d$*; (ii) WTA<WTP if subjects in both treatments perceive that it is easier to reverse than to delay the respective transactions:* $c_P^r < c_P^d$ *and* $c_A^r < c_A^d$*; (iii) WTA=WTP if subjects perceive the same selling (or buying) difficulties across the WTP and WTA transactions:* $c_P^r = c_A^d$ *and* $c_P^d = c_A^r$.

Here, only the first set of field treatments is relevant, as data on both WTP and WTA are necessary, and perceptions of the delay and reversal difficulties are critical to the predictions. Note that even if the respondents behave according to the commitment cost theory, WTA is greater than WTP only when the perceived delay and reversal difficulties satisfy certain conditions. Otherwise, it is possible that WTA is less than or equal to WTP.

Experiment Results

Table 1 summarizes the relevant statistics from field experiment I. Column 1 contains summary statistics for the overall sample, while columns 2 and 3 contain information for the WTP and WTA subsamples. Data in the first row suggest that the

TABLE 1. Summary statistics: field experiment I

Variable	Total Sample	WTP Subsample	WTA Subsample
Bid/offer value	9.69 (90) [6.74]	7.46 (49) [4.64]	12.37 (41) [7.35]
Value for keepers	–	7.00 (15) [3.89]	15.39 (18) [8.07]
Value for non-keepers	–	7.67 (34) [4.97]	10.00 (23) [5.89]
Years experience	8.42 (90) [5.50]	8.27 (49) [6.03]	8.61 (41) [4.87]
Dealer	0.11 (90) [0.32]	0.14 (49) [0.36]	0.07 (41) [0.26]
Gender	0.90 (90) [0.31]	0.92 (49) [0.28]	0.88 (41) [0.33]
Age	34.61 (90) [11.48]	33.47 (49) [11.41]	35.98 (41) [11.56]
Education	15.18 (90) [15.17]	15.06 (49) [3.22]	15.32 (41) [2.55]
Keep	0.37 (90) [0.37]	0.31 (49) [0.47]	0.44 (41) [0.50]
Delay difficulty	1.68 (72) [0.82]	1.55 (49) [0.74]	1.96 (23) [0.92]
Delay difficulty for keepers	–	1.20 (15) [0.41]	–
Delay difficulty for non-keepers	–	1.71 (34) [0.80]	1.96 (23) [0.93]
Purchase	2.22 (90) [0.91]	1.92 (49) [0.99]	2.59 (41) [0.63]
Reversal difficulty	1.95 (75) [1.01]	2.41 (34) [1.10]	1.56 (41) [0.74]
Reversal difficulty for keepers	–	–	1.56 (18) [0.86]
Reversal difficulty for non-keepers	–	2.41(34) [1.10]	1.57 (23) [0.66]
Income	53,765 (83) [26,154]	55,640 (43) [22,827]	51,750 (40) [23,137]
Outcome	2.26 (41) [2.27]	2.27 (49) [0.95]	na
Market value	12.69 (81) [7.20]	14.46 (45) [7.56]	10.47 (36) [6.13]

Note: The table presents the sample means of the variables, with the number of sample points in parentheses and the standard deviations in square brackets.

average WTA ($12.37) is much larger than the average WTP ($7.46), and this difference is statistically significant.[4] Thus, the value divergence commonly found in the literature certainly is present in experiment I as well.

Data presented in rows 2 and 3 push the analysis a level deeper and suggest that WTA and WTP subjects who plan to keep the card behave differently from one another; average WTA values ($15.39) are much larger than comparable WTP values ($7.00), and this difference is statistically significant at conventional levels. Yet even for those who plan to trade/sell the card, a nontrivial value disparity exists: WTP = $7.67 versus WTA = $10.00. This difference is only statistically significant at the $p < 0.054$ level using a one-sided alternative, however. This result is inconsistent with, for example, theories that suggest that indifference curves are unstable across different property rights regimes. A key feature of these theories is that value disparities should not be present when the individual views the good only as a medium of exchange. As Kahneman, Knetsch, and Thaler (1990, p. 1328) note, "there are some cases in which no endowment effect would be expected, such as when goods are purchased for resale rather than for utilization."[5]

Table 2 summarizes the relevant statistics for experiment II, which was designed with treatments that exogenously varied the delay and reversal difficulties in WTA. The reversal cost c_A^r is reduced in the GBG treatment, and the delay cost c_A^d is reduced in the table treatment. Subjects' perceptions of the delay and reversal costs are elicited through a survey instrument, as in experiment I.

Table 2 also contains the mean offer values for "keepers," who indicated that they expected to keep their pack if they did not sell it in the auction, as well as average values for "non-keepers," who intend to sell or trade at a later date if they are unsuccessful in the auction. These average values qualitatively mimic those in Table 1. In all cases, keepers report a higher average WTA. Further, they perceive that it is harder to reverse the trade and easier to delay selling the pack than do non-keepers. This asymmetric perception about the ease of delay and reversal is consistent with a higher WTA value for keepers, based on the commitment cost theory.

TABLE 2. Summary statistics: field experiment II

Variable	Total Sample	Base Subsample	GBG Subsample	Table Subsample
WTA value	4.10 (112) [2.29]	4.66 (55) [2.18]	3.23 (32) [2.18]	3.98 (25) [2.36]
Value for keepers	4.60 (27) [2.46]	4.69 (13) [2.09]	–	4.50 (14) 2.84
Value for non-keepers	3.48 (23) [1.55]	3.62 (12) [1.72]	–	3.32 (11) [1.42]
Years experience	11.74 (112) [10.37]	12.76 (55) [12.60]	10.62 (32) [7.96]	8.61 (41) [4.87]
Dealer	0.10 (112) [0.30]	0.16 (55) [0.37]	0.00(32) [0.00]	0.08 (25) [0.26]
Gender	0.875 (112) [0.33]	0.87 (55) [0.31]	0.88 (32) [0.34]	0.88 (25) [0.33]
Age	38.58 (112) [13.52]	39.6 (55) [14.79]	36.75 (32) [12.61]	38.68 (25) [11.89]
Education	15.05 (112) [2.46]	15.09 (55) [2.40]	15.06 (32) [2.82]	14.96 (25) [2.17]
Keep	0.54 (50) [0.50]	0.52 (25) [0.51]	–	0.56 (25) [0.51]
Delay difficulty[a]	3.12 (41) [1.38]	3.04 (24) [1.20]	–	3.24 (17) [1.64]
Delay difficulty for keepers	2.88 (24) [1.42]	2.92 (13) [1.32]	–	2.82 (11) [1.60]
Delay difficulty for non-keepers	3.47 (17) [1.28]	3.18 (11) [1.08]	–	4.00(6) [1.55]
Reversal difficulty	1.77 (89) [0.88]	1.86 (43) [0.94]	1.67 (21) [0.87]	1.72 (25) [0.79]
Reversal difficulty for keepers	2.11 (27) [0.93]	2.31 (13) [1.11]	–	1.93 (14) [0.73]
Reversal difficulty for non-keepers	1.52(23) [0.73]	1.58 (12) [0.67]	–	1.45 (11) [0.82]
Income	59,085 (112) [30,657]	54,545 (55) [30,112]	68,672 (32) [30,848]	58,800 (25) [30.04]
Market value	4.49 (112) [2.15]	4.98 (55) [2.31]	4.24 (32) [2.08]	3.51 (25) [1.54]

Note: The table presents the sample means of the variables, with the number of sample points in parentheses and the standard deviations in square brackets.

[a] Delay difficulty and intent to keep was collected only for the "table treatment" subsample and corresponding base subsample as explained in the text.

Hypothesis 1

Using data from experiment I, we run a series of simple ordinary least squares (OLS) bid/offer regressions. Tables 3 and 4 present the estimation results for six specifications for WTP (WTA), where the dependent variables are the individual bids (offers). Specifications 1 and 2 estimate the effects of the difficulties of delaying and reversing the transaction on the WTP and WTA values; specifications 3 and 4 estimate the effects of being a keeper; and specifications 5 and 6 combine these models.[6]

The regression results strongly support our theoretical predictions: reversal difficulty and delay difficulty are statistically significant at conventional levels, and their signs are consistent with predictions of the commitment cost theory for both WTP and WTA and consistent across the specifications. For example, reversal difficulty reduces WTP and increases WTA, while delay difficulty reduces WTA and increases WTP.

In experiment II, as shown in Table 2, the mean reported WTA for those with GBG is \$3.23, which is statistically different from WTA of the control group (\$4.66). Since a GBG reduces the reversal difficulty, this result is consistent with Hypothesis 1. Results for the table treatment subsample are directionally consistent with Hypothesis 1, but the mean WTA of \$3.98 is not significantly different from \$3.23 at conventional levels.

TABLE 3. Willingness-to-pay regressions: experiment I

	Specifications					
	1	**2**	**3**	**4**	**5**	**6**
Constant	7.75**	8.39**	7.66**	7.69**	6.37*	6.12*
	(3.27)	(3.08)	(9.56)	(8.45)	(1.92)	(1.75)
Reversal difficulty[a]	-1.82**	-1.93**				
	(-2.75)	(-2.73)				
Delay difficulty[b]	2.52**	2.42**			1.90*	1.95*
	(2.76)	(2.57)			(1.93)	(1.92)
Keep			-0.66	-0.69	0.56	0.68
(=1 if keep)			(-0.46)	(-0.45)	(0.38)	(0.44)
Dealer		-0.97		-0.11		0.50
(=1 if a dealer)		(-0.50)		(-0.06)		(0.26)
Gender					-2.21	-2.15
(=1 if male)					(-0.87)	(-0.84)
R^2	0.34	0.34	0.00	0.06	0.13	0.13
N	34	34	49	49	49	49

Note: Numbers in parentheses are t-statistics. * significant at 10%; ** significant at 5%.
[a] Response to question 10b.
[b] Response to question 11a.

TABLE 4. Willingness-to-accept regressions: experiment I

	Specifications					
	1	**2**	**3**	**4**	**5**	**6**
Constant	12.55**	14.10**	10.00**	9.85**	5.00	4.73
	(3.24)	(3.08)	(6.93)	(6.29)	(1.29)	(1.20)
Reversal difficulty[a]	2.38	2.08			4.40**	4.47**
	(1.49)	(1.23)			(3.31)	(3.33)
Delay difficulty[b]	-3.21**	-3.61**				
	(-2.82)	(-2.76)				
Keep (=1 if keep)			5.39**	5.54**	5.47**	5.83**
			(2.47)	(2.43)	(2.85)	(2.92)
Dealer (=1 if a dealer)		-2.26		1.15		2.70
		(-0.66)		(0.26)		(0.70)
Gender (=1 if male)					-2.18	-2.38
					(-0.73)	(-0.79)
R^2	0.40	0.41	0.14	0.09	0.36	0.37
N	23	23	41	41	41	41

Note: Numbers in parentheses are t-statistics. * significant at 10%; ** significant at 5%.
[a] Response to question 11a (note that this is different from the WTP table).
[b] Response to question 10b.

As in experiment I, we run a set of OLS regressions and report summary estimates in Table 5. Table 5 includes a series of specifications that generally provides insights consonant with Hypothesis 1. For example, in specification 1, while the table treatment dummy variable is not significant at conventional levels, the GBG dummy is highly significant and negative, consistent with Hypothesis 1. In addition, empirical results in columns 2 and 3 show that the coefficient of reversal difficulty is positive and highly significant. Specifications 4 and 5 provide insights on the robustness of the statistical significance of the treatment dummies with respect to the dealer and gender variables. In each case, the GBG dummy variable remains highly significant and negative. Specifications in columns 6–8 report regression results using models that include delay difficulty and whether subjects planned to keep the good.[7] Neither the perceived delay difficulty nor the table treatment dummy is statistically significant at conventional levels. However, the perceived reversal difficulty is statistically significant, and its sign is consistent with Hypothesis 1.[8]

TABLE 5. Willingness-to-accept regressions: experiment II

	Specifications							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Constant	4.66**	2.85**	2.57**	4.49*	4.26**	4.18**	3.60**	3.05*
	(15.56)	(5.12)	(4.54)	(14.01)	(6.75)	(9.63)	(6.84)	(2.51)
GBG dummy	-1.43**	-1.60**	-1.33**	-1.26**	-1.27**			
	(-2.89)	(-2.94)	(-2.40)	(-2.49)	(-2.49)			
Table dummy	-0.68	-0.38	-0.21	-0.59	-0.60	-0.20	-0.24	0.45
	(-1.27)	(-0.74)	(-0.41)	(-1.11)	(-1.11)	(-0.33)	(-0.41)	(0.68)
Reversal		0.88**	0.88**					1.16**
difficulty[a]		(3.53)	(0.25)					(2.85)
Delay								-0.35
difficulty[b]								(-1.51)
Keep							1.12*	0.05
(=1 if keep)							(1.87)	(0.67)
Dealer			1.29*	1.04	1.00			
(=1 if a dealer)			(1.92)	(1.45)	(1.37)			
Gender					0.27			
(=1 if male)					(0.43)			
R^2	0.07	0.21	0.25	0.09	0.09	0.00	0.07	0.29
N	112	89	89	112	112	50	50	41

Note: Numbers in parentheses are t-statistics. * significant at 10%; ** significant at 5%.
[a] Response to question 11a.
[b] Response to question 10b.

Hypothesis 2

We return to the experiment I data to examine the WTP and WTA values for various combinations of the perceived delay/reversal difficulties. Table 6 groups the subjects into the three categories specified in Hypothesis 2. Data summarized in row 1 support Hypothesis 2(*i*): the average WTA of 13.33 is larger than the average WTP of 5.84 for those who perceive a higher reversal difficulty than delay difficulty, and the difference is significant. Row 3 of Table 6 confirms Hypothesis 2(*ii*): WTP (13.93) > WTA (6.25) for the case of reversal difficulty being smaller than the delay difficulty. Again, the difference is statistically significant at conventional levels. We find this result to be quite amazing, as it suggests the strength of our dynamic option-based theory—aligning groups of subjects by the degree of delay/reversal difficulty yields average WTP values that are greater than average WTA values, precisely as the commitment cost theory predicts.

Several pieces of evidence from Table 6 are relevant for Hypothesis 2(*iii*). First, for subjects who perceive a higher difficulty to sell than to buy in both WTP and WTA, average WTP (5.84) is not significantly different from the average WTA (6.25). For those perceiving a higher difficulty to buy, average WTP (13.93) is not statistically different from the average WTA (13.33). Both null results are consistent with Hypothesis 2(*iii*). Yet results summarized in row 2 of Table 6 do not confirm 2(*iii*): although our theory predicts WTP = WTA when the delay and reversal costs are equivalent, the data indicate WTA > WTP. This result is, however, consistent with Hanemann's (1991) neoclassical explanation: because of income (shifts in the indifference curve) and substitution (curvature of the indifference curves) effects, neoclassical theory predicts value divergences.

TABLE 6. Effects of relative reversal and delay difficulties: experiment I

	WTP		WTA	
Relative Difficulties	**Mean**	**N**	**Mean**	**N**
1. Reversal difficulty > delay difficulty	5.84	19	13.33	6
	(3.11)		(5.47)	
2. Reversal difficulty = delay difficulty	6.50	8	15.00	5
	(4.07)		(6.12)	
3. Reversal difficulty < delay difficulty	13.93	7	6.25	12
	(5.42)		(3.05)	

Note: Numbers in parentheses are standard deviations.

Table 7 makes a finer split of the data by comparing specific levels of reversal/delay difficulties. Each cell represents WTP and WTA values for subjects who perceived certain degrees of buying and selling difficulties. For Hypothesis 2(*i*), the relevant comparisons are the WTP values in cells below the diagonal and WTA values in cells above the diagonal. These are subjects who perceive a higher reversal difficulty than delay difficulty in both WTP and WTA transactions. In these data it is clear that WTA> WTP either in pair-wise comparisons or in aggregate, supporting Hypothesis 2(*i*).

Similarly, Hypothesis 2(*ii*) is confirmed by a comparison of the WTP values in cells above the diagonal with WTA values in cells below the diagonal. Further, since the WTP and WTA values in the same cell are formed under beliefs about selling and buying difficulties that are consistent across the WTP and WTA treatments, Hypothesis 2(*iii*) predicts that the two values should be equivalent in each cell. Among the eight cells for which both values are reported, the average WTP is similar to the average WTA in six cells (WTA is higher than WTP in the other two cells). This observation supports Hypothesis 2(*iii*).[9]

Concluding Remarks

The divergence of compensation demanded and WTP measures of value has prompted many economists to pause and contemplate whether the basic tenets of neoclassical theory are satisfied. Some commentators have used the vast empirical evidence to

TABLE 7. Perceptions of reversal/delay difficulties: experiment I

		Difficulty of buying later (DelayD for WTP, or RevD for WTA)				
		1	**2**	**3**	**4**	**5**
Difficulty of selling later (RevD for WTP, or DelayD for WTA)	**1**	3.50 (2) 13.33 (3)	16 (3) 13 (4)	15 (1) 14 (2)		
	2	6.8 (5) 7.4 (5)	9.0 (5) 17.5 (2)	12.5 (2) –	9.5 (1) –	
	3	5.50 (6) 4.25 (4)	8.33 (3) 9.00 (2)			
	4	4 (2) –	5 (1) 3 (1)			
	5		5 (1) –	1 (1) –		

Note: The first entry is the average WTP, and the bottom entry is the average WTA; the sample size is in parentheses.

call into question the fundamental building blocks of economic theory. While static neoclassical theories have been proposed to explain the observed preferences, the data generally have not conformed well to these theories. In this paper, we examine whether a dynamic neoclassical theory based on the presence of commitment costs can explain the behavior of individuals within a competitive marketplace.

We find several pieces of evidence that are in favor of the commitment cost theory. First, our field experiment results suggest that a value disparity exists, even for those consumers who plan to purchase the good for resale. Second, we find that the comparative static predictions of the theory perform quite well: WTP (compensation demanded) increases (decreases) in the difficulty of delay and decreases (increases) in the difficulty of reversing the transaction. Third, even under the most stringent of our theoretical conjectures—including cases where WTP is predicted to exceed WTA—our data perform well. Overall, our results suggest that commitment costs are an important source of the value disparity and provide strong evidence that a neoclassical-based theory can explain the causes and severity of the value disparity.

Endnotes

1. Hanemann's (1991) work extended that of Randall and Stoll (1980), who demonstrated that the WTP/WTA disparity depends on the "price flexibility of income." Hanemann proved that the price flexibility of income is analytically equivalent to the ratio of the ordinary income elasticity of demand for the good to the Allen-Uzawa elasticity of substitution between the good and the *numéraire*. Thus, for low elasticity of substitution values, the price flexibility of income is large, suggesting that the ratio WTP/WTA also is large.

2. This assumption can be relaxed without changing the key results of our model. If the uncertainty is only partially resolved, the magnitude of the commitment cost effect will be smaller than if the resolution is complete, but the qualitative results will remain unchanged.

3. We should also note that we randomized participants into one of the two treatments by changing the treatment type at the top of each hour. Also, subjects only participated in one treatment.

4. Unless otherwise noted, all claims are supported by statistical tests at the 5 percent level. For every unconditional comparison, we employ a two-sample t-test and a two-sample Wilcoxon rank-sum test.

5. Average values of the subject-specific characteristics are similar across the two subsamples, indicating that our experiment procedure was successful at random placement of subjects in the two treatments.

6. Since "keepers" only answered the question of purchasing the good in the future, only delay difficulty is included for WTP and only reversal difficulty is included for WTA in specifications 5 and 6.

7. The number of observations decreases considerably in these specifications because many subjects left responses to these questions blank. Also, the GBG treatment dummy is not identifiable since none of these subjects completed the "delay difficulty" and "keep" questions because of experiment error.

8. Overall, in experiment II, the effects of the GBG and the perceived reversal difficulty provide perspicuous support for Hypothesis 1, but the table treatment and the perceived delay difficulty variables are consistently insignificant. There are at least two possible explanations. One is that respondents did not view the offer to use the monitor's table the next week as a significant decrease in the cost of delaying their

transaction to notably lower their commitment costs (they would still have to take the time to come and use the table with an uncertain outcome). Alternatively, respondents may not have been considering the delay possibility when forming their WTA values.

9. Our theory also conveniently describes empirical results that suggest that market experience attenuates the value disparity (e.g., Knez, Smith, and Williams 1985; Coursey, Hovis, and Schulze 1987; Brookshire and Coursey 1987; List 2003).

Appendix

Survey Forms

(I) WTP Treatment

Confidential Survey

These questions will be used for statistical purposes only. THIS INFORMATION WILL BE KEPT CONFIDENTIAL AND WILL BE DESTROYED UPON COMPLETION OF THE STUDY.

1. How long have you been active in the sportscard and memorabilia market? _____yrs
2. Are you a sportscard or sports memorabilia professional dealer? _____
3. How many sportscard or memorabilia shows do you attend in a typical year? _____
4. In how many of those do you typically trade? _____
5. Gender: 1) Male 2) Female
6. Age _____ Date of Birth _____
7. What is the highest grade of education that you have completed. (Circle one)
   1) Eighth grade 3) 2-Year College 5) 4-Year College
   2) High School 4) Other Post-High School 6) Graduate School Education
8. What is your approximate yearly income from all sources, before taxes?
   1) Less than $10,000 5) $40,000 to $49,999
   2) $10,000 to $19,999 6) $50,000 to $74,999
   3) $20,000 to $29,999 7) $75,000 to $99,999
   4) $30,000 to $39,999 8) $100,000 or over
9. What do you think is the likely market value of the good (a range is fine)?_____
10. If you win the auction:
    A. What do you plan to do with the good? Sell it ____ Trade it ____ Keep it _____
    B. If you plan to sell/trade the good, how easy do you think it will be to sell/trade?
       1 (very easy) 2 3 4 5 (almost impossible)
    C. If you decide to sell the good, which of the following do you think is true? You could
       (a) Recoup the full bid_____
       (b) Take a loss _____
       (c) Earn a profit _____
11. If you do not win the auction:
    A. How easy do you think it will be to obtain the good (or a close substitute) later?
       1 (very easy) 2 3 4 5 (almost impossible)

B. If you were to purchase the good (or a close substitute) later, which of the following do you think is true? The purchase price would be
(a) Above my bid _____
(b) Below my bid _____
(c) About the same as my bid _____

(II) WTA Treatment

Confidential Survey

These questions will be used for statistical purposes only. THIS INFORMATION WILL BE KEPT CONFIDENTIAL AND WILL BE DESTROYED UPON COMPLETION OF THE STUDY.

1. How long have you been active in the sportscard and memorabilia market? _____yrs
2. Are you a sportscard or sports memorabilia professional dealer? _____
3. How many sportscard or memorabilia shows do you attend in a typical year? _____
4. In how many of those do you typically trade? _____
5. Gender: 1) Male 2) Female
6. Age _____ Date of Birth _____
7. What is the highest grade of education that you have completed. (Circle one)
   1) Eighth grade 3) 2-Year College 5) 4-Year College
   2) High School 4) Other Post-High School 6) Graduate School Education
8. What is your approximate yearly income from all sources, before taxes?
   1) Less than $10,000 5) $40,000 to $49,999
   2) $10,000 to $19,999 6) $50,000 to $74,999
   3) $20,000 to $29,999 7) $75,000 to $99,999
   4) $30,000 to $39,999 8) $100,000 or over
9. What do you think is the likely market value of the good (a range is fine)?_____
10. If you do not sell in the auction:
    A. What do you plan to do with the good? Sell it ____ Trade it ____ Keep it _____
    B. If you plan to sell/trade the good, how easy do you think it will be to sell/trade?
    1 (very easy) 2 3 4 5 (almost impossible)
11. If you do sell the good in the auction:
    A. How easy do you think it will be to obtain the good (or a close substitute) later?
    1 (very easy) 2 3 4 5 (almost impossible)
    B. If you were to purchase the good (or a close substitute) later, which of the following do you think is true? The purchase price would be
    Above my offer_____
    Below my offer_____
    About the same as my offer_____

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