

# WTP and WTA in competitive and non-competitive environments

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## Abstract

Theoretical equivalence exists among various auction mechanisms, specifically the Second-Price-Auction (SPA), a competitive environment, and the BDM mechanism, a non-competitive environment. Yet, empirical studies suggest that behavior in these mechanisms may diverge. Our experimental study examines the WTP and the WTA of individuals by analyzing buying and selling bidding patterns both for a physical product (mugs) and for two types of lotteries (regular lotteries and extreme lotteries) in these two auctions mechanism: SPA and BDM. We found that the WTP in the SPA is higher than the WTP in the BDM for mugs and for regular lotteries, while the mechanisms do not differ significantly for extreme lotteries. In addition, the WTA in the SPA is lower than in the BDM for regular lotteries only. These results indicate that the WTP and WTA, as well as the WTA-WTP gap, tend to differ in the SPA and in the BDM as a result of the interaction between the competitiveness effect and other psychological effects on bidding patterns for riskless and risky assets. In addition, the current study suggests that the competitiveness effect depends not only on the type of mechanism (SPA), but also on the type of item (physical assets or lotteries) and the type of lottery. In addition, the influence of the competitiveness effect may vary between buying and selling positions.

Keywords: WTA, WTP, competitiveness, auction, lotteries.

## 1 Introduction

Several studies have compared the bidding patterns of subjects in different auction mechanisms. Despite the theoretical equivalence among various auction mechanisms, such as the BDM mechanism (Becker-DeGroot-Marschak, 1964) and the Second-Price-Auction (henceforth, SPA) (Vickery, 1961), empirical studies suggest that behavior in these mechanisms may diverge (Noussair et al., 2004; Lusk et al., 2004; Rutström, 1998). In auctions based on the BDM mechanism, individuals buying an asset declare their maximum buying price, known as willingness-to-pay (WTP). If the bidding price is higher than a drawn number, the individual pays the drawn number and buys the asset. When selling an asset, individuals declare their minimum selling price, known as willingness-to-accept (WTA). If the bidding price is lower than a drawn number, the individual receives the amount of the drawn number and sells the asset. In auc-

tions based on SPA, the highest bidder in a buying auction wins the final prize and pays the second highest bid. The lowest bidder in a selling auction wins the final prize and pays the second lowest bid.

The SPA is more competitive than the BDM mechanism, since each participant competes with others. Shogren et al. (2001) suggested that in the SPA, “people may submit bids to win for the sake of winning. They may bid WTP-up and WTA-down in order to walk out of the experiment as the ‘top-dog’ among their peers” (p. 105). The top-dog effect is said to exist if bidders submit bids in excess of their true valuation with the intention of deriving utility by winning the auction.

Previous evidence on the existence of a top-dog effect has been mixed. Shogren and Hayes (1997) report that nearly 90% of participants in an induced-value auction market submitted bids that were less than or equal to their assigned value. The authors concluded that these results are not consistent with the existence of a top-dog effect. In contrast, Kagel’s review (1995) of the induced-value SPA literature indicates that the mean bid in such auctions is generally *greater* than predicted by theory. Corrigan and Rousu (2003) provided evidence of SPA overbidding in repeated trial auctions, interpreting the results as the top-dog effect. In addition, Shavit et al. (2006) show that competitiveness affects bidding patterns in the SPA.

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The current study examines the impact of the top-dog effect, or the competitiveness effect, in the SPA on bidding patterns for different goods (riskless and risky assets) and in different positions (buyer or seller). In particular, the study examined the WTP and the WTA by analyzing buying and selling bidding patterns both for mugs and for lotteries in two separate auctions mechanism: the SPA, a competitive environment, and the BDM mechanism, a non-competitive environment.

We consider two types of lotteries: regular lotteries and extreme lotteries. Extreme lotteries involve very high outcome associated with small probability, and low, or zero, outcome associated with high probability. Previous studies did not distinguish between biddings on regular and extreme lotteries for the two mechanisms. In this study, we examine these two types of lotteries, since we expected to find differences between them on bidding patterns in the SPA and in the BDM. For extreme lotteries, we expect no impact of the competitiveness effect in the buying position of the SPA, since the chances for loss are very high and such a lottery will not be attractive to buy. In addition, we expect that the competitiveness effect in the selling position of the SPA will be canceled out since the seller of an extreme lottery, who focuses on the very high winning outcome, will avoid selling it.

To evaluate the WTP and WTA of an item, we considered several psychological effects that influence the bidding patterns of individuals. The effects are:

- *The regret effect* (Loomes & Sugden, 1982; Bar-Hillel & Neter, 1996), which may have an influence on the WTA for lotteries. For example: sellers may focus on the high winning outcome of a lottery and increase their WTA to avoid regret of selling it.
- *The disappointment effect* (Loomes & Sugden 1986, Mellers et al., 1997; Ang et al., 2005), which has a negative influence on the WTP for lotteries, reflecting the tendency to avoid the disappointment of getting the lowest outcome.
- *The ownership effect* (Kahneman et al., 1990; Sayman & Onculer, 2005), which has a positive influence on the WTA.
- *The competitiveness, or top-dog effect* (Shogren et al., 2001), which decreases the WTA and increases the WTP in order to win the auction.
- *The asymmetric effect* for lotteries (Schmidt & Traub, 2007; Peters et al., 2003), according to which buyers focus on the potential disappointment from the lowest outcome (zero) and sellers focus on the potential regret of losing the highest outcome (Loomes & Sugden, 1982; Bar-Hillel & Neter, 1996).

The impact of each of these effects, and the sum of all of them, on the WTP and the WTA is expected to vary among goods and mechanisms. The literature does not discuss the possible interaction between these psychological effects and the competitiveness environment effect. Our study fills this void and compares the interaction of these effects on bidding for mugs and for lotteries.

Psychological effects, such as loss aversion and the endowment effect, have been used to explain the WTA-WTP disparity (e.g., Thaler, 1980; Cousey et al., 1987; Kahneman, et al., 1991; Loomes & Weber, 1997; Weber et al., 2000). Yet, recent studies have questioned the existence and interpretation of a possible gap between WTP and WTA (Shogren et al., 2001; Plott & Zeiler, 2005; Horowitz & McConnell, 2002). Shogren and Hayes (1997) and Shogren et al. (2001) argued that the WTA-WTP disparity in the first trial for market goods (candy bars and university mugs) in both auctions (BDM and SPA) disappeared quickly for repeated trials in the SPA, though it persisted in the BDM mechanism. Shogren et al. (2001) suggested that the WTA-WTP disparity may depend on the auction mechanism. For lotteries, Schmidt and Traub (2007) argued that an asymmetric effect, in which the buyer focuses on the potential disappointment of the lowest outcome and the seller focuses on the potential regret of losing the highest outcome, may cause the disparity between WTA and WTP. In the current study we use not only mugs, but also regular and extreme lotteries that enable us to examine more rigorously this asymmetry between buyers and sellers.

In sum, the current study examines the WTA and WTP for riskless goods (mugs) and two types of risky assets (regular and extreme lotteries) in competitive versus non-competitive mechanisms and compares the WTA-WTP gap for these items in the two mechanisms. The study also discusses the influence of the interaction between the competitive effect and other psychological effects on subjects' bidding patterns. The results should shed some light on the impact of the competitiveness effect in the SPA on the bidding pattern for different assets and different positions, in comparison to the BDM.

The rest of the paper is organized as follows. Section 2 outlines the main hypotheses, Section 3 presents the experimental method, and Section 4 presents the results. Finally, Section 5 summarizes and concludes.

## 2 Hypotheses

In our hypotheses we distinguish between riskless assets (mugs) and risky assets (regular and extreme lotteries), since we expect to find that psychological effects have a differential impact on bidding patterns for each type of item.

Table 1: The theoretical influence of psychological effects on the WTP and WTA in SPA and BDM

	SPA		BDM	
	WTP	WTA	WTP	WTA
<b>a. Regular Lotteries</b>				
Competitiveness effect	+	–	none	none
Regret effect	none	+	none	+
Disappointment effect	–	none	–	none
Sum of the effects	unknown	unknown	–	+
(WTA-WTP) gap*	unknown		positive	
<b>b. Extreme Lotteries**</b>				
Competitiveness effect	0	0	none	none
Regret effect	none	+	none	+
Disappointment effect	–	none	–	none
Sum of the effects	–	+	–	+
(WTA-WTP) gap	positive		positive	
<b>c. Mugs</b>				
Competitiveness effect	+	–	none	none
Ownership effect	none	+ (weak)	none	+(weak)
Sum of the effects	+	unknown	none	+(weak)
(WTA-WTP) gap	negative		positive or zero	

\*\* include high outcome with small probability and low, or zero, outcome with high probability

### 2.1 Hypotheses for lotteries

For lotteries, Schmidt and Traub (2007) argued that assessment of WTA and WTP for risky assets differs from assessment for riskless commodities. Although, in the case of trading in riskless commodities, an individual is always in a safe position, lotteries are marked by asymmetry (asymmetric certainty effect). When determining the WTP, the individual gives up a position of certain wealth and acquires a position of risk; in contrast, when determining the WTA, the individual exchanges a risky position for one of certainty. Therefore, buyers and sellers may focus on different outcomes of the lottery (Peters et al., 2003). In particular, lottery buyers may focus on the zero outcome (or the lowest outcome) and decrease their WTP to avoid the disappointment of the lowest outcome, while sellers may focus on the high winning outcome and increase their WTA to avoid regret (Loomes & Sugden, 1982; Bar-Hillel & Neter, 1996). In addition, we expect the competitive environment of the SPA to lower the WTA and raise the WTP in order for the bidder to win

the auction (the top-dog effect).

For extreme lotteries, we expect the asymmetry between the buying and selling positions to be much more salient than for regular lotteries. Since the chances for loss are very high in an extreme lottery, such a lottery will not be attractive to buy; as a result we expect no impact of the competitiveness effect in the buying position of the SPA. In the limit, if the lottery has no value, then winning it in a competition is not perceived as a victory. Similarly, the seller of an extreme lottery, who focuses on the very high winning outcome and hence avoids selling, is extremely likely to be very disappointed, thus canceling the impact of the competitiveness effect in the selling position of the SPA. Again, in the limit, getting the highest price for what you don't want to sell is not a victory.

Tables 1 (a) and 1 (b) summarize the theoretical influence of the psychological effects on the WTP and the WTA in the two mechanisms, for regular lotteries and extreme lotteries:

Based on Tables 1 (a) and 1 (b), our hypotheses regarding lotteries are:

**Hypothesis 1, regular lotteries:**

- a *The WTP in a competitive auction (SPA) is higher than the WTP in a non-competitive mechanism (BDM).*
- b *The WTA in a competitive auction (SPA) is lower than the WTA in a non-competitive mechanism (BDM).*
- c *The WTA-WTP gap in the BDM mechanism is positive.*
- d *The WTA-WTP gap in the SPA is lower than this gap in the BDM.*

**Hypothesis 2, extreme lotteries:**

- a *The WTP in a competitive auction (SPA) does not differ from the WTP in a non-competitive mechanism (BDM).*
- b *The WTA in a competitive auction (SPA) does not differ from the WTA in a non-competitive mechanism (BDM).*
- c *The WTA-WTP gap is positive both in the BDM mechanism and in the SPA.*

**2.2 Hypotheses for mugs**

In the selling position of both mechanisms, the BDM and the SPA, we expect the *ownership effect* (Kahneman et al., 1990; Sayman & Onculer, 2005) to increase the WTA for mugs. Moreover, the ownership effect is expected to influence the bidding for mugs but not affect the bidding for lotteries, consistent with Kahneman et al. (1990), who noted that physical possession of an item produces a stronger ownership effect, or endowment effect, than the chance of receiving the item, or the property rights to it. Yet, the bidding pattern also depends on certain characteristics of the item (e.g., availability of substitutes) and specified market value (Sayman & Onculer, 2005). In the case of simple and standard mugs with specified market value and many substitutes, we expect the ownership effect in the selling position to be weak. In addition, in the SPA, we expect the competitiveness environment to decrease the WTA and increase the WTP in order to win the auction (the top-dog effect). Table 1(c) summarizes the theoretical influence of the psychological effects on the WTP and the WTA in each of the two mechanisms, for mugs. Based on Table 1(c), our hypotheses are:

**Hypothesis 3, mugs:**

- a *The WTP in a competitive auction (SPA) is higher than the WTP in a non-competitive mechanism (BDM).*
- b *The WTA in a competitive auction (SPA) is lower than the WTA in a non-competitive mechanism (BDM).*
- c *The WTA-WTP gap in the SPA is negative, while this gap in the BDM mechanism is positive or zero.*
- d *The WTA-WTP gap in the SPA is lower than this gap in the BDM.*

**3 Experimental procedure**

The participants in the experiment were 95 undergraduate students of economics and industrial engineering at Ben-Gurion University. The experiment took place during a class and lasted approximately half an hour. Participants were asked to bid prices for buying and selling mugs and for several different lotteries. We handed out the written instructions, including examples, and gave the participants ten minutes to read them. Then we read the instructions aloud, explained the examples and answered questions.

The participants were divided into two groups. In the first group, 52 students were asked to bid prices in a second-price-auction (SPA group), and in the other group, 43 students were asked to bid prices for the same assets in the BDM mechanism (BDM group). In the instructions to the SPA group, participants were told that, in the case of a buying auction, the person with the *highest* bidding price would win the auction, but would pay the *second highest* bidding price in the group participating in the auction. In the case of a selling auction, the person with the *lowest* asking price would win the auction, but would receive the *second lowest* asking price in the group participating in the auction.

In the instructions to the BDM group, participants were told that, for each asset, a number between a low value and a high value would be randomly selected by the computer (in the case of mugs, between 0.3 N.I.S and 10.3 N.I.S, and in the case of a lottery, between the lottery's low value and the lottery's high value). In the case of a buying auction, if the bidding price is above the random number, the bidder would pay the random number and get the lottery. However, if the bidding price is below the random number, the bidder would not get the lottery and would remain with the initial endowment. In the case of a selling auction, if the bidding price is below the random number, the bidder would get the random number and sell

the asset. However, if the bidding price is above the random number, the asset would remain with the bidder.

In both groups, the participants bid prices in two parts. First, they bid prices for the mugs, and then for the lotteries. They bid prices for buying the assets and for the selling auctions. In each part, the auctions were presented in random order to avoid any order effect. For each auction, participants received an initial balance, where in the case of selling problems, they owned the initial balance and the asset. In order to avoid an income effect, the initial balance was lower in the selling position than in the buying problems.

To provide concrete incentives, we told all participants that, at the end of the experiment, one of the problems would be randomly selected from each part, and we would pay them according to their final balance for the selected problem.<sup>1</sup>

The participants in the SPA group were told that at the end of the experiment, they would be randomly divided by a computer program into eight groups of five and two groups of six. The participants in each group would then compete on buying and selling the assets using the second-price auction. They were also told they would be paid 10% (in N.I.S.) of the final balance in the selected problem of the second part.

### 3.1 Description of the auctions

The auctions in the first part were for black and gray mugs. The mug auction offered only one of the mugs (to buy or to sell) to each group. The six lotteries presented in the second part are shown in Table 2.

The regular lotteries A-D had a relatively low probability (10%) of achieving the lowest outcome, and a high probability (50% or 60%) of achieving the best outcome. However, the extreme lotteries, E and F, had a relatively high probability (30%) of getting the lowest outcome, and a low probability (10%) of getting a very high outcome (1000), compared to all other outcomes in lotteries A-D.

The initial endowment was 15 N.I.S in the buying auction and 10 N.I.S in the selling auction. The initial endowment in the second part was 200 N.I.S in the buying auction and 100 N.I.S in the selling auction, for lotteries A B, E and F (200 N.I.S in the selling auction for lotteries C and D)<sup>2</sup>.

<sup>1</sup>The average payment in the first part was 13 N.I.S (approximately \$4 US), and 30 students also received a mug (worth 4 N.I.S or approximately \$1 US). In the second part, the average payment was 17 N.I.S (approximately \$5 US).

<sup>2</sup>We measured the risk index of the participants in the BDM and the SPA groups by a questionnaire based on Singer et al. (2003, 2005). We found that the risk attitude indices for individuals in the SPA and in the BDM groups did not differ significantly from one another (0.559 and 0.572, respectively,  $t(91) = 0.67$ ,  $p = 0.5$ ).

Table 2: The lottery auctions

Regular lotteries				
Probability	50%	40%	10%	Expected Value
Lottery A	200	40	0	116
Lottery B	200	40	10	117
Extreme lotteries				
Probability	10%	60%	30%	Expected Value
Lottery C	20	10	0	15.0
Lottery D	20	10	5	15.5
Lottery E	1000	20	0	113.0
Lottery F	1000	20	5	113.5

## 4 Results

The results are based on 212 bidding observations in the SPA and 172 biddings in the BDM for mugs. For lotteries, we used 529 and 504 biddings in the SPA and in the BDM, respectively.<sup>3</sup> We calculated for each subject the average bidding for mugs, regular lotteries and extreme lotteries. The average prices for subjects are shown in Table 3<sup>4</sup>.

### 4.1 WTP in the SPA and BDM

Table 3 shows that the WTP in the SPA is higher than the WTP in the BDM group both for mugs and for regular lotteries. This result is consistent with hypotheses 1(a) and 3(a) that the WTP in a competitive auction (SPA) is higher than the WTP in a non-competitive mechanism (BDM) for regular lotteries and mugs. Earlier studies (e.g., Lusk et al., 2004; Rutström, 1998) showed that the WTP in the SPA is consistently higher than that in the BDM for physical or tangible goods, and our result extends this finding to risky assets (regular lotteries).

For the extreme lotteries, we did not find any significant differences between the WTP in the BDM and in the SPA, consistent with hypothesis 2(a) that the WTP in a competitive auction (SPA) does not differ from the

<sup>3</sup>For lotteries in the SPA, 32 biddings out of a total of 624 biddings were omitted from the analysis, and in the BDM, 12 biddings out of a total of 516 biddings were omitted, due to nonsensical extreme values (e.g., WTP and WTA values of 100 NIS for lottery ticket that offered a 60% chance to win 20 NIS).

<sup>4</sup>Note that in the SPA we found significant differences, both in WTP and WTA, between the gray and the black mugs, reflecting the subjects' preferences.

Table 3: Average biddings for mugs and lotteries in SPA and BDM

	WTP			WTA		
	SPA*	BDM	t-test (p-value) SPA to BDM	SPA	BDM	t-test (p-value) SPA to BDM
All Mugs	8.23 (2.98)	5.34 (2.17)	5.25 (0.00)	5.85 (2.59)	5.60 (2.17)	0.50 (0.31)
Regular** lotteries (A-D)	0.84+ (0.32)	0.70+ (0.26)	2.20 (0.02)	0.78+ (0.29)	0.88+ (0.19)	-1.83 (0.04)
Extreme**lotteries (E,F)	0.64+ (0.39)	0.61+ (0.34)	0.41 (0.34)	1.10 (1.56)	0.95 (0.71)	0.56 (0.29)
Difference between Regular lotteries (A-D) and Extreme Lotteries (E,F)	0.20+ (0.33)	0.09+ (0.29)	1.62 (0.05)	-0.32++ (1.45)	-0.07 (0.67)	1.07 (0.14)

+ p-value < 0.05; for the null hypothesis that the average value equals the expected value (or equals 1 for the relative lotteries, or zero for the difference). (++) for p-value < 0.1)

\* SD in the brackets.

\*\* Relative to the expected values.

For all the tests, degrees of freedom= 93

WTP in a non-competitive mechanism (BDM). In addition, table 3 shows that in both mechanisms the difference between the WTP for regular lotteries and the WTP for extreme lotteries is significantly positive. However, this WTP difference between regular and extreme lotteries is significantly higher in the SPA than in the BDM. These results suggests that in the SPA the competitiveness effect has no impact for extreme lotteries, since lotteries that have a high probability for zero or a small amount are not attractive to buy.

These findings for the buying position are important since they emphasize the difference in the WTP between the two mechanisms only for mugs and for regular lotteries, but not for extreme lotteries. These results confirm our hypotheses that in the SPA the competitiveness effect has an impact on regular lotteries but no impact on extreme lotteries.

#### 4.2 WTA in the SPA and BDM

For regular lotteries, the result for the selling position shows that the WTA in the SPA is significantly lower than the WTA in the BDM, consistent with hypothesis 1(b) that the WTA in a competitive auction (SPA) is lower than the WTA in a non-competitive mechanism (BDM). This result suggests that for regular lotteries, the competitiveness effect in the SPA decreases the WTA compared to the WTA in the BDM.

For extreme lotteries, however, the results show no sig-

nificant differences between the WTA in the two mechanisms, consistent with hypothesis 2(b) that the WTA in a competitive auction (SPA) does not differ from the WTA in a non-competitive mechanism (BDM). This result suggests that the competitiveness effect has no impact on the SPA for extreme lotteries, due to the strong regret effect.

Table 3 also indicates that the difference between the WTA for regular lotteries and the WTA for extreme lotteries is negative in the SPA, but is not different from zero in the BDM. Yet, the WTA for regular-extreme lotteries difference is not significantly different between the two mechanisms.

For mugs, the results in Table 3 show that the WTA in the SPA group did not differ significantly from the WTA in the BDM group. This result suggests that for simple mugs, the competitiveness effect has zero or weak impact in the selling position, and can possibly explain why hypothesis 3(b) that, the WTA in a competitive auction (SPA) is lower than the WTA in a non-competitive mechanism (BDM), was not supported. This finding also reveals that the competitiveness effect has a smaller impact in the selling position than in the buying position.

#### 4.3 WTA-WTP disparity

Table 4 presents the average WTA-WTP disparity for the mugs and for the lottery auctions.

Table 4: Mean WTA-WTP disparity (and s.d.) for mugs and lotteries in SPA and BDM.

	WTA-WTP		t-test (p-value)
	SPA	BDM	SPA to BDM
All Mugs	-2.38 <sup>+</sup> (3.70)	0.25 (2.18)	-4.12 (0.00)
Regular lotteries** (A-D)	-0.06 (0.42)	0.17 <sup>+</sup> (0.35)	-3.01 (0.00)
Extreme lotteries** (E,F)	0.45 <sup>+</sup> (1.67)	0.34 <sup>+</sup> (0.72)	0.42 (0.34)
Difference between Regular and Extreme lotteries	-0.51 <sup>+</sup> (1.49)	-0.17 <sup>++</sup> (0.67)	-1.40 (0.08)

+ p-value < 0.05 for the null hypothesis the average equals zero, ++ for p-value < 0.1.

\*\* Relative to the expected values.

For all the tests, degrees of freedom = 93.

#### 4.4 WTA-WTP disparity for lotteries

For the BDM mechanism, the results in Table 4 show that the WTA-WTP disparity for all lotteries (regular and extreme) is significantly positive ( $WTA > WTP$ ), confirming hypotheses 1(c) and 2(c) that the WTA-WTP gap in the BDM mechanism is positive. These findings are consistent with the findings of Schmidt and Traub (2007), who used different procedures to elicit the WTA and WTP of lotteries.

For the SPA, we found that for regular lotteries the WTA-WTP disparity does not differ significantly from zero, while for extreme lotteries this gap is positive (confirming hypothesis 2(c) that for extreme lotteries the WTA-WTP gap in the SPA mechanism is positive). The results also indicate that in both mechanisms the difference in the WTA-WTP gap between regular and extreme lotteries is negative while, this difference is significantly higher in the SPA than in BDM<sup>5</sup>.

These results indicate that the WTA-WTP gap in the SPA depends on the impact of the competitiveness effect. On the one hand, for regular lotteries the competitiveness effect reduces the gap and offsets the positive influence of the regret and disappointment effects. On the other, for extreme lotteries the positive WTA-WTP gap suggests there is no impact of the competitiveness effect. In addition, the results in Table 3 support hypothesis 1(d) that for regular lotteries the WTA-WTP gap in the SPA is significantly lower than this gap in the BDM,

#### 4.5 WTA-WTP disparity for mugs

For the BDM, Table 4 indicates no significant difference between WTA and WTP for mugs. For the SPA, however, the WTA-WTP disparity is significantly *negative* for mugs. That is, in the competitive environment of the SPA,  $WTP > WTA$ . These results confirm hypothesis 3(c) that

<sup>5</sup>p-value < 0.1

for mugs the WTA-WTP gap in the SPA is negative, while this gap in the BDM mechanism is positive or zero. In addition, the results in Table 3 support hypothesis 3(d) that for mugs the WTA-WTP gap in the SPA is significantly lower than this gap in the BDM.

A possible explanation for the insignificant gap in the BDM is that the ownership effect is very weak for ordinary mugs with low market value and many substitutes. Sayman and Onculer (2005) provide evidence that the WTA-WTP disparity is smaller for market goods with available substitutes. Nevertheless, the negative WTA-WTP gap in the SPA can be explained by the dominant negative effect of the competitive environment in the buying position over the weak positive effect of the ownership effect in the selling position (see Table 1).<sup>6</sup>

## 5 Summary and conclusions

Our study separately examines the WTP and the WTA of individuals for riskless and risky assets in two mechanisms: the SPA, which is a competitive auction, and the BDM, which is a non-competitive mechanism. The assets included a physical product (mugs) and two types of lotteries: regular lotteries and extreme lotteries.

We claimed that in a competitive auction (SPA), participants bid higher prices in the buying position, and bid lower prices in the selling position, compared to their bids in a non-competitive auction (BDM) for mugs and for regular lotteries. We distinguished between bidding behavior in regular and extreme lotteries, and explained why competitive behavior is relevant only for regular lotteries but not for extreme lotteries. We also argued that in both mechanisms (SPA and BDM), the ownership effect

<sup>6</sup>Our study included a standard and simple mug available on the market. Using more unique physical products (e.g., university mugs, as in the experiments of Shogren et al., 2001) might strengthen the impact of the ownership effect, and in turn make the WTA-WTP gap more compatible with results of previous studies on mugs.

positively influences the WTA for mugs, while the regret effect positively influences the WTA for lotteries. In addition, the disappointment effect negatively influences the WTP for lotteries.

The experimental results support most of our claims. We found that the WTP is higher in the SPA than in the BDM for mugs and regular lotteries, while it does not differ significantly between mechanisms for extreme lotteries. In addition, the WTA is lower in the SPA than in the BDM for regular lotteries only. We also found that the WTA-WTP disparity is lower in a competitive auction than in a noncompetitive auction. The results emphasize the difference between regular and extreme lotteries. For extreme lotteries, we found no impact of the competitiveness effect and strong asymmetry between the evaluation of buyers and of sellers. The current study specifies the conditions of the competitiveness effect in influencing the bidding pattern of individuals. We show that this effect depends not only on the type of mechanism (SPA), but also on the type of item (physical assets or lotteries) and the type of lottery.

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