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## Working Paper

# Endowment effect theory, prediction bias and publicly provided goods – an experimental study

Finanzwissenschaftliche Arbeitspapiere, No. 75

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Suggested citation: Bischoff, Ivo (2006) : Endowment effect theory, prediction bias and publicly provided goods – an experimental study, Finanzwissenschaftliche Arbeitspapiere, No. 75, <http://hdl.handle.net/10419/22383>

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## Finanzwissenschaftliche Arbeitspapiere

Ivo Bischoff

### **Endowment effect theory, prediction bias and publicly provided goods – an experimental study**

Arbeitspapier Nr. 75 - 2006

ISSN 0179-2806

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## **Endowment effect theory, prediction bias and publicly provided goods – an experimental study\***

### **Abstract**

Many studies report on a systematic disparity between the willingness to pay for a certain good (WTP) and the willingness to accept retribution payments in exchange for giving up this good (WTA). Thaler (1980) employs prospect theory to explain this disparity. The literature contains two different interpretations of his endowment effect theory. Accordingly, the disparity is caused either by the disutility from parting with one's endowment and/or by an extra utility from ownership which is not anticipated by individuals who are not endowed with the good. So far, the empirical evidence on the applicability of endowment effect theory is limited to private goods. The current paper reports on an experiment which finds a significant ownership utility effect for a publicly provided good. This result indicates that prospect theory applies to publicly provided goods even though consumers do not have exclusive property rights.

Keywords: endowment effect, loss aversion, publicly provided goods, experiment

JEL: H40, H43, Q51, C92

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The author would like to thank Martin Haslauer and Christine Luh for helping me conduct the experiment. Their helpful comments, as well as those made by Uwe Dulleck, John A. List, Stefan Schäfer, Dennis Stremmel, the participants of the session on "Endowment Effects" at the IAREP-SABE 2006 in Paris and two anonymous referees are gratefully acknowledged. In addition, I would like to thank the University of Giessen for financial support.

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## 1. Introduction

Since the 1940s, the contingent valuation method and surveys are widely applied tools to elicit consumers' preferences (e.g. Hanley and Spash, 1993). The answers to these studies show a systematic disparity between the participants' willingness to pay for a certain good (WTP) and their willingness to accept retribution payments in exchange for giving up this good (WTA). The ratio of WTA:WTP lies between 3:2 and 3:1 for private goods like mugs, chocolate bars or hockey tickets but takes on much higher values for publicly provided goods (e.g., Adamovicz et al., 1993; Morrison, 1997, Horowitz and McConnell, 2002). Zöllner (1997) reviewed a number of studies on environmental goods and found an average ratio of 7:1 and a maximum 70:1 for forest preservation. The literature contains different explanations for this WTA-WTP-disparity (e.g., Morrison, 1998; Brown, 2005). The endowment effect is the most controversially discussed explanations among them. It was introduced by Thaler (1980) who draws on prospect theory and argues that a substantial part of the disparity is caused by a general loss aversion. A number of experiments support the empirical validity of this argument (e.g. Kahneman et al., 1991; Franciosi, 1996, Van Boven et al., 2003). So far, however, the evidence is restricted to private goods.

This paper provides first experimental evidence which shows that Thaler's endowment effect theory also applies to publicly provided goods. This paper starts with a brief review of literature on the WTA-WTP-disparity in section 2. Section 3 discusses the importance of these explanations for the large WTA-WTP-disparity found for publicly provided goods. Section 4 presents an experimental study which is specially designed to separate endowment effect theory from other explanations and thus explicitly test whether this theory applies to publicly provided goods. The results are discussed in section 5. Section 6 concludes.

## 2. Explanations for the WTA-WTP-disparity – a brief review of literature

### 2.1 Conventional explanations

The existing literature names a number of alternative explanations for the WTA-WTP-disparity.<sup>i</sup> The majority of them argues within the framework of conventional economic reasoning. According to Randall and Stoll (1980), the disparity may result from the fact that the participants asked for their WTA have an effective income which is higher on average than the effective income of those asked for their WTP. The more valuable the good at hand is, the larger the difference in effective income and thus the larger the disparity between WTA and WTP. Hanemann (1991) shows that a substitutability effect adds to the aforementioned point. The more difficult it is to find a substitute for the good, the higher the disparity. Hoehn and Randall (1987) explain the WTA-WTP-disparity by the fact that the majority of participants can be expected to be risk averse and uncertain about the precise utility from the good to be valued. The stronger risk aversion and uncertainty are, the higher the disparity between WTA and WTP. Finally, Kahneman et al. (1999) and Svedsäter (2003) argue that the participants may interpret their answer as a moral statement rather than a monetary valuation. Especially when asked to value goods which evoke strong moral sentiments, the participants will express their reluc-

reluctance to put monetary values to these by stating a WTP close to zero and very high WTA (e.g., Kahneman and Knetsch, 1992; Clark et al., 2000).

## 2.2 Endowment effect theory

Thaler (1980) was the first to apply prospect theory to explain the disparity between WTA and WTP. Accordingly, individuals asked for their WTA for a certain good will consider this good part of their endowment while individuals asked for their WTP do not. Given the asymmetric value function (e.g. Kahneman and Tversky, 1979), this difference in point of reference causes a disparity between WTA and WTP: "... goods that are included in the individual's endowment will be more highly valued than those not held in the endowment, *ceteris paribus*." (Thaler, 1980). Thaler (1980) introduced the term endowment effect for this phenomenon. In order to gain a better understanding of this endowment effect, this paper follows Plott and Zeiler (2005) in differentiating between the empirically observed phenomenon of a WTA-WTP-disparity and the theoretical explanation based on applying prospect theory (hereafter endowment effect theory). There is a broad consensus among behavioural economists that endowment effect theory offers an important contribution to understanding the empirically observed disparity. At the same time, there are two distinctly different interpretations of endowment effect theory.

According to Loewenstein and Adler (1995) and Van Boven et al. (2003), it results from the fact that people get attached to goods they own. In order to provide a valid explanation for the WTA-WTP-disparity, the utility from feeling attached to one's endowment has to be unanticipated by those individuals who are not endowed (e.g. Van Boven et al., 2003). To illustrate this, let us assume that the factors named in section 2.1 do not apply. At the same time, let us assume that people feel attached to the goods they possess. This feeling of attachment causes an extra utility which will hereafter be called ownership utility. It is important to note that the ownership utility is not drawn from owning any good in particular but rather from owning something at all (e.g., Loewenstein and Adler, 1995). Now consider a person who owns a certain good A and has the possibility to trade it for another good B. If this person anticipated the ownership utility, his valuation of good A and B would not be influenced by the fact that he owns A instead of B. He would know that when trading A for B the ownership utility he draws from B would compensate for the ownership utility lost by giving up A. Thus, he would not have to demand a retribution payment for the loss in ownership utility and his WTP and WTA for A would – *ceteris paribus* – be identical. Alternatively, when not endowed with either A or B, the person would anticipate that he will experience an additional ownership utility. Again, his WTP for A before receiving it would equal his WTA afterwards. If, on the other hand, the ownership utility is not anticipated, the individual does not foresee that possessing B will compensate him for the loss in ownership utility he suffers by giving up A. Nor can he anticipate the ownership utility from owning a good before possessing it. Thus, his WTA for a certain good will exceed its WTP even if the explanations discussed in section 2.1 do not apply. In other words: The feeling of attachment can explain the difference between WTA and WTP only if the ownership utility is not anticipated. It describes a bias in the way individuals predict their own preferences (e.g., Loewenstein and Adler, 1995; Van Boven et al., 2000). This phenomenon will hereafter be called (unanticipated) ownership utility effect.

Kahneman et al. (1991) offer an alternative interpretation of endowment effect theory. Accordingly, the WTA-WTP-disparity is caused by a disutility which the owner suffers when parting with an endowment. This disutility cannot be compensated for by owning another good in exchange because it results from the mere act of parting. This parting disutility effect can explain the WTA-WTP-disparity without implying any bias in the prediction of tastes.

Loewenstein and Adler (1995) report on an experiment which reveals a significant prediction bias for the WTA. They use a mug with the logo of the students' home university as the object of choice. In the control group, each student is asked to guess the result of tossing a fair coin. Those who guess correctly are given the mug for free, the others are given the possibility to buy it later on in the experiment. After the coin is tossed and the mugs are handed out, those students who received a mug (control group 1) are asked for their WTA. All other students (control group 2) are asked to state their WTP for the mug. In the experimental group, all students are told that each student had a 50 percent chance of receiving a mug for free. All he has to do is to predict the result of tossing a fair coin correctly. Before the coin is tossed, each student is asked to imagine that he made the right prediction and then state his WTA for which he would be willing to sell the mug again (anticipated WTA). The students in all groups are told that the actual trading price  $P$  for which they have to buy respectively sell the mug has been fixed ex ante but will not be announced until the end of the experiment. Every student who states a  $WTA \leq P$  has to sell the mug for the price of  $P$ . Similarly, any student stating a  $WTP \geq P$  has to buy it for the price of  $P$ .

**Table 1: WTP, WTA and ex ante WTA for mugs**

Group	Indicator	N	Average amount (standard error)
control group 1	WTA	24	5,96 \$ (0,460)
control group 2	WTP	29	4,05 \$ (0,329)
experimental group	anticipated WTA	53	4,16 \$ (0,293)

Source: Loewenstein and Adler (1995).

The results of the experiment are summarized in table 1. As predicted above, the WTA in control group 1 turned out to be significantly higher than the WTP in control group 2. The anticipated WTA voiced in the experimental group was significantly lower than the WTA in control group 1 but showed no significant difference to the WTP in control group 2. This result suggests that the players in the experimental group did not consider the mugs their own before the toss of the coin and were thus not attached to it. Furthermore, it suggests that they did not anticipate the feeling of attachment (i.e. the ownership utility) but stated a hypothetical WTA which largely equals the WTP voiced by control group 2. This result suggests that WTA-WTP-

disparity results from a systematic bias in the prediction of tastes. Measured by the ratio  $\beta$ , the prediction bias accounts for 94 per cent of the difference between WTP and WTA.

$$\beta = \frac{WTA - \text{anticipated WTA}}{WTA - WTP}, \quad (1)$$

With respect to the two different interpretations of endowment effect theory, this result suggests that the WTA-WTP-disparity is due to an unanticipated ownership utility effect rather than to a parting disutility effect as suggested by Kahneman et al. (1991). The evidence provided by Van Boven et al. (2003) further supports this notion. Though exercise reduces the magnitude of the prediction bias, the participants fail to anticipate the disparity between WTA and WTP throughout the experiment.

### 3. The WTA-WTP-disparity for publicly provided goods

In the contingent valuation studies reported in the literature, the ratio of WTA:WTP is substantially larger for publicly provided goods than for private goods (e.g., Zöllner, 1997; Horowitz and McConnell, 2002). This result seems to support the notion that the experimental evidence for private goods also holds for publicly provided goods, that is – just like private goods – public goods are subject to an endowment effect (e.g., Frey and Eichenberger, 1991; Hildebrandt, 1995: 119 ff.). On the other hand, other factors suggest that this conclusion may be overhasty. Basically, three courses of argumentation are important in this context. First, the conventional explanations for the disparity between WTA and WTP regularly have a stronger impact for publicly provided goods than they have for private goods (e.g., Morrison, 1998; Dupont and Lee, 2002; Brown, 2005). Second, the participants of the contingent valuation studies on publicly provided goods may face incentives that do not exist in studies on private goods. Third, the specific characteristics of publicly provided goods nourish doubt as to whether endowment effect theory applies to these goods to the same extent it applies to private goods.

#### 3.1 The special importance of conventional explanations

Contingent valuation studies are used to elicit the demand for different publicly provided goods such as environmental goods or different types of infrastructure. Generally, the per capita costs of supplying these costs are substantial, thus causing a substantial difference in income between those participants asked for their WTA and those asked to state their WTP (e.g., Ahlheim and Buchholz, 2000). In addition, private individuals and households will have substantial difficulties finding adequate substitutes for publicly provided goods. If existent at all, they are very costly to produce privately. Hence, the WTA-WTP-ratio can be expected to be larger than for private goods where substitutes are generally easier to find. Many publicly provided goods are complex and at least in parts intangible (e.g., Hanley and Spash, 1993). Therefore, the participants are highly uncertain about the expected utility but are asked to state precise monetary equivalents. Unlike in the case of private goods, the participants cannot rely on their own experience from market transactions for similar goods to help them. In this situation, risk-averse participants will state a WTP which is below the expected subjective utility and a WTA which is above the latter.<sup>ii</sup> In general, publicly provided goods evoke stronger moral sentiments than private goods. This is especially true for goods like health care and environmental preservation for which contingent valuation studies and surveys are frequently used. Following



Kahneman et al. (1999) and Svedsäter (2003), this contributes to the large WTA-WTP-disparity for publicly provided goods. Finally, Knetsch (1994) and Nape et al. (2003) point out that for many publicly provided goods, especially in cases of prohibiting environmental damage, the WTA is the natural measure to ask for, because the society feels to possess the right to consume an intact environment. If the participants are asked to state their WTP for a good they consider their own, they will express their discontent to this “wrong” question by stating a WTP close to zero.

### **3.2 Specific incentives in contingent valuation studies on publicly provided goods**

When the contingent valuation method is used to elicit preferences for publicly provided goods, a bid vehicle is introduced. It defines the way in which the costs are divided among the beneficiaries. Properly defined, the bid vehicle ensures that the WTP respectively WTA stated by an individual does not influence his contribution to the costs of providing the good. Thereby, it reduces the incentives for strategic answers (e.g., Hanley and Spash, 1993). However, it cannot fully eliminate these incentives because the participants can easily estimate the costs they have to incur if the good at hand is provided and find out whether their share of the costs is high or low – compared to the other users. Those who expect to be charged a relatively low contribution have an incentive to overstate their valuation. Participants expecting to be burdened heavily face the opposite incentives. These incentives are, however, the same for all participants, regardless of whether they state their WTP or WTA. Thus, strategic behavior is inadequate to explain the disparity between the two.<sup>iii</sup>

### **3.3 Endowment effect theory and publicly provided goods**

Studies by Kemp and others show that consumers’ perception and valuation of private goods and publicly provided goods differs distinctly (Kemp, 2002: 102-109). Though they do not explicitly deal with the endowment effect, their evidence gives a note of caution when transferring results obtained for private goods to publicly provided goods. In the context of this paper, another argument nourishes doubt as to what extent the empirical evidence supporting the applicability of endowment effect theory to private goods can be generalized to publicly provided goods. This argument is based on the fact that private and publicly provided goods differ in their characteristics. For private goods, each individual is given an exclusive property right by which it can exclude other individuals from participating in consumption. Given these exclusive property rights, the owner can naturally regard private goods as part of his individual endowment. For publicly provided goods, consumers are not assigned exclusive property rights but merely have the right to use them parallel to others. This non-excludability from consumption may prevent the consumer from regarding publicly provided goods as part of his individual endowment. In this case, the disutility from the act of parting can be expected to be smaller. Similarly, if excludability is a precondition for the feeling of attachment, the ownership utility derived from publicly provided goods may be smaller than for private goods. As a result, both parting disutility effect and ownership utility effect may be smaller in size for publicly provided goods. In the end, they may not exist at all.

Summing up, it is not self-evident to assume that endowment effect theory applies to publicly provided goods. The experimental evidence for private goods and the fact that the disparity between WTA and WTP is exceptionally large for publicly provided goods can merely be regarded as a hint. The following section presents an experimental study which is designed explicitly to test whether endowment effect theory holds for publicly provided goods. It adapts the set-up used by Loewenstein and Adler (1995) to suite the current purpose.

## 4. The experiment

### 4.1 Part I

#### 4.1.1 Set-up

The experiment consists of two parts. Part I was conducted during a regular lecture on Public Finance held by the author in autumn 2003. It involved 157 graduate students majoring in economics or business administration at the University of Giessen, Germany. At the beginning of the lecture, the students are informed that today's session will be used to perform an experiment. Participation is voluntary but highly advisable because it is interesting and will pay individually. The students were told that the university officials are thinking about introducing special tutorials to support the students preparing for the exam. Tutorials will be held in groups of 20 students and take 45 minutes per group. The tutors are experienced students employed by the university. For the current term, the right to attend a tutorial is restricted to participants of the experiment. The tutorials will only take place if the value assigned to them by the students exceeds the costs. The current experiment is conducted to elicit the students' valuation of the tutorials. In order to motivate correct answers, the participants of the experiment are offered tutorials for the current course in Public Finance provided that their valuation voiced during the experiment exceeds the costs (for details concerning the definition of valuation, see the instructions below). The costs are between 3.50 € and 15 € per person. The students are told that exact per capita costs ( $C$ ) have been fixed ex ante. They are stated in a letter contained in a sealed envelope which will not be opened until the experiment is over. The envelope is handed to a student to safely store it for meantime.

Following these introductory remarks, the students are divided into two groups of about equal size and separated in different rooms. In group 1, the participants are informed that they have the right to participate in a tutorial at no extra costs. Next, each student is asked to state his individual WTA, i.e. the amount of money for which he is willing to waive the tutorial. If the average WTA within the group is lower than the per capita costs, none of the students is offered a tutorial and each student is given a retribution payment of  $C$  € in cash. If the average WTA is greater than or equal to  $C$ , the initial offer concerning the tutorial is kept up and all students are offered a tutorial at no extra costs. The students are reminded that the decision problem is not a hypothetical one and that, depending on the average WTA, either all students in the group are offered a free tutorial or none of them is.

The students in group 2 are informed that they are allocated an individual endowment of 15 €. The latter serves two purposes. First, it is introduced to reduce or eliminate the income effect. Second, it is expected to increase the overall acceptance for the experiment because none of the students has to use private funds to pay for the tutorial. Thereby, the students are not

asked to pay for something they might feel they are entitled to consume for free. In addition, the instructor cannot be accused of making extra money out of his regular obligations (e.g., Knetsch, 1994; Nape et al., 2003). After being informed about the initial endowment, each participant is asked to state his individual WTP for the tutorial described above. If the average WTP in the group is lower than the per capita costs  $C$ , no-one in group 2 will get a tutorial and each student is given the full 15 € in cash. If the average WTP is greater than or equal to  $C$ , all students have the right to participate in the tutorial. Regardless of whether they make use of this opportunity, each student has to incur the per capita costs and is thus given  $15 - C$  € in cash. Again, the students are reminded that the decision problem is not a hypothetical one and that, depending on the average WTP, the tutorials are either offered to all students in the group or to none of them.

#### 4.1.2 Predictive theory

Given the evidence from the literature, group 1 is expected to state an average WTA which is significantly higher than the WTP voiced by group 2 (Hypothesis I). Apart from possible ownership utility effects or parting disutility effects, two reasons discussed in section 2.1 may contribute to this disparity. First, the tutorial in the current experiment is difficult to substitute as a private person. The existing private tutors are not considered true substitutes, because they are not expected to provide the same insider's information.<sup>iv</sup> Therefore the participants in group 1 may have witnessed an increase in effective income that exceeds the initial endowment of 15 € given to the members of group 2. Second, the influence of uncertainty about the quality and utility drawn from the tutorial session will lead risk-averse players to state a value for WTP that is lower and a value for the WTA that is higher than the expected utility.

In each group, the individually voiced WTA respectively WTP has no direct effect on the amount of money the individual student can expect (i.e.  $C$  or  $0$  € respectively  $15$  or  $15 - C$  €). Due to the large number of participants, the individual answer is also very unlikely to tip the scales as to whether or not the tutorial is offered. Nevertheless, the participants face incentives to answer strategically if their true WTA respectively WTP deviates from the expected per capita costs  $\hat{C}$ . If their true WTP respectively WTA is larger than  $\hat{C}$ , they have an incentive to exaggerate their valuation. If their true WTA respectively WTP is lower than  $\hat{C}$ , it is rational to understate their valuation. However, these incentives are identical for both groups. Therefore they may cause a general bias in both WTA and WTP but they cannot serve as an explanation for a possible disparity between the two.

### 4.2 Part II

#### 4.2.1 Set-up

Up to this point, the set-up largely resembles the one chosen by Loewenstein and Adler. In the next step of their experiment, Loewenstein and Adler (1995) introduced the experimental group. In the current context, this would mean to have a third group which receives the right to visit the tutorial provided their average ex ante WTA exceeds the per capita costs  $C$  and the coin flipped after the experiment shows the result predicted by them. Introducing such an experimental group in the current context suffers from two problems. First, it is likely to be regarded as extremely unfair to allocate a fairly useful tutorial by tossing a coin. Second, the

students in this group are likely to assume that the instructor will not withhold the tutorial from them if the coin shows the wrong face. Thus, this part of the instructions lacks credibility. As a consequence, the participants in this experimental group de facto play under the same rules as group 2. They will feel equally endowed with the tutorial and the ex ante WTA in the experimental group is expected to be identical to the WTA voiced in group 2. For this reason, the current experiment does not follow Loewenstein and Adler (1995) in introducing a third, experimental group.

Instead, a separate part II of the experiment is conducted in summer 2005, again during a lecture in Public Finance held by the author. It involved 162 students majoring in economics or business administration. At the beginning of the lecture, the students are informed that today's session will be used to perform an experiment. Participation is voluntary but highly advisable because it can pay individually. The students are divided into two groups and separated in different rooms. The students in group 1A are informed about the fact that in 2003, 78 of their fellow-students participated in an experiment conducted to elicit their WTA for a tutorial. The tutorial is described in the same fashion it was described in 2003. Next, the students in group 1A are informed that their task is to predict the average WTA voiced by group 1 in 2003 as accurately as possible. The instructions used in group 1 in 2003 are read to group 1A. After that, they are asked to state their individual estimate for the average WTA of group 1. To induce appropriate incentives, students are offered a reward between 30 € for the best and 5 € for the fifth-best estimate. The second group of students in 2005 (group 2A) run through the same procedure, the only difference being that their task is to predict the average WTP voiced by group 2 in 2003.

#### **4.2.2 Predictive theory**

Part II of the experiment is introduced to replace the experimental group in the experiment by Loewenstein and Adler (1995). This produced a measure for the estimated WTA of individuals who are not yet endowed with the good they are asked to value. For the reasons stated above, the current experiment derives this measure in a different way. The analysis is based on the assumption that the participants in group 2A are able to deliver unbiased predictions for the WTP voiced in group 2. Direct evidence to back this assumption is scarce. The study by Walton et al. (2004) shows that motorists deliver unbiased predictions for other motorists' WTP for road surface improvements. In addition, the assumption is backed by the literature on interpersonal prediction of preferences. It shows that, when having to predict the preference of others, subjects anchor on easily available information. The subject's own preferences are found to be a particularly strong point of anchoring (e.g. Davis et al., 1986; West, 1996). Starting from their own preferences, the subjects adjust their predictions if they have strong evidence that the person who's preferences are to be predicted has deviating preferences. In the context of the current experiment, the students in group 2A can be expected to anchor on their own preferences. As they generally know only very few of the students in group 2, they lack strong evidence which would justify an adjustment. At the same time, the students in both groups (2 and 2A) are at the same stage of their studies and have passed largely the same exams in their previous years. In addition, the groups as a whole show a similar composition with respect to age, sex and planned academic degree (i.e. economics or business administra-

tion). As the students in group 2A can readily assume these similarities, they are likely to anchor on their own preferences. And by doing so, they can be expected to deliver an unbiased estimate for the WTP voiced by group 2.

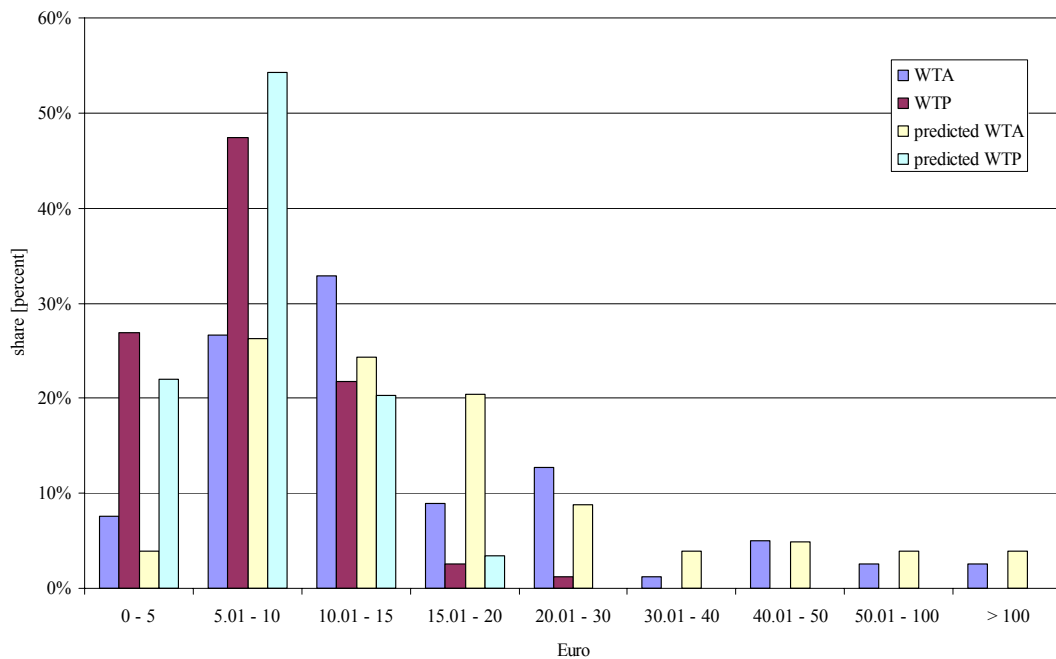
In principle, this course of argumentation also applies to group 1A. The essential question underlying this paper is whether the members of group 1A, who themselves are not endowed with the right to participate in the tutorial, manage to reach an unbiased prediction for the WTA of group 1 whose members are endowed with the tutorial. If the tutorial is not subject to an unanticipated ownership utility effect, the prediction will be unbiased (Hypothesis II). If hypothesis II holds, this does, however, not show that endowment effect theory as a whole does not apply to publicly provided goods. It merely means that these goods are not subject to an unanticipated ownership utility effect like it is reported for private goods. If the WTA-WTP-disparity is caused by a parting disutility effect, endowment effect theory applies to publicly provided goods even if the predicted WTA in group 1A equals the actual WTA voiced in group 1. On the other hand, if the predicted WTA turns out significantly lower than the average WTA, this indicates that the tutorial is subject to an unanticipated ownership utility effect. Thereby, the applicability of endowment effect theory to publicly provided goods is supported.

### 4.3 Results

Table 2 states the average WTA respectively WTP in the two parts of the experiment (see also figure 1). In part I of the experiment, both average WTA (8.88 €) and average WTP (26.06 €) exceeded the per capita costs  $C$  of 4.00 €. Consequently, all students who participated in first part of the experiment were offered a tutorial.

**Table 2: Average WTP and WTA for the tutorial**

Group	Indicator	N	Average amount (standard error)
1	WTA	79	26.06 € (5.929)
2	WTP	78	8.88 € (0.483)
1A	predicted WTA	103	21.86 € (2.496)
2A	predicted WTP	59	8.17 € (0.456)

**Figure 1: Histogramm for the WTA and WTP**

As suggested by hypothesis I, the WTA voiced by group 1 is significantly higher than the WTP in group 2 (Mann-Whitney-U-test,  $p < 0.001$ ). The WTA-WTP ratio is 2.93 : 1. The members of group 2A overestimated the average WTP in group 2 in 39 of 59 cases and understated it in 20 cases. The average estimate of 8.17 € is not significantly different from the true average of 8.88 € (t-test,  $p < 0.05$ ). This result gives strong support to the central assumption underlying this experiment. The members of group 1A underestimated the average WTA in group 1 in 83 of 103 cases. Overestimation is reported for only 20 participants. The predicted WTA (21.86 €) is significantly smaller than the true average (Kolmogorov-Smirnov sign-test,  $p < 0.001$ ), thus clearly rejecting hypothesis II. At the same time, it is significantly higher than both the average WTP in group 2 (Kolmogorov-Smirnov sign-test,  $p < 0.001$ ) and the average WTP as predicted by the members of group 2A (Mann-Whitney-U-test,  $p < 0.01$ ). In order to estimate the share of the WTA-WTP-disparity which is caused by the unanticipated ownership utility effect, the measure proposed by Loewenstein and Adler (1995) is modified as follows:

$$\beta^* = \frac{WTA - \text{predicted}WTA}{WTA - WTP} \quad (2)$$

The resulting value for  $\beta^*$  is 0.24.

## 5. Discussion

The experiment discussed above was designed to find evidence that endowment effect theory applies to publicly provided goods. The substantial difference between WTA and WTP in the first part of the experiment is in line with the pertinent literature. More important, the significant

difference between predicted and actual WTA clearly supports the notion that the publicly provided tutorial is subject to an unanticipated ownership utility effect. The difference between actual WTA and predicted WTA is a measure for that part of the ownership utility which the members in group 1 witness because they have the right to participate in the tutorial and which was not anticipated by the members of group 1A. It cannot be taken as a measure for the full endowment effect because the latter also includes the parting disutility effect. On the other hand, the results clearly show that endowment effect theory applies to publicly provided goods. Compared to the results of Loewenstein and Adler ( $\beta = 0.94$ ), the ownership utility effect's contribution to explaining the WTA-WTP-disparity is moderate. The value of  $\beta^* = 0.24$  indicates that the ownership utility effect only accounts for approximately one quarter of the difference between WTA and WTP. The remaining three quarters are caused by conventional factors, the specific incentives participants face when valuing publicly provided goods (see section 3) and possibly a parting disutility effect.

The set-up of the current set-up follows Loewenstein and Adler (1995) in the part I but replaces their experimental group by a separate part II which was conducted 18 months later. This part II of the experiment is the critical element in the chain of reasoning underlying the above conclusion. The main difference between the two set-ups is the following: In the experiment by Loewenstein and Adler (1995), the members of the experimental group are asked to predict *their own WTA* in the case of being endowed with the good to be valued. In the current experiment, the members of group 1A were asked to predict *their fellow students' WTA*. Consequently, a difference between the WTA predicted by group 1A and the actual WTA voiced by group 1 can have two causes. First, the difference can result from the unanticipated ownership utility effect. Second, it can be caused by the fact that the members of group 1A are generally unable to empathize with group 1. If the second factor had caused the bias in their prediction, the same bias would be expected for the predicted WTP by group 2A. However, group 2A delivered an unbiased estimate for the WTP in group 2. Thus, there is no evidence for a general bias in interpersonal prediction of preferences between the different groups of students. Instead, the prevailing difference must be attributed to the ownership utility effect. This result supports the notion that endowment effect theory also applies to the publicly provided tutorial.<sup>v</sup>

## 6. Conclusion

The disparity between WTA and WTP is a widely discussed topic in behavioral economics. The literature contains a number of alternative explanations for this phenomenon. The majority of these explanations are in line with conventional economic reasoning while endowment effect theory takes a behavioral economics approach and employs prospect theory. According to endowment effect theory, the WTA reflects the value of a negative prospect while the WTP states the value of a positive one. Given the loss aversion expressed in the value-function, the WTA turns out larger than the WTP even if the conventional explanations do not apply. This difference between WTA and WTP may result from the disutility associated with the act of parting with one's endowment (parting disutility effect) and/or from the positive utility derived from ownership which is not anticipated by non-owners (ownership utility effect). This paper addresses the question whether endowment effect theory applies to publicly provided goods.

While the WTA-WTP-disparity is especially large for these goods, it is not self-evident that part of this disparity is explained by endowment effect theory. Doubt is especially nourished by the fact that consumers are not assigned exclusive property rights. Consequently, the utility from “owning” publicly provided goods respectively the disutility from parting with them can be expected to be much smaller than for private goods for which consumers have exclusive property rights. This paper reports on an experiment which shows an unanticipated ownership utility effect for a publicly provided tutorial. This result indicates that endowment effect theory applies to publicly provided versions. More generally speaking, citizens seem to regard publicly provided goods as part of their individual endowment even though they are not assigned exclusive property rights but are merely given the right to consume them parallel to others. When asked to give these goods up, they react by showing loss aversion similar to the one reported for private goods.



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## Endnotes

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<sup>i</sup> This is not to say that all relevant studies show a significant difference between WTA and WTP. In fact, a number of them show that the difference is reduced or even disappears if participants are given the opportunity to learn and the studies are based on sophisticated methods of elicitation (e.g. List, 2004; Plott and Zeiler, 2005). This paper aims at explaining the WTA-WTP-disparity when it occurs and thus concentrates on the literature where a positive disparity is observed.

<sup>ii</sup> Thereby, they can furthermore assure that they “make a good deal” by paying a low price if the good is provided respectively receiving a high retribution payment if they have to give it up (e.g., Brown, 2005).

<sup>iii</sup> Recent research has shown that altruistic preferences play an important role in public good provision and contingent valuation studies (e.g., Cooper et al., 2004; Fehr and Fischbacher, 2004). The participants' WTA respectively WTP depends on their own utility as well as the other participants' utility from the good at hand. An individual who's individual utility is equivalent to 5 € and who expects other individuals he cares about to draw a similar utility from the good can be expected to state a valuation of more than 5 €. Again, however, the effect exists regardless of whether the individual has to state his WTA or WTP. Consequently, altruistic preferences by themselves cannot explain the disparity between WTP and WTA (e.g., Nunes and Schokkaert, 2003).

<sup>iv</sup> This assumption is backed by the participants' WTP for a tutorial conducted by a private coaching agency. This WTP was elicited two weeks after the actual experiment and amounted to 6.52 € on average compared to the 8.88 € voiced in by group 2.

<sup>v</sup> In one important respect, the specific set-up chosen for part II of the current experiment is more adequate in testing endowment effect theory than the set-up chosen by Loewenstein and Adler: The members of the Loewenstein and Adler's experimental group face a 50 percent chance of being endowed with the good to be valued. Therefore, the question of whether they already consider the good part of their endowment cannot be answered with certainty. Overconfident students might well feel endowed because they are confident that their prediction concerning the result of tossing the coin will be correct. In the current experiment, the members in group 1A definitely do not feel endowed with the right to participate in the tutorial.