ANCHORING EFFECTS IN AN EXPERIMENTAL AUCTION

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Abstract

Auctioning goods is a widespread practice, particularly in the agricultural sector. The outcome of auctions can be affected by various factors. One of these factors can be anchoring effects, which describe the influence of present available information on numerical values in human decisions. However, the influence of anchoring effects in auctions carried out offline is largely unknown. For this reason, we analyze anchoring effects of exogenously provided values using an experimental auction with farmers. In total, 48 groups of five farmers each participate in a series of four auctions for envelopes containing a €10 banknote with a 50% probability of occurrence. Our results indicate that anchoring based on exogenously presented values can result either in negative adjustment or no adjustment depending on the auction characteristic. Furthermore, the results show that previous bids affect following bids, which might also be an anchoring effect.

Keywords

anchoring effect, experimental auction, extra-laboratory experiment, agricultural decision maker; previous sale price.

1 Introduction

Auctions are widespread for selling and buying goods, such as art paintings, flowers, fish or natural resources, including the rights to drill oil (WOLFSTETTER, 1996). However, auctions are also common in the agricultural sector. Special periodic events take place where farmers can sell or buy breeder animals, such as cattle (ROBINSON and CHRISTLEY, 2007; COATNEY et al., 2012), horses (Stock et al., 2006), hogs, sheep, and goats (BOLTE et al., 2008). Furthermore, auctions for agricultural machines, agricultural enterprises, and farm land exist (RITCHI BROS. AUCTIONEERS, 2013; HÜTTEL et al., 2013).

All these different auctions, however, have one fundamental characteristic in common: They all offer defined goods, whereby the price results from the competition of the bidders to receive this good (CASSADY, 1967). The individual bid for an auctioned good depends on the value attached to a good given by the potential buyers (WOLFSTETTER, 1996). This is influenced e.g. by the risk of the transaction, seller reserves (MASSAD and TUCKER, 2000), price information (KAMINS et al., 2004), and anchoring effects (SUGDEN et al., 2013). While many anchoring points in transactions are identified, anchoring effects in offline auctions are largely unknown. With this in mind, the present study focuses on anchoring effects and their influence on experimental offline auctions.

Anchoring effects in general were first described by TVERSKY and KAHNEMAN (1974) and have been highly discussed since their first introduction in 1974. Today, anchoring effects are shown in a wide range of transactions, for example pricing (BUCCHIANERI and MISON, 2013; STRACK and MUSSWEILER, 1997) or negotiations (PHILLIPS and MENKHAUS, 2010). In bilateral negotiations PHILLIPS and MENKHAUS (2010) reported that price information operates as anchoring points for sellers and buyers, whereas GALINSKY and MUSSWEILER (2001) revealed that the first offer in negotiations works as an anchoring point and, therefore, influences the outcome. Indeed, research has also been conducted regarding anchoring effects in auctions. Some studies discuss anchoring effects in online auctions, such as eBay (Ku et al., 2006; KAMINS et al., 2004; SIMONSOHN and ARIELY, 2008) or bidz.com (DODONOVA and KHOROSHILOV, 2004). However, only few publications exist on anchoring effects in offline auctions, even though in the agricultural sector, most auctions are carried out offline. Bids in online auctions and offline auctions are not comparable (KAZUMORI and MCMILLAN, 2005; ROE et al., 2011). Furthermore, farmers differ from the population in terms of the risk attitude (GUERIN and GUERIN, 1994) and the external pressure of agricultural policy (SCHULMAN and ARMSTRONG, 1989) and, therefore, have to be seen as a particular occupation group. Moreo-

ver, farmers have a high willingness to invest (WILLOCK et al., 1999). Also students who have often served as participants in experiments behave differently in comparison to real decision makers (BURNS, 1985; FURNHAM and BOO, 2011). The generalizability as well as the validity of experiments conducted with students would thus be questionable. Moreover, most of the studies about anchoring effects were conducted with students (THORSTEINSON et al., 2008; PHILLIPS and MENKHAUS, 2010; GALINSKY and MUSSWEILER, 2001).

Therefore, our study focuses on anchoring effects in offline auctions which are carried out with real decision makers – in our case farmers. More precisely, the present study aims to investigate whether exogenously presented anchoring points influence the bidding behavior in auctions, since there is a gap in the literature with regard to the effect of values presented by an enumerator.[1] Additionally, the effect of previous bids on the amounts of bids in a series of four auctions is examined. We have chosen an experimental approach designed as an extra laboratory experiment. Thereby, we achieve the following: First, we can control the situation and the framework conditions, including the group size of bidders and the sold homogenous good; second, we receive information about the participating farmers.

The results about anchoring effects in auctions may be useful for both agricultural sellers and buyers. Sellers can learn how to place their goods advantageously, while buyers can learn about their bidding behavior. Additionally, farmers who want to buy goods can learn about external factors influencing their bidding behavior. Sole knowledge about anchoring effects helps to avoid an influence (GALINSKY and MUSSWEILER, 2001).

The article is structured as follows: In Section 2, the hypotheses will be derived from the existing literature, while the experimental design will be described in Section 3. Subsequently, the characteristics of the sample will be presented, and the hypotheses will be tested (Section 4). Finally, the results will be summarized, and future research implications will be provided in Section 5.

2 Deviation of the Hypotheses

As mentioned before, anchoring effects were proven in auctions, but there are only a few publications regarding the anchoring effect in offline auctions, which is commonly used in agriculture. At auctions, farmers meet and can for example talk about the realized or paid prices. This exchange may work as anchoring point and can cause adjustments of the bidders. Nevertheless, in the literature, the anchoring effect of orally presented anchoring points is not investigated in the context of auctions.

Indeed, anchoring effects based on surrounded values are discussed in a wide range of research areas. For example BUCCHIANERI and MINSON (2013) expose the listed house prices as an anchoring point for the sales prices. Overestimations (or underestimation) of the listed house prices result in an increase (or decrease) of the selling prices of houses. In addition, the anchoring point identified is the "buy now" price in online auctions which increases the final bid significantly (DODONOVA and KHOROSHILOV, 2004). Because of the robust impact of the exogenous anchoring, we derive the hypothesis:

H1: In auctions an exogenous anchoring point presented by the enumerator affects the following bids in the direction of the anchoring point.

There is one study which can be found discussing the anchoring effect in offline auctions for art paintings sold two times within a period of 10 years (BEGGS and GRADDY, 2009). BEGGS and GRADDY (2009) found evidence that the actual sale price of a painting is affected by anchoring. This anchoring effect can either be based on the previous sale price of the painting or the presale estimate. However, they cannot divide this anchoring effect regarding the two aforementioned prices. Like BEGGS and GRADDY (2009), we assume that the price infor-

[1] Person who conducts experiments.

mation of previous sales anchors the amount of the bids in the following sale and, therefore, differences between the groups of participants arise. We derive the following hypothesis:

H2: In a series of auctions, the previous successful bid affects the following bids of the bidders of one group.

3 Experimental design

The experiment is designed as an extra-laboratory experiment which is a class of experiments not conducted in the laboratory but with the same characteristics as a laboratory experiment (CHARNESS et al., 2013). Our experiment fulfills these characteristics for the following reasons: We carried out the experiment in the field and not in the laboratory and maintained constant framework conditions. Furthermore, we sold goods in reality to a non-standard subject pool, in our case farmers. The participating farmers know that they take part in an experiment and that their behavior will be analyzed. Additionally, the experiment is carried out face-to-face and is not computer based as it is the case in many laboratory experiments (KU et al., 2006; THORSTEINSON et al., 2008).

The experiment consists of two sections. First, the participating farmers attend an experimental auction. Second, the farmers answer a personal questionnaire about the farm characteristics and their socio-demographic parameters. Then they participate in an Eckel and Grossman lottery (EGL) (ECKEL and GROSSMAN, 2008) according to Reynaud and Couture (2012) to discover the risk attitude.

3.1 Design of the experimental auction

We decided to incorporate in the experimental auction the two characteristics discussed in the literature, i.e. the open bid auctions and the closed-seal bid auctions (MASSAD and TUCKER, 2000; RILEY, 1989). Bids in open bid auctions are presented in public. On the contrary, the bids in closed-seal bid auctions are sealed, and the bidders are unaware of the others' bids (MASSAD and TUCKER, 2000; RILEY, 1989). The most famous and most often used open bid auctions are the English auction[2] and the Dutch auction[3], whereby the most common closed-seal bid auctions are the first-price sealed-bid auction[4] and the second-price sealed-bid auction[5] (WOLFSTETTER, 1996). By including all four of these types of auctions, we aim to intentionally alienate the participants from the decision situations during the experimental auction and, therefore, avoid or at least reduce learning effects caused by repetition of one auction characteristic (BREUSTEDT et al., 2007).

The four incorporated types of auctions appear randomly to avoid the starting point bias (BAZERMAN and SAMUELSON, 1983) and allow for the bids to be directly comparable. Additionally, we reduce the order effect. To ensure the same quantity of each occurring auction type, the enumerator receives a leaflet whereupon the order of the auctions is noted. Furthermore, for simplicity reasons as well as for a better comparability, we abstracted the auction subject from real agricultural goods and decided to auction envelopes which contain a €10 banknote with a probability of occurrence of 50%. Hence, as in real auctions the quality of the auctioned good becomes apparent when the transaction has been completed (MCAFEE and MCMILAN, 1987). The €10 banknote is to attract all farmers regardless of the specialization of their farms.

[2] The bidders overbid each other. The highest bidder receives the good.

[3] The enumerator starts with a high bid and lowers it until the first bidder is willing to pay the called price. This bidder receives the auctioned good.

[4] The bidders write down their bids in secrecy. The bidder submitting the highest bid receives the good and pays the price he has written.

[5] The bidders write down their bids in secrecy. The bidder submitting the highest bid receives the good, but has to pay the amount of money of the second highest submitted bid.

To ensure a design which is close to real auctions we decided to present, on the one hand, no exogenous anchoring point (Scenario 1) and on the other hand a high anchoring point (Scenario 2). The average winning bids in the first auctions of both scenarios are compared to examine anchoring effects.

- Scenario 1: The experiment is conducted as described in the following. No anchoring point is exogenously provided.
- Scenario 2: One minor change occurs in the introduction of the experiment. The enumerator tells the participants that in a previous auction the average winning bid was €7.50.[6] In doing so, we want to set an exogenous anchoring point to check if this value influences the behavior of the participants. Furthermore, we create a realistic situation as farmers communicate and discuss prices in auctions.

The farmers were asked and invited to participate by the enumerator. In order to attract participants, each farmer receives a representation allowance of €10. This amount has to cover the opportunity costs of participation. With a planned playing period of 20 minutes, the representation allowance corresponds to an average hourly wage of €30.[7] The participants are randomly assigned to one scenario with the result that half of the participating groups are randomly assigned to Scenario 1; the other half of the groups are randomly assigned to Scenario 2. The order of the different auction types is equivalent for both scenarios.

One group of participants consists of five randomly chosen farmers. Once five farmers committed to taking part, the group was complete, and the experiment started. We determined a group size of exactly five farmers because BAZERMAN and SAMUELSON (1983) showed that the group size influences the average winning bid in auctions. By ensuring a group size of exactly five participants, the influence on the bidding behavior is constant. At the beginning of the experiment, the group of farmers is informed that they take part in an auction, and they are informed about the rules by the enumerator. The group is informed that four envelopes are auctioned, whereby two of them contain money, and each successful bidder has to pay in reality for the purchased envelope. To make sure that the participants bid individually, it is not allowed to make arrangements, which is controlled by the enumerator.

For simplicity, the bids can only vary in increments of €0.50. When the English auction is carried out, the enumerator starts with a bid of €0.50 and asks the participants if they are willing to pay this price. Farmers who are willing to pay the called price raise their hands. The enumerator raises the bids until only one bidder is willing to pay the actual price. The Dutch auction is carried out the other way around. The enumerator starts with €10.00 and counts down until the first bidder calls "mine" and accepts the price. Thus, we documented the successful bids in the open bid auctions.

When carrying out the first-price sealed-bid auction and the second-price sealed-bid auction, the participants receive a leaflet to write down their bid. Afterwards, the leaflet is returned to the enumerator. Hence, the auctions are based on sealed bids; participants are not allowed to see the bids of others. In both auctions, the bidder submitting the highest bid obtains the envelope, whereas in the second-price sealed-bid auction, the bidder submitting the highest bid has to pay only the bid of the second highest bidder. All bidders are informed about the amount of the successful bid. We documented the successful bids and, in addition, the unsuccessful bids in closed-seal bid auctions.

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[6] The successful bids in the pretests were on average very high. Therefore, we chose €7.50 as the anchoring value to investigate whether an anchoring effect can be observed.

[7] We are aware that we can cause a 'house money effect' according to THALER and JOHNSON (1990), with the paid representation allowance at the beginning of the experimental auction. Losing some money of the prior gain does not hurt as much as "losing one's own cash" (THALER and JOHNSON, 1990:657). Since each participant receives the same amount of representation allowance, all participants are consequently biased in the same manner.

The respective successful bidder receives one envelope at the end of the experiment and has to pay the effective bid to the enumerator. Therefore, the participants do not know during the auction which envelopes contain a €10 note. For the case that the amount of bid is identical for two participants in one group, both participants receive one envelope. Another envelope which contains money with a probability of occurrence of 50% comes into play.

3.2 Personal questionnaire and Eckel and Grossman Lottery

To investigate the effect of anchoring separated from the influence of socio-demographic and socio-economic characteristics as well as the characteristics of the farms, we retrieved relevant information in the personal questionnaire. Furthermore, we asked the farmers which of the auction types they were familiar with before they participated in the experiment. A short description of each auction is provided for clarification. Since the experience of participants may influence the bidding behavior (WILCOX, 2000), the questions if participants use auctions to purchase goods and if participants buy goods in auctions are asked. Moreover, acquaintances among the group of participants is recorded. Participants who know each other receive more information than bidders who do not know each other and bid, therefore, differently. Additionally, the group dynamics can be governed by the acquaintance of the participants which may affect the individual bids (SCHWEIZER and UNGERN-STERNBERG, 1983).

In order to discover the risk attitude of the participants an EGL modified according to REYNAUD and COUTURE (2012) is carried out. We decided to use this lottery because it is cognitively easier to understand in comparison to the most common Holt and Laury lottery (DAVE et al., 2010). In addition, by choosing the EGL we avoid the problem of inconsistent risk preferences, which can occur in a Holt and Laury lottery when participants change from lottery A to the riskier lottery B and back to lottery A (HOLT and LAURY, 2002). Furthermore, in the EGL the probability is the same as in our auction and, therefore, we avoid problems with probability weighting.

In the EGL, the participants had to choose the one out of nine different gambles that they are most likely to play. The participation in the lottery is not associated with costs, but the outcomes vary between the nine gambles. The varying payments affect the expected value between the gambles, thus the later gambles become more risky. The risk attitude is expressed by the Eckel and Grossman lottery-value (EGL-value). Gambles chosen between 1 and 5 indicate risk aversion (EGL-value), while those chosen between 7 and 9 reveal risk-seeking behavior. The decision for gamble 6 indicates a risk-neutral decision-maker.[8]

4 Results and discussion

4.1 Descriptive statistics

The experimental auction was carried out in autumn 2013 in Central Germany. Altogether, we went to nine information events organized by German agricultural companies. Agricultural firms take the chance at these events to present new varieties of plants or innovative machines and offer information to the farmers. At these events, we randomly asked approximately 520 farmers to participate in the experiment. In total, 240 farmers, roughly 45% of all people asked, were willing to participate. Thus, the experiment was conducted with 48 groups of five farmers each. The average time for carrying out the experiment was 19 minutes.

[8] To achieve incentive compatibility, one in 50 participants is randomly drawn as a winner. This participant takes part in the Eckel and Grossmann lottery. The money the winner receives is defined by the chosen gamble.

Table 1: **Socio-demographic and socio-economic characteristics of the participants**[(a)]

Characteristics	Mean	Standard deviation
Male participants	92.50%	
Age (years)	39.23	15.78
Farmers with a university degree	25.00%	
Completed agricultural vocational	73.33%	
Farm manager[(b)]	50.00%	
EGL-value[(c)]	3.75	2.50
Farmland (ha)	168.56	268.83
Farm income as mainstay	79.56%	
Farm type		
Cash crop	42.36%	
Dairy	13.54%	
Finishing	9.17%	
Others	34.93%	

(a) n = 240.
(b) The 50% of the participants who are not managing an agricultural enterprise work on a farm.
(c) 1-5 = risk averse, 6 = risk neutral, 7-9 = risk seeking.

Table 1 shows the socio-demographic and socio-economic characteristics of the participants. The average age is 39.23 years with the range being 17 to 75 years. The EGL-value shows that the farmers are on average risk averse. The size of farms varies between 3 and 2,300 ha of farmland cultivated. The participating farmers state that the English and the first-price sealed-bid auction are the most well-known auction types. 77.12% of the participants indicated that they have already heard about these auction types. The Dutch auction is known by 42.37% of the farmers, and 19.07% know the second-price sealed-bid auction. For buying products in real life, 18.61% of the farmers use some kind of auction, while 15.58% of the farmers reported selling products in auctions.

Already during the implementation of the experiment it seems that groups with low successful bids in the first auction stay low until the last auction, whereby high successful bids in the first auction result in high bids in the following auction. Approximately, 40% of the participants won one auction, and 39% won no auction at all. Thus, 21% of the participants won more than one auction whereby solely one participant won all auctions.

Figure 1: Amount of bid in open bid auctions (left) and closed-seal bid auctions (right) for scenario 1 (•) and scenario 2 (o) in €

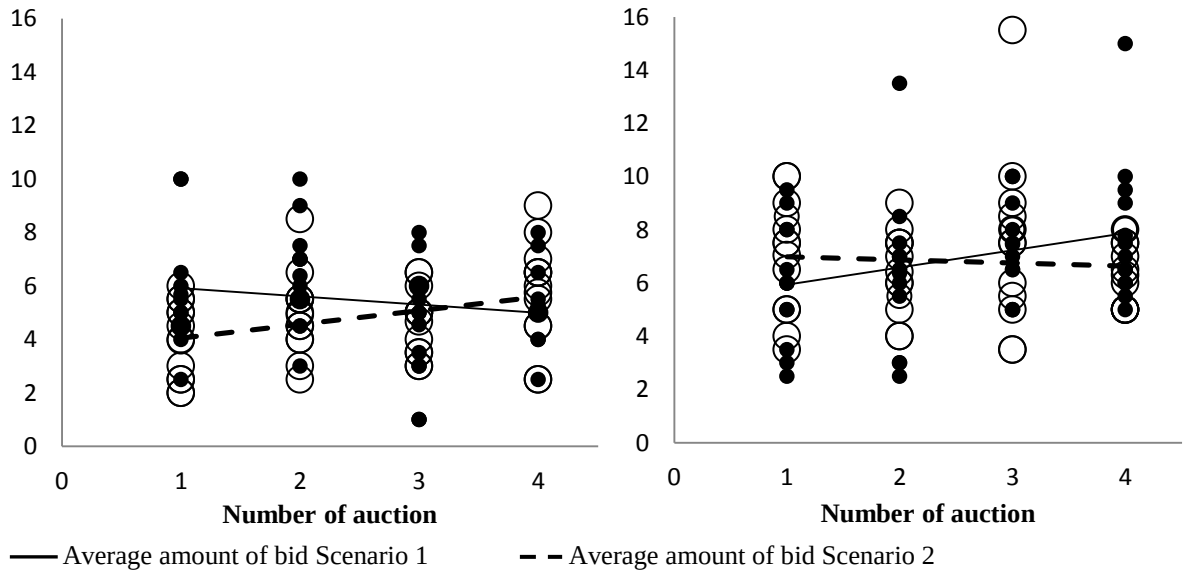

Figure 1 depicts the successful bids for both scenarios and the four auctions. By auctioning a homogeneous good and randomizing the order of auctions, we can compare the bids directly with each other. At first glance, there are differences between the auction characteristics. The successful bids in closed-seal bid auctions are on average higher than the successful bids in open bid auctions for both scenarios. If a verbal anchoring point is exogenously provided, the average winning bid in open bid auctions is lower compared to those not having an exogenously anchoring point and increases over the four auctions. An opposed effect occurs for the closed-seal bid auctions. The average successful bid is higher in scenario 2 compared to scenario 1 for closed-seal bid auctions and decreases over the subsequent auctions.

4.2 Hypotheses testing

To test the hypotheses, in the following, an ordinary least squares (OLS) regression is estimated. To explain the effect of the previous successful bid on the following bids, we use both the subsequently observed successful and unsuccessful bids as the dependent variable and the previous successful bid as the explanatory variable. Due to the reason that each group takes place in four auctions, the successful bid in the first auction is the explanatory variable for the bids in the second auction, whereby the successful bid in the second auction is the explanatory variable for the bids in the third auction and so on for each group. These explanatory bids are summed up in the variable 'previous successful bid'. We assume that the anchoring point solely affects the bids in the first auction and, therefore, differences between scenario 1 and scenario 2 in the first auction exist. Thus, for groups faced with the exogenously presented anchoring point, the variable 'dummy exogenous anchor' is included. Furthermore, we integrated the interaction of 'dummy exogenously anchor' and 'dummy auction characteristic' to reveal the anchoring effect separately for the two auction characteristics. 'Dummy bids second auction' ('dummy bids third auction'; 'dummy bids fourth auction') indicates bids observed in the second auction (third; fourth auction) and we therefore, measure a possible learning effect. With these dummies we investigate whether the anchoring point, presented before the first auction starts, has an explanatory content regarding the bids in the first auction after the verbal anchoring point is presented. Therefore, the bids of the first auction with no exogenously anchoring point serve as a baseline for the dummy variables that control for the auction order in the regression and 'dummy exogenous anchor'.[9] Furthermore, we control for the 'auction characteristic' with a dummy variable, because in open bid auctions the individuals of one group can update their individual value and in closed-seal bid auctions no updating can take place (WOLFSTETTER, 1996). 'Dummy unsuccessful bid' indicates whether bids were successful or unsuccessful. Unsuccessful bids are solely documented for closed-seal bid auctions. If farmers are familiar with purchasing goods in auctions, the dummy variable 'dummy purchase' is displayed.

[9] Instead of the previous successful bid, we used the expected value (€5.00) of one envelope in the experimental auction to explain the bids of the first auction in scenario 1. The results are robust with regard to the value we used.

Table 2: OLS regression, dependent variable following bid, robust standard error[a]

	Coefficient	t-statistic
Constant	2.34	2.69 ***
Previous successful bid in €	0.37	5.99 ***
Dummy exogenous anchor[b]	-1.04	-1.82 *
Dummy exogenous anchor • Dummy auction characteristic	1.05	1.72 *
Dummy bids second auction	0.87	2.81 ***
Dummy bids third auction	1.01	3.17 ***
Dummy bids fourth auction	0.96	3.18 ***
Dummy auction characteristic[c]	1.65	5.33 ***
Dummy unsuccessful bid[d]	-3.02	11.56 ***
Dummy purchase[e]	-0.45	-1.69 *
EGL-value	0.05	1.32
Years of school education	-0.02	-0.37
University degree[f]	-0.08	-0.35
Gender[g]	0.01	0.03
	$R^2 = 0.33$	

(a) n = 550; * = p-value < 0.10; ** = p-value < 0.05; *** = p-value < 0.01.
(b) 1 = exogenous presented anchoring point of €7.50; 0 = no anchoring point given.
(c) 1 = closed-seal bid auction; 0 = open auction.
(d) 1 = unsuccessful bid; 0 = successful bid.
(e) Do you use auctions to purchase goods? 1 = yes; 0 = no.
(f) 1 = yes; 0 = no.
(g) 1 = male; 0 = female.

With view to the exogenous anchoring point, the coefficient 'dummy exogenous anchor' shows that the presented point of €7.50 results in a negative anchoring effect. In auctions with exogenously provided anchoring points the average amount of the winning bid is significantly lower (by €1.04) compared to first auctions with no anchoring point exogenously provided. If, however, a closed-seal bid auction follows the exogenous anchor the negative adjustment is compensated. Thus we cannot state an effect of exogenously provided anchoring points in closed-seal bid auctions. However, we derive a negative anchoring effect for open bid auctions for the reason that 'Dummy exogenous anchor' is significantly negative, and the interaction term is significantly positive. *We can conclude that negative anchoring effects affect the following bids in open bid auctions and, therefore, hypothesis 1, which assumes that auctions with an exogenous anchoring point presented by the enumerator significantly affect the following bids in the direction of the anchoring point, has to be rejected.*

The coefficient of the variable 'previous successful bid' is highly significant. Hence, the previous successful bid influences the bids in the following auction. The average following bids increases by €0.37 if the previous successful bid is €1.00 higher. Thus, our results reveal that farmers adjust to the previous successful bid and increase their bids for each € of the amount of the previous bid. This is a hint that the previous successful bid may work as an endogenous anchoring point. *Hence, hypothesis 2 which assumes that in a series of auctions the previous successful bid affects the following bids cannot be rejected.*

The result that a negative adjustment occurs is surprising as, in the literature, anchoring is described to be a very robust effect towards the anchoring point (GALINSKY and MUSSWEILER, 2001; NUNES and BOATWRIGHT, 2004; FURNHAM and BOO, 2011). The expected value for one envelope is €5.00, and the used anchoring point with €7.50 is higher than that. Due to the reason that the presented value is higher than the expected value for one envelope, the decrease in the average winning bid in open bid auctions may occur because the bidders react

with reactance (MIRON and BREHM, 2006) because of group effects. Therefore, the different adjustment reaction has to be based on the auction characteristic and the opportunity to update the value attached to a good during open bid auctions (WOLFSTETTER, 1996). The bidding behavior in open bid auctions is observable by the other participants in the group, while in closed-seal bid auctions the bidding behavior of the participants in the group cannot be observed. Thus, in closed-sealed bid auctions the participants are not influenced by participants in the group and cannot update their individual value. As proven in ultimatum games by BORNSTEIN and YANIV (1998) the decisions of isolated individuals are less rational compared to decisions of groups. In addition, the findings by COOPER and KAGEL (2005) underlie that isolated individuals perform worse than groups in games. Indeed, in the literature can be found that anchoring effects may not be as robust as shown in many studies (FUDENBERG et al., 2012).

Also, the effect of the previous bid on the actual successful bid can be affected by different factors. Participants can for example orient themselves to the bids of the other participants in the group and update their preferences (TUFANO, 2010; MANIADIS et al., 2014). However, updating preferences is oriented to the amount of the previous successful bids. Therefore, we suppose that the previous bid is an anchor for updating preferences. Also learning is based on the previous amounts of bids, whereby the previous bids may also act as anchor. Overzealous bidders can influence the amount of bids. One bidder won all auctions, and nine bidders won three auctions. The majority of participants won zero auctions or one auction only. Hence, most of the participants showed no overzealous bidding behavior. Overzealous bidding might play a rather subordinate role in our study.

Some further insights can be derived from the regression results (Table 2). The position of the bids in the auction series that is controlled by the 'dummy bids second auction', 'dummy bids third auction,' and 'dummy bids fourth auction' have a highly significant effect on the amount of the bids compared to the bids of auction one in scenario 1. Hence, the amount of bids also depends on the order of the bids in the series of auctions which can be interpreted as a learning effect. However, the amounts of bids do not differ significantly between the variables 'dummy bids second auction', 'dummy bids third auction', and 'dummy bids fourth auction' which is tested with linear restrictions in the regression model. The coefficient 'dummy unsuccessful bid' indicates that unsuccessful bids are on average €3.02 lower than successful bids. In addition, the variable 'dummy auction characteristic' has a significant influence on the amounts of bids. On average the bids in closed-seal bid auctions are €1.65 higher than in open bid auctions.

The variable 'dummy purchased', which controls for the experience of farmers with purchasing goods in auctions, influences the bidding behavior. Further personal characteristics of the participants such as the risk attitude (depicted EGL-value), the years of school education, or whether participants have a university degree do not affect the bidding. Moreover, the gender of participants has no effect with regard to the amount of bids.

5 Conclusion and Outlook

Auctions are widespread trade mechanisms. Especially in the agricultural sector, many goods, such as breeder animals, machines, or farm land are auctioned. To investigate if anchoring effects influence the buyer's individual value for auctioned goods, we carried out an extra-laboratory experiment with farmers. Forty-eight groups of five participating farmers each take place in an experimental auction which consists of a series of four auctions for envelopes which contain a €10 banknote with a 50% probability of occurrence. For each group, we documented the successful bid and for the first-price sealed-bid auction and the second-price sealed-bid auction also the unsuccessful bids. Half of the groups were additionally confronted with an exogenously presented anchoring point.

The results provide evidence for anchoring effects in a series of experimental offline auctions. First, we found that a comparatively high exogenous anchoring point presented by the enumerator has a negative influence on the following bids in the open bid auctions. We suppose that the high value provided by the enumerator as well as the auction characteristic based on group effects influences the bidding behavior of the participants. Second, we found that the first successful bid affects the bids in the following auction, and this continues for the next auction. Hence, the participants update their preferences by orientation from the successful bids.

Price information in agriculture appears everywhere. This information, with regard to our results, can be anchoring points and should be analyzed concerning their effect. With this knowledge, we first can generate careful hints on how to place or when to buy goods in a series of auctions selling the same good. Sellers can learn how to place their goods and, thereby, potentially generate higher profits. Hence, sellers could place their goods late in a series of auctions. When the first auction achieves a low final bid it is likely that the other auctions also achieve low final bids. In this case, sellers can withdraw their goods. Furthermore, sellers learn that they can influence the bids in auctions with information about prices. Indeed, sellers should be aware of placing high exogenously anchoring points, because buyers can negatively adjust to this value, and the received price is less. Sellers shall offer their goods in sealed bid auctions.

Also buyers with the knowledge that they are subconsciously influenced by other bidders could adapt their behavior. Accordingly, it could be sensible not to buy when the first successful bid is high in a series of auctions selling the same good with an equal value. The high bids are likely to stay on the high level. In addition, buyers should be aware of their individual value for goods to be less impressionable regarding anchoring. Buyers can negatively adjust when exogenously provided anchoring points are implausibly high. If so, buyers who are aware of their individual value for the offered good are likely to buy favorably in open bid auctions. Moreover, the results have shown that the average winning bid in closed-seal auctions is higher than in open bid auctions. Therefore, buyers should buy in open bid auctions.

In future research, it will be interesting to investigate if the observed negative adjustment with regard to high anchoring points is a robust effect. The experiment could be conducted with other maybe context-free anchoring points, in other countries, or with different professional groups. Furthermore, the experiment could be repeated using only one auction type to determine the learning effect in repeated auctions. For simplicity reasons, we did not assume real agricultural goods. To reveal if farmers bid differently for agricultural goods, the experimental auction with other goods could be repeated.

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