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To cite this version:

Nicolas Jacquemet, Stephane Luchini, Robert-Vincent Joule, Jason Shogren. Do French student really bid sincerely?. 2008. halshs-00277282

HAL Id: halshs-00277282

https://shs.hal.science/halshs-00277282

Preprint submitted on 6 May 2008

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GREQAM

Groupement de Recherche en Economie
Quantitative d'Aix-Marseille - UMR-CNRS 6579
Ecole des Hautes Etudes en Sciences Sociales
Universités d'Aix-Marseille II et III

Document de Travail
n°2008-12

DO FRENCH STUDENTS REALLY BID SINCERELY ?

Nicolas JACQUEMET
Robert-Vincent JOULE
Stéphane LUCHINI
Jason SHOGREN

April 2008

WORKING PAPER

Do French Students Really Bid Sincerely?*

Nicolas Jacquemet † University of Paris I
Robert-Vincent Joule‡ Université de Provence
Stéphane Luchini§ Greqam-Idep CNRS
Jason Shogren¶ University of Wyoming

November 2007

Abstract

Do French Students really bid sincerely in real and hypothetical incentive compatible auctions? Recent evidence suggests they do, which goes counter to most observed bidding behavior in the United States, and supports the idea that cultural differences may explain bidding behavior more than economic circumstances. Herein we run a robustness check by exploring bidding behavior in classic Vickrey auction for real and hypothetical values in the two largest cities (Paris and Lyon). Two striking results emerge–(1) French students bid sincerely; and (2) no hypothetical bias exists.

Keywords: Auctions; Demand revelation; Experimental valuation; Hypothetical bias

JEL Classification: C7, C9, Q0

*We wish to thank Romain Zeiliger for his assistance in developing the software and Bruno Rock for his help in running the experiment. We gratefully acknowledge the GATE laboratory for welcoming us, in particular Jean-Louis Rullière and Marie-Claire Villeval. Logistical help from the Paris School of Economics was greatly appreciated.

†Paris School of Economics and University of Paris I Panthéon–Sorbonne. Centre d'Economie de la Sorbonne, 106 Bd. de l'Hôpital, 75013 Paris. Nicolas.Jacquemet@univ-paris1.fr

‡Laboratoire de Psychologie Sociale - EA 849, Université de Provence, 29, avenue Robert-Schuman 13621 Aix-en-Provence cedex 1. joule-rv@up.univ-aix.fr

§GREQAM-CNRS, Centre de la Vieille Charité, 13236 Marseille Cedex 02. stephane.luchini@univmed.fr

¶Department of Economics and Finance, University of Wyoming, Laramie, WY 82071-3985, United States; and Department of Economics, Umeå University, S 901 87 Umeå, Sweden. JRamses@uwyo.edu

1 Introduction

Hypothetical Bias (HB) arises whenever elicited preferences are different depending on whether the elicitation method has monetary consequences or not. The accumulated evidence, mainly from lab experiments, leads Harrison and Rutström (2006) to claim "that the evidence strongly favours the conclusion that hypothetical bias exists", which undercuts the basic foundations of popular state preference valuation methods used in cost-benefit analyses. Recent work, however, finds evidence to suggest cultural differences might be driving why hypothetical bias is not observed in every nation. For example, Emheke et al. (2007) implemented the same referendum lab valuation experiment in China, France, Niger and the United States. They find that US subjects (Indiana and Kansas) exhibit a significant HB; but subjects in China and Niger are likely to exhibit a 'negative' HB; and finally, French subjects (from Grenoble) are the least prone to HB.

The open question we address in this paper is whether their French results are robust. Our work extends Ehmke, Lusk, and List (2007) results in three key ways. First, we assess the robustness of such idiosyncratic behavior by eliciting values in two of the largest cities – Paris and Lyon. Second, we examine robustness of HB using the classic second-price auction with induced values rather than a referendum with home-grown values. Finally, we use a between-subjects protocol that prevents order effects than can arise in a within-subjects protocol. Our results unambiguously confirm that the incentive context – real or hypothetical – is neutral on French bidders' behavior. French bidders pay what they say.

2 The experiment

2.1 Experimental design

Our experiment explores the robustness of hypothetical bias in two locations in France. We induce people to reveal their preferences for a good using a Vickrey auction with induced values under real and hypothetical treatments.[1]

Following standard procedures, an unspecified "good" is sold in a Vickrey second-price auction: the highest bidder wins and pays the second-highest bidder's bid. An auction has 9 bidders each endowed

[1]The Vickrey auction with induced values is one of the most standard institution used in the literature dealing with valuation experiments. Examples include McClelland, Schulze, and Coursey (1993), Frykblom (2000) or Cherry, Frykblom, Shogren, List, and Sullivan (2004). The success of the Vickrey auction (Vickrey 1961) stems from its revelation property. Theory shows that without an outside option, a rational bidder's dominant strategy is to bid his induced value. In addition, experimental evidence confirms that the second-price auction performs reasonably well in revealing preferences for both induced and non-induced values auctions (see Kagel 1995).

with a unique induced value – *i.e.* the price at which the bidder can sell the good to the monitor after the auction (see, e.g., Kagel 1995). The induced demand curve is identical in all auctions and is defined by: $\{84; 76; 71; 68; 65; 63; 53; 38; 24\}$. All monetary values are expressed in ECU (*Experimental Currency Unit*). The auction is repeated over 9 periods, implementing all possible permutations between individual private values. Each participant experiences only once each private value; and the whole demand curve is induced in every period. Although the repetition is deterministic, we avoid end-game effect by providing the subjects with no information on that point – except for the repetition itself. The bidders do not know the other bidders' induced value or the induced demand curve. A bidding period ends when every bidder has chosen a bid between 0 and 100. At the end of the period, subjects are privately informed about whether they win the auction (along with the price paid in this case), their gain for the period and, lastly, whether a new auction period is about to start.

In both the real and hypothetical treatment, each subject receives a 10€ show-up/participation fee. In the *real* treatment, the ECU accumulated earnings across all auction periods are added to this fee – would it happen, negative total earnings would decrease the show up fee up to 5€.[2] In contrast, only the fee is paid under the *hypothetical* treatment. This is made common knowledge by stating explicitly in the oral and written instructions that payments are either constant (hypothetical) or depend on decisions made in each period (real). Details about the nature of the monetary earnings is the only difference between the instructions used in both conditions.

2.2 Experimental procedure

We ran six sessions in the two largest French cities: Paris and Lyon. In Paris, we ran three hypothetical sessions, and one real at the University of Paris 1, in the Parisian Experimental Economics Laboratory; in Lyon, we ran one Hypothetical and one Real session at the GATE laboratory, University of Lyon.[3] Each session used 18 subjects separated into two distinct 9-bidder auctions. Overall, 108 subjects participated to the different sessions. Participants were first to third-year undergraduate students in law, economics or chemistry. The experiment was computerized using a software developed under REGATE (Zeiliger 2000).

All practical conditions were kept constant in the two locations. Recruitment was internet-based and all email-messages were harmonized. The two experimental labs are set identically, with wood separation between computers, organized in rows. One monitor ran all sessions and used identical procedures and words in welcoming the participants and describing the experiment.

A typical session proceeds as follows. First, each subject signs an individual consent form before

[2]This lower bound stems from the way participants are recruited: we contractually commit ourselves to a minimum earning equal to 5€.

[3]For more information, see `http://leep.univ-paris1.fr/` and `http://www.gate.cnrs.fr/`

entering the lab and assigned randomly to a computer. Next the written instructions, based on Cherry et al. (2004)' instructions, are distributed and read aloud.[4] The monitor uses both a non-numerical example and quiz to highlight the most salient features of the design. The experiment begins only once every question has been privately answered. Finally, participants are encouraged to ask clarifying questions before starting the experiment.

The experiment begins by asking the subjects to fill out a computerized questionnaire about socio-economic characteristics (gender, sex,...). Next the auction is introduced. In each round, the winning bidder's profits equal the difference between his or her induced value and the price he or she pays for the good (the second highest bid). For the 8 non-winning bidders, their profits are zero for that round. Only the winner sees the two highest bids at the end of the round. At the end of the experiment, subjects are privately paid their monetary payoff in cash - (1) 10€ in the hypothetical condition, or (2) computed as the sum of this fee and the profits/losses ECU accumulated in the real condition. The common knowledge exchange rate was 3ECU for 1€. The experiment last around half an hour and the average gain is 10 Euros.[5]

3 Results

We first consider aggregate behavior by round and induced value in each treatment, real and hypothetical. Two results emerge. First, at the aggregate level, we find no hypothetical bias. No differences arise between elicited demands in the real or hypothetical contexts. Second, at the individual level, we find no evidence of hypothetical bidding. We conduct an econometric analysis finding both the slope and the constant of the bidding regression line are not significantly different if bids are elicited with or without monetary incentives.

First, consider the aggregate results. Table 1 illustrates bidding behavior at the aggregate level by round and treatment. Results suggest an absence of hypothetical bias. Strictly rational bidding in real and hypothetical treatments would result in the elicitation of $542 \times 9 = 4878$ ECU. Adding up the bids in each of the auction in the real context, we elicit in total 5241 (119.4%) and 5087 (112.0%)ECU in Paris and 4989 (99.3%) and 5049 (103.5%) ECU in Lyon. In the hypothetical context, elicited aggregate demands range from 4763 (97.6%) to 5475 ECU (112.2%).

When looking at the different rounds, 75.0% of the elicited aggregate demands in the real context are in the 90%-110% interval, and this percentage increases to 91% when considering the 80%-120% interval. In the hypothetical context, 52.8% of these elicited aggregate demands are in the 90%-110% range and 86.1% when considering the 80%-120% interval.

[4] An English translation of the original instructions in French is provided in Appendix A.

[5] Minimum hourly wage was 6.50 Euros at the time of the experiment (source: http://www.urssaf.fr).

Table 1: Aggregate bidding behavior by group and round

	Round									
	1	2	3	4	5	6	7	8	9	Total
Real										
Paris / Group 1	523	566	572	566	500	647	683	633	551	5241
	(96.5%)	(104.4%)	(105.5%)	(104.4%)	(92.3%)	(119.4%)	(126.0%)	(116.8%)	(101.7%)	(107.4%)
Paris / Group 2	426	515	673	583	562	607	607	535	579	5087
	(78.6%)	(95.0%)	(124.2%)	(107.6%)	(103.7%)	(112.0%)	(112.0%)	(98.7%)	(106.8%)	(104.3%)
Lyon / Group 1	482	586	573	521	529	538	588	619	553	4989
	(88.9%)	(108.1%)	(105.7%)	(96.1%)	(97.6%)	(99.3%)	(108.5%)	(114.2%)	(102.0%)	(102.3%)
Lyon / Group 2	509	563	554	568	566	562	563	577	587	5049
	(93.9%)	(103.9%)	(102.2%)	(104.8%)	(104.4%)	(103.7%)	(103.9%)	(106.5%)	(108.3%)	(103.5%)
Hypothetical										
Paris / Group 1	396	469	595	532	609	538	540	595	627	4901
	(73.1%)	(86.5%)	(109.8%)	(98.2%)	(112.4%)	(99.3%)	(99.6%)	(109.8%)	(115.7%)	(100.5%)
Paris / Group 2	542	523	545	571	612	615	639	547	639	5233
	(100.0%)	(96.5%)	(100.6%)	(105.4%)	(112.9%)	(113.5%)	(117.9%)	(100.9%)	(117.9%)	(107.3%)
Paris / Group 3	499	561	583	598	603	660	636	679	656	5475
	(92.1%)	(103.5%)	(107.6%)	(110.3%)	(111.3%)	(121.8%)	(117.3%)	(125.3%)	(121.0%)	(112.2%)
Paris / Group 4	339	410	535	597	542	544	606	578	612	4763
	(62.5%)	(75.6%)	(98.7%)	(110.1%)	(100.0%)	(100.4%)	(111.8%)	(106.6%)	(112.9%)	(97.6%)
Paris / Group 5	413	525	556	600	646	643	659	667	721	5430
	(76.2%)	(96.9%)	(102.6%)	(110.7%)	(119.2%)	(118.6%)	(121.6%)	(123.1%)	(133.0%)	(111.3%)
Paris / Group 6	476	557	526	551	563	558	557	547	542	4877
	(87.8%)	(102.8%)	(97.0%)	(101.7%)	(103.9%)	(103.0%)	(102.8%)	(100.9%)	(100.0%)	(100%)
Lyon / Group 1	488	527	563	613	572	643	583	588	611	5188
	(90.0%)	(97.2%)	(103.9%)	(113.1%)	(105.5%)	(118.6%)	(107.6%)	(108.5%)	(112.7%)	(106.4%)
Lyon / Group 2	539	575	608	586	607	603	585	555	492	5150
	(99.4%)	(106.1%)	(112.2%)	(108.1%)	(112.0%)	(111.3%)	(107.9%)	(102.4%)	(90.8%)	(105.6%)

Note. The second column reports the aggregate induced demand, *i.e.* the sum of the induced values exogenously attributed to the buyers. For each treatment in row, the upper part displays the aggregate revealed demand (*i.e.* the observed bids) in each round (in column) and summed over rounds (last column). The bottom part reports the ratio of this revealed demand to the aggregate induced demand, in %. A group is a set of 9 subjects - a pair of two successive groups constitutes a session.

Table 2: Aggregate bidding behavior by group and induced value

Induced value	24	38	53	63	65	68	71	76	84
Agregate Demand	216	342	477	567	585	612	639	684	756
Real									
Paris / Group 1	331	356	518	537	659	616	673	738	813
	(153.2%)	(104.1%)	(108.6%)	(94.7%)	(112.6%)	(100.7%)	(105.3%)	(107.9%)	(107.5%)
Paris / Group 2	356	379	560	508	659	643	608	596	778
	(164.8%)	(110.8%)	(117.4%)	(89.6%)	(112.6%)	(105.1%)	(95.1%)	(87.1%)	(102.9%)
Lyon / Group 1	263	355	506	544	584	637	633	709	758
	(121.8%)	(103.8%)	(106.1%)	(95.9%)	(99.8%)	(104.1%)	(99.1%)	(103.7%)	(100.3%)
Lyon / Group 2	229	365	490	579	626	628	667	707	758
	(106.0%)	(106.7%)	(102.7%)	(102.1%)	(107.0%)	(102.6%)	(104.4%)	(103.4%)	(100.3%)
Hypothetical									
Paris / Group 1	245	357	569	608	601	602	594	593	732
	(113.4%)	(104.4%)	(119.3%)	(107.2%)	(102.7%)	(98.4%)	(93.0%)	(86.7%)	(96.8%)
Paris / Group 2	381	451	481	585	600	590	648	697	800
	(176.4%)	(131.9%)	(100.8%)	(103.2%)	(102.6%)	(96.4%)	(101.4%)	(101.9%)	(105.8%)
Paris / Group 3	345	433	547	653	604	652	680	746	815
	(159.7%)	(126.6%)	(114.7%)	(115.2%)	(103.2%)	(106.5%)	(106.4%)	(109.1%)	(107.8%)
Paris / Group 4	305	349	446	529	552	565	618	622	777
	(141.2%)	(102.0%)	(93.5%)	(93.3%)	(94.4%)	(92.3%)	(96.7%)	(90.9%)	(102.8%)
Paris / Group 5	299	360	614	689	662	692	701	744	669
	(138.4%)	(105.3%)	(128.7%)	(121.5%)	(113.2%)	(113.1%)	(109.7%)	(108.8%)	(88.5%)
Paris / Group 6	205	395	465	565	605	590	633	678	741
	(94.9%)	(115.5%)	(97.5%)	(99.6%)	(103.4%)	(96.4%)	(99.1%)	(99.1%)	(98.0%)
Lyon / Group 1	321	359	502	588	581	663	674	701	799
	(148.6%)	(105.0%)	(105.2%)	(103.7%)	(99.3%)	(108.3%)	(105.5%)	(102.5%)	(105.7%)
Lyon / Group 2	293	378	470	545	627	659	693	736	749
	(135.6%)	(110.5%)	(98.5%)	(96.1%)	(107.2%)	(107.7%)	(108.5%)	(107.6%)	(99.1%)

Note. The first row reports the induced values attributed to buyers. The second row reports the corresponding aggregate demand in each treatment, *i.e.* induced values × number of subjects. For each group, the upper part of the row displays the aggregate revealed demand (*i.e.* the observed bids posted by buyers the induced value of whom are reported in column). The bottom part reports the ratio of this revealed demand to the aggregate induced demand, in %. A group is a set of 9 subjects - a pair of two successive groups constitutes a session.

We now consider the aggregate bidding behavior by induced value and treatment condition. In Table 2, we added up the bids in sorting by induced value for each of the treatments. Examining Table 2 suggests that real and hypothetical treatments perform equally well in the aggregate when considering the induced value level. Results show that elicited demands match in aggregate the induced demand[6] for almost all the induced values in both treatments. Elicited demand when considering only the lowest induced value (24 ECU) are more likely to exceed induced demand. For this particular value, we elicit from 106.0% to 164% of induced demand in the real condition while in the hypothetical we elicit from 94.9% to 176.4%.

Table 3: Random-effects Tobit regression

Coefficient	Estimated parameter	$p-$value
α	-4.97	0.113
α_H	3.84	0.273
β	0.92	0.000
β_H	-0.04	0.490
ϕ_2	6.99	0.000
ϕ_3	11.84	0.000
ϕ_4	12.14	0.000
ϕ_5	12.04	0.000
ϕ_6	14.45	0.000
ϕ_7	15.42	0.000
ϕ_8	14.31	0.000
ϕ_9	14.83	0.000
σ_α	7.45	0.000
σ_ϵ	14.16	0.000
Loglikelihood	-3905.009	

Note: $n = 972$ observations. 3 observations are left censored, 918 uncensored and 51 right censored.

We now focus on bidding behavior at the individual level. We test for hypothetical bias, using a panel tobit model censored at 0 and 100 (Cherry et al. 2004):

$$b_{it} = \beta\nu_{it} + \beta_H HYP_i \times \nu_{it} + \alpha_i + \alpha_H HYP_i + \phi_t + \epsilon_{it} \tag{1}$$

where b_{it} denotes subject i's ECU bid in trial t; ν_{it} denotes subject i's induced value in trial t. The term α_i represents subject-specific characteristics and is decomposed in a constant term α and a random effect term α_i of mean zero and variance σ_α^2 standing for individual heterogeneity. Trial-specific effects ϕ_t are introduced as dummies in the regression. HYP_i is a dummy variable which equals one when the bid is elicited in the hypothetical context. The parameter α_H associated with HYP_i accounts for the effect of the hypothetical condition on the constant term of the bidding regression line while β_H accounts for its effect on the slope of the regression line. Finally, ϵ_{it} is bid error with mean zero and variance σ_ϵ^2.

[6] Aggregate demands for each induced value are given in the second line of the Table.

We test hypothetical bias by testing the joint nullity of the coefficients α_H and β_H. Table 3 presents the results (the constant term contains the mean individual effect and round 1 time-effect). Econometric results shows that parameters associated with the hypothetical condition are not different from zero when tested separately: $p = .273$ for α_H and $p = .490$ for β_H. We also conduct a joint nullity test of α_H and β_H using a LR test. The LR test cannot reject the joint nullity of both parameters (LR=2.00 with $p = 0.368$). The econometric model that analyses bidding behavior at the individual level therefore confirms what has been shown at the aggregate level–the absence of an hypothetical bias in our data.

4 Conclusion

Do cultural differences generate different behavior when people reveal their preferences? The results in Ehmke et al. (2007) suggest "yes" – in a referendum experiment, they found a 'negative' hypothetical bias in China and Niger, and no hypothetical bias in France. Herein we explore whether this French result was robust to changes in location and allocation institution. We implement a classic Vickrey auction in Paris and Lyon using an experimental design shown to induce hypothetical bias in the United States (Cherry et al. 2004).

Our results are two-fold. First, French subjects bid their induced value – the Vickrey auction worked as a demand revealing mechanism. Although the results are weaker at low induced values, these results do not contradict other laboratory valuation experiments using the same experimental setting (see, in particular, Cherry et al. 2004; Shogren et al. 2001). Second, we find no evidence of hypothetical bias. This result supports the findings for French people in Ehmke et al. (2007).

Ehmke et al. (2007) explain their results by speculating that differences must exist between individualist and collectivist societies to the extent that people in collectivist societies are more bound in their behaviour by social rules and norms. The implication is that both society types use distinct "templates" to guide the choice of their actions in hypothetical situations. Perhaps-our results only support the idea that French subjects do not seem to have a problem with insincere bidding and hypothetical bias. Future research will have to explore the inventory of possible sincere bidding and real-hypothetical templates that might exist across different cultures. For example, Henrich et al. (2001) argue that "the degree of cooperation, sharing, and punishment exhibited by experimental subjects [in social dilemmas experiments] closely corresponds to templates for these behaviors in the subjects' daily lives" (p.76). For our results, the explanation of people's behaviour in the hypothetical situation would reduce to identifying the template(s) associated with behavior beyond purely economic incentives.

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A Supplementary material: Instructions

[The instructions reported below are used for the Hypothetical treatment. The changes implemented according to the treatment appears in brackets.]

You're involved in an experiment in which you can earn money. The amount you will earn [REAL: *will depend on your own decisions as well as the decisions of other participants*] is fixed and does not depend on your decisions during the experiment.

Before starting the experiment, we will ask you to answer a few questions aimed at knowing you better (your age, your gender, your work occupation, ...). **All those informations** [REAL: ***as well as your monetary earnings] will be kept anonymous and confidential***.

EXPERIMENT PROCEEDING

At the beginning of the experiment, **two groups involving 9 participants** are made. **Each participant belongs to the same group during the whole experiment**.

Overview. You will be participating in an auction in which you are buyer. The currency unit used in the auction is the ECU (Experimental Currency Unit). [REAL: *Its value in Euros is described at the end of the instructions*]. **The amount of ECU you earn during the experiment has no consequence on your monetary payoff.** You will submit a bid in ECU to acquire one unit of the good that the experiment monitor will re-acquire from you. There will be several rounds of bidding. [REAL: *The outcome of each auction in each round directly influences how much you will get paid at the end of the experiment.*]

EACH ROUND PROCEEDING

Each round has 8 steps.

Step 1. Each bidder looks at his or her **resale value** on his or her screen. recording sheet for this round. We label **resale value** the price in ECU the monitor will pay to buy back a unit of the good that is purchased in the auction. **The resale values of different participants in a group can be different**. Once you looked at your resale value, press the OK button;

Step 2. Each bidder then submits a bid in ECU to buy one unit of the good. To this matter, move the scroll bar until you see the price you want to submit. Then press the OK button below the scroll bar to confirm your choice;

Step 3. The monitor ranks the bids from highest to lowest. For instance:

n° 1 fs.l ECU **Highest bid**

n° 2 df.g ECU

n° 3 za.f ECU

n° 4 sc.d ECU

n° 5 qs.a ECU

n° 6 nj.h ECU

n° 7 hh.m ECU

n° 8 ht.t ECU

n° 9 ky.l ECU **Lowest bid**

Step 4. The second highest bid (bid n°2) determines the **market price**. In the above example, the second highest bid is df.g ECU then the market price would be et df.g ECU:

n° 1 fs.l ECU

---

n° 2 df.g ECU **Second highest bid: market price**

---

n° 3 za.f ECU

n° 4 sc.d ECU

n° 5 qs.a ECU

n° 6 nj.h ECU

n° 7 hh.m ECU

n° 8 ht.t ECU

n° 9 ky.l ECU

Step 5. The buyer who bid the highest price (the buyer ranked n°1) purchases one unit of the good at the market price. In the above example the buyer who bid fs.l ECU purchases one unit of the good that costs df.g ECU.

Step 6. Buyer n°1 then sells the unit back to the monitor. The price of this transaction is the resale value listed for that round on his/her screen. The profit in ECU the bidder n°1 earns for that round is the difference between the resale value and the market price:

$$\text{profit} = \text{Resale value - market price}$$

Important remark. You can have negative profits: if you buy a unit of the good and the resale value is less than the market price, your profits will be negative.

Step 7. All bidders at or below the market price (buyers n°2 to n°9) do not buy anything, **they make zero profit for that round**.

Step 8. End of the round. You profit in ECU in that round appears on your screen. Press the OK button once you read it. On your screen appears whether: a new round is about to start; or the experiment is over.

How will you take your decisions?

Your screen is divided into three areas:

In the upper part are displayed all the information you need to take your decisions.

The middle part allows you to take your decisions, by pressing on the displayed buttons.

The bottom part reminds you with your past decisions and profits..

Payment of your earnings

[Real: *At the end of the experiment, we compute the sum of your profits in* ECU *across rounds. If your profit in a given round is negative, the total decreases ; if your profit in a given round is positive, the total increases. This total is converted into you Euros according to the rate: 3* ECU *= 1* €*. A fixed fee equal to 10*€*is added to this payoff.*] Your payoff for participating in the experiment is a fixed fee equal to 10€. You will be paid privately the corresponding monetary payoff in cash at the end of the experiment.

Please do not talk and try not to communicate with any other subject during the experiment. I you communicate, you will be asked to leave and forfeit any money earned. it is very important you correctly understand the instructions. If you have a question, please raise your hand, someone will come to give you answers. Please follow these instructions.

Thanks for participating.

B Supplementary material: Questionnaire

1. Groups are rematched in each round.

   ☐ YES ☐ NO

2. Each group involves _____ participants.

3. At the beginning of each round, all participants belonging to my group are attributed the same resale value.

   ☐ YES ☐ NO

4. When I make a bid, I can bid any amount I wish.

   ☐ YES ☐ NO

5. The market price is set by the bid of the second highest bidder in my group.

   ☐ YES ☐ NO

6. If my bid is the highest bid and is equal to RR.U ECU and the second highest bid in my group is GG.K ECU, then I buy the unit of the good.

   ☐ YES ☐ NO

   If YES, I pay: _____ for the good.

7. If I purchase a unit of the good and my resale value is greater than the market price, I will make positive profits.

   ☐ YES ☐ NO

8. The monetary payoff I will be paid at the end of the experiment depends on the amount of ECU I earned in the auction.

   ☐ YES ☐ NO

If you are surprised by some answers, please ask questions.