The Visible Hand: Finger Ratio (2D:4D) and Competitive Behavior*

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Abstract

In an experiment using two-bidder first-price sealed bid auctions with symmetric independent private values, we scan also the right hand of each subject. We study how the ratio of the length of the index and ring fingers (2D:4D) of the right hand, a measure of prenatal hormone exposure, is correlated with bidding behavior and total profits. 2D:4D has been reported to predict competitiveness in sports competition (Manning and Taylor, 2001, and Hönekopp, Manning and Müller, 2006), risk aversion in an investment task (Dreber and Hoffman, 2007), and the average profitability of high-frequency traders in financial markets (Coates, Gurnell and Rustichini, 2009). We do not find any significant correlation between 2D:4D and both bidding or profits. Yet, our study raises an issue of ethnic differences with respect to 2D:4D.

Keywords: Hormones, Digit ratio, 2D:4D, Risk behavior, Competition, Competitive behavior, Bidding, Endocrinological economics.

JEL-Classifications: C72, C91, C92, D44, D81, D87.

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1 Introduction

To what extent are economic behavior and outcomes biologically determined? There is a growing literature with empirical evidence that biological factors substantially influence economic outcomes. Apart from the well known gender wage gap (see for instance Blau and Kahn, 2000) and evidence that on average tall men earn more than shorter men (Case and Paxson, 2008) and that attractive people earn on average more than less attractive people (Kanazawa and Kovar, 2004), there is also evidence that points to more specific biological mechanisms such as certain hormones or certain genes that determine to some extend economic behavior. For instance, Apicella et al. (2008) find risk taking in an investment decision is positively correlated with salivary testosterone levels in men. In the same investment decision task, Dreber et al. (2009) associate significant more risk taking behavior of men with the presence of the 7-repeat allele of the dopamine receptor D_4 gene. Using a lottery choice task in a design with monozygotic and dizygotic twins, Cesarini et al. (2009) conclude that risk preferences are heritable. Finally, Kosfeld et al. (2005), Zak et al. (2005) and Zak et al. (2007) find that exposing humans to the hormone oxytocin increases trust, trustworthiness and generosity.

In this study we investigate to what extent competitive behavior may be influenced by prenatal exposure to hormones such as testosterone and estrogen. That is, we are interested in what sense competitive behavior may be influenced by biological events before birth. We use as a proxy the "visible hand", that is the ratio between the length of the 2nd (index) finger and the 4th (ring) finger of the subjects' right hand (so called "digit ratio" or more precisely 2D:4D). (See Manning, 2002, for an introduction.) 2D:4D is positively correlated with prenatal exposure to estrogen and negatively correlated to prenatal exposure to testosterone (Manning et al., 1998, Hönekopp et al., 2007). On average, men have lower 2D:4D than women. 2D:4D is to a large extent genetically determined (Paul et al., 2006), but it may also be affected by the environment in utero. In any case, it is determined before birth and thus before common economic, social, and cultural factors could shape competitive behavior.

There is already some indirect empirical evidence that 2D:4D may predict competitive behavior. Manning and Taylor (2001) and Hönekopp, Manning and Müller (2006) show that lower 2D:4D predicts more competitiveness in sports. It is justified to ask whether this result is due to a correlation with physical fitness or (mental) "competitiveness." Dreber and Hoffman (2007) show that risk taking in an investment task is significantly negatively correlated with 2D:4D in white subjects but Apicella et al. (2008) show that this is not the case in a more ethnically mixed sample. It is known that there are differences in 2D:4D between ethnic groups (Manning, et al., 2002, Manning et al., 2004). Both "competitiveness" and risk taking behavior are relevant for our study. We investigate the correlation between 2D:4D and bidding behavior and profits in sealed bid first price auctions with symmetric independent private values. It is known that higher risk taking in those auctions amounts to relatively lower bids (see Krishna, 2002, Chapter 4.1). Thus we hypothesize that 2D:4D is positively correlated with bids and negatively correlated with profits.

The study most relevant to ours is Coates, Gurnell and Rustichini (2009) who find that lower 2D:4D predicts the 20-month average profitability of 44 male high frequency traders in London. We do not find a significant correlation of both competitive bidding and profits with 2D:4D in repeated sealed bid first price auctions played by 192 college students. While the study by Coates, Gurnell and Rustichini (2009) is clearly related to ours, there are several important differences that may account for the contrasting results. First, Coates, Gurnell and Rustichini (2009) focus on a sample of males in a highly selected profession while we focus on a diverse sample of college students. Second, high frequency traders compete under time pressure in a complex environment while such pressure and complexity is absent in the sealed bid first price auction. Third, the stakes are different. Successful traders earn more than £ 4 million a year while subjects in our study earned on average US$ 18.81. Finally, the size of our sample is more than four times their sample.

Ours is not the first study of 2D:4D in experimental games. Van den Bergh and Dewitte (2006) report that in ultimatum bargaining games men with lower 2D:4D are more likely to reject unfair offers in neutral contexts but are morel likely to accept unfair offers in sex-related contexts. Using a public good game, Millet and Dewitte (2006) find that men and women with lower digit ratio contribute proportionally, whereas those with higher 2D:4D contributed either more or less.

We are also not the first to study how biological factors affect bidding in auctions. Casari, Ham and Kagel (2007) report significantly different bidding behavior of men and women in sealed bid first price common value auctions. Initially, women bid significantly higher than men and hence are more prone to the winner's curse. However, women also learn bidding much faster than men, thus eventually their earnings may even slightly surpass those of the men. Ham and Kagel (2006) report that females bid significantly higher than men in two-stage first price private value auctions. Chen, Katuščák and Ozdenoren (2009) study the effect of the menstrual cycle on bidding behavior of women in sealed bid first and second price auctions with independent private values. They report that women bid higher than men in all phases of their menstrual cycle in the first price auction but not in the second price auction. Moreover, in the first price auction, higher bidding in the follicular phase and lower bidding in the luteal phase is driven entirely by oral hormonal contraceptives. No such differences appear for second price private value auctions. These findings are contrasted in a follow-up paper by Pearson and Schipper (2009) who report for sealed bid first price auctions that women bid significantly more risk averse only in the menstrual and premenstrual phase but are less risk averse during the fertile window of the cycle. They find no effect of hormonal contraceptives. They suggest an evolutionary hypothesis according to which women are hormonally predisposed to behave generally more riskily during their fertile phase of their menstrual cycle in order to increase the probability of conception, quality of offspring and genetic variety. Although these finds are contradictory, they are provocative and warrant a further analysis of what sense hormones may influence competitive behavior. In the current paper, we are using the same auction environment as in Chen, Katuščák and Ozdenoren (2007, 2009) and Pearson and Schipper (2009).

The paper is organized as follows: In Section 2 we outline the experimental design. The analysis of the data is presented in Section 3. A STATA dataset and do-file that reproduces the entire analysis reported here and additional analysis is available from `http://www.econ.ucdavis.edu/faculty/schipper/`.

2 Experimental Design

The purpose of the experiments is to correlate bidding behavior in first price auctions with the 2D:4D. Every session of the experiment was divided into four successive phases: instructions, bidding, questionnaire, and a scan of the right hand.

Instructions: At the beginning of each session, subjects were randomly assigned to a computer terminal. After signing a consent form, each of them received printed instructions (see appendix). Subjects were given 5 to 7 minutes to read through the instructions, after which instructions were read aloud by the experimenter. Then subjects were given time to complete the review questions in private (see appendix). The experimenter went through the questions and answers aloud, after which the experimenter discussed and answered any additional questions from the subjects. In total, about 20 minutes of each experimental session was spent on the instructions.

Bidding: Subjects repeatedly played a two-bidder first-price seal bid auctions with symmetric independent private values drawn from a piecewise linear distribution function constructed as follows: A bidder's valuation is drawn independently with probability 0.7 from the the "low" distribution L and with probability 0.3 from the "high" distribution H. The support of both distributions is $\{1, 2, ..., 100\}$. The respective densities, l and h, are given by

$$l(x) = \begin{cases} \frac{3}{200} & \text{if} \quad x \in \{1, 2, ..., 50\} \\ \frac{1}{200} & \text{if} \quad x \in \{51, 52, ..., 100\} \end{cases}$$

$$h(x) = \begin{cases} \frac{1}{200} & \text{if} \quad x \in \{1, 2, ..., 50\} \\ \frac{3}{200} & \text{if} \quad x \in \{51, 52, ..., 100\} \end{cases}$$

In each round, the highest bidder wins the imaginary object and pays its bid. If both bidder's bid equal bids, each bidder wins with equal probability. The profit of winner bidder is value minus bid. The loosing bidder's payoff is zero.

Each session consisted of 8 subjects, who were randomly re-matched in each round. Subjects played 2 practice rounds, the payoffs obtained in these rounds did not count for the final payoff, and then 30 "real" rounds.

At the beginning of each round, bidders were privately informed on their computer screen of their valuation. They then independently entered a bid on the computer. The winner of each pair was determined and each subject was informed of her/his valuation, bid, the winning bid and whether (s)he received the object and her/his total payoff accumulated so far. (For screen shots, see Pearson and Schipper, 2009.)

Questionnaire: At the end of the session, subjects completed a questionnaire on demographic information and the menstrual cycle (see Pearson and Schipper, 2009). Data with regard to the menstrual cycle are analyzed in Pearson and Schipper (2009).

Scanning of the right hand: At the end of the experiment, we scanned each subject's right hand with a conventional office scanner. The length of the fingers were measured from scanned images using Adobe Photoshop by both authors separately. The measures used here are based on the averages of these two measurements for each finger of the subject respectively.

The auctions were programmed in z-tree (Fischbacher, 2007). We used the same software program as Chen, Katuscak and Ozdenoren (2007, 2009). We are very grateful to Yan Chen for providing us the program. The experiment was conducted at the Social Science and Data Service Lab at UC Davis in Fall 2007. Subjects were recruited from the student population of UC Davis using Orsee (Greiner, 2004). Our subjects earned about USD 18.81 with USD 5.00 as the minimum and USD 41.23 as the maximum.

Table 1 presents the summary statistics of demographic variables. We got 192 subjects in sessions to 8 subjects. Thus we have 24 independent observations. Out of the 192 subjects, 94 subjects are female. Average 2D:4D of males is significantly lower than of females ($t = -2.295$, $p = 0.013$). This holds also for the Asian subsample ($t = -3.939$, $p < 0.001$). But contrary to the literature, this is not the case in our white subsample ($t = 0.105$, $p = 0.543$). The hispanic, black and other subsamples are too small to draw meaningful conclusions.

3 Results and Discussion

For our analysis, we fix two features. First, to control for correlation across time and subjects, we cluster standard errors at the session level. Recall that subjects play 30 rounds. Hence, their decisions in each round may be correlated across time. Moreover, subjects are randomly rematched each round within the session of eight subjects. Hence, their interaction may affect each other's decisions. By clustering on the session level, we control for such correlations (see Cameron et al., 2008).

Second, each specification of regressions on bids also includes a cubic polynomial in the value and a set of period indicators to control for learning. Each specification on total profits also includes the mean, the standard deviation, and the skewness of the subject's empirical distribution of values. We do not report these estimates here but they are available by request.

We estimate the following parametric model for bids:

$$b_{i,t} = \beta_0 + \beta_1 v_{i,t} + \beta_2 v_{i,t}^2 + \beta_3 v_{i,t}^3 + \delta_t + \zeta X_i + \theta d_i + \varepsilon_{i,t},$$

where $b_{i,t}$ is the bid of subject i at time period $t = 1, ..., 30$, β_0 is a constant, $v_{i,t}$ is the value of subject i at time period t, δ_t is a set of period dummies, X_i is a vector of demographic variables including gender, age, race, number of siblings, and majors of study

Table 1: Demographic Summary

Variable			Observations	Mean	Std. Dev.	Min	Max
Female			192	0.49	.50	0	1
Age			192	20.52	3.00	18	36
Number of siblings			192	1.57	1.11	0	6
Math			192	0.08	0.27	0	1
All Sciences			192	0.37	0.48	0	1
Economics			192	0.41	0.49	0	1
Other Social Sciences			192	0.26	0.43	0	1
Humanities			192	0.08	0.27	0	1
Digit ratio	White	Male	35	0.960	0.026	0.899	1.022
		Female	20	0.959	0.030	0.898	0.999
		All	55	0.960	0.027	0.898	1.022
	Asian	Male	47	0.944	0.026	0.882	1.000
		Female	65	0.963	0.026	0.912	1.033
		All	112	0.955	0.028	0.882	1.033
	Hispanic	Male	10	0.954	0.025	0.913	1.002
		Female	5	0.948	0.043	0.898	0.996
		All	15	0.952	0.031	0.898	1.002
	Black	Male	2	0.951	0.015	0.941	0.962
		Female	1	0.917		0.917	0.917
		All	3	0.940	0.022	0.917	0.962
	Others	Male	6	0.973	0.025	0.938	0.998
		Female	7	0.978	0.034	0.942	1.033
		All	13	0.975	0.029	0.938	1.033
	All	Male	98	0.952	0.028	0.882	1.022
		Female	94	0.961	0.029	0.898	1.033
		All	192	0.957	0.029	0.882	1.033

depending on the specification, and d_i is subject i's digit ratio. $\varepsilon_{i,t}$ is the unobserved error term of subject i in period t (clustered on the session level). Analogously, we estimate a parametric model for total dollar profits (summed over all time periods) in which we drop the time period dummies and the cubic polynomial in the value and add the mean, the variance and the skewness of the subject's empirical distribution of values as regressors.

Table 2 provides results for the entire sample of 192 subjects. There is a strong gender effect for both bids and profits. On average, women bid higher than men and earn less

Table 2: Full Sample

	(bids)	(bids)	(profits)	(profits)
Digit Ratio		−1.818		5.863
		(8.927)		(19.030)
Female	2.223***	2.243***	−3.336***	−3.402***
	(0.629)	(0.627)	(1.016)	(1.002)
Age	−0.153	−0.152	0.340	0.338
	(0.103)	(0.103)	(0.213)	(0.216)
Num. of Siblings	−0.103	−0.102	−0.177	−0.179
	(0.261)	(0.261)	(0.331)	(0.331)
Asian	−0.860	−0.873	0.866	0.912
	(0.724)	(0.735)	(1.053)	(1.123)
Other	−0.363	−0.372	−0.092	−0.063
	(1.056)	(1.060)	(1.493)	(1.508)
Observations	5760	5760	192	192
R^2	0.84	0.84	0.27	0.27

Standard errors (Clustered at the session level) in Parentheses
Significance levels: *10%; ** 5%; *** 1%

than men. This has been reported already in Pearson and Schipper (2009), where we trace it back to the menstrual cycle. Similar gender effects have been reported in Casari, Ham and Kagel (2008), Ham and Kagel (2006), and Chen, Katuščák and Ozdenoren (2009).

We see in Table 2 that 2D:4D does not significantly influence bidding and profits. Moreover, in comparing the first and the second regression (and the third and the fourth regression) we conclude that the digit ratio does not absorb any effect from the gender. In fact, if gender is omitted (not reported in Table 2), then the 2D:4D still has no significant effect. Moreover, including variables for choice of major does not change the results nor does the omission of the variable for the number of siblings (not reported in Table 2). We conclude that "the visible hand is invisible," or more formally

Observation 1 *The 2D:4D does not significantly affect bidding behavior or profits in the full sample.*

Since 2D:4D is dimorphic with respect to gender, we may obtain significant effects when separating our sample by gender. In fact, some prior studies of the digit ratio in psychology have found significant effects of 2D:4D for men but not for women. (E.g., see Sanders et al., 2005, for a mental rotation task.)

Table 3 presents results separated by gender. Again, there are no significant effects of 2D:4D on bidding behavior and profits. This holds also when controlling for majors or dropping the variables for the number siblings (not reported in Table 3). We conclude

Observation 2 *The 2D:4D does not significantly affect bidding behavior or profits in both male or female subsamples.*

Table 3: Sample Separated by Gender

	(bids-female)	(profits-female)	(bids-male)	(profits-male)
Digit Ratio	−9.697	31.794	8.731	−12.229
	(11.371)	(19.051)	(14.952)	(31.221)
Age	−0.032	0.105	−0.265*	0.546**
	(0.170)	(0.262)	(0.140)	(0.260)
Num. of Siblings	−0.512	0.334	0.241	−0.546
	(0.431)	(0.537)	(0.443)	(0.497)
Asian	−1.315	0.275	−0.243	1.122
	(1.059)	(1.389)	(1.193)	(1.965)
Other	−1.407	1.557	0.075	−0.729
	(1.627)	(2.221)	(1.673)	(1.975)
Observations	2820	94	2940	98
R^2	0.85	0.14	0.84	0.33

Standard errors (Clustered at the session level) in Parentheses
Significance levels: *10%; ** 5%; *** 1%

It is known from prior studies of the correlation between the digit ratio and risk taking that effects of 2D:4D may depend on ethnic groups (Apicella et al., 2008, Dreber and Hoffman, 2007). Therefore we studied the two major ethnic groups in our sample, Whites and Asians, in isolation. The results are reported in Table 4.

Table 4: White and Asian Subsamples

	(bids-white)	(profits-white)	(bids-asian)	(profits-asian)
Digit Ratio	−24.346	60.363**	13.458	−10.014
	(20.461)	(28.801)	(13.802)	(30.573)
Female	3.789***	−4.422**	2.046**	−4.083***
	(1.060)	(1.754)	(0.826)	(1.372)
Age	−0.249**	0.394	−0.168	0.373
	(0.105)	(0.264)	(0.263)	(0.461)
Num. of Siblings	0.172	0.013	−0.703*	0.115
	(0.360)	(0.629)	(0.365)	(0.491)
Observations	1650	55	3360	112
R^2	0.86	0.41	0.84	0.25

Standard errors (Clustered at the session level) in Parentheses
Significance levels: *10%; ** 5%; *** 1%

There is a significant effect of the digit ratio on profits for the white subsample, but no such an effect for bids or the Asian subsample. Moreover, the effect is positive, which is contrary to what one would expect given that lower digit ratios are correlated with lower testosterone levels. That is, the higher the digit ratio the higher the profit. Moreover, given that the differences of 2D:4D between white males and females are the opposite of what is reported in the literature - although this difference is not significant in our sample - we are not confident in the result. This led us to study the subsamples further.

In Table 5 we separated the white subsample further into the male white subsample and the female white subsample. We observe that the significant effect of the digit ratio on profits persists for males but not for females. Again, the effect is contrary to what one might expect.

Table 5: White Subsamples

	(bids-male)	(profits-male)	(bids-female)	(profits-female)
Digit Ratio	−42.078	99.760*	−3.375	29.449
	(32.648)	(50.801)	(18.664)	(32.019)
Age	−0.216	0.327	−0.252**	0.241
	(0.201)	(0.444)	(0.098)	(0.189)
Num. of Siblings	0.012	0.107	0.402	−0.495
	(0.541)	(0.960)	(0.371)	(0.678)
Observations	1050	35	600	20
R^2	0.86	0.41	0.89	0.41

Standard errors (Clustered at the session level) in Parentheses
Significance levels: *10%; ** 5%; *** 1%

Interestingly, we see in Table 4 that age is statistically significant for the bids of the white subsample. It appears that the older the student, the lower are his or her bids on average. Table 5 suggests that this is due to white female students in our sample. Yet, the number of observations is rather low since we just have 20 white female students among our subjects. We are not confident to claim any significant effect.

Table 6 shows the results for our subsample of Asian students. Close inspection reveals that the digit ratio is marginally significant for bids of Asian males ($p = 0.106$) but not for their profits or for the bids or profits of Asian females. This finding is also in the expected direction, that is, the lower the digit ratio the lower the bids. Again, age of Asian males seems to influence their profits positively and their bids negatively.

Table 6: Asian Subsamples

	(bids-male)	(profits-male)	(bids-female)	(profits-female)
Digit Ratio	34.914	−57.658	−2.851	27.333
	(20.678)	(45.814)	(17.650)	(32.181)
Age	−0.445*	0.911*	0.115	−0.017
	(0.245)	(0.469)	(0.291)	(0.512)
Num. of Siblings	−0.532	−0.123	−0.931	0.393
	(0.769)	(0.960)	(0.590)	(0.631)
Observations	1410	47	1950	65
R^2	0.84	0.33	0.85	0.11

Standard errors (Clustered at the session level) in Parentheses
Significance levels: *10%; ** 5%; *** 1%

The digit ratio may interact with ethnicity. It is known that there are differences in 2D:4D between ethnic groups (Manning, et al., 2002, Manning et al., 2004). Moreover, recall that Dreber and Hoffman (2007) report significantly more risk taking in an investment task for lower 2D:4D in White subjects but Apicella et al. (2008) show that this is not the case in a more ethnically mixed sample. Additional observations may yield sharper results.

Observation 3 *The evidence on the effect of 2D:4D on bidding behavior and profits with regard to White and Asian subsamples is inconclusive.*

We note that the digit ratio is a noisy measure of prenatal hormone levels. Moreover, our measure of the digit ratio adds additional noise. For instance, if we use the measurements of the digits by the first coauthor, the effects on bids by Asian males are significant while they are not with the average of authors measures. So perhaps it is not surprising that we don't find a strong correlation.

A Instructions

Introduction

You are about to participate in a decision process in which an imaginary object will be auctioned off for each group of participants in each of 30 rounds. This is part of a study intended to provide insight into certain features of decision processes. If you follow the instructions carefully and make good decisions you may earn a bit of money. You will be paid in cash at the end of the experiment.

During the experiment, we ask that you please do not talk to each other. If you have a question, please raise your hand and an experimenter will assist you.

You may refuse to participate in this study. You may change your mind about being in the study and quit after the study has started.

Procedure

In each of 30 rounds, you will be *randomly* matched with one other participant into a group. Each group has two bidders. You will not know the identity of the other participant in your group. Your payoff each round depends ONLY on the decisions made by you and the other participant in your group.

In each of 30 rounds, each bidder's value for the object will be randomly drawn from 1 of 2 distributions:

High value distribution: If a bidder's value is drawn from the high value distribution, then

- with 25% chance it is randomly drawn from the set of integers between 1 and 50, where each integer is equally likely to be drawn.
- with 75% chance it is randomly drawn from the set of integers between 51 and 100, where each integer is equally likely to be drawn.

For example, if you throw a four-sided die, and it shows up 1, your value will be equally likely to take on an integer value between 1 and 50. If it shows up 2, 3 or 4, your value will be equally likely to take on an integer value between 51 and 100.

Low value distribution: If a bidder's value is drawn from the low value distribution, then

- with 75% chance it is randomly drawn from the set of integers between 1 and 50, where each integer is equally likely to be drawn.
- with 25% chance it is randomly drawn from the set of integers between 51 and 100, where each integer is equally likely to be drawn.

For example, if you throw a four-sided die, and if it shows up 1, 2 or 3, your value will be equally likely to take on an integer value between 1 and 50. If it shows up 4, your value will be equally likely to take on an integer value between 51 and 100.

Therefore, if your value is drawn from the high value distribution, it can take on any integer value between 1 and 100, but it is three times more likely to take on a higher value, i.e., a value between 51 and 100.

Similarly, if your value is drawn from the low value distribution, it can take on any integer value between 1 and 100, but it is 3 times more likely to take on a lower value, i.e., a value between 1 and 50.

In each of 30 rounds, each bidder's value will be randomly and independently drawn from the high value distribution with 30% chance, and from the low value distribution with 70% chance. You will not be told which distribution your value is drawn from. The other bidders' values might be drawn from a distribution different from your own. In any given round, the chance that your value is drawn from either distribution does not affect how other bidders' values are drawn.

Each round consists of the following stages:

Bidders are informed of their private value, and then each bidder will simultaneously and independently submit a bid, which can be any integer between 1 and 100, inclusive.

The bids are collected in each group and the object is allocated according to the rules of the auction explained in the next section.

Bidders will get the following feedback on their screen: your value, your bid, the winning bid, whether you got the object, and your payoff.

The process continues.

Rules of the Auction and Payoffs

In each round,

- if your bid is greater than the other bid, you get the object and pay your bid:

  Your Payoff = Your Value - Your Bid;

- if your bid is less than the other bid, you don't get the object:

  Your Payoff = 0.

- if your bid is equal to the other bid, the computer will break the tie by flipping a fair coin. Such that:

  with 50% chance you get the object and pay your bid:

  Your Payoff = Your Value - Your Bid;

  with 50% chance you don't get the object:

  Your Payoff = 0.

There will be 30 rounds. There will be 2 practice rounds. From the first round, you will be paid for each decision you make.

Your total payoff is the sum of your payoffs in the 30 “real” rounds.

The exchange rate is $1 for 13 points.

We encourage you to earn as much cash as you can. Are there any questions?

Review Questions: Please raise your hand if you have any questions. After 5 minutes we will go through the answers together.

1. Suppose your value is 60 and you bid 62.
   If you get the object, your payoff =.
   If you don’t get the object, your payoff =.
2. Suppose your value is 60 and you bid 60.
   If you get the object, your payoff =.
   If you don’t get the object, your payoff =.
3. Suppose your value is 60 and you bid 58.
   If you get the object, your payoff =.
   If you don’t get the object, your payoff =.
4. In each of 30 rounds, each bidder’s value will be randomly and independently drawn from the high value distribution with % chance.
5. Suppose your value is drawn from the low value distribution. With what % chance is the other bidder’s valuation also drawn from the low distribution?
6. True or False:
   If a bidder’s value is 25, it must have been drawn from the low distribution.
   If a bidder’s value is 60, it must have been drawn from the high distribution.
   You will be playing with the same two participants for the entire experiment.
   A bidder’s payoff depends only on his/her own bid.

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