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The gender difference in the value of winning☆

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HIGHLIGHTS

- We design an all-pay auction experiment which reveals the gender of the opponent.
- We find that women bid higher than men, but only when bidding against other women.
- Our findings suggest that women have a higher value of winning than men.

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ABSTRACT

We design an all-pay auction experiment in which we reveal the gender of the opponent. Using this design, we find that women bid higher than men, but only when bidding against other women. These findings, interpreted through a theoretical model incorporating differences in risk attitude and the value of winning, suggest that women have a higher value of winning than men.

1. Introduction

There is robust evidence that women bid more aggressively than men in winner-pay common value (Casari et al., 2007; Ham and Kagel, 2006) and first-price auctions (Chen et al., 2013). Such aggressive bidding by women seems inconsistent with a large body of experimental work on tournament entry (Croson and Gneezy, 2009; Niederle and Vesterlund, 2011). Rather, this literature suggests that women are less (not more) competitive

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than men because they tend to choose the pay-for-performance over the tournament payment scheme (Niederle and Vesterlund, 2007; Cason et al., 2010; Sutter and Glätzle-Rützler, 2015).[1]

The main problem in interpreting and reconciling the findings from the auction literature and the tournament entry literature is that a choice to bid in an auction and a choice to enter a tournament may depend on the same factors, such as risk preferences, as well as unrelated factors, such as familiarity with competitive market interactions. For example, women's lower tolerance for risk (Croson and Gneezy, 2009) could explain why they avoid tournaments (Dohmen and Falk, 2011), and it could also explain more aggressive bidding in winner-pay auctions (Harrison, 1989). Therefore, it may be tempting to conclude that gender differences in bidding behavior and tournament entry are driven by the same factor(s). However, it is also possible that there are other factors unique to each environment that may be driving such differences.[2]

We contribute to the ongoing debate about the gender difference in competitiveness by designing an all-pay auction experiment in which we reveal the gender of the opponent. Our experimental treatments mimic the comparative statics predictions of a simple theoretical model, allowing us to examine differences in bidding that are due to differences in risk attitude and the value of winning. By revealing the gender of the opponent, we can rule out a number of other confounds that may be causing gender differences, such as beliefs, mistakes, and stereotypes.

Confirming prior findings from the auction and contest literatures, we find that women bid higher than men (Ham and Kagel, 2006; Casari et al., 2007; Chen et al., 2013; Mago et al., 2013; Price and Sheremeta, 2015; Dechenaux et al., forthcoming). Importantly, this is only when women bid against other women. Therefore, we can rule out that higher bidding by women is due to a lack of familiarity with competitive market interactions or due to inferior mathematical skills which prevent women from calculating the optimal bidding strategies. Such impediments would increase women's bids not only against women but also against men. Our data, interpreted through a theoretical model, suggests that women have a higher value of winning.

2. Theoretical predictions

All-pay auctions are often used to model real life contests when the costs of competing are unrecoverable (Hillman and Riley, 1989; Baye et al., 1996). In a standard two player all-pay auction with complete information, player 1, with the higher valuation for winning the auction V_1, submits bid b_1, and player 2, with the lower valuation V_2, submits bid b_2. The player who submits the highest bid wins the auction and receives the corresponding prize. However, both players have to pay their bids irrespective of who wins the auction (hence the term "all-pay auction").

Behavior in the all-pay auction can be characterized by a mixed strategy equilibrium, in which both players randomly draw their bids from a certain interval (Hillman and Riley, 1989; Baye et al., 1996). Theoretically, such behavior depends on the valuation for winning V, which may not necessarily be reflected in the monetary value of the prize (Sheremeta, 2010, 2013, 2015), and risk aversion R (Fibich et al., 2006; Gneezy and Smorodinsky, 2006).[3] Our theoretical model considers these two factors simultaneously. The details of the theoretical model and the proofs of the theoretical predictions can be found in Appendix A. Here we provide only a short overview of our main results. For convenience, we use "bid" to refer to the "mean bid" (since the equilibrium bid is defined by a mixed strategy).

Table 1
Theoretical bids by gender and opponent.

Gender pairs	Valuation V, Risk aversion R			
	$V_M > V_F$ $R_M < R_F$	$V_M > V_F$ $R_M > R_F$	$V_M < V_F$ $R_M < R_F$	$V_M < V_F$ $R_M > R_F$
MM vs. FF	$>$	$\Leftrightarrow$	$\Leftrightarrow$	$<$
FM vs. FF	$\Leftrightarrow$	$<$	$\Leftrightarrow$	$<$
MF vs. MM	$<$	$\Leftrightarrow$	$<$	$\Leftrightarrow$
FM vs. MM	$<$	$<$	$=$	$=$
MF vs. FF	$=$	$=$	$<$	$<$
MF vs. FM	$\Leftrightarrow$	$>$	$<$	$\Leftrightarrow$

Table 1 provides theoretical predictions for our experiment. For convenience, FF (female–female), FM (female–male), MF (male–female) and MM (male–male) refer to the mean bids by females against females, females against males, males against females, and males against males, respectively. These predictions are based on the assumption that men and women differ in their valuation for winning the auction (V_M vs. V_F) and risk aversion (R_M vs. R_F). When valuation and risk aversion have the same effect on the predicted behavior, we have strict inequalities. For example, lower valuation for men ($V_M < V_F$) as well as lower risk aversion for men ($R_M < R_F$) both imply MF $<$ MM (see Appendix A), so the joint effect is certain: MF $<$ MM. On the other hand, lower valuation for men ($V_M < V_F$) implies MM $<$ FF but lower risk aversion for men ($R_M < R_F$) implies MM $>$ FF, so the joint effect is uncertain: MM $\Leftrightarrow$ FF.

3. Experiment

We recruited a total of 192 subjects, 98 subjects (51 males, 47 females) from Shenzhen University and 94 subjects (39 males, 55 females) from University Town. Subjects were paired randomly and anonymously into four pairings: MM (42 subjects), MF (48 subjects), FM (53 subjects), and FF (49 subjects).

The experiment was conducted in standard lecture halls. To reduce the time necessary for the experiment, we gave monitors envelopes according to rough estimates of the number of people in each part of each lecture hall. Each envelope contained a bidding sheet with instructions (available in Appendix B) informing subjects that they had 10 CNY and could bid for an additional 10 CNY in an all-pay auction. For comparison, a student assistant makes 10–15 CNY per hour.

On the bidding sheet, subjects could mark a bid ranging from 0 to 10 CNY in 0.5 CNY increments. The winner received the prize of 10 CNY. Bids of zero always gave subjects the endowment of 10 CNY. We gave subjects 10 examples of bids and corresponding payoffs, allowing two minutes for questions and answers. There was a place on the bidding sheet for students to write down their

[1] This literature uses tournament entry decisions in "real effort" experiments to measure competitiveness. Subjects in these experiments have a choice to be rewarded by a tournament payment scheme (e.g., to be the best of four) or a pay-for-performance payment scheme (i.e., per unit of output).

[2] Women's choice to avoid tournaments could be also driven by lower confidence (Kamas and Preston, 2012), beliefs and gender stereotypes (Niederle and Vesterlund, 2007, 2011). Similarly, women may overbid in auctions because they are not as familiar with competitive market interactions (Ham and Kagel, 2006) and cannot calculate the optimal bidding strategies (Geary, 1996; Casari et al., 2007).

[3] The value of winning can be viewed as an approximation to different non-monetary considerations, such as the non-monetary utility of winning (Sheremeta, 2010, 2013, 2015), the disutility of losing (Delgado et al., 2008), envy (Mago et al., forthcoming), status (Charness et al., 2013; Clingingsmith and Sheremeta, 2015; Chen et al., 2015), and recognition (Andreoni and Petrie, 2004; Samek and Sheremeta, 2014). Similarly, risk attitude can be viewed as an approximation to factors influencing individual behavior under uncertainty, such as risk aversion (Sheremeta, 2011), loss aversion (Shupp et al., 2013), and strategic risk (Masiliunas et al., 2014).