Working Paper in Economics No. 766

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Department of Economics, June 2019

ISSN 1403-2473 (Print)
ISSN 1403-2465 (Online)

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Abstract

Experimental evidence from both the lab and the field shows that women on average have a lower propensity to enter a competitive environment. In this paper, we investigate gender differences in competitiveness using a lab-in-the-field experiment and a subject pool consisting of Chinese adults. China provides an interesting environment to study in this regard since the country has promoted gender equality for a long time and the gender gap in earnings is small in a cross-country comparison. However, in many respects, China is still a patriarchal society. Our experimental results show that women perform equally well as men in a piece-rate task and significantly better in a competitive payment environment. Despite this, men are more than twice as likely to voluntarily choose a competitive environment. This gender difference cannot be explained by differences in risk preferences or overconfidence.

Key words: Competition; Gender Difference; Experiments; China.

JEL code: C91; D03; D10; I31; P30.

1. Introduction

Gender differences in competitiveness have been widely documented in many contexts and across countries (e.g., Gneezy et al., 2008; Niederle and Vesterlund, 2011). They have been put forward as a key factor explaining observed gender differences especially in educational and occupational choices and wages (Buser et al., 2014; Jurajda and Münich, 2011; Kleinjans, 2009). Investigating gender differences in educational and occupational choices using naturally occurring data is challenging, since it is difficult to establish causal effects of gender on competitive choices. As a result, experimental methods have been developed. There is by now a large experimental literature documenting gender differences in willingness to compete, building on the pioneering experimental work by Gneezy et al. (2003) and Niederle and Vesterlund (2007). A key finding from these experiments is that women are less likely to compete, while men often compete in situations where they should not (e.g., Dargnies, 2012; Datta Gupta et al., 2013; Niederle and Vesterlund, 2007 and 2011; Niederle et al., 2013; Sutter and Rützler, 2014). These findings are robust to alternative explanations including differences in abilities, risk preferences, and overconfidence, although the extent of the differences varies both among studies (Buser et al., 2014; Kamas and Preston, 2012; Niederle and Vesterlund, 2010) and across contexts and cultures. For example, in Healy and Pate (2011), the difference in competitiveness between men and women is drastically reduced if the competition is between teams and not individuals, while Gneezy et al. (2009) found that women were more willing to compete in a matrilineal society in India than in an extremely patriarchal society in Tanzania.

This paper provides experimental evidence on the willingness to compete among adult men and women in China. In particular, we use an adult subject pool in three different cities located in different provinces. China provides a particularly interesting case for studies of gender differences in competitiveness. First, the country has long promoted gender equality and has traditionally had a small gender gap in earnings in an international perspective. Women in China have also participated in the labor market to a greater extent than women in most other countries. Already in the 1950s, the Chinese government worked actively to enable the Han Chinese women to work outside the household (Croll, 1983). All workers were assigned to jobs, and wages were centrally regulated. At the same time, the policy of equal pay for equal work was implemented and women had almost the same number of working hours as men (Gustafsson and Li, 2000). The female labor force participation has exceeded 80% for a long time. China was also one of the first countries to ratify the United Nations International Convention to eliminate all kinds of discrimination against women (CEDAW). Although a

gender wage gap have existed, it was rather small in an international comparison (Gustafsson and Li, 2000).[1] Second, an educational reform consisting of an expansion policy was implemented in 1999 (Che and Zhang, 2018). As a result of the reform, the education level of Chinese women have increased dramatically in both rural and urban areas (Attané, 2012).[2] Third, sons have traditionally been preferred over daughters due to the patriarchal family structure in China, with potentially negative effects on Chinese women´s willingness to compete. This gender preference was further strengthened by the one-child policy introduced in 1979 (Das Gupta et al., 2010). Fourth, Chinese women´s work situation has changed since the beginning of this century as the number of state-owned companies, which typically offer an employment-for-life guarantee, has decreased. Thus, unemployment has started to rise among women, and especially among older women decreased (Maurer-Fazio et al., 2011).

Most of the previous studies on gender differences in competitiveness have focused on university students (Datta Gupta et al., 2013; Gneezy et al., 2003; Healy and Pate, 2011; Niederle and Vesterlund, 2007; Niederle et al., 2013), although some have been conducted using adults from the general population (Gneezy et al., 2009; Reuben et al., 2015) or children and adolescents (Booth and Nolen, 2012; Cardenas et al., 2012; Sutter and Rützler, 2010 and 2014). Moreover, almost all of these have been conducted in Western societies, leading to very little evidence regarding cultural differences. Notable exceptions include Gneezy et al. (2009) and Zhang (2018). Gneezy et al. (2009) found a much higher willingness to compete among women in a matrilineal society in India, but an opposite pattern in an extremely patriarchal society in Tanzania, indicating social learning effects depending on whether an environment is male or female dominated.[3] Zhang (2018) conducted an experiment on competitiveness among high school students from two patrilineal ethnic groups in China (Han Chinese and Yi) and found no gender gap among Han students but a significant difference between men and women among Yi students. According to Zhang (2018), one possible explanation for this difference is that although traditionally both Han Chinese and Yi societies have been characterized by male-dominated norms, as mentioned, these norms became weaker among Han Chinese due to the many reforms by the Communist Party starting already in the 1950s. Among other things, a

[1] The total gender wage gap was 15.5 % in 1988 and 17.5 % in 1995, but lower among the youngest and more educated women (Gustafsson and Li, 2000).
[2] Before the reform, women had a clearly lower average level of education than men (Gustafsson and Li, 2000).
[3] These results are in line with the findings by Booth and Nolen (2012). Although their subjects were students in the UK, their results also emphasized contextual effects explaining differences between genders: Girls from single-sex schools behaved more like boys, i.e. they behaved more competitively than girls from coed schools.

large share of Han Chinese women joined the labor force around this time, strengthening women´s position in the society. Ethnic groups such as Yi were excluded from this labor reform and therefore remained more patriarchal.[4]

In this paper, we investigate whether there are gender differences in competitiveness among adult Han Chinese. Following Niederle and Vesterlund (2007), we conducted a lab-in-the-field experiment as part of a large survey with several experiment. We did this in three cities in three provinces located in different parts of China. In contrast to most previous studies showing no gender differences in performance between the genders, our results show that women on average performed equally well or better thans males . Moreover, while both genders improved their performance under competition, this effect was stronger among women than men. Despite this, and after controlling for both expectations about performance in the tournament and risk preferences, we find that men are substantially more likely to choose to compete.

2. Experimental design and procedure

2.1. Experimental design

The competition experiment was based on the experimental design developed by Niederle and Vesterlund (2007). Subjects completed three tasks, but only one was randomly selected as payoff relevant. Each subject was randomly matched with three other participants to form a group of four people, but they did not know who the other group members were. The group composition was the same during the whole experiment, and in each group, two members were men and two were women.[5] Subjects faced the task of calculating the sum of five randomly chosen two-digit numbers. Subjects were not allowed to use a calculator but could write the numbers down using a pen and scratch paper that we provided. To familiarize them with the task, they completed a one-minute trial round. After that, the first part of the experiment began.

For Task 1 – piece rate payment – the subjects were asked to calculate the sum of five randomly chosen two-digit numbers and write the answers on an answer sheet. The time provided for this

[4] Zhang (2018) also studied one matrilineal society (Mosou) and found Mosou men to be more competitive than Mosou women, despite the fact that the Mosou society is matrilineal. She argues that a possible reason for the result is that Mosous are a polygamous ethnic group.

[5] All subjects were invited back to the community or university office, where they were asked to draw a piece of paper from a box. To ensure there were two men and two women in each group, male and female subjects were asked to draw a paper from two separate boxes where each paper had a letter between A and Z. Two men and two women who drew the same letter were placed in the same group. They then separately drew a second piece of paper with a number from 1-3 on it to decide which task would determine their payment.

task was three minutes. The payment was 3 yuan per problem solved if the task was randomly selected for payment. In Task 2 – tournament – subjects again had three minutes to solve the same type of math problems. However, now the payment depended on the performance relative to that of the other group members. The group member who solved the largest number of problems received 12 yuan per correct solution while the other participants received no payment. In case of a tie, the ranking of the group members with equal performance was randomly determined. In Task 3 – choice between piece rate and tournament – the subjects first had to choose payment schedule – piece rate or tournament – and then again solve the same type of math problems for three minutes. If a subject chose piece rate, the payment was again 3 yuan per correct response. If a subject chose tournament, the performance was evaluated relative to the performance of the other three group members in Task 2. If the subject solved more problems than any of the other three group members, the payment was 12 yuan per correct response. Finally, the subjects guessed their rank relative to other group members in Tasks 1 and 2. For each correct guess, they earned 3 yuan.

We also use the results from an incentive-compatible risk experiment to investigate how risk preferences affect the decision to enter a competitive situation. Risk preferences were elicited from three different lotteries with probabilities of winning of 10%, 50%, and 90%, respectively. We used a choice list for each lottery, where subjects chose between a safe amount and a lottery with a certain probability of winning a fixed amount (e.g., Sutter et al., 2013). For each new row on the choice list, the safe amount was increased. We measure risk attitudes based on the choice when a subject switched from choosing the lottery to choosing a sure amount, which allows us to calculate the corresponding certainty equivalent (see Carlsson et al. (2018) for details).

2.2. Recruitment and experimental procedure

We conducted our study in three cities, namely Guilin (located in southern China), Wuxi (located in eastern China), and Lanzhou (located in western China), in 2014. Table 1 summarizes the basic characteristics of these three cities. Wuxi is the more developed city with a higher GDP per capita.

Table 1. Characteristics of the three sampled cities.

Variable	Guilin	Wuxi	Lanzhou
City area (km^2)[a]	565	1643	1574
City resident population[b] (person)	1,507,200	3,613,800	2,659,700
GDP per capita (yuan)	34,859	126,389	54,771
Disposable annual income per capita (yuan)	26,811	41,731	23,030
Average annual salary (yuan)	45,194	68,187	51,928

Source: The data is from 2015 statistics yearbooks at both city and provincial levels.

[a] The total area of the city´s main districts.

[b] Permanent residents who live in the city´s main districts.

The experiments used in this paper are part of a large study on the Chinese one-child policy (see Carlsson et al., 2018).[6] The subjects included in the study had to meet the following requirements: (i) born in 1976–1986 in the sampled city, (ii) parents were born in the city (had urban Hukou) , and (iii) parents belonged to the Han majority.[7] The third criterion ensures that the subjects and their parents had been exposed to the many reforms implemented by the Communist Party starting already in the 1950. All subjects were selected from the community registration system. Community coordinators[8] helped us make a first random selection based on the three conditions. We then contacted potential subjects by phone and re-checked that they did meet our three eligibility requirements. Only eligible subjects were invited to participate in the experiments and survey. The sample was balanced on both birth year and gender.

Once subjects arrived at the community or university office, they were interviewed in a separate room by one experimenter. First, the eligibility of the subject was once again checked, and then the whole study was introduced. All subjects participated in five different experiments: competition, risk and ambiguity preferences, time preferences, a public good game, and an ultimatum game experiment. In addition to the experiments, the subjects were asked to complete a questionnaire. They were promised a show-up fee of 50 yuan and possibly additional payments from the experiments. In each of the three cities, ten graduate students from the local university were employed as experimenters and trained to conduct the survey.

[6] The current paper uses a somewhat larger sample size since we do not rely on strict exclusion restrictions based on the one-child policy. Furthermore, in Carlsson et al. (2018), the focus was on the one-child policy and not on gender differences.

[7] *Hukou* is the Chinese household registration system. Since we wanted to focus on subjects born in cities, we had to make sure that both of the subject´s parents had a city Hukou.

[8] The community coordinators worked at the community office and were more familiar with the residents than we were. They helped introduce our survey to the potential eligible subjects, and thus increased their trust in our survey.

In each experiment, the experimenter read the instructions out loud before the subjects were allowed to make the decisions. No feedback or information about the outcome was given between experiments. This was followed by a questionnaire survey that included questions about the individual and their household characteristics, attitudes, social capital, trust in socieyt, risk attitudes, and happiness. Then the subjects were paid a show-up fee of 50 yuan together with any earnings from risk and ambiguity experiment uncertainty and the time preference experiment.[9] As the other three experiments involved interaction with others, all subjects were asked to come back on a later day for payment, since their payments depended on what decisions others had made.The experiments were always conducted in the same order, and hence the competition experiment was always conducted first, followed by the risk experiment. The whole session lasted for about 1.5 hours.

A total of 856 subjects participated in the experiments. We drop two subjects with the wrong birth years, and thus 854 subjects (428 men and 426 women) are left for our analyses: 407 in Guilin, 200 in Wuxi, and 247 in Lanzhou. Table 2 presents descriptive statistics of the whole sample by gender. There are no statistically significant differences between men and women for most of the individual and household characteristics. However, on average, men are more likely to be an only-child and have higher income than women. Compared with men, a larger proportion of women are married and have children.

[9] In the case of time preferences, subjects received their payments on the same day only if they had chosen payment today; otherwise the money was transferred to their bank accounts on a specific date.

Table 2. Descriptive statistics by gender.

Variable	Description	Men	Women	H_0: No difference between gender (p-value)
Age	Age in years	32.85 (3.166)	33.14 (3.275)	0.194
Education	Years of education	15.10 (2.275)	15.25 (1.999)	0.911
Public sector	=1 if work in the public sector	0.49 (0.500)	0.53 (0.500)	0.273
Collective sector	=1 if work in the collective sector	0.12 (0.324)	0.13 (0.338)	0.587
Only child	= 1 if no siblings	0.76 (0.431)	0.68 (0.469)	0.011
Number siblings	No. of siblings if subject has siblings	1.29 (0.532)	1.25 (0.593)	0.369
Married	= 1 if married	0.75 (0.436)	0.82 (0.389)	0.015
Have children	= 1 if subject has at least one child	0.61 (0.489)	0.72 (0.451)	<0.000
Number of children	No. of children if subject has children	1.04 (0.202)	1.03 (0.160)	0.292
Income	Own annual income in 10,000 yuan	5.96 (6.770)	3.60 (3.054)	0.000
Household income	Annual household income in 10,000 yuan	13.17 (11.966)	12.85 (11.521)	0.132
Parent university educated	= 1 if at least one parent has university degree	0.25 (0.44)	0.23 (0.42)	0.357
No. of obs.		428	426	

Note: The figures in the parentheses are standard deviations. Tests are Wilcoxon rank-sum tests and proportion tests.

3. Results

3.1 Piece rate and tournament

Table 3 summarizes the average performance by men and women in the piece-rate and tournament tasks (Tasks 1 and 2). In Figures A1 and A2 in the appendix, we also present the distribution of number of correctly solved problems by gender in the piece-rate and tournament tasks. In the piece-rate task women solved on average 9.6 problems correctly, while men solved 9.2. Using a Wilcoxon rank-sum test, this difference between genders is insignificant at conventional levels (p-value=0.054).[10] For the tournament, women on average correctly solved 10.4 problems and men 9.7, and this difference is statistically significant at the 1 % level. Thus, our results indicate that women are slightly better than men at solving problems, which contradicts what many other previous studies have found, including the original study Niederle and Vesterlund (2007) as well as Niederle et al. (2013) and Zhang (2018).

[10] Throughout the paper, we use a Wilcoxon rank sum test for the gender difference tests, unless otherwise noted.

In addition, there was an increase in performance from piece rate to tournament for both genders. More specifically, women and men increased their number of correctly solved problems by 0.76 and 0.49, respectively (Wilcoxon signed rank test; p-value < 0.001 for both women and men). Admittedly, this increase could be caused by learning effects or the different incentive environments under piece rate and tournament (Niederle and Vesterlund, 2007). Interestingly, however, the increase in performance is statistically significantly larger among females than males (p-value=0.020). This result is not in line with what others have found. For example, Gneezy et al. (2003) found that men increased their performance in a tournament, while women did not, and Gneezy and Rustichini (2004) found that boys improved their performance in a competitive situation, while girls did not.[11] Furthermore, in our study out of the 214 randomly created groups, women were the best performer in 120 and men in 96.[12] Thus, in our sample, women have a somewhat higher probability of winning than men.

Table 3. The average performance by gender in the piece-rate and tournament tasks

	Men	Women	Wilcoxon rank-sum test (p-value)
Piece rate	9.16 (3.31)	9.61 (3.46)	0.054
Tournament	9.65 (3.21)	10.38 (3.56)	0.005
Difference	0.49 (2.22)	0.76 (2.33)	0.023
No. of obs.	428	426	

Note: The numbers in the parentheses are standard deviations.

4.2 Tournament entry

Since we find that women are better than men at solving the math problems in a competitive situation (the tournament task), one would perhaps expect women to be more likely to choose tournament in Task 3. However, only 19.7 % of the women chose to enter the tournament in Task 3, whereas the corresponding proportion for men is 42.8 %, i.e., men were more than twice as likely as women to choose competition. The difference is statistically significant (proportion test; p-value < 0.001). Our results are in line with the results by Niederle and Vesterlund (2007), who found that twice as many men as women chose the competitive alternative. Our results are very different from those presented by Zhang (2018), who found no gender differences in competitiveness among Han Chinese subjects. However, Zhang (2018) used high school

[11] In Table A1 in appendix we also report the results separately for each province. We find that women outperform men in all provinces, and also that they improve their performance more under competition than men. However, most gender differences are not statistically significant at the 5 % significance level.
[12] The actual ranks include the cases of ties.

students as subjects, while we used an adult non-student subject pool. Thus, it is difficult to directly compare the results of the two studies. There could be effects related to the age of the subjects. For example, Garratt et al. (2013) find that older individuals are less willing to compete. Yet, in Mayr et al. (2012), the willingness to compete changed across the life span and peaked at around age 50.

Table 4 presents the average performance for subjects who chose piece rate and tournament, respectively, separately for men and women. We first compare the performances in Tasks 1 and 2. For both genders, we find that subjects who chose tournament performed better than those who chose piece rate; the only exception is men's performance in the piece rate task. On the other hand, the improvement from the piece rate to the tournament task is largest for men who chose tournament. Thus, on average, women who chose tournament were better at solving math problems, but they did not significantly improve their results under competition. Although men who chose tournament were not significantly better than men who chose piece rate in Task 1, once being under competition, they significantly improved their results in Task 2.[13]

Table 4. The average performance by choice of incentive scheme (standard deviations in parentheses)

	Task 1		Task 2		Task 2- Task 1		Task 3	
	Men	Women	Men	Women	Men	Women	Men	Women
Choose piece rate	8.96 (3.24)	9.37 (3.34)	9.18 (2.98)	10.17 (3.50)	0.22 (2.11)	0.81 (2.30)	9.30 (3.16)	10.34 (3.26)
Choose tournament	9.42 (3.400)	10.59 (3.78)	10.29 (3.39)	11.19 (3.74)	0.87 (2.33)	0.59 (2.45)	10.56 (3.55)	10.98 (3.34)
Wilcoxon rank sum (p-value)	0.133	0.015	0.001	0.053	0.019	0.168	0.000	0.212

For those who chose piece rate, there is no statistically significant difference in task 1 performance (piece rate) between men and women (p-value=0.115), while women performed better in Task 2 (tournament) (p-value<0.001). Among those who chose tournament, women performed better than men in task 1 (p-value=0.028), while there is no statistically significant difference between men and women in task 2 (p-value=0.131). Finally, we can look at the performance in Task 3, where subjects performed either piece rate or tournament depending on their own choice (last two columns in Table 4). Men who chose to enter the tournament

[13] For the subsample of subjects who chose tournament in Task 3, our results are in line with those by Gneezy et al. (2003) and Rustichini (2004), who found that men and boys, respectively, improved their performance when competing, while females and girls did not change their behavior from a non-competitive situation.

performed on average better than those who chose piece rate, but for women there are no statistically significant differences between the two groups.

4.3 Explaining the difference in tournament entry

Why were women more reluctant to choose tournament in Task 3, despite being, on average, slightly better than men? There could be many reasons for this, including a difference in confidence and risk preferences, but also other individual characteristics such as level of education and income. In order to investigate what affects the tendency to choose tournament, we estimate a binary probit model explaining the likelihood of tournament entry. Apart from including a variable measuring ability – performance in Task 2 – we investigate the explanatory power of confidence and risk preferences. Before presenting the results, we will therefore first look at confidence and risk.

4.3.1 Confidence

Confidence is one important factor that could influence the decision of whether to enter the tournament. In the experiment, subjects were asked to guess their rank in Tasks 1 and 2 (with 1 being the best and 4 the worst) after they finished Task 3. We focus on the guess for Task 2 here. The average guess for men was 2.3 and for women 2.4, and the difference in distributions is not statistically significant (p-value = 0.252). Figure 1 presents the distribution of guessed rank for Task 2. Most of the subjects guessed that their relative ranks were in the middle (rank 2 or 3). The share of subjects guessing they were the top-performer is slightly higher for men.

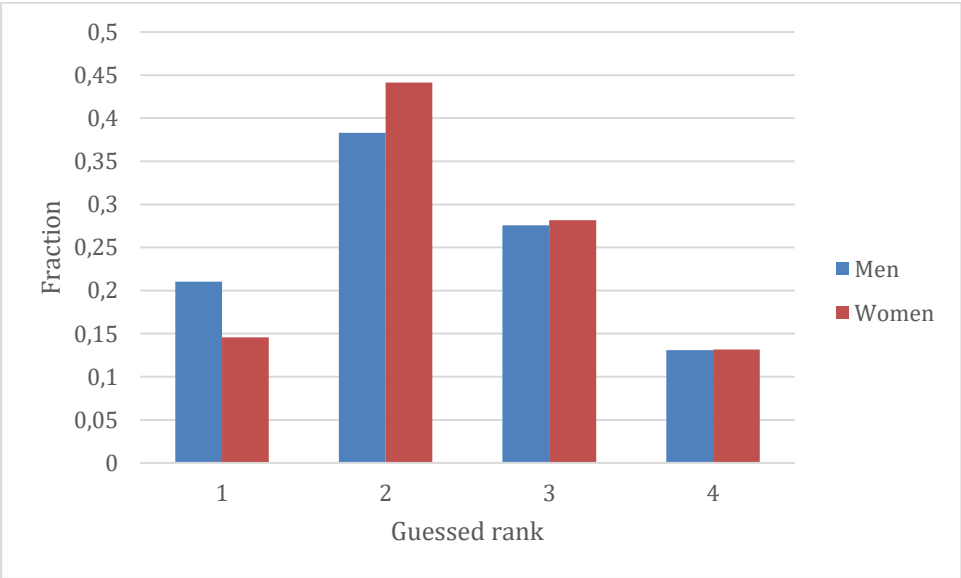

Figure 1. Guessed rank for Task 2

As can been seen in Table 5, the share of correct guesses for those who guessed they were ranked number one in their group in Task 2 is higher for women (9.9/14.6 = 68 %) than for men (9.3/21 = 44 %). Thus, there is some evidence of overconfidence for both men and women, but the magnitude of this belief is highest for men.[14]

Table 5. Guessed and actual rank in Task 2

Guessed rank	Men´s actual rank				Women´s actual rank			
	1	2	3	4	1	2	3	4
1	9.3%	6.5%	4.0%	1.2%	9.9%	4.0%	0.7%	0.0%
2	11.0%	10.0%	10.5%	6.8%	16.2%	13.4%	8.9%	5.6%
3	3.7%	5.8%	8.9%	9.1%	5.9%	8.5%	6.8%	7.0%
4	1.2%	1.9%	4.4%	5.6%	0.9%	2.8%	3.8%	5.6%

4.3.2 Risk preferences

Attitudes to risk is another potential determinant of the decision to choose tournament, yet previous findings are quite inconclusive in this regard (Buser et al., 2014; Kamas and Preston, 2012; Niederle and Vesterlund, 2007). In this paper, we use the ratio between the certainty equivalent at the switching point and the expected value for each of the lotteries to measure subjects´ risk preferences. A ratio of the certainty equivalent to the expected value greater than one indicates that the subject is risk loving, while a ratio smaller than one indicates risk aversion. Table 6 shows that both men and women are, as expected, more risk loving at a lower probability of winning (10 %) and more risk averse at a higher probability level of winning (50 and 90 %). Moreover, women are more risk averse than men for two of the three probability levels (50 and 90 %), but the differences are not sizeable in economic terms.

[14] Another way to see this is to estimate a model on guessed rank in the tournament and control for both performance in Task 2 and gender. When we do this, both performance and gender are statistically significant, i.e., women are less likely than men to state a high rank. The estimated results are available upon request.

Table 6. Ratio between certainty equivalent and expected value at switching point in risk experiment; standard error in parentheses

	Probability of winning		
	10%	50%	90%
Men	3.22	1.25	1.02
	(2.47)	(0.42)	(0.16)
Women	3.01	1.13	0.97
	(2.02)	(0.39)	(0.18)
Wilcoxon rank-sum test (p-value)	0.831	0.001	<0.001

In Table A2 in the appendix, we report the results from a regression analysis for the risk experiment with a 50 % probability of winning (this is also the risk question we use in the following regression analyses), where we included individual and household characteristics. Importantly, what we find is that there is a statistically significant difference in risk preferences between men and women even when we control for characteristics such as income and parents´ education level.

4.3.3 Regression results

The results of a binary probit model, where the dependent variable is equal to one if the subject chose tournament in Task 3, are summarized in Table 7. We find that the size of the marginal effect for female subjects is stable and around -0.25 irrespective of the model specification, i.e., the fact that women are less likely to choose tournament in Task 3 holds also after including several controls. In addition, our measure of confidence, the guessed rank of own performance in Task 2, and risk preferences significantly explain the likelihood of choosing tournament: Those who thought they were ranked low and those who were more risk loving were more likely to choose the tournament in Task 3.[15] Among the socio-economic variables, we find that having a university degree does not have a significant impact on the likelihood of choosing tournament, while having parents with a university degree increases this likelihood by eight percentage points. Being married is also positively associated with tournament entry, whereas being an only child does not have a significant effect.

[15] We also ran regressions where we interacted being a woman with performance, guessed rank, and risk preference, respectively, but none of these interaction effects were significant. Results are available upon request.

Table 7. Probit model, the determinants of tournament entry; standard errors in parentheses

	(1) Marginal effects	(2) Marginal effects	(3) Marginal effects	(4) Marginal effects
Female	-0.247***	-0.237***	-0.224***	-0.234***
	(0.031)	(0.031)	(0.032)	(0.033)
Performance in task 2	0.020***	0.010*	0.010*	0.013**
	(0.005)	(0.005)	(0.005)	(0.006)
Guessed rank in task 2		-0.078***	-0.081***	-0.073***
		(0.020)	(0.020)	(0.021)
Risk			0.130***	0.145***
			(0.040)	(0.041)
Socio economic controls	No	No	No	Yes
Regional controls	No	No	No	Yes
Pseudo R-squared	0.07	0.08	0.09	0.12
Number of obs.	854	854	854	854

Note: Socio-economic controls include age, having a university degree, working in the public sector, , being married, being an only child, having been at daycare as a child, parents being university educated, and income.

5. Discussion

By using the experimental design by Niederle and Vesterlund (2007), we investigate willingness to compete in a subject pool consisting of adults in three different provinces in China. Women are, on average, slightly better than men at the performance task of calculating the sum of five randomly chosen two-digit numbers. Moreover, women improve their performance significantly more than men when the task is performed as a tournament rather than with a piece-rate payment structure. Strikingly, men are still more than twice as likely to enter a tournament, i.e., to choose to compete. On average, subjects who are more confident or risk loving are more likely to choose the tournament when offered a choice, but the gender difference in willingness to enter a tournament cannot be explained by differences in risk preferences or over-confidence.

Our study contributes to and complements previous literature by investigating gender differences in a non-Western country by applying an experiment to an adult subject pool in China. As we have discussed, the Chinese case is particularly interesting to study since there are two opposing forces that might affect Chinese women´s willingness to compete. On one hand, the Chinese government has promoted gender equality for a long time and the gender gap in earnings is small in a cross-country comparison. On the other hand, China is in many respects still a patriarchal society, and some policies, notably the one-child policy, have affected gender equality negatively. The main findings from previous studies that women tend to shy away from competition are also found in our rather different setting, i.e., a country where women for many

decades have been part of the labor market to a greater extent than women in most other countries. This indicates that women´s unwillingness to compete is a robust finding across different countries and different government policies. Since China is a patriarchal society where men and boys are generally assigned a higher value than women and daughters, our results are also in line with those by Gneezy et al., (2009), who found that women were less willing to compete in patriarchal than in matrilineal societies. Thus, one possible explanation is that the patriarchal society model actually has had a stronger influence on women´s behavior than the official attempts by the Chinese government to promote women's participation in the workforce. Thus, despite a number of policies promoting women's educational attainment and workforce participation, the influence of other factors still result in stark differences between men and women when it comes to willingness to compete.

Acknowledgments

Financial support from the Center for Collective Action Research is gratefully acknowledged.

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Appendix 1. Additional tables and figures

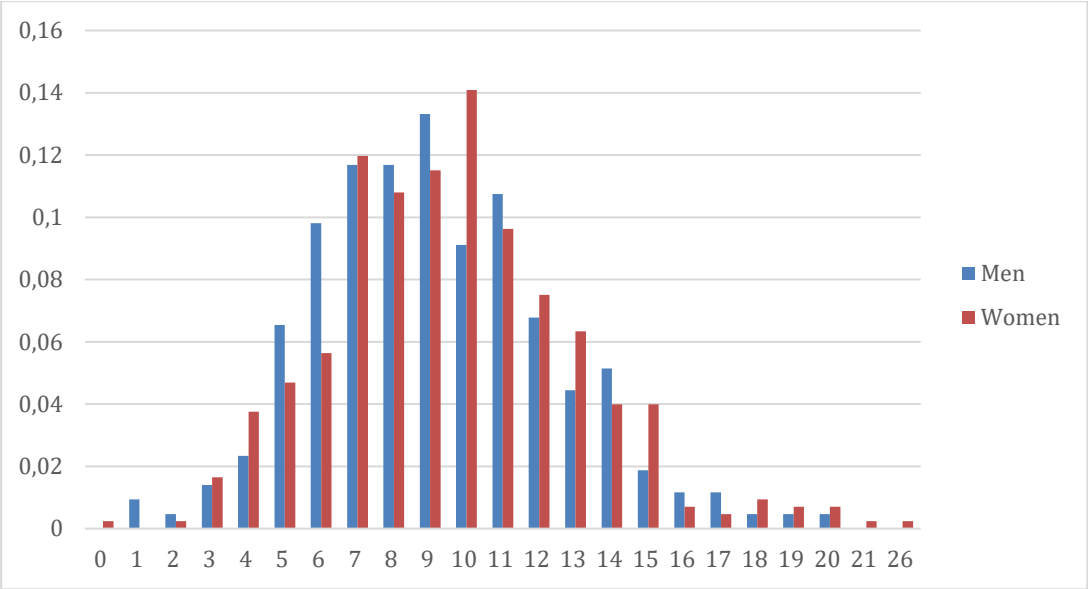

Figure A1. Distribution of performance (number of correctly solved problems) by gender under piece rate.

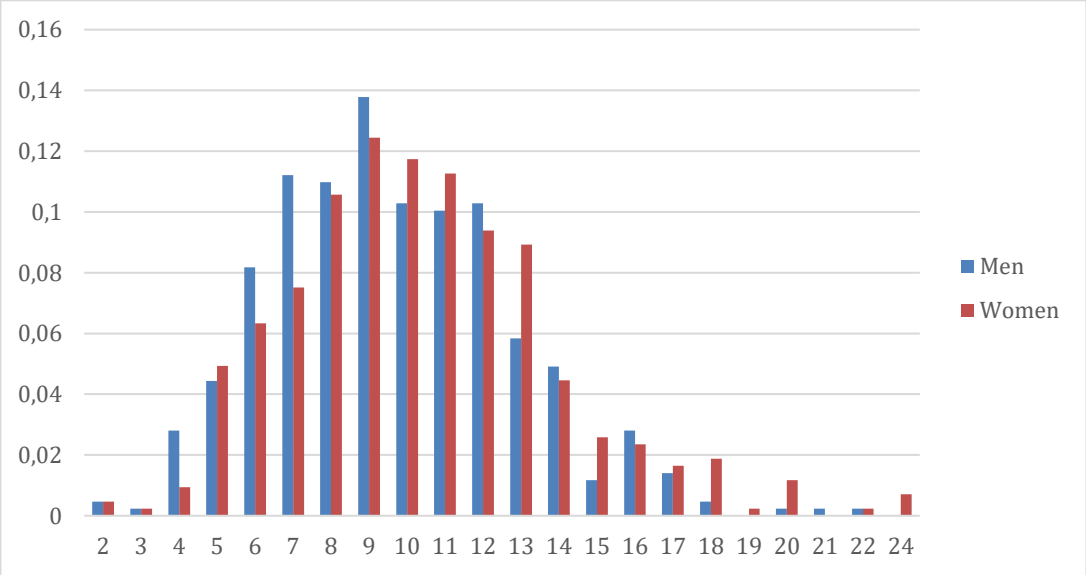

Figure A2. The distribution of performance by gender under tournament

Table A1. Average performance by gender and by province under piece rate and tournament; standard deviation in parentheses.

	Men	Women	Wilcoxon rank-sum test (p-value)
		Guilin	
Piece rate	8.926 (3.401)	9.069 (3.490)	0.644
Tournament	9.407 (3.302)	9.847 (3.364)	0.239
Difference	0.480 (0.159)	0.778 (0.155)	0.074
Number of obs.	204	203	
		Wuxi	
Piece rate	9.930 (3.053)	10.770 (3.573)	0.107
Tournament	10.320 (2.930)	11.680 (4.010)	0.021
Difference	0.390 (2.183)	0.910 (2.575)	0.130
Number of obs.	100	100	
		Lanzhou	
Piece rate	8.911 (3.291)	9.561 (3.092)	0.085
Tournament	9.516 (3.217)	10.187 (3.248)	0.071
Difference	0.605 (2.197)	0.626 (2.327)	0.596
Number of obs.	124	123	

Table A2. Regression model on risk preferences; standard errors in parentheses.

Variable	Coefficient
Female	-0.121***
	(0.028)
Age	-0.015**
	(0.005)
University degree	-0.068**
	(0.030)
Public sector	-0.0002
	(0.031)
Collective sector	0.097**
	(0.047)
Married	0.002
	(0.036)
One child	0.002
	(0.035)
Income	-0.001
	(0.003)
Parents have university degree	-0.047
	(0.033)
Wuxi	0.053
	(0.037)
Lanzhou	0.002
	(0.033)
Constant	1.758***
	(0.174)
Number of obs	854
Pseudo R-squared	0.04