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# **Gender Differences in Willingness to Compete**

**Muhammad Ahmed Nazif  
Farah Said**



**Centre for Research in Economics and Business  
Lahore School of Economics**

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## Lahore School of Economics

Intersection Main Boulevard Phase VI, DHA and Burki Road  
Lahore 53200, Pakistan  
Tel: 042-36561230; 042-36560936  
Email: [creb@lahoreschool.edu.pk](mailto:creb@lahoreschool.edu.pk)

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Lahore School of Economics  
Intersection of Main Boulevard, Phase VI, DHA, and Burki Road  
Lahore 53200, Pakistan  
Tel.: +92 42 3656 1230  
[www.creb.org.pk](http://www.creb.org.pk)  
[creb@lahoreschool.edu.pk](mailto:creb@lahoreschool.edu.pk)

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## **Preface**

The Centre for Research in Economics and Business (CREB) was established in 2007 to conduct policy-oriented research with a rigorous academic perspective on key development issues facing Pakistan. In addition, CREB (i) facilitates and coordinates research by faculty at the Lahore School of Economics, (ii) hosts visiting international scholars undertaking research on Pakistan, and (iii) administers the Lahore School's postgraduate program leading to the MPhil and PhD degrees.

An important goal of CREB is to promote public debate on policy issues through conferences, seminars, and publications. In this connection, CREB organizes the Lahore School's Annual Conference on the Management of the Pakistan Economy, the proceedings of which are published in a special issue of the Lahore Journal of Economics.

The CREB Working Paper Series was initiated in 2008 to bring to a wider audience the research being carried out at the Centre. It is hoped that these papers will promote discussion on the subject and contribute to a better understanding of economic and business processes and development issues in Pakistan. Comments and feedback on these papers are welcome.

**Since the second half of 2018 we have had issues with our regular editing services, as a result of which there has been a growing backlog of working papers that had been approved by the editorial committee. To avoid further delays in dissemination of the ongoing research, we decided to publish approved but unedited working papers online. Working paper No 03-18, December 2018 was the first such paper.**



CREB Working Paper Series

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## **Abstract**

This thesis investigates the gender difference in competitiveness using a sample of undergraduate and graduate students in a private, higher education institution in Pakistan. The study uses standard 'tournament' style incentivized experiments to measure participants' willingness to compete. We find that there is no difference in willingness to compete by gender when participants are incentivized to improve upon their own past performance or when they are competing with someone of the same gender. However, we do find a difference in the willingness to compete among male and female participants when they compete with others whose gender they do not know. These results can provide insights on the correlation between competitiveness of students and their labor market outcomes later in life. Results also indicate the type of competition that can potentially improve productivity of both men and women.



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## **1. Introduction**

Gender imbalance in labor force – participation and wage earned, is well documented in literature. In Punjab, Pakistan, three times as many men than women are employed in the labor force (Punjab Development Statistics, 2015). The gender imbalance exists in the rest of the country as well (Labor Force Survey 2013-14). Differences in education and qualification can explain part of the wage differential, (Yasin, Fani, & Yaseen, 2010). However, this gender disparity does not exist in the underdeveloped countries but in the developed world as well as the recent literature finds that females in many developed countries, with equal if not higher, educational attainment than men are disproportionately under-represented in top corporate jobs as well as in politics(Villeval, 2012). Similarly, young women are more likely than young men to have a university degree in US: 46% of women vs. 36% of men aged 25 to 34(OECD, 2012) but labor force participation rate of men aged 25 to 34 in US (88.8%) exceed that of the women(74.5%)for women of the same age (Bureau of Labor Statistics, 2016).

Villeval (2012) shows that part of the gender imbalance in labor force and politics may be due to women being less competitive than men. Studies suggest that difference in the willingness to compete may help to explain the persistent gender differences in choices of degree subjects career choices and labor market outcomes, culminating in gender differential in wages (Buser, Niederle and Oosterbeek 2014; Reuben, Sapienza and Zingales 2015; Buser, Peter and Wolter 2017, Niederle 2017). This thesis attempts to establish if a gender differential in the willingness to compete exists in a sample of randomly selected students from a higher education institution in Lahore, Pakistan. Furthermore, in this thesis we explore whether this gender differential varies by who the individual is competing against – his or her own past performance or the performance of others. This last is an important distinction as it can provide an indication of ‘healthy’ competition

– i.e. competition that encourages all to participate and improve equally, rather than prompting one group to compete while discouraging the other.

Gender difference in willingness to compete is quantified through the use of experiments validated in different studies. This study makes use of standard, validated experiments designed to measure willingness to compete. We then introduce variations to investigate if the gender difference in willingness to compete exists when a person is competing against their own past performance, other partner whose gender is not known and other partner who is of the same gender. Briefly the results we find in this paper are that gender difference in willingness to compete only exists when the partner gender is not known and in this case females are less willing to compete as compared to men.

The rest of this paper is organized as follows. Section 2 discusses relevant literature, Section 3 presents the research methodology used, Section 4 discusses the results of the study and Section 5 presents the conclusion of the paper.

## **2. Literature Review**

### **2.1 Importance of Competitiveness**

Competitiveness has the potential to determine labor market outcomes and boost performance (Gneezy, Nierdele and Rustichini, 2003). Many of the studies mentioned in this section use experimental, rather than self-reported measures of competitiveness where the competitiveness is defined as an individual's preference to be rewarded for outperforming others. These experimental measures of competitiveness use individual preference to compete with others in a series of incentivized 'tournaments' that involve a task requiring effort and very basic skills, for example, solving puzzles or simple mathematical problems. One such study with MBA

graduates found that graduates who are more competitive earn 9% more than their less competitive peers; by choosing higher paying industries at graduation and remaining in these industries for several years (Reuben, Sapienza, & Zingales, 2015). Competitive students tend to have higher earnings expectations, and with men displaying more competitiveness than women up to 18% of the gender difference in earnings expectations can be explained by gender differences in competitiveness and confidence (Reuben, Wiswall, & Zafar, 2015). Outside of labor market choices, competitiveness in lab experiments has been shown to effect investment choices in a group of small-scale entrepreneurs in Tanzania (Berge et al, 2015).

## **2.2 Gender Differential in Competitiveness**

Competitiveness has often been used to explain gender differentials in education and labor market outcomes in the developed world. A study involving secondary school students in the Netherlands concluded that boys are more likely to choose math and science intensive academic tracks (prestigious, high paying tracks) compared to girls and as much as 20% of this gender difference in track choice is explained by differences in competitiveness (Buser, Niederle, & Oosterbeek, 2014). Another study with high school students in Switzerland confirms these findings (Buser, Peter, & Wolter, 2017). The implications of these, and other studies, is that competitive individuals tend to select competitive subjects to specialize in, determining higher labor market outcomes later on in life (Joensen & Nielsen, 2009). Literature, in general, finds males to be more competitive than women

There is evidence of the gender gap in the willingness to compete even after controlling for abilities, confidence, risk preferences (Kamas & Preston, 2012) and expected performance (Niederle & Vesterlund, 2008). In addition, this gender difference in willingness to compete has been shown to develop at a young age and persist later in life (Sutter & Glätzle-Rützler, 2010).

Though the gender differential in competitiveness is well documented, evidence is scarce on why women are less competitive than men. Some possible reasons given include low levels of confidence in one's abilities and perceived norms around how men and women should behave. Evidence from a framed field experiment in Germany shows that willingness to compete among women depends on whether the competition is with other women or a mixed group. However, low levels of competitiveness can be mitigated by self-belief. Women who are confident about their ability are not concerned about the gender mix while the women who underestimate their abilities are reluctant to compete in a mixed gender setting (Burow, Beblo, Beninger, & Schröder, 2017).

Competitiveness can also be affected by whether an individual expects their efforts to be rewarded (Ali, Tatlah, & Saeed, 2011). The willingness to compete could be lower in females due to the effect that perceived discrimination has on motivation levels. For instance, Delavande & Zafar (2013) showed that in Pakistan men of lower socio-economic status discriminate against women of lower socio-economic status. This can be potentially harmful to the motivations and aspirations of women.

However, despite the reasons for gender difference in competition, literature also provides useful insights into how to reduce these gender differences. One key insight is to look at whom the individual is competing against. Most of the literature discussed above, looks at competitiveness when competing against others in a mixed gender group. I discuss literature on competition against own past performance and others of the same gender next.

### **2.3 Gender Difference in 'Self' Competition**

Experimental evidence indicates that men and women are equally motivated and competitive if rewarded against their own past performance. In a lab experiment offering participants either a fixed regular piece rate or a larger piece rates if they improve on their past

performance, men and women were found to be equally competitive, even after controlling for risk aversion and self-confidence (Klinowski, 2017). Results imply that performance pay based on self-performance can be a gender neutral way of inducing competition in incentive structures of organizations (Klinowski, 2017). These results have been validated in a framed field experiment (Bandiera, Fischer, Prat, & Ytsma., 2016).

However, to the best of our knowledge, only one study measures ‘self’ and ‘other’ competition in the same group of participants. Apicella et al (2017) use two experiments, one laboratory and one online market experiment, to investigate the gender differences in willingness to compete against one self and against others. It was seen that men are more likely to compete than women when competing against others but men and women are equally likely to compete when trying to beat their own past performance.

## **2.4 Gender Difference in ‘Same Gender’ Competition**

Literature provides mixed results on how men and women may react to competition depending on the gender of their competitors. In their seminal paper requiring university students to participate in ‘tournaments’ solving mazes, Gneezy et al (2003) find that women are less likely to compete in mixed sex groups than men but the that men and women were equally competitive against individuals of the same gender. On the other hand, a study on 9 year old children found out that boys perform better in single sex competition while girls perform worse (Gneezy & Rustichini, 2004). These results could imply that competitiveness may be a product of different settings, and that preference of competition may be influenced by gender norms and experiences.

## 2.5 Contribution to Literature

The distinction between ‘self’ and ‘other’ competition is an important one as literature shows preference to compete develops early and tends to persist. Competition can often be efficiency enhancing but can also be welfare reducing if it leads to conflict or distracts a group from performing well. Studies suggest self-competition can prompt improvement where other-completion cannot: Rewards for individual performance can encourage both men and women to improve upon their performance, potentially reducing gender gaps in earnings and career choices.

Studies focus on measuring ‘other-competition’, while measurement of ‘self-competition’ is rare (Apicella et al 2017), especially within the same sample which this study aims to do. This study not only looks at the ‘other’ and ‘self’ competition but also distinguishes between the identity of the ‘other’, using both mixed and same gender settings. This will be the first study that looks at the level of competitiveness exhibited by students in Pakistan. This thesis makes use of established experimental measures on a sample of highly educated students in a private higher education institution in Pakistan. Results of the study can help inform policy decisions to reduce inequities arising from gender differences in competitiveness as it can give us insights on how to set up employment contracts that enhance efficiency as well as welfare. If there is no difference between men and women in willingness to compete when compared to self, contracts can be designed in such a manner that the performance is compared to one’s own past performance, encouraging both men and women to compete equally and progress.

## 2.6 Research Questions

The thesis investigates three primary research questions:

1. Do gender differences exist in the willingness to improve upon past performance? That is, do men and women react differently when *competing against their own self*?

2. Do gender differences exist in the willingness to compete against others? That is, do men and women compete differently when trying to *outperform others*, when their competitor may be a man or a woman?

3. Do gender differences exist in the willingness to compete against *others of their own gender*?

The first two research questions replicate the experiment by Apicella et al (2017) for a sample of students from a private, higher education institution in Pakistan. However, the third research question brings in another dimension that has also been looked at in literature, but never in the same sample. The experiment design employed here allows us to exploit individual variation in responses.

### **3. Research Methodology**

#### **3.1 Methodology**

This thesis replicates the strategy used by Apicella, Demiral, & Mollerstrom(2017). Their measure of competitiveness using lab experiments has been widely validated in other studies (e.g., Niederle and Vesterlund, 2007). This study uses a sample of randomly selected, 153male and 146 female students at a private higher education institution in Lahore. Participants were compensated for their time and for one randomly selected activity conducted during the experiment session. The experiments were conducted in sessions of not more than 8 individuals at a time, with three different treatments **‘self’ treatment, ‘other’ treatment where partner gender is not known and ‘other’ treatment where the partner is of the same gender as the participant**. Survey questions were used to collect data on other control variables through questionnaire administered at the end of each experiment session. The experiment and surveys were conducted on tablet (using SurveyCTO).



The experiment was conducted as follows:

- In the first round, administered to everyone in the sample, participants solve a series of simple mathematical problems (sum of five <sup>1</sup>two-digit numbers) in 90 seconds and received a piece rate (Rs.100) for each correctly answered question.
- The first treatment, *'self' treatment*, was administered to the whole sample. The next two rounds were conducted as follows:
  - Round 2: Participants were asked to match their own performance in the last round. Participants will be paid double the piece rate which is the tournament rate (Rs.200) if they show an improvement in the number of questions answered correctly; otherwise receive nothing.
  - Round 3: Participants are given a choice between the 'tournament' (round 2) or piece rate (round 1) incentive. A preference for the tournament reflects willingness to compete with self.

Participants were not told about their performance after each round as it might have biased their choice in round 2 so the performance and earnings were revealed at the end of the experiment.

The two 'other' treatments – gender partner not known and when the partner is of the same gender, were randomly administered to one half of the sample each due to logistical issues related to the time respondents were willing to spend in each session (experiment + survey) and to improve understanding of the information being given in each session.

Rounds 4 and 5 in the *'other' treatment where gender partner was not known* were conducted as follows:

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<sup>1</sup>Randomly selected out of 125 pre-programmed two-digit numbers sums of equal difficulty.

- Round 4: Participants matched with an anonymous partner in a tournament. The subject in the pair with the highest correct answers is paid double the piece rate that is the tournament rate (Rs. 200) for every correctly answered problem, the other gets nothing.
- Round 5: Participants are given a choice between the ‘tournament’ (round 4) or piece rate (round 1) incentive. A preference for the tournament reflects willingness to compete with others.

Rounds 4 and 5 under ‘other’ treatment where the partner is of the same gender were conducted as follows:

- Round 4: Participants matched with a partner of the same gender in a tournament. It is possible that explicitly mentioning the gender of the partner would elicit behavior that the respondent felt the experimenter wants to see. We borrow from protocol followed by experiments, where less explicit cues of partner of the gender is provided<sup>2</sup>. In order to avoid experimenter demand from biasing response, we provided the name of the partner the respondent had been paired with rather than explicitly stating the gender.<sup>3</sup> Names were selected at random, from a list of names that are either obvious male or female names in the local context. The subject in the pair with the highest correct answers is paid double the piece rate that is the tournament rate (Rs. 200) for every correctly answered problem, the other gets nothing.

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<sup>2</sup>Banuri and Memon, 2017

<sup>3</sup> Names were used rather than mentioning that you are matched with a male or female. The intuition is that by explicitly mentioning gender, respondents may deduce that the study is about gender so they would have responded accordingly. The details of the names used are in Appendix 1

- Round 5: Participants are given a choice between the ‘tournament’ (round 4) or piece rate (round 1) incentive. A preference for the tournament reflects willingness to compete with others.

To minimize feedback between rounds, earnings were not announced till the end of the experiment. Subjects were informed they will be paid the earnings from one randomly selected activity (Self and Other or Self and Same Gender, Round 1/2/3/4/5) at the end of the activity.

The experiment was followed by a survey to elicit measures of basic demographics (gender, household income bracket, study major), confidence (incentivized ranking of own and partner performance across the rounds), risk aversion (using Binswager (1980)) & aspirations (using measure similar to Kosec & Mo, 2017). See appendix 1 for details.

Confidence and risk aversion were measured because the literature extensively uses these measures as controls when looking at gender difference in willingness to compete which intuitively makes sense as confident person would be more willing to compete whereas a risk averse person would be less willing to compete. Other than that, aspirations were measured because of intuition that more aspiring individuals would be more willing to compete as well.

The next section contains details on how the data generated from these experiments was used.

### **3.2 Empirical estimation**

Data generated from these experiments to investigate if gender differences exist in the willingness to compete across the three treatments described in section 3.1. We estimate the following regressions:

To test if competitiveness is different among men and women when improving upon past performance, we estimate:

$$WTC_{SELF,i} = \beta_0 + \beta_1 Female_i + \beta_2 Confidence_i + \beta_3 RiskPref_i + \beta_4 Aspirations + X_i + u_i \quad (iii)$$

Where  $WTC_{SELF}$  is willingness to compete exhibited by selecting the tournament rate in the ‘self’ treatment’.

We test if gender differences exist in preference to compete with self by testing the significance of the coefficient on female ( $\beta_1$ ).

To test if competitiveness is different among men and women when competing with others where partner gender is not known, we estimate:

$$WTC_{OTHER,i} = \beta_0 + \beta_1 Female_i + \beta_2 Confidence_i + \beta_3 RiskPref_i + \beta_4 Aspirations + \mathbf{X}_i + u_i \quad (i)$$

Where  $WTC_{OTHER}$  is willingness to compete exhibited by selecting the tournament rate in third round of the ‘other treatment where partner gender is not known’. *Female* is a binary variable equal to 1 if the respondent is female, *Confidence*, *RiskPref* and *Aspirations* represents survey measures of self-confidence, risk preferences and aspirations, respectively.  $\mathbf{X}$  represents vector of other controls including Age, Household Income, School Year and Performance in Round 1<sup>4</sup>. All errors are clustered at the session level.

We test if gender differences exist in preference to compete with others by testing the significance of the coefficient on female ( $\beta_1$ ).

We estimate the following regression to estimate if the willingness to compete is different among men and women when the gender of the partner is the same as the respondents’:

$$WTC_{SAME,i} = \beta_0 + \beta_1 Female_i + \beta_2 Confidence_i + \beta_3 RiskPref_i + \beta_4 Aspirations + X_i + u_i \quad (ii)$$

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<sup>4</sup> Performance in round 1 is used as a benchmark measure of ability.

Where  $WTC_{SAME}$  is willingness to compete exhibited by selecting the tournament rate in the ‘other treatment where same partner gender’. We test if gender differences exist in preference to compete with same gender by testing the significance of the coefficient on female ( $\beta_1$ ).

#### 4. Results

**Table 1: Summary Statistics by Gender**

	<b>Male</b>	<b>Female</b>		
	<b>Mean</b>	<b>Mean</b>	<b>Difference</b>	<b>P-Value</b>
Tournament Selection (Self Treatment)	0.29	0.25	0.04	0.425
Tournament Selection (Other Treatment)	0.31	0.15	0.16	0.0013
Risk Preference	2.71	2.72	-0.01	0.9451
Confidence	0.63	0.66	-0.02	0.6717
Age	20.99	20.80	0.19	0.3359
Household Income	3.00	3.23	-0.22	0.1303
School Year	2.50	2.49	0.01	0.9478

We have a total sample of 299 respondents, with 153 (51% of the sample) males and 146 (49% of the sample) females. The ‘other’ treatment where partner gender was not known was administered to a randomly selected half of the sample. Respondent ages ranges from 18 to 28 years with a mean age of 21 years. 94% of the sample were undergraduate students, 31% were enrolled in the first year. The mean household income of the sample ranged Rs. 200,000 - 400,000.

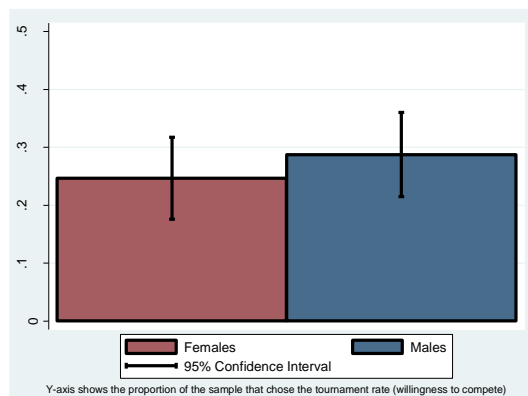
Referring to table 1, we can see that there is no difference between the male and the female sample except for in terms of the tournament selection in the other treatments. The sample overall is slightly risk averse as the risk preference variable is between 1 and 6 with 1 being extreme risk averse and 6 being extreme risk lover. Also, almost 65% of the sample was confident with their performance.

**Table 2: Balance between the two Other Treatments**

	Other Treatment (Partner Gender not Known)	Other Treatment (Same Partner Gender)		
	Mean	Mean	Difference	P-Value
Tournament Selection	0.26	0.21	0.05	0.3226
Risk Preference	2.74	2.68	0.06	0.7363
Confidence	0.61	0.68	-0.07	0.212
Age	20.75	21.05	-0.3	0.1165
Household Income	3.15	3.08	0.07	0.6415
School Year	2.29	2.69	-0.4	0.0106

Table 2 shows the balance between the samples of the two other treatments. The difference in their means is not significant for any of the variables except for the school year variable. However, this is not a problem as all of the variables are controlled for in the regressions.

If we look at the bar graphs with confidence intervals depicting the selection of the tournament rate (willingness to compete) by gender across the three treatments it is clear that the gender difference in willingness to compete only exists when competing with others (partner gender not known) as the confidence intervals do not overlap for males and females.



**Figure 1: 'Self Treatment'**

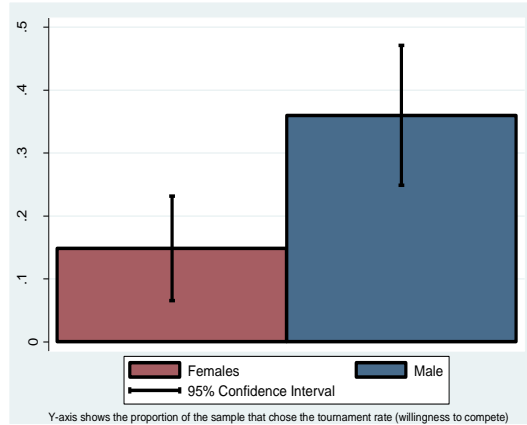


Figure 2: 'Other Treatment (Partner Gender not known)

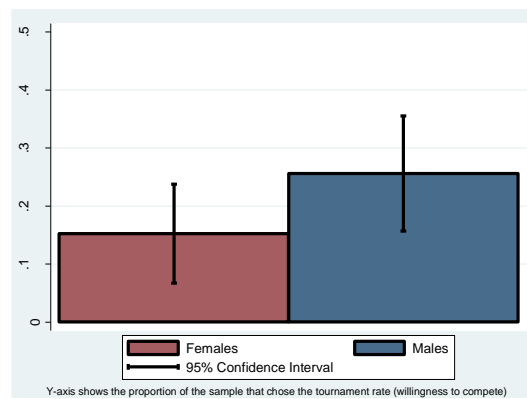


Figure 3: 'Other Treatment (Same Gender Partner)

#### 4.1 Regression Results

In the other treatment where partner gender was not known, 36% of the males chose the tournament rate whereas only about 15% of the females chose the tournament rate. This difference of 21% was the highest among all the treatments as the difference between females and males choosing the tournament rate were about 4% in the self-treatment and about 10% in the other treatment where there was same gender partner. The bar charts from the previous subsection shows these results graphically and shows that the gender difference in selecting the tournament rate (willingness to compete) is only significant for the other treatment where partner gender is not known as discussed earlier.

Regressions results clearly depict that gender difference does not exist when a person is competing against his/her own past performance and if a person is competing with someone who is of his/her own gender after controlling for risk, confidence, aspirations and other demographical characteristics. Gender difference exists when a person is competing with another person whose gender is unknown. These results are in line with what the literature states regarding gender difference in willingness to compete. Results imply that females would be as comfortable as men when competing with their own self or when competing with someone of their own gender but would not be as comfortable as men when competing with others (gender not known). The gender disparities that we see are very much a result of the discrimination being faced by females but some part of it could be that the gender disparities that exist is due to the gender difference in willingness to compete. Females being less willing to compete result in them not achieving as much as the males thus the gender disparity arising or expanding.

There are many implications of these results because it is very interesting to see that how a person's willingness to compete depending on whom they are competing with. These results are especially significant in case of females as it can help reduce gender disparities that might be there just because there are gender differences in willingness to compete. Employers can employ performance-based contracts where the person is judged with regards to their own past performance. According to these results, females would not be at a disadvantage with performance-based contracts as there is no gender difference in willingness to compete when it comes to competing with one's own self/ past performance. Projects can be assigned in a single sex group setting so that the females are more comfortable in competing and can result in enhancing the performance of female workers.



Risk and confidence is significant in all of the regressions across the three treatments except for in OLS regression of other treatment where partner gender is not known. This makes intuitive sense, and is in line with findings in literature, where risk loving and more confident individuals are more likely to compete. Respondents with greater aspirations may also be more willing to compete. We find aspirations are not significant in any of the regressions across the three treatments

**Table 3: ‘Self-treatment’**

	<b>OLS</b>	<b>Probit</b>	<b>OLS</b>	<b>Probit</b>	<b>OLS</b>	<b>Probit</b>
	<b>WTC<sub>SELF</sub></b>	<b>WTC<sub>SELF</sub></b>	<b>WTC<sub>SELF</sub></b>	<b>WTC<sub>SELF</sub></b>	<b>WTC<sub>SELF</sub></b>	<b>WTC<sub>SELF</sub></b>
<b>Female</b>	-0.041 (0.0531)	-0.1248 (0.161)	-0.0365 (0.0532)	-0.116 (0.166)	-0.0330 (0.0542)	-0.104 (0.171)
<b>Confidence</b>	-	-	0.106** (0.0487)	0.351** (0.166)	0.110** (0.0517)	0.372** (0.180)
<b>Risk</b>	-	-	0.0414** (0.0193)	0.125** (0.0570)	0.0401** (0.0178)	0.127** (0.0517)
<b>Aspirations</b>	-	-	-0.0145 (0.0113)	-0.0469 (0.0395)	-0.0139 (0.0104)	-0.0443 (0.0367)
Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1	n = 299 Without Controls	n = 299 Without Controls	n = 299 Without Controls	n = 299 Without Controls	n = 299	n = 299

Note: WTC<sub>SELF</sub> is the willingness to compete which takes on the value of one if the participant chooses tournament rate in ‘self-treatment’ (round 3) and zero otherwise. Controls include Age, Household Income, School Year and Performance in Round 1. Female is a dummy equal to 1 if the participant is a female. Confidence is a binary variable equal to 1 if the respondent believes that he/she has performed better than the person they were matched in round 4. Risk (using Binswager (1980)) & aspirations (using measure similar to Kosec & Mo, 2017)<sup>5</sup>. Errors clustered at the session level.

<sup>5</sup> Further details in Appendix 1

**Table 4: Willingness to compete in ‘other’ treatment– (partner gender not known)**

	OLS	Probit	OLS	Probit	OLS	Probit
	WTC <sub>OTHER</sub>	WTC <sub>OTHER</sub>	WTC <sub>OTHER</sub>	WTC <sub>OTHER</sub>	WTC <sub>OTHER</sub>	WTC <sub>OTHER</sub>
<b>Female</b>	-0.211** (0.0930)	-0.684** (0.286)	-0.143* (0.0812)	-0.521* (0.274)	-0.172* (0.0847)	-0.659** (0.287)
<b>Confidence</b>	-	-	0.268*** (0.0773)	1.037*** (0.281)	0.241*** (0.0742)	0.952*** (0.274)
<b>Risk</b>	-	-	0.0333 (0.0226)	0.126* (0.0763)	0.0345 (0.0223)	0.135* (0.0758)
<b>Aspirations</b>	-	-	3.93e-05 (0.00896)	-0.00721 (0.0432)	0.000384 (0.00832)	-0.00551 (0.0453)
Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1	n = 149 Without Controls	n= 149 Without Controls	n = 149 Without Controls	n= 149 Without Controls	n = 149	n = 149

Note: WTC<sub>OTHER</sub> is the willingness to compete which takes on the value of one if the participant chooses tournament rate in ‘other treatment where partner gender is not known’ (round 5) and zero otherwise. Controls include Age, Household Income, School Year and Performance in Round 1. Female is a dummy equal to 1 if the participant is a female. Confidence is a binary variable equal to 1 if the respondent believes that he/she has performed better than the person they were matched in round 4. Risk (using Binswager (1980)) & aspirations (using measure similar to Kosec & Mo, 2017)<sup>6</sup>. Errors clustered at the session level.

<sup>6</sup> Further details in Appendix 1

**Table 5: Willingness to compete in ‘other’ treatment– (same gender partner)**

	OLS	Probit	OLS	Probit	OLS	Probit
	WTC <sub>SAME</sub>	WTC <sub>SAME</sub>	WTC <sub>SAME</sub>	WTC <sub>SAME</sub>	WTC <sub>SAME</sub>	WTC <sub>SAME</sub>
<b>Female</b>	-0.104 (0.0610)	-0.370* (0.221)	-0.0753 (0.0599)	-0.434 (0.304)	-0.0696 (0.0668)	-0.426 (0.317)
<b>Confidence</b>	-	-	0.275*** (0.0630)	1.800*** (0.471)	0.259*** (0.0664)	1.725*** (0.532)
<b>Risk</b>	-	-	0.0647*** (0.0204)	0.277*** (0.0980)	0.0637*** (0.0207)	0.293*** (0.0956)
<b>Aspirations</b>	-	-	0.0195 (0.0190)	0.0627 (0.0847)	0.0168 (0.0192)	0.0648 (0.0789)
Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1	n = 150 Without Controls	n= 150 Without Controls	n = 150 Without Controls	n= 150 Without Controls	n = 150	n = 150

Note: WTC<sub>SAME</sub> is the willingness to compete which takes on the value of one if the participant chooses tournament rate in ‘other treatment where same partner gender’ (round 5) and zero otherwise. Controls include Age, Household Income, School Year and Performance in Round 1. Female is a dummy equal to 1 if the participant is a female. Confidence is a binary variable equal to 1 if the respondent believes that he/she has performed better than the person they were matched in round 4. Risk (using Binswager (1980)) & aspirations (using measure similar to Kosec & Mo, 2017)<sup>7</sup>. Errors clustered at the session level.

## 5. Conclusion

Using experimental method with a sample of 299 students studying at a private higher education institution, this study found that gender difference exists when competing with others when gender of the competitor is not known while there is no gender difference in willingness to compete when improving upon own past performance or when competing with someone of the same gender. By implication we can say that females are less willing to compete with males as there is no gender difference in willingness to compete when competing with their own gender but the difference exists when competing with others whose gender is not known.

<sup>7</sup> Further details in Appendix 1

Another interesting finding is that men are more willing to compete with others than with themselves. On the other hand, women are more likely to compete with themselves than with others, irrespective of gender of the partner. This points to some interesting patterns of behavior by each gender which also has important implications broadly as well as for women's labor market outcomes in addition to what we test in the paper – that women are less likely to compete than men with a partner of unknown gender. It seems like women think they can improve their performance more than they think they can outperform a random person of the same gender. On the other hand, men don't seem to think they can improve their performance as much as they can outperform others.

To the best of our knowledge, there is no other study that looks at willingness to compete among students in Pakistan. Results can help inform policy decisions to reduce inequities arising from gender differences in competitiveness.

Further, findings have the potential to suggest a solution to bridging the gender gap in pay and performance. Rewards for individual performance can encourage both men and women to improve upon their performance, potentially reducing gender gaps in earnings and career choices. Companies can employ performance-based contracts that can enhance female's willingness to compete and eliminate gender disparity. Firms does not have to eliminate the element of competition from their environment but rather introduce it in another way such as the performance-based contracts mentioned above where the competition of a person is with his/her own self in terms of improving upon their past performance.

Due to logistical restrictions and to avoid respondent confusion, participants were randomly selected to receive two of three treatments and so we cannot test for the difference in individual decision across all three treatments. The study is also limited by the size of the sample

- a larger sample could have helped improve precision of our results and investigate heterogeneity of results by respondent characteristics.

## Bibliography

Alan, S., & Ertac, S. (2016). Mitigating the Gender Gap in the Willingness to Compete: Evidence from a Randomized Field Experiment. *Department of Economics, University of Essex (mimeo)* .

Ali, Z., Tatlah, I. A., & Saeed, M. (2011). Motivation and student's behavior: A tertiary level study. *International Journal of Psychology and Counselling* , 29-32.

*Almost 1 in 5 Congress Members Are Women. Here's How Other Jobs Compare.* (2016). Retrieved from npr: <http://www.npr.org/2016/06/11/481424890/even-with-a-female-presumptive-nominee-women-are-underrepresented-in-politics>

Apicella, C. L., Demiral, E. E., & Mollerstrom, J. (2017). No Gender Difference in Willingness to Compete When Competing against Self. *American Economic Review* , 136-40.

Bandiera, O., Fischer, G., Prat, A., & Ytsma., E. (2016). Do women respond less to performance pay? Building evidence from multiple experiments.

Banuri, S., & Memon, R. (2017). Men don't listen: Gender and discrimination in the workplace (Working Paper).

Berge, L. I., Bjorvatn, K., Pires, A. J., & Tungodden, B. (2015). Competitive in the lab, successful in the field? . *Journal of Economic Behavior & Organization* , 303-317.

Binswanger, H. P. (1980). Attitudes toward risk: experimental measurement in rural India. *American Journal of Agricultural Economics* , 395-407.

Bureau of Labor Statistics. (n.d.). Civilian labor force participation rate. Retrieved from <https://www.bls.gov/charts/employment-situation/civilian-labor-force-participation-rate.htm>

Burow, N., Beblo, M., Beninger, D., & Schröder, M. (2017). Why Do Women Favor Same-Gender Competition? Evidence From a Choice Experiment. *DIW Discussion Paper no. 1662* .

Buser, T., Niederle, M., & Oosterbeek, H. (2014). Gender, competitiveness, and career choices. *The Quarterly Journal of Economics* , 1409-1447.

Buser, T., Peter, N., & Wolter, S. (2017). Gender, Competitiveness, and Study Choices in High School: Evidence from Switzerland. *American Economic Review* , 125-130.

Delavande, A., & Zafar, B. (2013). Gender Discrimination and Social Identity: Evidence from Urban Pakistan. *FRB of New York Staff Report No. 593* .

Gneezy, U., & Rustichini, A. (2004). Gender and competition at a young age i. *American Economic Review* , 377-381.

Gneezy, U., Niederle, M., & Rustichini, A. (2003). Performance in competitive environments: Gender differences. *The Quarterly Journal of Economics* , 1049-1074.

Joensen, J. S., & Nielsen, H. S. (2009). Is there a Causal Effect of High School Math on Labor Market Outcomes? *Journal of Human Resources* , 171-198.

Kamas, L., & Preston, A. (2012). The importance of being confident; gender, career choice, and willingness to compete. *Journal of Economic Behavior & Organization* , 82-97.

Klinowski, D. (2017). Gender and the Willingness to Compete Against Own Past Performance.

Kosec, K., & Mo, C. H. (2017). Aspirations and the Role of Social Protection: Evidence from a Natural Disaster in Rural Pakistan. *World Development* , 49-66.  
*Labor Force Survey 2013-14*. Islamabad: Pakistan Bureau of Statistics (Government of Pakistan).

Niederle, M. (2017). A Gender Agenda: A Progress Report on Competitiveness. *American Economic Review* , 115-119.

Niederle, M., & Vesterlund, L. (2008). Gender Differences in Competition. *Negotiation Journal* , 447-463.

OECD. (2012). *Closing the Gender Gap: United States*.

(2015). *Punjab Development Statistics*. Lahore: Bureau of Statistics (Government of Punjab).

Reuben, E., Sapienza, P., & Zingales, L. (2015). Taste for competition and the gender gap among young business professionals. *National Bureau of Economic Research Working Paper 21695*.

Reuben, E., Wiswall, M., & Zafar, B. (2015). Preferences and biases in educational choices and labour market expectations: Shrinking the black box of gender. *The Economic Journal* .

Sutter, M., & Glätzle-Rützler, D. (2010). Gender Differences in the Willingness to Compete Emerge Early in Life and Persist. *IZA Discussion Paper No. 5015* .

Villevall, M. C. (2012). Ready, Steady, Compete. *Science* , 544-545.

Yasin, G., Fani, M., & Yaseen, A. (2010). Determinants of gender based wage discrimination in Pakistan: a confirmatory factor analysis approach. *International Research Journal of Finance and Economics* , 177-196.



## Appendix 1: Experiment

Thank you for taking the time to be here today. Today we will conduct a few activities; these activities are being done on behalf of LSE. These activities are for research purpose only. The results of the study may eventually be published or become part of a book.

These activities will take approximately 12 mins. As a token of appreciation, we will pay you Rs. 100 for your time. If you feel you will not be able to give us 12 mins of your time, please feel free to leave. Once you decide to stay however, we would request you to please stay throughout the session.

Please indicate your gender.

- Male
- Female

What is your age (in complete years)?

How much is your monthly household income?

- <100,000
- 100,000 to 200,000
- 200,000 to 400,000
- 400,000 to 600,000
- >600,000

In which year are you?

- 1<sup>st</sup> Year
- 2<sup>nd</sup> Year
- 3<sup>rd</sup> Year
- 4<sup>th</sup> Year

- 5th Year (MBA/MPHIL)
- 6th Year (MBA/MPHIL)

You will have opportunity to earn real money. This activity has five rounds. At the end of the session, we will randomly select a round within the activity, for payment and you will be paid your earnings in that round only. We will play all rounds first and then make payments.

### **‘Self-Treatment’**

#### **Round 1**

In this round, I am going to ask you to sum a series of five two digit numbers. If you get a question right, you will be paid Rs. 100 per correctly answered question if this activity is selected for payment. However, you will only have 90 seconds to answer these questions.

#### **Round 2**

We will give you twice as much as in round 1 (rs.200) for every correct answer provided that you perform better than you did in the first round. That is, you must provide more correct answers than you did in the first round. If you do, you will win rs. 200 for every correctly answered problem! If you do not, you will get nothing!

You will have 90 seconds for this round

#### **Round 3**

Now you have the option of either choosing the paying scheme similar to round 1 or the paying scheme similar to the previous round. So your options are to get Rs.100 for every correctly answered problem or get Rs.200 for every correctly answered problem provided you perform better than your performance in the last round but if you select this option and you do not perform better than your performance in the last round, you will get nothing.

Again you will have 90 seconds to answer these questions

- get rs.100 for every correct answer

- get rs.200 for every correctly answered question provided you perform better than your performance from the last round

These three rounds were played with all 299 participants.

Half of the sample were given ‘**other treatment where partner gender is not known**’ and the other half ‘**other treatment where same gender partner**’ as two additional rounds.

**One half of the sample getting:**

**‘Other Treatment where partner gender is not known’**

**Round 4:**

In this round, you have been anonymously matched with someone else. However, I do not know who that person is and I cannot reveal that to you. We will give you twice as much as in the previous round for every correct answer provided that you outperform your partner. That is, you must provide more correct answers. If you do, you will win rs.200 for every correctly answered problem! If you do not, you will get nothing!

Again you will have 90 seconds to answer these questions

**Round 5:**

Now you have the option of either choosing the paying scheme similar to round 1 or the paying scheme similar to the previous round. So your options are to get Rs.100 for every correctly answered problem or get Rs.200 for every correctly answered problem provided you perform better than the person you were matched with in last round but if you select this option and you do not outperform the person you were matched with, you will get nothing.

Again you will have 90 seconds to answer these questions

- get rs.100 for every correctly answered questions

- get rs.200 for every correctly answered question provided you outperform the matched person from last round

**The other half of the sample getting:**

**‘Other Treatment where same gender partner’:**

**Round 4:**

In this round, you have been anonymously matched with Mr/Miss XYZ. We will give you twice as much as in the round 1 for every correct answer provided that you outperform the person you are matched with. That is, you must provide more correct answers. If you do, you will win rs.200 for every correctly answered problem! If you do not, you will get nothing!

Again you will have 90 seconds to answer these questions

Male participants were given masculine names to elicit that they are matched with a male person and females given feminine names to elicit they are matched with females.

Names used for males (Ahmad, HamzaAdil, Naveed, Ali, Abdullah, Fahad, Jawad and Talha)

Names used for females (Ayesha, Maryam, Rida, Fatima, Mahnoor, Sadia, Zainab, Khadija, Farah and Anum)

**Round 5:**

Now you have the option of either choosing the paying scheme similar to round 1 or the paying scheme similar to the previous round. So your options are to get Rs.100 for every correctly answered problem or get Rs.200 for every correctly answered problem provided you perform

better than the person you were matched with in last round but if you select this option and you do not outperform the person you were matched with, you will get nothing.

Again you will have 90 seconds to answer these questions

- get rs.100 for every correctly answered questions
- get rs.200 for every correctly answered question provided you outperform the matched person from last round

### **Confidence Measure**

(Self-Treatment) I answered more questions correctly in round 2 than I did in round 1:

- Yes (1)
- No (0)

(Both Other Treatment) If my performance is compared to that of the person I was matched to, I answered more questions correctly in round 4:

- Yes (1)
- No (0)

### **Risk Measure (Binswanger, 1980)**

- Which option do you prefer?

<b>Choice</b>	<b>Head</b>	<b>Tails</b>
<b>A</b>	<b>100</b>	<b>100</b>
<b>B</b>	<b>90</b>	<b>190</b>
<b>C</b>	<b>80</b>	<b>240</b>
<b>D</b>	<b>60</b>	<b>300</b>
<b>E</b>	<b>20</b>	<b>380</b>
<b>F</b>	<b>0</b>	<b>400</b>

A person who chose option A in our sample was the most risk averse or least risk taker while the person who chose F was the least risk averse and the most risk loving.

### **Aspirations Measure (Kosec& Mo, 2017)**

#### Household income

- What is the level of household monthly income you have at present?
- What is the level of household monthly income you would like to achieve?

#### Education

- What level of education you have at present?
- What level of education you would like to achieve?

#### Personal assets

- What is the level of personal assets (Laptop, Cellphone, etc) you have at present? (What is the approximate value of the assets you have at present)? Report in PKR"
- What is the level of personal assets (Laptop, Cellphone, etc) that you would like to achieve?

#### Social Status

- What is the level of social status you have at present among your peers?

- What is the level of social status that you would like to achieve among your peers?

$$\text{Aspirations level} = \sum_{n=1}^4 \frac{\alpha_n^i - \mu_n^g}{\sigma_n^g}$$

- $\alpha$  is the aspired outcome of individual  $i$  on dimension  $n$  (income, assets, education, or social status).
- $\mu$  is the average aspired outcome in treatment  $g$  for outcome  $n$ .
- The standard deviation of aspired outcomes in treatment  $g$  for outcome  $n$  is  $\sigma$ .

## Appendix 2: Regressions with controls

**Table 1: ‘Self Treatment’**

	OLS	Probit
	WTC <sub>SELF</sub>	WTC <sub>SELF</sub>
<b>Female</b>	-0.0330 (0.0542)	-0.104 (0.171)
<b>Confidence</b>	0.110** (0.0517)	0.372** (0.180)
<b>Risk</b>	0.0401** (0.0178)	0.127** (0.0517)
<b>Aspirations</b>	-0.0139 (0.0104)	-0.0443 (0.0367)
<b>Age</b>	0.0510** (0.0254)	0.164** (0.0768)
<b>Household Income</b>	0.0221 (0.0170)	0.0760 (0.0549)
<b>School Year</b>	-0.0425 (0.0291)	-0.137 (0.0950)
<b>Round 1</b>	0.0235 (0.0241)	0.0799 (0.0736)
<b>Constant</b>	-0.970** (0.477)	-4.682*** (1.473)
Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1	N = 299	N = 299



**Table 2: ‘Other Treatment (Partner Gender not known)’**

	<b>OLS</b>	<b>Probit</b>
	<b>WTC<sub>OTHER</sub></b>	<b>WTC<sub>OTHER</sub></b>
<b>Female</b>	-0.172* (0.0847)	-0.659** (0.287)
<b>Confidence</b>	0.241*** (0.0742)	0.952*** (0.274)
<b>Risk</b>	0.0345 (0.0223)	0.135* (0.0758)
<b>Aspirations</b>	0.000384 (0.00832)	-0.00551 (0.0453)
<b>Age</b>	-0.0405 (0.0324)	-0.159 (0.112)
<b>Household Income</b>	0.0115 (0.0288)	0.0499 (0.106)
<b>School Year</b>	0.0588 (0.0381)	0.222 (0.141)
<b>Round 1</b>	0.0474 (0.0371)	0.181 (0.124)
<b>Constant</b>	0.704 (0.683)	0.930 (2.258)
Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1	N = 149	N = 149

**Table 3: ‘Other Treatment (Same Gender Partner)’**

	OLS	Probit
	WTC <sub>SAME</sub>	WTC <sub>SAME</sub>
<b>Female</b>	-0.0696 (0.0668)	-0.426 (0.317)
<b>Confidence</b>	0.259*** (0.0664)	1.725*** (0.532)
<b>Risk</b>	0.0637*** (0.0207)	0.293*** (0.0956)
<b>Aspirations</b>	0.0168 (0.0192)	0.0648 (0.0789)
<b>Age</b>	0.0235 (0.0376)	0.146 (0.145)
<b>Household Income</b>	-0.0427 (0.0299)	-0.169 (0.153)
<b>School Year</b>	-0.0139 (0.0359)	-0.0594 (0.151)
<b>Round 1</b>	0.0474** (0.0229)	0.200** (0.0972)
<b>Constant</b>	-0.501 (0.708)	-5.723** (2.783)
Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1	N = 150	N = 150

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**Intersection Main Boulevard Phase VI, DHA and Burki Road  
Burki Lahore 53200, Pakistan**