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# Effect of Non-Monetary Incentives on Women's Competitive Inclination: Experimental evidence from Ancona, Italy

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Abstract: This study investigates how monetary incentives versus non-monetary incentives affect women's decision to enter a competitive environment. This study was conducted in Ancona Italy, in a controlled laboratory experiment with a total of 60 participants; of which 29 were male and 31 were female. Participants were given mathematical addition problems to solve under alternative incentives. How they received these incentives differed based on their preference to enter or withdraw from the competition. The study also included components that assessed risk preferences and willingness to pay for the non-monetary incentive in the experiment. Results show no significant difference in performance scores in the mathematical rounds among gender. However, there is a slight marginal difference when it comes to choosing competition when the incentives are switched from cash to a non-monetary incentive. When cash was the incentive, 41% of men chose to enter competition compared to 29% of women. When the incentive was switched to a gender salient non-monetary incentive, 45% of men chose to enter competition compared to 42% of women. Even though these differences are not statistically significant, the study suggests that women's inclination to compete increased after the incentive was switched from cash to a non-monetary gender-salient incentive.

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## 1. Introduction

Men and women differ in many facets of life. Throughout the years, advancements in society and technology have narrowed these gender differences especially in developed countries but nonetheless the gender gap in our society still remains. One notable area where gender difference is clearly evident is in the labor market. Looking into a large data set of U.S. firms, Bertrand and Hallock (2001) illustrate that women comprise about 2.5% of the five highest paid executives. A recent study looked at the absence of women in leadership roles in 21,980 different firms that are headquartered in 91 countries. This study found no women present as a board member in 60% of the firms; a little over half of these firms have no women senior executives at the corporate boards and less than 5% of these firms have a woman chief executive officer (Noland, Morand & Kotschwar, 2016). The gender gap in compensation is also significant and affects many women around the globe (Bertrand & Hallock, 2001).

Psychologists have tried to explain this gender gap mainly through the Role of Congruity Model (Eagly and Karau, 2002). This model suggests that women are perceived to be less influential in society and they are expected to operate based on these societal constraints. If they deviate away from these socially accepted roles, then that presents a loss of identity for some women. For those few women who do overcome these constraints and make it to the top positions, once they are at the top, they tend to be less favored among their peers because they are now operating in a role that is not congruent with the norm.

Other explanations for this gender gap come from behavioral economists. Within the past decade, economists have hypothesized competitiveness to be the driving force behind this gender gap. Using incentivized controlled experiments, most economists in the western world have designed several laboratory tasks that allow subjects to perform these tasks under a competitive tournament setting and a non-competitive piece-rate setting. Studies by Gneezy, Niederle and Rustichini (2003), and Gneezy and Rustichini (2004) show that when performing a laboratory task, men tend to perform better than women in a competitive setting. In addition, Eckel & Grossman (2008) found that risk aversion tends to also affect women's decision to enter a tournament, which can explain why they tend to shy away from competition as the tournament setting in these experiments involves uncertainty in payoffs. These findings are crucial in understanding the labor market because if women tend to shy away from competitive

environments, then they are less likely to take risks, ask for promotions and enter the male-dominated leadership and executive roles.

It is important, however, to note here that the incentives used in these laboratory experiments are monetary based cash incentives. In addition, competing for a cash prize could be a task that is more socially accepted for men to strive in than it is for women. Hence, if there are incentives introduced that are more attractive to women, this can further encourage their drive to equally compete with men. Besides, cash may not equally motivate women the same way it does men. Could the incentive itself have an effect in shaping men and women's competitive behavior? Would changing the incentive to a non-monetary reward that appeals more to women somehow change the outcome of these results?

The objective of this study is to find out if offering gender salient non-monetary incentives can increase women's participation in competitive environments. This study has important policy implications that encourage workforces and financial institutions to consider implementing incentives that are equally attractive to both men and women in an effort to close the gender gap that is persistent in the labor market.

This particular study was conducted in Ancona, Italy. Participants were asked to perform a math addition task under both the piece-rate non-competitive setting and the tournament competitive setting. After completing the task under both settings, subjects were given the choice to select which payment scheme they preferred. The incentives offered for these choice rounds are both monetary and non-monetary incentives. The results show that 41% of men chose to enter competition compared to 29% of women when the incentive offered was cash. However, when the incentive was switched to a gender salient non-monetary incentive, 45% of men chose to enter competition compared to 42% of women. Even though these results are not statistically significant, it shows a 13% marginal increase in tournament entry decision for women when the incentives were switched from cash to a non-monetary incentive. Risk tolerance level and willingness to pay for the non-monetary incentive were also assessed in this study and the results show no statistically significant difference among gender.

The rest of the paper is organized as follows: Section 2 reviews the relevant literature. Section 3 reviews the methodology: hypothesis, experimental design and model specifications of the research question. Section 4 reviews the results and section 5 reviews the conclusion.

## 2. Literature Review

### 2.1 *Understanding gender differences*

In order to understand why this gender gap in the labor market exists, it is imperative to look at how men and women differ when it comes social norms and how much of their behavioral difference affects their decision-making.

Bryant, et al. (2012) describes the gender roles that existed in the 19th-century Victorian era as men being the primary breadwinners and women staying at home to care for their families as well as to perform any household duties. These gender roles that have been reinforced in society for many centuries still apply as social norms today, especially in developing countries. In America, women during World War II took on more active work roles outside of the household mainly due to the men leaving to fight in the war (“A change,” 2012). Women in these work roles were not paid nearly half of what the men would make. The Women’s Policy Research in 2009 reports that “a woman makes 77 cents to every dollar that a man makes and since 1980, the gap has narrowed by 16.8 cents, showing an increase from 60.2 cents to 77 cents” (Bryant, et al., 2012).

To further explain gender inequality, Robeyns (2003) uses Amartya Sen’s (1973) capability approach, which focuses on leading a valuable life based on what each person is capable of being or doing without considering utilities, resources, and income. This approach stirred up quite a controversy among feminists because Sen’s address of gender inequality was to merely focus on the intrinsic capabilities of women rather than the means of achieving it. Robeyns created a list according to Sen’s capability approach and one of the lists he talks about is *Education and Knowledge*. This category points out that in the western world, there is equal access for girls and boys to get a formal education but gendered social norms do play a role in shaping their mindset for the future. There is more emphasis placed on the boys to get a good education, land a good secure job and be able to provide for his family. Another category of Robeyns’s list is *Domestic work and nonmarket care*, which refers to taking care of children and other dependents such as the elderly in the household. In majority of households, women are the ones caring for the children and the elderly, creating a large inequality in the household work. *Paid work and other projects* is another related category that shows a major gap affecting women negatively. Robeyns states that women, on average, tend to be less productive and efficient than men in the workplace as a result of all these work demands at home.

Furthermore, referring to studies based on European countries, Booth (2009) mentions that there are discernible gender differences when it comes to expectations of family formation and fertility. These instances tend to hold women back from attaining a higher paying position or promotion, compared to men who don't have those restrictions. Organizational sociologists also highlight that one of the indicators for a promotion at a job usually entails staying longer hours at work to exhibit dedication, which most women cannot do if they have a family at home relying on them for everything (Simpson, 1998). As a result, women in the workplace are a *riskier* option for the firms. Hence, this risk can be one of the reasons why certain women tend to have lower wages.

Chichilnisky (2009) relates this vicious circle between family (household) and the marketplace to the classical prisoner's dilemma and states that, "the Gender Gap emerges as a rational and stable Nash equilibrium". In order to balance family and work, most women also tend to get a job that allows them to work from home. An empirical study that was done among 28 different nations, mostly from Western and Latin American countries, states that women work at home about 70% more than men which can also contribute to this gender gap in compensation at the marketplace (Davis, et al., 2007). Chichilnisky states that the inequality at the workplace also leads to more inequality at home which tends to lower welfare of the family. The study further states that men who make higher salaries tend to only work in the marketplace, without any added work when they get home. On the other hand, women who work in the marketplace earn a reduced amount of salary and are also expected to do all the housework when they get home. This inequality at home becomes an externality for the firm because it reduces the productivity level of women, which impacts the firm negatively. This again leads to a vicious cycle, placing women at a disadvantage where they are overworked and underpaid. Chichilnisky refers to this as the *unfair-unfair equilibrium*, which is the Pareto-inferior<sup>1</sup> solution to the market-family game. What is the Pareto-efficient<sup>2</sup> outcome is the *fair-fair equilibrium* where men and women both share the work at home equally and get paid equally at the firm. Equal pay leads to equal share of work at home, equal share of work at home will allow both men and women to increase their productivity levels at work which creates a win-win

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<sup>1</sup> Pareto inferior is a state where resources are not distributed in an efficient manner (Vriend, 2000).

<sup>2</sup> Pareto efficient is a state where one party's outcome is not improved without making the other party's outcome worse (Martorana, 2007).



situation for both the firms and the families. However, the problem with this solution, just as in the prisoner's dilemma, refers to the risk of deviating involved from either side of the party, which can then cause them to go back to that vicious cycle of Pareto-inferior outcome.

Another reason put forth to explain why women usually do not attain the highest paying jobs is due to their lower bargaining power compared to men. Based on western studies, Booth (2009), states that women are less likely to get outside offers and as a result will settle with any offer that they are given without having the chance to bargain for their wages. It can be inferred that these occurrences can also be driven by employer discrimination. Lipman\_Blumen (1976), based on his western studies, referred to this as "homosocial" preference where individuals tend to choose their own gender without having an erotic attraction. If majority of the top executive positions are all filled by men then they might prefer to keep it that way in order to feel more comfortable. The congruity model in the psychology literature explains how perception of gender roles can be a catalyst for this continued prejudice against women in the workplace (Eagly and Karau, 2002). The model rationalizes how men are perceived more favorably to become leaders compared to women. The model further explains that when some women overcome this ceiling and obtain management positions, they tend to be favored less because these leadership positions do not fit their perceived norm in society.

## *2.2 Related experimental studies:*

Women's perceived lack of ambition when it comes to leadership roles in management and political offices is another area where gender differences are notable. Based on a study done with 60 United States companies, women, compared to men, tend to report less desire to step into senior management (Barsh and Yee, 2012). Relatedly, Preece & Stoddar (2015) conducted an experiment in a suburban area in the United States to test why there is a gender difference in political competitions. The sample was pooled from the local 2010 Republican caucus who happened to be politically active individuals and workers for the labor market. In their experiment, they offered the treatment group a message that carries a highly competitive political description in it while the control group received a natural statement that didn't have any competitive message in it. The researchers then compared the rates at which both groups inquired more information about running for office. What they found was that women compared to men, are discouraged by the competitive nature of politics and as a result are less interested in acquiring more information about running for office. A similar study conducted at University of Pittsburgh by Kanthak & Woon (2015) also found negative results on women's

desire to enter a competitive election process. In their experiment, they found that men and women do not differ when it comes to their decision to volunteer when the selection process was at random compared to the significant difference present when the selection process involves an election. In both studies, the competitive nature of politics and the election process tend to deter women from running for office.

Relatedly, in the past decade, behavioral economists have taken special interest in understanding why this gender gap in the labor market exists. Using incentivized controlled experiments, economists have mainly hypothesized level of *competitiveness*, *risk preferences* and *confidence* to be some of the main factors affecting this gender gap. A prominent study done by Niederle and Vesterlund (2007) measured the difference in level of competitiveness between genders when asked to perform a task; a task first under a noncompetitive piece-rate setting and then a competitive tournament setting where gender differences are expected to show. Using a sample of both undergraduate and non-undergraduate students at the University of Pittsburgh, the results showed that 73% of men chose to enter the competitive tournament round versus 35% of women. The researchers have found confidence level and attitude towards competition to be the possible reasons for this gender gap in tournament entry. Niederle & Vesterlund (2011) did a review of their study a couple of years later and addressed how this gender gap affects money-maximizing choices. The high ability women were not entering competition and increasing their chances of acquiring monetary gain while the low-performing men, regardless of their ability, were still choosing to enter competition which increased their likelihood of winning.

Many researchers in this field have replicated Niederle and Vesterlund's (2007) prominent study and found very similar results with one exception. Price (2010) found no significant difference in gender when it comes to choosing the tournament over the piece rate. Another difference in the replication is regarding overconfidence. Niederle and Vesterlund (2007) found 75% of men to be overconfident regarding their relative performance and ranking in the tournament as opposed to 43% of women with a p-value of 0.016. This significant gender difference in overconfidence was not found in Price's (2010) replication (p-value=0.853). Possible explanation for why the experiment did not yield the same results could be due to the gender difference at Purdue University, where the experiment was conducted, not being pronounced enough. In addition, Price's experiment was conducted only on undergraduate students whereas the original, Niederle & Vesterlund's experiment also included non-undergraduate students which has strengthened their results.

Niederle and Vesterlund (2007) used a mathematical task in their experiment because they were trying to simulate the real-world male-dominated field. A few other researchers have changed the task to see if the same results will hold. Wozniak et al. (2010) conducted the same experiment with the math task but added a word task component to it where participants, at a public university, picked a letter and formed as many words as they could starting with that letter. On the math task, the results showed the men slightly outperformed women during the piece rate payout system, showing no significant gender difference. However, under the tournament payout scheme for the math task, the gender differences are large where 31% of females chose to compete in tournaments compared to 54% of males. Men were also found to be confident in the tournament round during the math task. These results were not found in the word task. Women performed slightly better in both competitive and non-competitive settings when the task was switched from math to word but these differences were not statistically significant.

Relatedly, Datta Gupta, Poulsen & Villeval (2005) conducted a similar experiment at Lyon University in France by switching the task from solving mathematical additions to solving mazes which they found to be a gender-neutral task. In their experiment, they also revealed the gender of the opponent during the tournament round, which is opposite from most of the studies done in this area. The result of this experiment showed that 60% of men chose the tournament payout method as opposed to 34% of women. They also found risk to be a significant factor for the women who chose the piece-rate payout scheme, deterring them from competing in the tournament whereas risk did not matter for men. The study further found the gender of the opponent to be a factor in men's decision to compete but it was not a factor for women. Men tend to choose to compete when matched with a man and the same was true when they were matched with a woman because they believed that the woman also chose to compete which increased their participation in the tournament.

Vandegrift & Yavas (2009) conducted an experiment in Pennsylvania State University where they changed the task of the experiment to be a computer-based forecasting task that predicts the fictitious stock market prices. The monetary incentives offered in this experiment were based on forecasting accuracy. The rewarding systems are also similar where the piece-rate payment scheme is individual based and tournament schemes have a winner-take-all approach. The results show that men's forecasting errors were 26% (8.7 points) lower than women's. This gap is even more pronounced in the winner-take-all tournament option where men's forecasting errors were

33% (10.5 points) lower than women's. Even after controlling for forecasting skill, the results showed that men chose to enter the tournament scheme at a significantly higher rate than women.

Another important component that is addressed in this area of research is the influence of culture. Culture plays a major role in shaping men and women's identity in society and some researchers have tested how culture might impact competitive inclination among gender. Gneezy, Leonard & List (2008) did a similar experiment with the Maasai tribe in Tanzania that represents a patriarchal society<sup>3</sup> and the Khasi tribe in India that represents a matrilineal society<sup>4</sup>. The task in this experiment was to successfully toss a tennis ball into a bucket that was placed three meters away. Participants in this research were also given the option to choose which payment scheme they preferred after playing this game in both a non-competitive and a competitive setting. The findings in this research showed similar results as in Neiderle & Vesterlund's (2007) experiment for the Maasai tribe where 26% of women chose to compete compared to 50% of men. However, the reverse was found in the Khasi tribe where 54% of women chose to compete compared to 39% of men. Although not statically significant, the researchers were astonished to find that the Khasi women outcompeted the Maasai men (54% to 50%, respectively).

In addition, some studies have looked into the role that being in a single-sex group versus a coed group might have in shaping competitive and risk-taking behavior. Booth (2009) conducted an experiment in the U.K. using 10-11 year old students that came from both a single-sex school and a co-educational school. Students were randomly assigned to 3 groups: all-girls, all-boys and a mixed group. These students were given mazes to solve with real payoff that was randomly selected at the end. Their willingness to compete was measured by their decision to compete in a winner-take-all tournament or a non-competitive piece rate. Booth's results showed that, *ceteris paribus*<sup>5</sup>, the girls from the single-sex group opted to compete significantly more than the girls in the co-educational groups. The girls in the single-sex group behaved more like boys compared to the co-educational girls which is consistent with the gender identity hypothesis that suggest that there is more pressure for girls to exhibit behavior that is consistent with societal

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<sup>3</sup> Patriarchal society is a social system that places men to be superior to women (Gneezy, Leonard & List, 2008).

<sup>4</sup> Matrilineal society is a social system that places women to be superior to men (Gneezy, Leonard & List, 2008).

<sup>5</sup> *Ceteris Paribus* means all things being equal (*Ceteris Paribus*, n.d.).

expectations (Maccoby, 1998). Booth also tested the level of risk aversion of the girls in these alternative settings. The results showed that girls in the single-sex schools are equally likely to choose riskier option than the girls in the mixed gender group.

Even though the literature, based on these randomized controlled experiments, suggests that women tend to have lower desire to compete compared to men, it is important to note that the incentives used in these experiments are *cash-money*.

The value of money itself can have different meanings for both men and women. Based on a study done in American society, Prince (1992) states that the role of money for men is linked with dominance and success. This further illustrates why men are more confident in handling money and taking risks to acquire wealth. The study found that women also valued money highly but their reasons were in-line with obtaining valuable objects and experiences that can enhance their lives. The sample size used in this particular research is small and lacks diverse demographic variables however it does further validate how men and women differ in their perception of money. In addition, men having more access to financial information puts women at a disadvantage in terms of lacking knowledge of the risks involved in credit or investment strategies and as a result makes them less influential in handling money (Swamy, 2014).

My study tries to add a different perspective to these existing literature by looking at the effect of non-monetary (non-cash) incentive on women's competitive preferences.

### 3. Methodology

#### 3.1 Hypothesis

In Niederle and Vesturlund's (2007) experiment, there were four major theories that this research was based on:

- i. Men enter the tournament more than women because they like to compete.
- ii. Men enter the tournament more than women because they are more overconfident.
- iii. Men enter the tournament more than women because they are less risk averse.
- iv. Men enter the tournament more than women because they are less risk averse to feedback on relative performance.

The task of this experiment involved adding up numbers as presented below:

21	35	48	29	83	
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There was a total of three rounds in this experiment. The first round is the *piece-rate* payment scheme where every participant got paid based on the number of correct answers he or she

received. The second round is the *tournament* payout method where everyone is in competition and only the winner received payment that is higher than the amount offered during the first round; the loser in this round received nothing. The third round is a choice-round where participants made a decision to play either using the piece-rate system or the tournament system.

In my research, I am hypothesizing that women's lack of desire to compete is a result of not being offered any other incentives, outside of cash, that might be more attractive to them. If we include non-monetary incentives more valued by women, then women's decision to enter competitive environments will increase.

To test my hypothesis, I am replicating the study done by Niederle and Vesterlund (2007) by slightly modifying and adding three more rounds to the game. These added rounds will measure participant's decision to enter tournament when a non-monetary incentive is offered, and it assesses *risk preferences* and *willingness to pay* for voucher using the Multiple Price Eliciting method (MPL)<sup>6</sup>. The non-monetary incentive that was chosen in our experiment is a supermarket voucher, believed to be favored more by women.

### 3.2 *Experimental Setting*

The data for this experiment was collected in the province of Ancona, Italy during summer of 2015. There was a total of 60 participants, of whom 29 were men and 31 were women. The experiment was conducted in a total of 5 sessions. This sample included both parents and non-parents, as we wanted to see the effect of the gender-salient non-monetary incentive on all subjects regardless of their parental status. The data for this experiment was collected with the help of enumerators, who sent out invitation letters to a church group, an archery group, scout group, and schools. The invitation letters did not specify the details of the experiment. In order to control for selection bias, in each of the sessions, we introduced subjects that were external to the group. In addition, if one of the enumerators were the recruiter for the session, another enumerator who did not have any personal connections with the group was assigned to conduct the experiment.

### 3.3 *Experimental Design*

The incentivized experiment consisted of six rounds of games. At the end of the six games, participants filled out a survey. After the survey was completed, participants rolled a die to determine which of the six games they will be awarded payout for, in addition to the €10 show

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<sup>6</sup> MPL is a method that gives pairs of options for subjects to choose from thereby eliciting preferences (Anderson, 2004).

up fee. And payout was based on performance so participants were encouraged to try their best in each of the rounds. The rewards were given to participants after the games were completed and surveys were collected. The entire session lasted for about one hour and a half.

The task of the first four rounds is about solving as much math additions as possible, within three minutes of time without using a calculator. The additions are five of two-digit numbers (i.e.  $12 + 20 + 35 + 35 + 10 = ?$  ) and there were a total of 12 questions on each sheet. The fifth round had no time limit and it was intended to assess risk preferences. And the sixth game, also had no time limit, and it was intended to assess individual valuation of the non-monetary incentives (willingness to pay for supermarket voucher).

- Round 1: Piece rate payout system – participants were paid €2 for every correct answer.
- Round 2: Tournament payout system – each participant was randomly paired up with an opponent and whoever among the pair scored the highest on the questions received €4 for every correct answer whereas the opponent who scored less received nothing. If there was a tie, both subjects received €2. Participants were later asked to guess their opponents scores to measure for confidence level.
- Round 3: Choice-Money (CM) – participants were asked to choose either the “piece-rate” payout method or “tournament” payout method and they were paid out in *cash-money* according to their choices. If participants chose the tournament payout then their scores were paired with their opponents’ scores from round 2. This ensures that each subject is paired with an opponent who was performing under the same competitive condition and avoids the payoffs from influencing any other participants.
- Round 4: Choice-Voucher (CV) – participants were asked to choose the “piece-rate” payout method or “tournament” payout method and according to their choices, they were paid out in *supermarket vouchers* instead of cash. As in round 3, for those who chose tournament, their scores were compared with their opponents in round 2. The vouchers here hold the same value as the cash.

The orders of these rounds were randomized in order to avoid learned effectiveness across the sessions. The first 2 rounds always came before the next two rounds since subjects had to perform under both the competitive setting as well as the non-competitive setting before they were given the opportunity to choose which setting they preferred. Throughout all these games, participants only looked at their own scores and they were not aware of who their opponents were or how well they scored compared to them.

- Round 5: Risk preference assessment – using the MPL method, as shown in Figure 1, Option A has a higher payout than the certain payouts offered in Option B but Option A has a 50-50% chance of acquiring a higher payout. There was a total of 12 options presented to the participants. One of these 12 options were randomly selected for payment. Risk tolerance in this round is calculated by measuring the highest amount of certain cash payout for which the subject selected the lottery option (Option A) before switching over to Option B for the first time.
- Round 6: Willingness to Pay (WTP) for Voucher – The WTP for voucher here is defined as the maximum amount of certain cash the subject is willing to sacrifice to obtain the supermarket voucher. This follows a similar MPL format as shown in Figure 2. Total of 12 questions presented here as well and one option out of the 12 is randomly selected for payment. The calculation for measuring WTP for voucher is also the same as in round 5; highest value of cash payout right before subject *first* switched over to select Option B. For easier interpretation throughout this paper, I will refer to these rounds according to the order listed above even though these orders were different across the sessions.

### 3.4 Survey Design

At the end of the experiment, all participants filled out a survey that asked about subject's demographics and socio-economic status. The survey also included questions that assessed how participants viewed risk, gender perceptions in the household and an individual's perception towards patience.

### 3.5 Model Specification and Estimation Strategy

The model presented below tries to answer my research question: *Can offering gender-salient non-monetary incentive increase women's participation into a competitive environment?* Hence, I'm choosing to conduct a Probit model that allows me to see female's participation level in competitive environments in both treatments where money and supermarket vouchers are offered as incentives. I am also conducting an OLS linear model to assess willingness to compete when voucher is the incentive.

#### a) Probit Regressions

*For Choice-Money (CM) Round:*

$$Pr(CM_i = 1) = \beta_0 + \beta_1 Female_i + \beta_2 Prob.Win_i + \beta_3 Risk.Tol_i + \beta_4 Confidence + \beta_5 X + \varepsilon_i$$

CM = 1 if subjects chose to enter tournament (competition) when money is the prize (Round 3) and CM=0 otherwise. *ProbWin* is the probability of winning in the tournament round, *Risk.Tol* is



a measure of risk tolerance (Round 5) and Confidence is measured by subtracting their own score during the compulsory tournament game (Round 2) to the score they guessed their opponents received in that round. These controls are consistent with what literature suggests affects a person's decision to enter competition. I am also including a vector  $X$  that controls for age, monthly income, marital status, education level, work status and parental status. I expect the signs of these controls to be positive and the sign for female to be negative.

*For Choice-Voucher (CV) Round:*

$$Pr(CV_i = 1) = \beta_0 + \beta_1 Female_i + \beta_2 Prob.Win_i + \beta_3 Risk.Tol_i + \beta_4 Confidence + \beta_5 WTP_i + \beta_6 X + \varepsilon_i$$

CV=1 if subjects chose to enter tournament (competition) when supermarket voucher is the prize (Round 4) and CV=0 otherwise. All the other measures are similar here with the addition of WTP for voucher (Round 6). I expect the signs for all these variables to be positive with the exception of female. I'm expecting the sign for female to be negative since the results are comparing to men, but nonetheless, I expect this female coefficient to be higher than the female coefficient in the choice-money round.

The coefficient of interest in both of these regressions is the difference in  $\beta_1$  while controlling for the other variables.

#### b) OLS Regression

$$\Delta Change = \beta_0 + \beta_1 Female_i + \beta_2 Prob.Win_i + \beta_3 Risk.Tol_i + \beta_4 Confidence + \beta_5 WTP_i + \beta_6 X + \varepsilon_i$$

In order to assess willingness to compete when the treatments are switched from cash to voucher, I created a *change* variable. This *change* variable is the difference between Choice-Money round and Choice-Voucher round ( $change = choice-voucher - choice-money$ ) and takes on the values of -1, 0 or 1. If subjects chose to compete in the Choice-Voucher round (Round 4) but not in the Choice-Money round (Round 3), then the value of the change variable will be 1. If subjects decided to only compete when the treatment was cash instead of voucher, then the change variable will take on the value of -1. If subjects decided to compete in both Choice-Money and Choice-Voucher rounds, then the value of the change variable is 0.

The coefficient of interest here is  $\beta_1$ , seeing the effect of women's willingness to compete when the incentive offered is supermarket voucher only.

## 4. Results

### 4.1 *Descriptive Summary Statistics*

There is a total of 60 participants, of which 29 are male and 31 are female. For men, average age is 42, majority of them are single with 44% married, and 37% of them are parents. The

majority of the men in this sample have attained education level only up to high school with 27% attaining education more than a high school. About 48% of the men work full-time and average income is approximately €2400 per month. For women, average age is 40, majority of them are single, with 48% married. The majority of them are parents at 51% and 58% of them have an education level higher than a high school. On average, 33% of women work full-time and earn approximately €2600 a month. These results are shown in Table 1.

#### *4.2 Experimental Results*

##### Performance scores by Rounds:

In Round 1 (piece-rate), the average number of scores for females was 6.12 and 6.48 for males. In Round 2 (tournament), the average number of scores for females was 6.94 and for males, it was 7.0. In Round 3 (choice-money), females on average scored 7.26 while males on average scored 7.38 and in Round 4 (choice-voucher), females on average scored 7.16 while males on average scored 7.34. Even though, men on average scored slightly higher than women in all four rounds, using a two-sided t-test, these results showed no statistical significance ( $p=0.67$ ,  $p=0.94$ ,  $p=0.88$ ,  $p=0.81$ , respectively). Both men and women improved their scores in the choice rounds compared to the first two rounds and this may be due to learning effects of the task across the rounds. The average distribution of these performance scores is shown in Figure 3.

Furthermore, in Round 5, the risk tolerance level for female on average was 6.0 and for males, it was 5.6; this is insignificant at  $p=0.59$ . In this round, men selected option A (the riskier option) more than women did but these differences are not significant (Male=6.38, Female=6.10,  $p=0.62$ ). The results from Round 6 showed that there were no significant differences among gender (Female=7.83, Male=7.93,  $p=0.93$ ). Even though this was not significant, in this round, more females on average chose option A that only consisted of the supermarket voucher payout option (Female=7.48, Male=6.59,  $p=0.18$ ). The confidence level for females on average was -1.03 which means that at least 1 female guessed that their opponents did better than them and for men the average was 0, which means that none of the males in the sample thought that their opponent scored better than them. This was not significant at  $p=0.11$ , however the result is consistent with what the literature suggests that women tend to be less confident about their performance when placed in a competition. Average distributions of these results are shown in Figure 4.

### Tournament entry decision in Round 3 (Choice-Money) and Round 4 (Choice-Voucher):

There is a prominent difference among gender when it comes to entering competition when money is the incentive offered. As shown in Figure 5, about 41% of men chose the tournament payout method versus only 29% of females who chose to enter competition. However, this difference is not statistically significant ( $p=0.32$ ). When supermarket voucher is the incentive offered, about 45% of males chose to enter competition versus 42% of females. Again, these results were not statistically significant ( $p=0.82$ ). However, it is important to note that female participation to enter a competitive environment did increase from just 29% when cash was the incentive to 42% when supermarket voucher was the incentive.

#### *4.3 Regression Results:*

Controlling only for the variables that the literature suggests affects a person's decision to enter tournament (probability of winning, risk tolerance, confidence and the value of a voucher), the first probit regression, as shown in Table 2 (equation 4), estimates that when money is the incentive offered, females are about 18 percentage points ( $SE=0.371$ ) less likely to enter competition compared to men who have the same compulsory tournament score, risk tolerance level and confidence level. In the second set of probit regressions, as shown in Table 4 (equation 5), when supermarket voucher is the incentive offered, females have 10 percentage points ( $SE=0.345$ ) less probability of choosing to enter competition compared to males under the same controls. Even though these results are not statistically significant, it does show that the gender gap has narrowed and females' competitive inclinations have increased when the voucher treatment is introduced as the incentive.

Adding the vector that controls for background characteristics such as age, education level, monthly income, marital status, parental status, and work status, the probit regression output for the cash treatment in Table 2 (equation 5) shows that females are about 20 percentage points ( $SE=0.444$ ) less likely to enter tournament when cash is the incentive compared to men under the same controls. Again, adding the demographic variables as controls and looking at the probit regression for the voucher in Table 4 (equation 6), it shows that females are 1-percentage point ( $SE=0.432$ ) less likely to compete in a tournament compared to men under the same controls. These results are consistent with my hypothesis in terms of women's participation to compete increasing when treatment is switched from cash to voucher.

In addition, to test the rate by which women are more willing to compete in the voucher relative to the cash treatment, I pooled the data from both the treatments and tested for the

significance of the gender and voucher treatment interaction. I used individual fixed effects to control for heterogeneity across treatments, performance during tournament, confidence level, risk tolerance level and any other time-invariant characteristics. The result, as shown in Table 3, indicates that an additional unit of the female and voucher interaction term increases competition by 0.095. Even though this does not show significance, it is still a positive coefficient indicating an increase in competition.

Furthermore, for the change variable in willingness to compete, the results show that for men, about 83% of them decided to compete in both rounds; 7% only competed when cash was the treatment and 10% competed only when voucher was the treatment. For women, 62% of them competed in both rounds; 12% of them only competed when cash was the treatment and 26% of them only competed when voucher was the incentive. Although these differences are not statistically significant ( $p=0.52$ ), the results show that more women decided to enter the tournament when supermarket voucher was the incentive offered. These results are shown in Figure 6.

Using this change variable, I did a linear OLS regression to see the effect that being a female has on entering competition only when voucher is the incentive offered. I also added the controls suggested by literature having an impact on competition entry decision (probability of winning compulsory tournament, risk tolerance level and confidence level) along with demographic controls. On Table 5 (equation1), the results show that females compared to males are 9.5 percent ( $SE=0.136$ ) more likely to compete when voucher is the incentive offered. In the second equation, the results show that females compared to males are 3.8 percent ( $SE=0.152$ ) more likely willing to compete when voucher is the incentive, after controlling for probability of winning the tournament, risk tolerance level and confidence level. As shown in equation 3, this number for female goes up to 8 percent ( $SE=0.185$ ) more likely to compete compared to males in this sample after adding demographic controls in the regression. Even though these coefficients are not large and significant, they do show a positive correlation that suggests that female participation to compete has increased only when voucher was the incentive offered.

## 5. Conclusion

In order to understand why gender gap exists in the workplace, it is crucial to look into gender differences that affect behavior. The top executive and well-paid positions tend to be competitive, involve risk-taking and require confidence to attain. Men seem to qualify more for these positions than women do. Economists have conducted numerous experiments on western

societies to explain this gender gap and their findings suggest that women's lack of competitiveness might be the driving force behind this gap (Niederle and Vesturlund, 2011). In these experiments, the economists all use monetary incentives to administer the tasks, simulating a real world payoff. However, it is important to understand that competing for a task that rewards in cash could put women at a disadvantage because of possible societal beliefs that such task is more suited for men. Hence, how would the outcome of the results change if we introduced a non-monetary incentive that appeals more to women?

My results show that men and women on average do not differ substantially when it comes to their performance scores on the mathematical games (Rounds 1-4). Their risk preference and willingness to pay for voucher (Round 5-6) is not statistically different either. There was a marginal difference in women's participation to enter tournament (competition) when we offered them cash as the incentive (29%) versus when we offered them supermarket voucher as the incentive (42%). This increase in women's participation to enter a competitive environment is consistent with my hypothesis in this experiment. However, in order to conclude that my hypothesis is statistically sound, I would need to have a significant output for the females who chose to compete when voucher was the incentive offered during the experiment. Hence, in order to attain higher statistical power and lower the standard errors present, this experiment will need to be conducted further with an increased sample size and diverse group of people.

The overall results show that more women competed when we switched the incentive from cash to a supermarket voucher. This study provides insight into the effect of incentives on women and offers a different perspective to the existing literature. The study also has important policy implications for the labor market and financial institutions. These entities tend to mostly offer monetary incentives and the gender gap in these institutions is highly pronounced around the globe. In an effort to reduce this gender gap, examining the restrictions on the supply side and looking into offering gender-salient incentives and work benefits could result in positive changes for women in these entities. Restructuring the requirements for promotion such as long hours and having non-flexible schedules that might hinder some women can also help in reducing this gender gap in pay and attainment of top positions (Goldin, 2014). Implementing child-care programs that offer working mothers a subsidy can also increase women's labor force participation by freeing up time for them to attain formal employment and take on more competitive roles within their employment (Clements, et al., 2013). Clements, et al. also suggest reforms to the pension system that ensure maternity leaves do not result in lower pensions may

help in reducing early retirement for women thereby increasing their chances to make an impact at their workplace. The fight for gender equality in the labor market has come a long way and there have been tremendous improvements in our society. For the first time ever in U.S. history, four out of ten mothers are primary breadwinners and approximately two-thirds are co-breadwinners (Barbour, Brown & Shoemaker, 2011). There are also more educated and highly capable women leaders now in the 21st century than ever before. However, this fight for gender equality is far from over. It is time that women get the same opportunities as men do and receive equal pay for equal work. It is time to close this gender gap that exists in the labor market once and for all.

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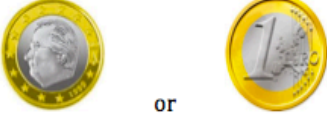

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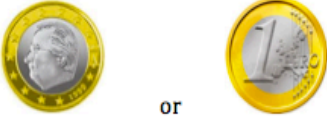

Figure 1: Risk Preference (Round 5)

1     Option A : Coin Toss                       Option B : Receive Cash

 or 

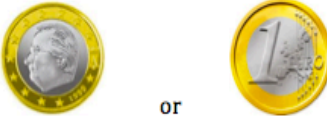

Heads = €15                      Tails = €0    €1

2     Option A : Coin Toss                       Option B : Receive Cash

 or 

Heads = €15                      Tails = €0    €2

3     Option A : Coin Toss                       Option B : Receive Cash

 or 

Heads = €15                      Tails = €0    €3

Figure 2: Willingness to pay for supermarket voucher (Round 6)

	Option A: non-cash prize	Option B: cash prize	Option chosen
			A or B?
1.	10€ supermarket voucher	1€	
2.	10€ supermarket voucher	2€	
3.	10€ supermarket voucher	3€	
4.	10€ supermarket voucher	4€	
5.	10€ supermarket voucher	5€	
6.	10€ supermarket voucher	6€	

Figure 3: Performance Mean Scores

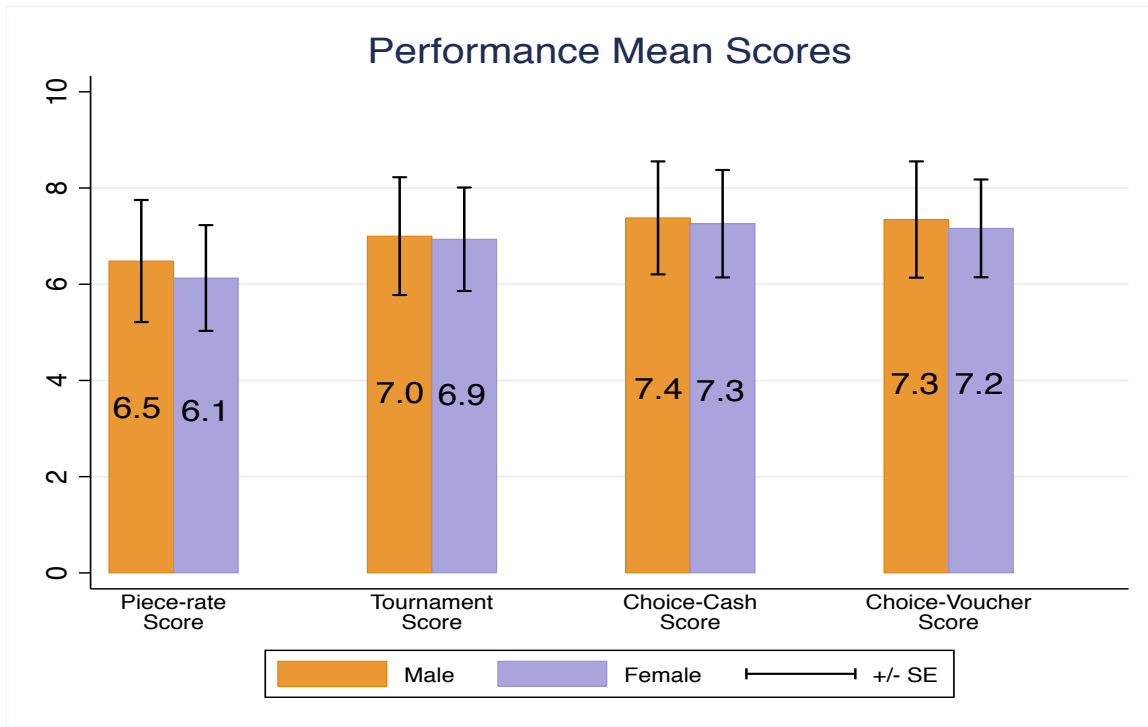


Figure 4: Preferences and Beliefs

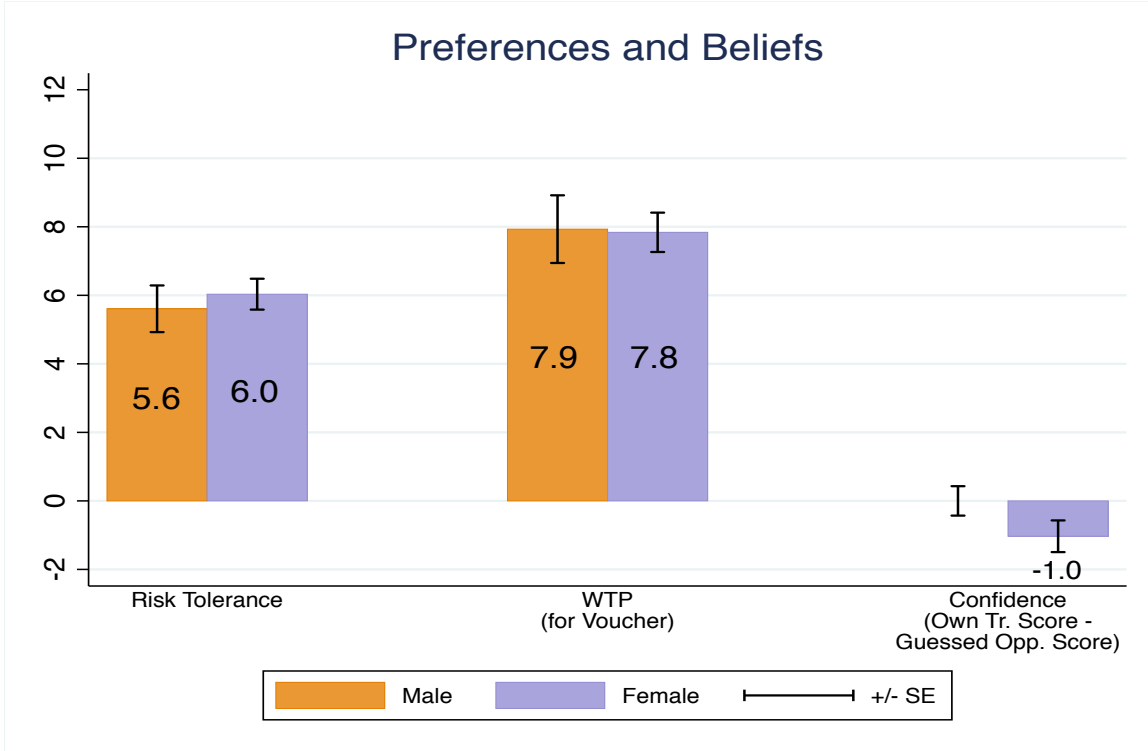


Figure 5: Decision to compete in Choice-Money and Choice-Voucher rounds

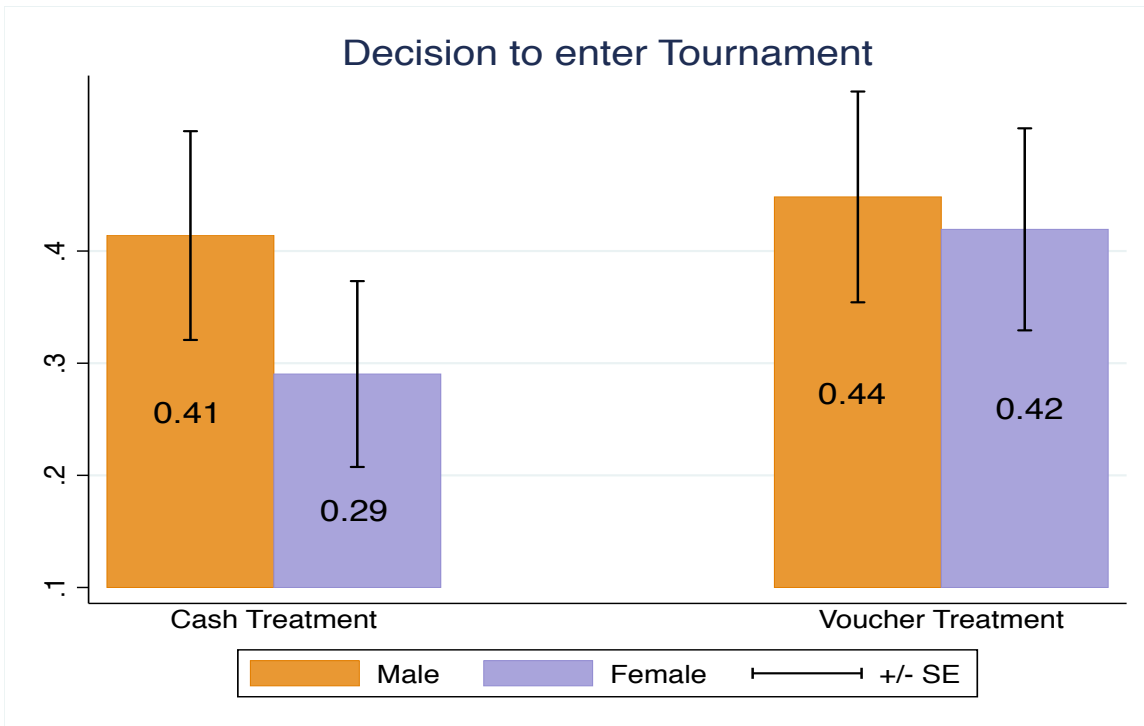


Figure 6: Change in tournament entry (Choice Voucher – Choice Money)

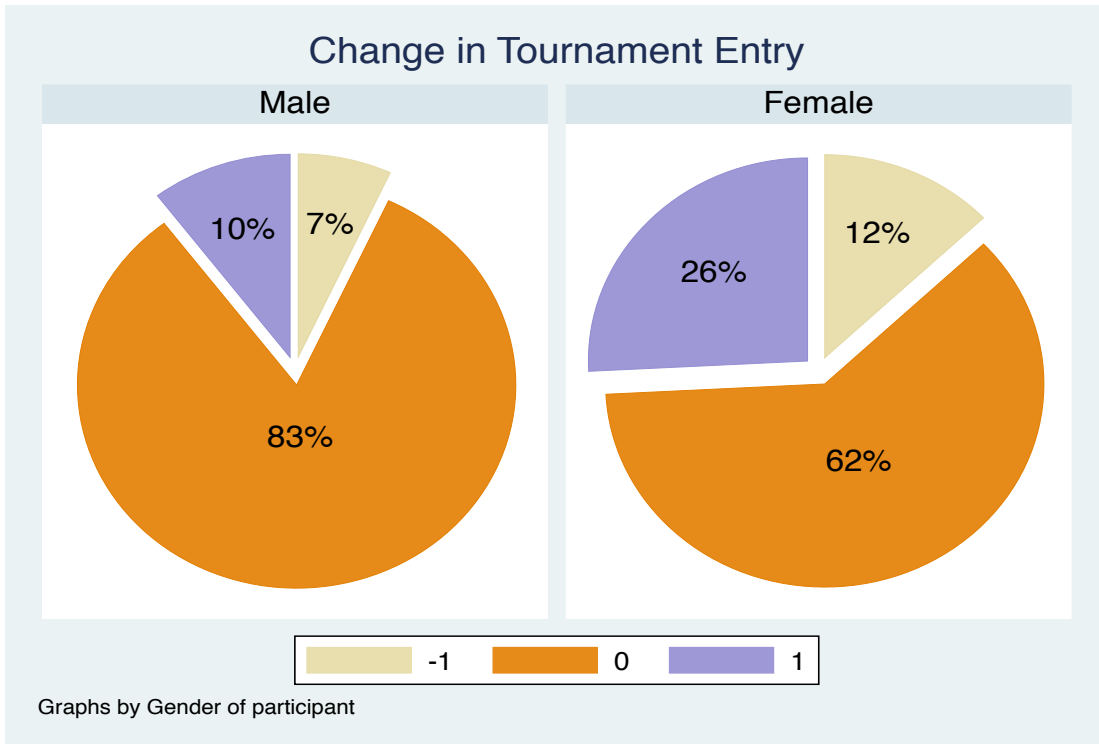


Table 1: Descriptive summary statistics  
 ---Means with standard deviation, minimum and maximum values---

VARIABLES	Male (N = 29)				Female (N = 31)			
	mean	sd	min	max	mean	sd	min	max
Age	42.03	18.89	19	75	40.23	15.16	19	65
Marital Status	0.448	0.506	0	1	0.483	0.508	0	1
Parents	0.379	0.493	0	1	0.516	0.508	0	1
Education Level	0.275	0.454	0	1	0.58	0.501	0	1
Work Status (Full time)	0.481	0.509	0	1	0.333	0.479	0	1
Monthly Income	€ 2,399	1145	0	€ 4,615	€ 2,590	1324	0	€ 6,000

Table 2: Tournament Entry – Choice Money Round (CM)  
 Dependent variable – Tournament entry decision during choice money round  
 ---Binary Probit Estimations with robust standard errors---

Independent Variables	(1)	(2)	(3)	<b>(4)</b>	<b>(5)</b>
<b>Female</b>	-0.335 (0.337)	-0.348 (0.357)	-0.340 (0.358)	-0.182 (0.371)	-0.207 (0.444)
Probability of winning (TR)		0.184*** (0.061)	0.185*** (0.061)	0.111 (0.079)	0.151* (0.091)
Risk Tolerance			0.069 (0.287)	0.076 (0.294)	0.067 (0.327)
Confidence				0.178 (0.108)	0.111 (0.110)
Age					0.009 (0.018)
Marital Status					-0.269 (0.598)
Parent					-0.460 (0.586)
Education Level					-0.346 (0.441)
Work Status					-0.375 (0.445)
Monthly Income					0.000 (0.000)
Constant	-0.218 (0.237)	-1.541*** (0.504)	-1.438** (0.657)	-0.930 (0.744)	-1.206 (1.070)
Observations	60	60	60	60	57
CM = 1 if subjects choose tournament					
CM = 0 otherwise					
Robust standard errors in parentheses					
*** p<0.01, ** p<0.05, * p<0.1					

Table 3: Tournament entry decision specified as panel with treatment interaction

Dependent variable – Tournament entry decision

---OLS on Pooled Panel with robust standard errors and individual fixed effects---

Independent Variables	(1)	(2)
Voucher treatment	0.083 (0.069)	0.034 (0.078)
<b>Female × Voucher treatment</b>		0.095 (0.136)
Constant	0.350*** (0.034)	0.350*** (0.034)
Observations	120	120
R-squared	0.025	0.032
Number of ID	60	60
Dependent Variable=1 if subjects choose to enter competition Dependent Variable =0 otherwise		
Column 2: Main effect of women is absorbed by individual fixed effects		
Robust standard errors in parentheses		
*** p<0.01, ** p<0.05, * p<0.1		



Table 4: Tournament Entry – Choice Voucher Round (CV)  
 Dependent variable – Tournament entry decision during choice voucher round  
 ---Binary Probit Estimations with robust standard errors---

Independent Variable	(1)	(2)	(3)	(4)	(5)	(6)
<b>Female</b>	-0.074 (0.328)	-0.067 (0.336)	-0.054 (0.338)	-0.071 (0.343)	-0.103 (0.345)	-0.018 (0.432)
Probability of Winning (TR)		0.125** (0.057)	0.128** (0.057)	0.136** (0.077)	0.157** (0.079)	0.206** (0.093)
Risk Tolerance			0.118 (0.279)	0.117 (0.279)	0.032 (0.302)	0.169 (0.349)
Confidence				0.015 (0.097)	0.037 (0.100)	0.067 (0.108)
Willingness to Pay (voucher)					0.087** (0.041)	0.103** (0.052)
Age						-0.023 (0.019)
Marital Status						-0.381 (0.677)
Parent						0.456 (0.517)
Education Level						-0.929** (0.437)
Work Status						-0.302 (0.451)
Monthly Income						-0.000 (0.000)
Constant	-0.130 (0.235)	-1.014** (0.475)	-0.847 (0.636)	-0.930 (0.731)	-0.620 (0.730)	0.518 (1.037)
Observations	60	60	58	58	58	55

CV = 1 if subjects choose tournament

CV = 0 otherwise

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 5: Change = Choice Voucher (CV) – Choice Money (CV)  
 Dependent variable – Tournament entry decision across choice voucher & choice money rounds  
 ---OLS Estimations with robust standard errors--

Independent Variable	(1)	(2)	(3)
<b>Female</b>	0.095 (0.136)	0.038 (0.152)	0.080 (0.185)
Probability of winning (TR)		0.015 (0.032)	0.008 (0.034)
Risk Tolerance		0.015 (0.108)	0.036 (0.139)
Confidence		-0.053 (0.042)	-0.046 (0.047)
Willingness to pay (voucher)		0.016 (0.013)	-0.015 (0.017)
Age			-0.009 (0.006)
Marital Status			-0.049 (0.195)
Parent			0.255 (0.210)
Education Level			-0.170 (0.189)
Work Status			0.063 (0.152)
Monthly Income			-0.000 (0.000)
Constant	0.034 (0.078)	0.036 (0.299)	0.521 (0.404)
Observations	60	60	57
R-squared	0.008	0.061	0.142

Change = 1 if subjects chose to only compete during CV  
 Change = 0 if subjects chose to compete during both rounds  
 Change = -1 if subjects chose to only compete during CM  
 Robust standard errors in parentheses  
 \*\*\* p<0.01, \*\* p<0.05, \* p<0.1