Team competition: Eliminating the gender gap in competitiveness*

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Abstract

Recent experimental results indicate that women do not like competitive environments as much as men. This paper presents an experimental design giving participants the opportunity to enter a tournament as part of a team rather than alone. While a large and significant gender gap in entry in the Individual Tournament is found in line with the literature, no gender gap is found in entry in the Team Tournament. Women do not enter the tournament significantly more often when it is team-based but men enter significantly less when they are part of a team rather than alone. Changes in overconfidence as well as in risk, ambiguity and feedback aversion and the difference in men's and women's taste for competition all account for part of the disappearance of the gender gap in tournament entry. A remaining explanation is that men, and more precisely, high-performing dislike the uncertainty about their teammate's ability more than women. The results suggest that men's distaste for the Team Tournament is mainly caused by high-performing men not wanting to help a less deserving participant get higher payoffs.

Keywords: Teams, Gender Gap, Tournament

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1 Introduction

The existence of a gender gap in income and social positions in the American and European labor markets is a well known and well documented fact. [1] The wage gap increases for highly educated workers as one moves up the distribution, as shown by De la Rica et al. (2008). Using a sample composed of a large group of US firms, Bertrand and Hallock (2001) found that only 2.5% of the executives in their sample were women. Such a well documented fact has received various explanations [2]

The present paper tackles one particular explanation for the gender gap: a difference between genders in the taste for performing in competitive environments. For instance, Fox and Lawless (2004) showed that women who share the same personal characteristics and professional qualifications as men express significantly lower levels of political ambition to hold elective office.

Experimental economics has proved to be a useful tool for studying gender differences in the propensity to enter competitive environments, as it enables one to study the competitive behavior of participants in a real-effort exercise while carefully controlling for potential explanations. The core idea is to compare subjects' choices between a remuneration scheme which does not imply competition, i.e. a piece rate, and one that does, i.e. a tournament. Variations in the protocol are used to disentangle the respective explanatory power of alternative explanations. Participants thus have to make successive choices in slightly different environments. An important contribution along this line is Niederle and Vesterlund (2007). Their main result is that women choose to enter the tournament far less often than men, resulting in a male-dominated pool of entrants. [3] More precisely, low-performing men enter the tournament too often while high-performing women do not enter enough, when taking payoff-maximizing choices into consideration. These results show that a substantial gap remains after adding controls for all expected effects such as overconfidence and risk and ambiguity aversion. This residual gap is labeled as a difference between genders in the taste for performing under the pressure of competition. It is worth wondering whether men

[1] See Anker (1998) among the numerous references on the subject

[2] See for example Goldin and Rouse (2000), Altonji and Blank (1999)

[3] See *"Do Women Shy Away From Competition? Do Men Compete Too Much?"* (Niederle and Vesterlund, 2007), *"Male and Female Competitive Behavior: Experimental Evidence"* (Gupta et al., 2005) and *"How Costly is Diversity? Affirmative Action in Light of Gender Differences in Competitiveness"* (Niederle et al., 2008)

are more competitive than women per se or if what was thought of as being a gender gap in the taste for competition actually conceals other explanations. For instance, men's greater taste for competition may depend on the type of competition.

The results of Niederle and Vesterlund (2007) raise two concerns. Firstly, reducing the gender gap in social positions is socially desirable. Secondly, from a welfare perspective, competitive environments do not succeed in attracting the best performers. It would therefore be advisable to urge highly able women to enter competitions more often while discouraging men of low ability to do so.

This paper explores the team competition as a way of reducing the gender gap in tournament entry and getting the best performers to self-select into the competition. Indeed, when they have the option, people often choose to engage in competition with a colleague rather than alone. One can think for instance of academic publication where papers are often co-authored or of invitations to tender which frequently oppose several teams, each representing a firm. Numerous experimental results suggest that the decision-making process may be more efficient among teams than for individuals: teams are faster learners than individuals (Cooper and Kagel, 2005, Kocher and Sutter, 2005), they take more risks when it enables them to get higher expected earnings (Rockenbach et al., 2007) and they play closer to the predictions of game theory (Luhan et al., 2009, Bornstein and Yaniv, 1998). However, as other experimental results point towards less efficiency of groups in comparison with individuals (Cason and Mui, 1997, Cox and Hayne, 2006), it is not straightforward to predict how the team membership will affect subjects' willingness to compete. One of the main question is whether the team tournament will do a better job of attracting the best candidates into the competition than the individual tournament.

There are several canals through which the competition being team-based rather than individual may affect differently men and women's competitive behavior. Men and women's confidence in their chances of winning the tournament as well as their risk and ambiguity aversion might be affected in a different way. Men and women may also react differently to the fact that, when belonging to a team, one's payoffs are influenced by one's teammate's performance and one's performance influences one's teammate's payoffs. Finally, men and women may experience mod-

ifications in their taste for competition (for instance, women may come to like competition more as part of a team or men may not enjoy it as much).

The notion of team used in the present paper is the most simple one so as not add more complexity: a team is composed of two teammates who perform separately without knowing the identity of their teammate. Being part of a team to compete may have an effect on one's willingness to enter the competition. This intuition is supported by a growing literature in experimental economics which shows that group membership greatly affects individual behaviors. Chen and Li (2009) show that their participants behave more altruistically with an ingroup match than with an outgroup. Charness et al. (2007) show that when group membership is made salient, either by common payoffs or by letting an audience of group members watch the decision-maker, decisions tend to favor more the payoffs of the whole group and Sutter (2009) finds that, in an investment experiment, the decisions made individually by one group member are very similar to the decisions taken jointly by all the members of a team.

The present experiment may add to the findings on group membership, as participants have to decide whether or not to become a member of a team in order to enter a tournament. Comparing the effort of participants who could choose whether to be part of a team to that of participants who were forced to belong to a team, Keser and Montmarquette (2007) found that voluntary teaming significantly increases the level of effort. Having the option to be part of a team may well also have an effect on subjects' competitiveness.

The main result of the present paper is that no gender gap in entry is observed when the tournament is *team-based*, while the *individual* tournament produces a significant gender gap in line with Niederle and Vesterlund (2007) and Niederle et al. (2008), henceforth NV and NSV. Whereas women enter as often alone as when part of a team, men enter significantly less often when part of a team. Changes in overconfidence as well as in risk, ambiguity and feedback aversion and the change in the extent to which men and women like competition all account for part of the disappearance of the gender gap in tournament entry. Nevertheless, they do not explain it all. The residual explanation, once controls for all of these factors have been added, is that men, and more precisely high-performing men, dislike the uncertainty on their teammate's ability more than

women.

My results suggest that high-performing men's distaste for the team tournament comes from their not wanting to help a less deserving participant get higher payoffs. At least, high-performing men are reluctant to take the chance of losing the tournament because of a less able teammate. They seem ready to give up some of their earnings to prevent that from happening. Indeed, almost all men with an above median performance chose to enter the *individual tournament* but many of them opted out of the standard *team tournament*. To allow us to find out more clearly what caused the change in competitive behavior when the competition was team-based rather than individual, participants had one more choice to make. They had to choose between a piece rate and a specific kind of team tournament, for which the information that they will be matched with a teammate of a level close to their own is added. When confronted with these to alternatives, most high-performing men were back in the tournament.

Team Tournaments help get a gender-balanced pool of entrants, offering women equal chances of winning the competition. Nevertheless, the tournament being team-based negatively affects the quality of the pool of candidates as high-performing men do not enter the team tournament. Team competition thus does not allow to get the best performers to self-select into the competition. A way of achieving *both* an equal representation of genders among entrants and a good quality of the pool of competitors is to assure participants that they will be matched with someone of about the same ability as their own if they choose to enter the team tournament.

The rest of this paper is organized as follows. Section 2 presents the experimental design. The results are given in Section 3. Section 4 studies the consequences on welfare of the type of tournament. Finally, Section 5 provides some concluding remarks.

2 Experimental Design

The experimental design builds on that of NV. The basic idea is to have participants choose a remuneration scheme between a piece rate and a tournament before they have to perform the exercise determining their payoffs. The exercise subjects were asked to perform is the same as in NV: additions of five 2-digit numbers.

Participants were told that they had to complete eight tasks of which two would be randomly chosen for payment at the end of the experiment. The remuneration schemes available (in particular the tournament being rather individual or team-based) changed between tasks and the switches in the choice to enter the tournament provided information on the reasons behind the competitive behaviors.

Teams are tricky to handle and one had to be as careful as possible not to introduce more complexity than needed in the matching process. Teams are composed of two teammates who will not know whether they are matched with a man or a woman as this may well have an impact on one's decision to enter the team tournament. Therefore, subjects have to choose whether to be paid according to a piece rate or a team tournament in which case they will win their tournament if their teammate and themselves solve more additions than their two randomly chosen opponents.

One major change of the competition being team-based rather than individual is that, in a team tournament, a subject influences her teammate's payoffs and have her teammate influence her own payoffs. In order to control for this factor on one's decision to enter the team tournament, participants also had to make a choice between a piece rate and a team tournament with a teammate of the same level. In this specific kind of team tournament, a participant knew that if she chose to enter she would be matched with a participant with a past performance close to her own. The switches in competitive behavior arising when the matching process changes provide information about the importance of knowing the level of one's teammate when choosing whether to compete.

This section first presents the different effects which needed to be controlled for before detailing the tasks participants had to go through.

2.1 What Needs to be Controlled for

The experimental design needs to allow one to disentangle the role played by several factors in explaining the change in the gender gap in entry when the tournament becomes team-based. In order to avoid making the design even more complicated than it already needs to be, the notion of team I selected is the most simple one: two teammates who would not be aware of the identity of their teammate or of that of their opponents. This way, the effect of the gender of one's teammate

or opponents on the decision to enter the tournament does not have to be taken into account. Every potential effect of the team tournament had then to be listed before an appropriate way to control for it was found.

First of all, the tournament being team-based rather than individual changes one's expected payoff from entering the tournament for each level of performance. Nevertheless, as the probability changes in the exact same way for men or women, it is unlikely that this change of probability might cause a reduction in the gender gap in tournament entry.

Secondly, NV and NSV found a significant gender gap in overconfidence. It could be the case that overconfidence about one's team chances of winning the tournament differs from overconfidence about one's chances to win the individual tournament. Tajfel (1970) discovered that groups formed on the basis of almost any distinction are prone to ingroup bias. Within minutes of being divided into groups, people tend to see their own group as superior to other groups. It could be the case that men and women differ in how they are affected by this ingroup bias. Women could for example be more optimistic than men about their teammate's performance.

Thirdly, being part of a team could have a different effect on men's and women's ambiguity, risk or feedback aversion. Teams and individuals do not have the same risk preferences. Shupp and Williams (2007) found that the variance of risk preferences is generally smaller for groups than individuals and the average group is more risk averse than the average individual in high-risk situations, but groups tend to be less risk averse in low-risk situations. Rockenbach et al. (2007) showed that compared to individuals, teams accumulate significantly more expected value at a significantly lower total risk. Being part of a team may have a different impact on men's and women's risk preferences. Women could, for example, be less risk averse as part of a team than alone.

Fourthly, in a team competition one's performance influences one's teammate's payoffs and one's payoffs are influenced by one's teammate's performance. For instance, if my teammate is worse than I am, it will lower both my probability of winning the tournament and my payoff if we do win. Charness and Jackson (2009) explore play between groups where one member of each 2-person group dictates the play of that group and is therefore responsible for the payoff of the other group member. They find that a substantial part of the population plays a less risky strategy when

choosing for a group than when playing only for themselves. Again, men and women may react differently to this responsibility issue.

Lastly, the taste for competing might change depending on whether one is part of a team or alone. Niederle and Vesterlund (2007) found that, after controlling for differences in overconfidence, risk, ambiguity and feedback aversion, the gender gap in tournament entry was not entirely accounted for. They label the residual explanation as a gender difference in the taste for performing in a competitive environment. The fact that the tournament is no longer an individual one could have a different impact on men's and women's thrill or fear of competition. Indeed, a literature interested in gender differences in economic decisions (Eckel and Grossman, 1998, 2001, 2008, Ortmann and Tichy, 1999) finds that women tend to be more socially-oriented and less individually-oriented than men as well as more cooperative and less selfish. If team competition succeeds in wiping out the gender gap in the taste for competition, it could lead to a reconsideration of the idea that men are more competitive than women per se. The following subsection presents the tasks the participants had to go through and explains how they allow one to control for the effects listed in the present subsection[4].

2.2 The Tasks

At the end of each task, participants were informed of their absolute performance (the number of additions they correctly solved) but were not informed of their relative performance until the end of the experiment. Participants received instructions on a task only immediately before completing it.

Task 1. piece rate: Participants are given the three-minute addition exercise. If Task 1 is randomly chosen for payment, they receive 50 cents per correct answer.

Task 2. individual tournament: Participants are given the three-minute addition exercise. If Task 2 is chosen for payment, the subject receives 1 euro per correct answer if she solved more additions than her randomly chosen opponent, otherwise she receives nothing.

[4]See Table 9 in Appendix B for a synthesis of tasks and what they control for

Task 3. Choice between piece rate (PR henceforth) and individual tournament (IT henceforth): Before they perform their additions, subjects have to choose whether they want to be paid according to the piece rate (50 cents per correct answer) or the individual tournament compensation scheme. A participant who selects the tournament receives 1 euro per correct answer if her Task 3 performance exceeds the Task 2 performance of a randomly chosen opponent, otherwise she receives nothing. Subjects are competing against a competitive performance of their opponent but the decision to enter the tournament is not affected by beliefs about whether the opponent is going to enter. In addition, it allows one to rule out the possibility that a participant may not enter because she may fear to inflict losses on her opponent.

Task 3 bis. Choice between *submitting* Task 1 performance to piece rate or individual tournament: No additions to do here, the performance which will determine the payoff is the task 1 performance. If a participant chooses to submit her task 1 performance to the piece rate, she receives 50 cents times her Task 1 performance. If she chooses to submit her Task 1 performance to the individual tournament, she receives 1 euro per addition correctly solved in Task 1 if she solved more additions than her randomly chosen opponent, otherwise she receives nothing. Task 3 bis is identical to Task 3 (in both cases the tournament is a more risky choice implying more ambiguity and subjecting the participant to feedback at the end of the experiment concerning whether she beat her opponent) except for the fact that it does not involve a future performance. In particular, the participant who chooses to submit her past performance to the tournament does not have to perform under the pressure of competition. In consequence, any change in behavior between Tasks 3 and 3 bis will be attributed to the taste for performing in a competitive environment.

Task 4. Choice between piece rate and team tournament: Subjects have to choose whether they want to be paid according to the piece rate or the team tournament. The team tournament is a two to two competition. If a participant chooses the team tournament, two opponents are randomly drawn among the other participants present in the room. One teammate is randomly drawn among the participants who chose the team tournament. [5] This implies that a subject who chooses to

[5] In the case where only one participant would have chosen the team tournament, which never happened, the teammate would have been drawn among participants who chose the piece rate. Also, if an uneven number of participants chose the team tournament, participants were paired and a teammate was randomly chosen among them whose per-

enter the team tournament knows that her teammate will have made the same choice so that both teammates will be competing at the same time against their opponents, facilitating the emergence of a team spirit. If the number of additions solved by one's team during Task 4 exceeds the number of additions solved by the opposing team during Task 2, each teammate receives 1 euro times the average score of their team. Otherwise, they receive nothing.

Task 4 bis. Choice between *submitting* Task 1 performance to piece rate or team tournament: No additions to do here, the performance which will determine the payoff is the Task1 performance. If a participant chooses to submit her Task 1 performance to the piece rate, she receives 50 cents times her Task 1 performance. If she chooses to submit her Task 1 performance to the team tournament, two opponents are randomly drawn among the other participants present in the room. One teammate is randomly drawn among the participants who chose to submit to the team tournament. [5] If the number of additions solved by one's team during Task 1 exceeds the number of additions solved by the opposing team during Task 1, each teammate receives 1 euro times the average score of their team. Otherwise, they receive nothing. Task 4 bis is identical to Task 4 (considering overconfidence, risk aversion and uncertainty about teammate's ability) except for the fact that it does not involve a future performance. In particular, the participant who chooses to submit her past performance to the team tournament does not have to perform under the pressure of competition. In consequence, any change in behavior between Tasks 4 and 4 bis will be attributed to the taste for performing in a team competition.

Task 5. Choice between piece rate and team tournament with a teammate of the same level (TTid henceforth): If a participant chooses the team tournament with a teammate of the same level, two opponents are randomly drawn among the other participants present in the room. One teammate is attributed from among the participants who chose the team tournament: the participant whose Task 2 performance was the closest to the participant's own Task 2 performance. If the number of additions solved by one's team during Task 4 exceeds the number of additions solved by the opposing team during Task 2, each teammate receives 1 euro times the average Task 5 score of their team. Task 5 resembles Task 4 in that the subjects have to choose between a piece rate

formance was added to the remaining participant's performance to compute the score of her team.

remuneration and a team tournament but in Task 5 the uncertainty about one's teammate's ability at solving additions (or at least part of it) is taken away. Then, assuming that learning effects are the same for men and women, if men's and women's behavior changes in a different way between Task 4 and Task 5, it will be attributed to a different reaction to the uncertainty about one's teammate's ability.

Task 5 bis. Choice between *submitting* Task 1 performance to piece rate or team tournament with a teammate of the same level: No additions to do here, the performance which will determine the payoff is the Task 1 performance. If a participant chooses to submit her Task 1 performance to the piece rate, she receives 50 cents times her Task 1 performance. If she chooses to submit her Task 1 performance to the TTid, two opponents are randomly drawn from among the other participants present in the room. One teammate is attributed from among the participants who chose the team tournament: the participant whose Task 2 performance was the closest to the participant's own Task 2 performance. If the number of additions solved by one's team during Task 1 exceeds the number of additions solved by the opposing team during Task1, each teammate receives 1 euro times the average score of their team. Otherwise, they receive nothing.

Belief-assessment Questions

A difference in confidence between men and women may explain a significant part of the gender gap in tournament entry. NV and NSV found that both men and women are overconfident but men are more so. In order to control for differences in confidence both in one's chances of winning the individual tournament and in one's team chances of winning the team tournament, participants had to answer belief-assessment questions at the end of the experiment. Participants had to guess the mean Task 1 and Task 2 performances of the participants in their session.

The participants were recalled that during Task 4 they had to choose between a piece rate and a team tournament, for which two opponents were randomly drawn from among the other participants and a teammate was randomly drawn from among the other participants who had chosen the team tournament. They were also told that even if they had chosen the piece rate at Task 4, two opponents and One teammate had still been randomly chosen in the exact same way. Their own Task 2 performance was recalled to them and participants had to guess the Task 2 performances

of their teammate and opponents chosen during Task 4. The participants were recalled that during Task 4 bis they had to choose between submitting their Task 1 performance to either a piece rate or a team-tournament, for which two opponents were randomly drawn from among the other participants and a teammate was randomly drawn from among the other participants who had chosen to submit to the team tournament. They were also told that even if they had chosen the piece rate at Task 4 bis, two opponents and one teammate had still been randomly chosen in the exact same way. Their own Task 1 performance was recalled to them and participants had to guess the Task 1 performances of their teammate and opponents of Task 4 bis. A participant knew she would earn 1 euro per correct guess.

3 Results

The experiment was run at the Parisian Experimental Economics Laboratory (LEEP) of Paris 1 University.[6] 39 men and 37 women took part in the experiment. 68 of those 76 subjects were students, among which 25 were economics majors and 9 were management majors. There were 6 sessions and the proportion of women in these sessions varied between 31% and 71%. The average participant earned 15,86 euros including a 7-euro show-up fee. This section presents the results of this experiment. It starts by studying the gender differences in performance and entry in the individual tournament, providing results in line with NV. Then the gender differences in entry in the team tournament are explored. Finally, the explanatory power of the different potential explanations for the disappearance of the gender gap in entry is investigated.

3.1 Gender Differences in Performance and in Entry in the Individual Tournament

In this subsection, I check whether there are some gender differences in performance, which was the case in NSV but not in NV. I also look at the gender gap in the individual tournament entry.

[6]Subjects were recruited through the online recruitment system ORSEE (Greiner, 2004). The experiment was computerized using the REGATE software (Zeiliger, 2000).

In the present paper, a participant in the individual tournament is the winner if she beats one opponent. This one-to-one competition could have an effect on the participants' decision to enter. In NV, one has to beat the performances of three other participants to be considered the winner of the tournament. Here, I chose to consider a one-to-one competition as a matter of simplicity since I subsequently needed to introduce teams.

Men's performances were slightly above women's. In Task 1 (piece rate), men solved 5.9 additions on average while women solved 5.6 additions. In Task 2 (tournament), men solved 7.4 additions on average while women solved 6.3 additions. These differences are not significant with a two-sided Mann-Whitney test. While men perform significantly better under the tournament than under the piece rate (a two-sided Mann-Whitney test yields p=0.04), it is not the case for women (p=0.34). After having gone through the piece rate and tournament remuneration schemes, participants have to choose which one they want to perform under for Task 3. If they choose the tournament, they will be considered the winner if they beat the Task 2 performance of their opponent. Considering the true distribution of Task 2 performances, a payoff-maximizing participant should choose the tournament if her task 3 performance exceeds 6 (see Figure **??** in the Appendix: an omniscient participant with a performance above or equal to 6 has higher expected payoffs from the individual tournament than from the piece rate). If the participant's Task 3 performance is exactly the same as her Task 2 performance, 62% of women and 67% of men have higher expected earnings from the tournament. This predicted gender gap is not significant (a two-sided Fisher's exact test yields p=0.81).

As in NV, there is a gender gap in the individual tournament entry: 51.35% of women and 84.62% of men chose to enter the individual tournament. This difference is significant with a two-sided exact Fisher's test (p=0.00). While men enter significantly more often than expected (p=0.00), it is not the case for women (p=0.65). However the gender gap in tournament entry is greater for participants with above median Task 2 performances. 50% of low performing women and 62% of low performing men chose to enter the individual tournament (a two-sided Fisher test yields p=0.70). Among high performing participants, 52% of women and 96% of men entered the tournament (p=0.00). The first logit regression of Table 1 shows tournament entry as a function of

Table 1: Logit of Tournament-Entry Decision (Task 3)

Regressors	(1)	(2)	(3)
Female	-0.29	-0.25	-0.16
	(0.01)	*(0.01)*	*(0.01)*
Perf2	0.05	0.03	0.01
	(0.04)	*(0.19)*	*(0.49)*
Guesswin		0.40	0.33
		(0.01)	*(0.04)*
Submit			0.15
			(0.01)
Observations	76	76	76

Logit regressions.
The table presents marginal effects computed at a man with a Task 2 performance of 6.86 which corresponds to the average Task 2 performance. P-values are in brackets.

the participant's gender and Task 2 performance. High performing participants tend to enter more often but controlling for performance, women enter significantly less often than men.

This gender-gap in tournament entry has several potential explanations: differences in overconfidence between men and women, differences in risk, ambiguity and feedback aversion, differences in the taste for performing in a competitive environment. We start by examining whether men are more overconfident than women, as found in NV and NSV. At the end of the experiment, participants' Task 2 performance was recalled to them and they had to guess the Task 2 performance of their teammate and opponents at Task 4. From their answer, their guessed rank was computed and the guessed ranks conditional on the actual Task 2 performance (4 levels were assigned, each corresponding to 25% of participants) were compared.

An ordered logit regression of the guessed rank yields a negative and significant ($p<0.01$) coefficient of Task 2 performance and a positive and significant effect of Female ($p=0.07$). The higher the Task 2 performance, the better the participant thinks she is, while, for a given performance, men are more overconfident than women.

The second regression of Table 1 shows that the more confident the participant is about winning (guesswin=1 if the participant's guess of the mean Task 2 performance is below her own Task 2 performance, otherwise guesswin=0), the more prone she is to enter the tournament. Adding this

control for this measure of confidence, the gender gap in tournament entry diminishes but remains significant. The difference in confidence between genders accounts for part of the gender gap in tournament entry: the fact that women are less confident than men in their chances of winning the tournament helps explain why they enter the tournament less often. Nevertheless, when controlling for Task 2 performance and beliefs about winning, women still choose to enter less often than men, meaning that the gender gap in entry is not only due to women being less able or less confident than men.

In order to also control for the role of risk, ambiguity and feedback aversion in the gender gap in tournament entry, the Task 3 bis decision to submit the Task 1 performance to either a piece rate or an individual tournament is used. Indeed, the Tasks 3 and 3 bis decisions are the same except for the fact that only in Task 3 does the participant actually have to perform in a competitive environment. In consequence, when adding the Task 3 bis decision in the regressors, any remaining gender gap will be attributed to a difference in the taste for performing under competition since Submit allows to control one more time for one's confidence in her chances to win and adds a new control for risk, ambiguity and feedbck aversion. The third regression of Table 1 shows that a participant who chooses to submit her Task 1 performance is more likely to choose to enter the individual tournament but a great and significant gender gap remains. The fact that women are more averse to risk, ambiguity and feedback than men helps explain why they enter the tournament less often since the coefficient of Female diminishes when adding the decision to submit to the regressors. Nevertheless, the residual significant gender gap must be attributed to a difference in the taste for performing in a competitive environment between genders. These results are in line with NV and NSV.

3.2 Gender Differences in Entry in the Team Tournament

As for the individual tournament, anyone with higher expected earnings from the team tournament than the piece rate should enter the team tournament. As can be seen in Figure **??** of Appendix B, this corresponds to participants with a Task 2 performance above or equal to 6. This is the case for 62% of women and 67% of men. The predicted gender gap is not significant (p=0.81).

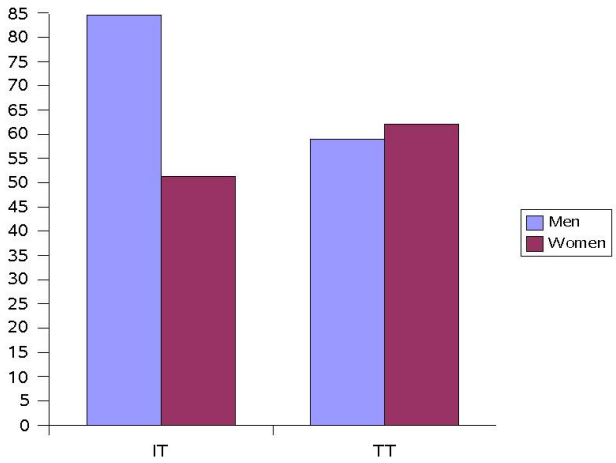

Figure 1. Proportion of male and female entrants in the individual tournament (IT) and team tournament (TT).

In line with the predictions, the data do not bring any gender gap to light: 62% of women and 59% of men chose to enter the team tournament (p=0.82). Men enter less than what is predicted by payoff maximizing choices but not significantly less (p=0.49). As can be seen in Figure 1, it appears that while women do not choose to enter the tournament significantly more often when it is team-based (p=0.48), men enter significantly less as part of a team than alone (p=0.02).

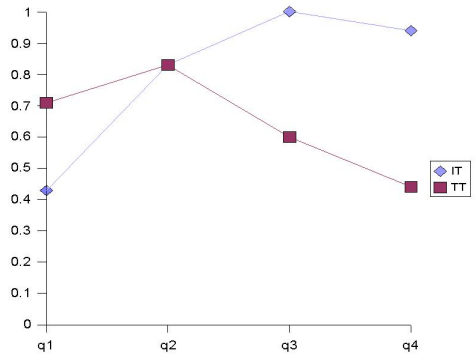

Figure 2. Proportion of men entering the individual and Team Tournaments conditional on performance level.

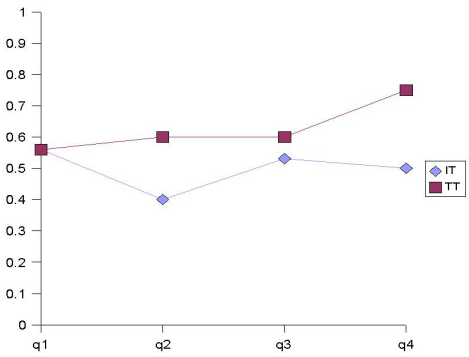

Figure 3. Proportion of women entering the individual and Team Tournaments conditional on performance level.

Figures 2 and 3 show the percentage of men and women who choose to enter the individual and team tournament conditional on their Task 2 performance level. It can be seen that when the tournament is team based, men tend to enter less often for a given probability of winning, while women seem to enter a little bit more. It is also noteworthy that the relation between the

Table 2: Logit of Tournament-Entry Decision (Tasks 3 and 4)

Regressors	Men	Women	All
Female			-0.21
			(0.00)
Female*Team			0.15
			(0.01)
Team	-0.26	0.11	-0.15
	(0.01)	*(0.32)*	*(0.01)*
Prob	0.16	0.12	0.14
	(0.45)	*(0.67)*	*(0.41)*
Observations	78	74	152

Logit regressions using clusters for each participant.
The table presents marginal effects computed at a man in the individual tournament with a 50% chance of winning the tournament. P-values are in brackets.

performance level and the team tournament entry decision is decreasing for men. The logit regression of men's decision to enter the team tournament on the probability of winning (see the Appendix for an explanation of how the probability of winning was computed) provides a negative but only marginally significant coefficient (p=0.0984). The implications of the tournament being team-based rather than individual on the pool of entrants will be discussed in Subsection 4.3.

A logit regression of the decision to enter a tournament (Task 3 and Task 4) on the probability of winning (Prob) and a team dummy (team=1 for the Task 4 decision to enter the team tournament and team=0 for the Task 3 decision to enter the individual tournament) is reported in Table 2. Even though the probability of winning is unknown to the participant, including it to the regressors allows one to compare the efficiency of the different tournaments (Does a given tournament leads the better participants to self-select into it?). As two observations were used for each participant (Task 3 and Task 4 decisions to enter each of the tournaments), a cluster on the participant was used to take into account the fact that the two decisions to enter the tournaments taken by the same individual are not independent. Conditional on the probability of winning, the fact that the tournament is team-based decreases men's propensity to enter while it has no significant effect on women's decision to enter. The probability of winning has no significant effect on either men's or women's propensity to enter. Overall, participants tend to choose less often to enter the tournament when it is team-based. The positive and strongly significant marginal effect of Female*Team shows

that when the tournament is team-based the gender gap in tournament entry is significantly reduced.

3.3 Explanations for the Changes in Tournament Entry Between the Individual Tournament and the Team Tournament

The change in the probability of winning does not provide an explanation for the reduction of the gender gap in tournament entry which arises between the individual and the team tournament, as both men and women endure the same distortion of the probability of winning. In this subsection, the roles of the other potential explanations cited in the introduction are investigated.

3.3.1 The Role of Beliefs

Confidence in subjects' chances of winning the individual tournament helped explain their decision to enter the individual tournament. In the individual tournament, men were found to be more overconfident in their chances of winning than women. It would be interesting to see whether this is also the case for the team tournament or if the gender difference in overconfidence is reversed when participants are part of a team. For instance, women could feel more confident about their chances of winning when they are paired with a teammate because they could be more optimistic than men about the performance of their teammate. In such a case, this change in beliefs would help explain the reduction of the gender gap in tournament entry. To assess for the potential explanatory power of beliefs on the disappearance of the gender gap in entry in the team tournament, we use the dummy Guesswin which equals 1 if the participant's beliefs are consistent with winning the tournament, and 0 otherwise. Remember that a participant knows her absolute performance at each task. For the individual tournament, Guesswin equals 1 if the participant thinks her Task 2 performance is above average and 0 otherwise. For the team tournament, Guesswin equals 1 if the participant thinks the sum of her Task 2 performance and her teammate's Task 2 performance exceeds the sum of their opponents'Task 2 performances.

The first regression reported in Table 3 shows that beliefs help explain men's decision to enter the tournaments. Controlling for beliefs, the coefficient of Team in men's regression is reduced showing that part of the explanation why men enter less often in the tournament when it is team-

Table 3: Logit of Tournament-Entry Decision (Tasks 3 and 4)

Regressors	Men	Women	All
Female			-0.17
			(0.00)
Female*Team			0.13
			(0.01)
Team	-0.20	0.14	-0.11
	(0.02)	*(0.29)*	*(0.01)*
Prob	-0.17	0.03	-0.03
	(0.45)	*(0.92)*	*(0.86)*
Guesswin	0.39	0.16	0.23
	(0.01)	*(0.33)*	*(0.03)*
Observations	78	74	152

Logit regressions using clusters for each participant.
The table presents marginal effects computed at a man in the individual tournament with a 50% chance of winning the tournament and with beliefs consistent with winning the tournament. p-values are in brackets.

based comes from men being less confident in their chances of winning the tournament as part of a team than alone. However, since Team remains negative and significant, it must be that other factors account for men's disaffection for the tournament when it is team-based. On the other hand, beliefs are not helpful in explaining women's decision to enter.

Overall, a participant whose beliefs are consistent with winning the tournament is 23% more likely to enter than a similar participant whose beliefs are consistent with losing the tournament. Controlling for beliefs, the effect of Female*Team decreases but remains positive and significant. The reduction of the gender gap in overconfidence which occurs when the tournament becomes team-based helps explain the disappearance of the gender gap in tournament entry, but other factors must play a role as this change in beliefs does not explain all of it.

3.3.2 The Role of the Taste for Competition.

A second factor which is likely to explain part of the disappearance of the gender gap when the tournament is team-based is the taste for competition which may be different when the type of competition changes. To control for this, the decisions to submit the Task 1 performance to the individual and team tournament are used. Indeed, the decisions to enter a given tournament and

to submit a past performance to the same tournament are very similar in every aspect, except for the fact that only when deciding to enter a tournament does the participant actually have to perform in a competitive environment. Consequently, by adding the decision to submit, one can see whether the disappearance of the gender gap occurring when the tournament is team-based is fully accounted for by changes in confidence, risk, ambiguity and feedback aversion and the reaction to the uncertainty on one's teammate's ability or if part of it is due to changes in how men and women like to perform in a competitive environment.

Table 4: Logit of submitting a past performance to a tournament (Tasks 3 bis and 4 bis)

Regressors	Men	Women	All
Female			0.00
			(0.48)
Female*Team			0.09
			(0.19)
Team	0.00	0.20	0.07
	(0.84)	*(0.16)*	*(0.87)*
Prob	-0.09	0.57	0.24
	(0.76)	*(0.12)*	*(0.25)*
Guesswin	0.27	-0.05	0.06
	(0.07)	*(0.75)*	*(0.47)*
Observations	78	74	152

Logit regressions using clusters for each participant.
The table presents marginal effects computed at a man in the individual tournament with a 50% chance of winning the tournament and with beliefs consistent with winning the tournament. p-values are in brackets.

Table 4 presents the logit regression of the decision to submit Task 1 performance to the tournament. Decisions to submit both to the individual and to the Team Tournaments are used. It can be seen that neither for men nor for women is the coefficient of Team significant, showing that the fact that the tournament is team-based rather than individual does not influence the decision to submit to a tournament. In particular, men are not less likely to submit a past performance to a tournament when it is team-based, while they choose to enter a tournament significantly less as part of a team than alone. In the pooled regression, Female*Team is not significant, showing that the fact that the tournament is team-based does not help reduce the gender-gap in submission to the tournament. It must be that changes in men and women's taste for competition must play a role

in explaining the disppearance of the gender gap when the tournament is team-based.

In the logit regressions presented in Table 5 the decision to submit Task 1 performance was added to the regressors to explain the decision to enter the tournament. For both men and women, the decision to submit to the tournament helps explain the decision to enter the tournament. Such is also the case in the pooled regression where it can be seen that compared with someone who decided not to submit, an otherwise similar participant who did submit has a 27% higher chance of entering the tournament.

Table 5: Logit of Tournament-Entry Decision (Tasks 3 and 4)

Regressors	Men	Women	All
Female			-0.09
			(0.00)
Female*Team			0.06
			(0.02)
Team	-0.11	0.12	-0.05
	(0.00)	*(0.60)*	*(0.00)*
Prob	-0.06	-0.17	-0.12
	(0.77)	*(0.48)*	*(0.40)*
Guesswin	0.21	0.17	0.17
	(0.02)	*(0.22)*	*(0.01)*
Submit	0.25	0.27	0.27
	(0.00)	*(0.00)*	*(0.00)*
Observations	78	74	152

Logit regressions using clusters for each participant.
The table presents marginal effects computed at a man in the individual tournament with a 50% chance of winning the tournament, with beliefs consistent with winning the tournament and who submitted his Task 1 performance to the tournament. P-values are in brackets.

When adding this new control, men still react negatively to the fact that the tournament is team-based but less so. This suggests that changes in men's confidence and risk, ambiguity and feedback aversion as well as their reaction to the uncertainty on their teammate's ability help explain why they do not enter the team tournament as often as they did the individual tournament. Indeed, adding the decision to submit to the regressors allows to control for every factor that may affect the decision to enter a tournament except for a change in the taste for competition. The fact that the coefficient of Team becomes less negative in men's regression therefore indicates that, when the tournament is team-based rather than individual, the fact that men are less confident, more

risk, ambiguity and feedback averse and/or react negatively to their not knowing the ability of their teammate help explain the elimination of the gender gap in tournament entry. Nevertheless, as the coefficient of Team remains negative and significant, another factor must play a role in men's disaffection for the team tournament: men do not enjoy performing in a competitive environment as much when it is a team competition.

As for women, the coefficient of Team has decreased but remains positive and significant showing that women must experience more confidence, less risk, ambiguity and feedback aversion in the team tournament than in the individual tournament and/or they enjoy not knowing the level of their teammate, but it is not enough to explain all of their extra attraction to competition when it is team-based which is partly due to the fact that they come to like competition more when they are part of a team.

In the pooled regression the coefficient of Female*Team is largely reduced when the decision to submit is added to the regressors, but it remains positive and significant. Part of the disappearance of the gender gap in tournament entry is due to a reduction in the gender difference in confidence, risk attitude and to the fact that men dislike ignoring the ability of their teammate more than women. Nevertheless, a part of this disappearance remains unexplained which is accounted for by a reduction of the gender gap in the taste for competition.

3.3.3 The Role of Uncertainty About One's Teammate's Ability.

The effect of one last factor has to be controlled for: the taste for influencing one's teammate's payoffs and for having one's teammate influence one's own payoffs.

In order to do so, the Task 5 decision to enter the team tournament with a teammate of the same level (TTid) is used in addition to the Task 3 and 4 decisions. The Task 5 decision resembles the Task 4 decision (team tournament) except for the fact that the uncertainty about the level of one's teammate in the addition addition (or at least part of it) is removed, since the participant knows that if she enters the tournament she will be matched with a teammate whose Task 2 performance is close to her own. Consider a participant who chooses not to enter the Task 4 team tournament but does enter the Task 5 team tournament with a teammate of the same level. One will be able to

Table 6: Logit of Tournament-Entry Decision (Tasks 3 and 4)

Regressors	Men	Women	All
Female			-0.06
			(0.00)
Female*Team			0.06
			(0.02)
Team	-0.10	0.17	-0.03
	(0.00)	*(0.53)*	*(0.01)*
Prob	-0.06	-0.09	-0.12
	(0.77)	*(0.66)*	*(0.41)*
Guesswin	0.20	0.10	0.14
	(0.00)	*(0.36)*	*(0.03)*
Submit	0.24	0.14	0.22
	(0.00)	*(0.04)*	*(0.00)*
IdPartn	0.02	0.22	0.10
	(0.81)	*(0.20)*	*(0.25)*
Observations	78	74	152

Logit regressions using clusters for each participant.
The table presents marginal effects computed at a man in the individual tournament with a 50% chance of winning the tournament, beliefs consistent with winning the tournament, who submitted her Task 1 performance to the tournament and chose to enter the team tournament with a teammate of the same level. p-values are in brackets.

infer that the reason why this participant does not like the Task 4 team tournament is because of the uncertainty surrounding her teammate's level. [7]

In the regressions presented in Table 6 the dummy IdPartn equals 1 when the participant chose to enter the team tournament with a teammate of the same level (Task 5) and 0 otherwise. The introduction of IdPartn in the regressors leaves the coefficient of Team almost unchanged in men's regression, suggesting that men's distaste for the uncertainty about their teammate's ability explains why their taste for competition decreases when it is team-based. Indeed, adding Idpartn to the regressors should clear the coefficient of Team of everything other than the uncertainty about one's teammate's level that may cause men to dislike team competition. As for women, as the coefficient of Team increases (a bit) when IdPartn is added to the regressors, it seems that the tournament being team-based makes them like competition more.

In the pooled regression, the introduction of IdPartn leaves the coefficient on Female*Team

[7] Obviously, since Task 5 is completed after Task 4, order effects can play a role, but it seems reasonable to assume these order effects would be the same for men and women.

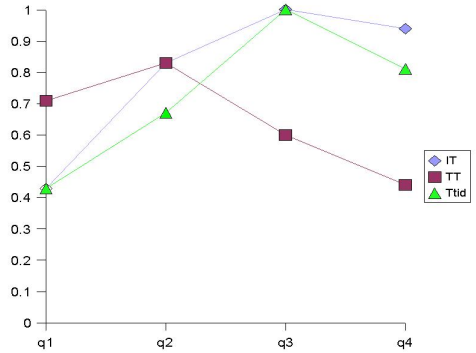

Figure 4. Proportion of men entering the tournaments conditional on performance level.

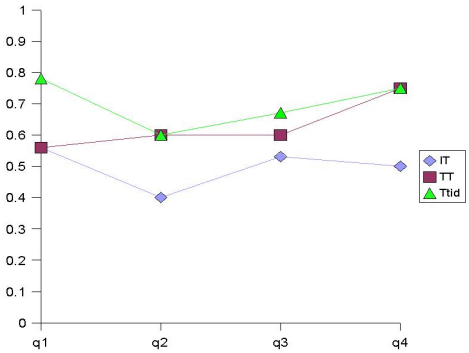

Figure 5. Proportion of women entering the tournaments conditional on performance level.

unchanged. It must therefore be that the gender gap in how men and women dislike the uncertainty on their teammate's ability is a huge driving force of the disappearance of the gender gap in tournament entry.

Table 7: Logit of Tournament-Entry Decision (Tasks 3 and 4)

Regressors	Men	Women	All
Female			-0.06
			(0.00)
Female*Team			0.04
			(0.04)
Team	0.13	-0.04	0.15
	(0.07)	*(0.87)*	*(0.69)*
Prob	0.40	-0.11	0.09
	(0.17)	*(0.69)*	*(0.62)*
Guesswin	0.27	0.09	0.17
	(0.00)	*(0.37)*	*(0.02)*
Submit	0.21	0.16	0.21
	(0.00)	*(0.04)*	*(0.00)*
IdPartn	0.02	0.22	0.11
	(0.90)	*(0.21)*	*(0.21)*
Prob*Team	-0.95	0.04	-0.60
	(0.01)	*(0.95)*	*(0.05)*
Observations	78	74	152

Logit regressions using clusters for each participant.
The table presents marginal effects computed at a man in the individual tournament with a 50% chance of winning the tournament, with beliefs consistent with winning the tournament and who submitted his Task 1 performance to the tournament. P-values are in brackets.

Looking more closely at which men and women self-select into the different kinds of tourna-

ments, it seems that it is mainly high-performing men who run away from the team tournament when they do not know the level of their teammate. Indeed, Figures 4 and 5, show that high-performing men choose massively to enter the individual tournament (96% of above median male performers enter the individual tournament) and the team tournament with a teammate of the same level (88%) but a lot of them choose the piece rate when proposed a standard team tournament (50%). As for women, they seem to enter a little bit more whatever their performance level when the tournament is team-based. Furthermore, whether they know something about the ability of their teammate does not much change their propensity to enter.

In order to confirm this intuition, I ran a logit regression presented in Table 7 adding the interaction term Prob*Team. The results of the regressions of Table 7 suggest that the disaffection of men for the team tournament is widely caused by high-performing men. Indeed, in men's regression, the coefficient of Prob*Team is negative and highly significant and the coefficient of Team increases to become positive once Prob*Team is added to the regressors. It indicates that high-performing men would rather lose part of their payoffs by choosing the piece rate than take the chance of maybe helping a less deserving participant get higher payoffs by entering the team tournament. At least, men seem unwilling to risk losing the tournament because of a low-performing teammate. In the pooled regression, the coefficient of Prob*Team is negative and significant. Furthermore, the coefficient of Female*Team is reduced by one third and the coefficient of Team becomes positive and no longer significant. This tends to prove that the reduction of the gender gap in tournament entry when the tournament is team-based rather than individual is mainly attributable to high-performing men.

4 Consequences on Efficiency of the Type of Competition.

The introduction of the team tournament was successful in wiping out the gender gap in tournament entry. It is obviously essential to closely study the consequences of the team tournament on other aspects in order to weigh up the pros and cons. This section studies the consequences of the type of tournament on participants' payoffs as well as on the pool of entrants and its quality, i.e. the performance of those who choose to enter. It enables one to draw some conclusions on the

implications of the choice of a type of competition for both contestants and recruiters.

A question crucial to our interest is how the type of tournament influences the quality of the pool of entrants. Figure 6 represents the percentage of participants who chose to enter each of the three tournaments conditional on Task 2 performance level. Compared with the individual tournament, more low-performing and fewer high-performing participants choose to enter the team tournament. This obviously affects the average performance of the entrants, even though the difference in performance between the entrants of the individual and team tournament is not significant (p=0.18 for the two-sided Mann Whitney test and p=0.09 for the one-sided test). On the other hand, the proportion of entrants of each performance level in the TTid is similar to the proportion of entrants in the individual tournament.

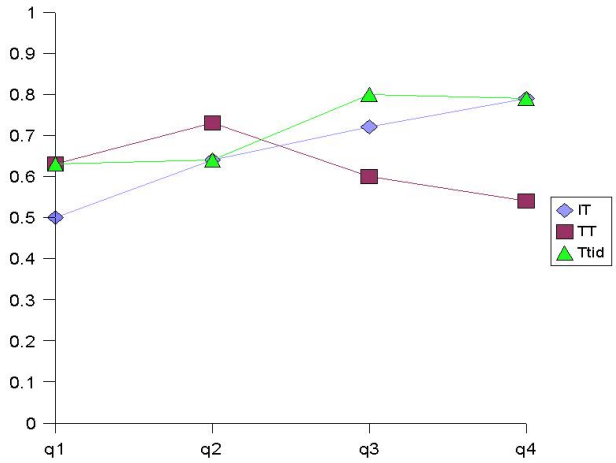

Figure 6. Proportion of entrants in the tournaments conditional on performance level.

Figures 7 and 8 show respectively the average performances and payoffs of male and female entrants in the three kinds of tournament. Men's performances are slightly higher than women's (except for the team tournament where male and female entrants are of the same level) but not significantly so. We can observe a decrease of men's performance when the tournament becomes team-based which is, however, not significant. It may be due to men shirking when part of a team, but it may also be caused by the selection effect (numerous high-performing men opt out of the team tournament while they entered the individual tournament). Female entrants' performance, on the other hand, is very stable across tournaments. In consequence, the fact that the tournament is

team-based does not negatively affect the quality of the female pool of entrants. Still, the average performance of entrants is lower under the team tournament (6.48) than under the individual tournament (7.48). Men's performance goes up again when participants know that they will be matched with a teammate of the same level.

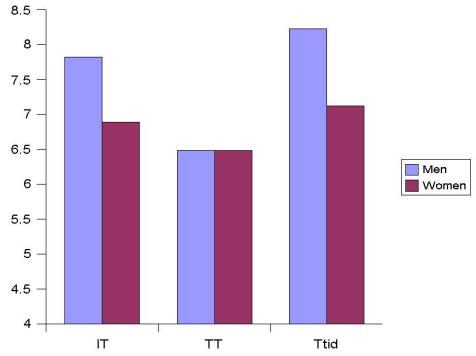

Figure 7. Performance (number of additions correctly solved) of male and female entrants in the three tournaments.

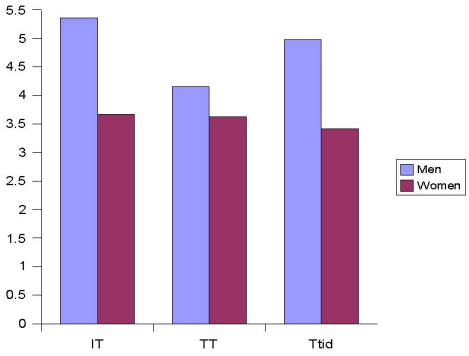

Figure 8. Payoffs (in euros) of men and women for the three tournaments.

In order to check whether male entrants' average performance is lower under the team tournament than under the individual tournament because of shirking behaviors or because of a selection bias, I ran a Heckman's two-step estimation. I first look at what determines the decision to enter the tournament using a Probit model. Then, conditional on that decision, the (task 2) performance is explained with an OLS model corrected for the selection bias. The results of the first regressions were already discussed earlier. The secong regression of table 8 suggests that participants do not lower their effort when engaged in the team tournament. Indeed, there is no significant drop in performance of candidates to the team tournament in comparison with candidates to the individual tournament. I can therefore rule out shirking as an explanation for the decrease in performance of male entrants between the individual and the team tournament. The remaining explanation is the selection effect due to high-performing men shying away from the tournament when it is team-based and they do not know anything about their teammate's ability. The fact that the inverse mill's ratio (Lambda) is highly significant shows that controlling for the selection bias was necessary.

As for payoffs, the gender payoff gap is marginally significant for the individual tournament and the team tournament with a teammate of the same level (p=0.11 each time with a two-sided Mann-Whitney test) but it is far from being significant (p=0.33) for the team tournament. The

Table 8: Heckman two-step regression model with sample selection for dependent variable Perf2 (task 2 performance)

	Regressors	Coefficient	p-value
Tournament-entry decision			
	Intercept	0.46	0.15
	Female	-1.01	0.00
	Team	-0.84	0.01
	Female*Team	1.17	0.01
	Guesswin2	0.74	0.00
Observations		152	
Perf2			
	Intercept	9.25	0.00
	Female	1.63	0.21
	Team	1.26	0.27
	Female*Team	-2.31	0.15
	Lambda (IMR)	-5.8	0.00
Observations		98	

disappearance of the gender gap in payoffs occuring in the team tournament comes nevertheless with a cost, as men undergo a decrease in their payoffs while women's payoffs remain stable (due to high-performing men not entering the tournament when it is team-based). It is then worth wondering whether this dumbing down of payoffs is too high a price for gender equality. Notice that providing information about one's teammate's ability is enough to see men's payoffs go up again, increasing in turn the gender payoff gap.

To sum up, the team tournament allows to obtain a gender-balanced pool of entrants and to eliminate the gender payoff gap. However, this comes at the cost of a deteriorated average performance of entrants. Under the team tournament with a teammate of the seme level, performances of both male and female contestants are at their highest levels as can be seen from Figure 7. Since, furthermore, men and women enter at similar rates (p=0.52) in this tournament, it seems to offer several attractive features.

5 Conclusion

This paper aims at studying the effect of a tournament being team-based rather than individual on the gender gap in tournament entry. The results allow a better understanding of the gender gap in competitiveness and provide a way of obtaining a gender-balanced pool of entrants. While a large and significant gender gap in entry in the individual tournament is found in line with NV and NSV, no gender gap is found in entry in the team tournament. Women do not choose to enter the tournament significantly more often when it is team-based but men enter significantly less as part of a team than alone. A first explanation is a reduction of the gender gap in overconfidence occurring when subjects are part of a team (men are less overconfident when part of a team than alone). Another explanation lies in a change in risk, ambiguity and feedback aversion: women become less risk, ambiguity and feedback averse when part of a team than alone and men become more risk, ambiguity and feedback averse. The remaining explanation is due to men not liking the uncertainty about their teammate's ability. This result is in line with Durante and Putterman (2008) who found that men, but not women, choose significantly lower taxation rates when pre-tax incomes are determined on the basis of performance in a game rather than randomly. Men seem unwilling to lower their payoffs in order to increase those of a less able participant who they may see as being less deserving.

This experiment provides a way of wiping out the gender gap in tournament entry. However, when looking more closely at the consequences on welfare aspects of the tournament being team-based, it appears that it negatively affects the quality of the pool of entrants by crowding out the high-performing men from tournament entry. High-performing men seem to be repeled by the uncertainty about their teammate's ability or by the idea that they might help a less deserving participant get higher payoffs by entering the team tournament and as a result they choose not to enter the team tournament even if it means getting lower payoffs. In turn, the average payoff of entrants decreases when the tournament is team-based. There is, nevertheless, a way of getting a gender-balanced pool of entrants without driving away high-performing men from competition by providing contestants with information about their teammate's ability, namely, telling them they will be matched with a teammate of level close to their own.

In the present paper, I chose not to consider the impact of one's teammate and opponents' gender on her decision to enter competitions. However, it is very likely that this has an impact. Indeed, Niederle et al. (2008) showed that a reason why affirmative action was successful in enticing women to enter competition was because women are more comfortable competing against other women. Furthermore, Ivanova-Stenzel and Kübler (2005)'s results suggest that competitive performances are affected by teammates' gender. Future research may therefore focus on the impact of one's teammate and opponents' gender on one's willingness to enter a team competition.

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Appendices

A Consequences of the Type of Tournament on the Probability of Winning and Expected Payoffs

The consequences of the tournament being team-based on the quality of the pool of entrants and their payoffs will depend on the change in the probability of winning and expected payoffs, all other things being equal, but also on the change in behavior which in turn has an impact on the probability of winning and expected payoffs. Remember that, when entering the team tournament, a participant knows that she will be matched with a teammate who also chose to enter the team tournament. Hence, the level of other participants who chose to enter has an impact on a participant's probability of winning if she enters, as well as on her payoffs if she enters and wins (as each teammate of the winning team earns 1 euro times the average performance of the team). First of all, let us look at Figures 9 and 10 which represent respectively the probability of winning [8] and the expected payoffs [9] for each of the three tournaments conditional on performance.

It can be seen that while for the individual and the team tournament with a teammate of the same level the probabilities of winning and the expected payoffs are both close, such is not the case for the team tournament. Indeed, the team tournament provides higher expected payoffs than the two other tournaments for low-performing participants and lower expected payoffs for high-

[8] 1.000.000 pairs of opponents' performances were drawn by sampling with replacement from the Task 2 performances of the 76 participants. 1.000.000 teammate's performances were drawn from the Task 2 performances of the potential teammates i.e. of the participants who chose to enter the team tournament. For each level of performance, the probability of winning the individual tournament was computed by calculating the number of times out of 1.000.000 this given performance exceeded the first opponent's performance. Similarly, for each level of performance, the probability of winning the team tournament was computed by calculating the number of times out of 1.000.000 this given performance plus the partner's performance exceeded the sum of both opponent's performances. Finally, the probability of winning the team tournament with a teammate of the same level was found by computing how many times the double of a given performance exceeded the sum of the two opponents' performances.

[9] 1.000.000 pairs of opponents'performances and 1.000.000 teammate's performances were drawn by sampling with replacement from the Task2 performances of the 76 participants. For each level of performance, the expected payoff from entering the individual tournament was computed in the following way. For each given performance, the payoff corresponding to each of the 1.000.000 first opponent's performances was computed and averaged. Similarly, for each level of performance, the expected payoff from entering the team tournament was computed by calculating the payoff corresponding to each of the 1.000.000 different sets of one teammate's and two opponents' performances and averaging it.

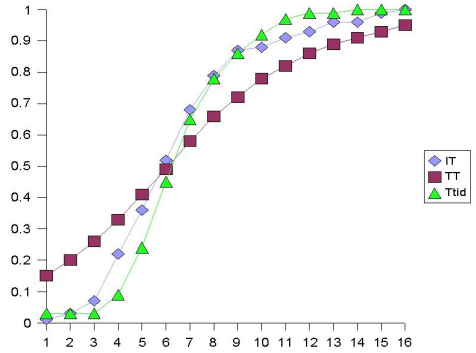

Figure 9. Probability of winning the tournaments conditional on performance.

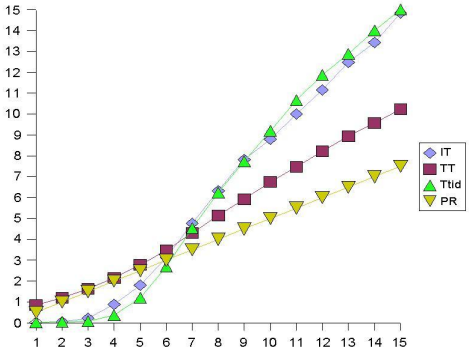

Figure 10. Expected payoffs of the tournaments conditional on performance.

performing participants.

The average Task 2 performance of the team tournament entrants (6.52) is lower than the average Task 2 performance of the whole group (6.86) but it is far from being significant. Nevertheless this is not unexpected, as the difference of performance between those who did choose to enter and those who did not is not significant (a two-sided Mann Whitney test yields p=0.30) implying all the more that the difference of performance between the entrants and the whole group is not significant either.

B Tasks and What They Control for

The following table is a synthesis of the tasks participants had to complete, how they compare to other tasks and what they allow one to control for.

Table 9. Tasks and What They Control For

Tasks	1	2	3	3 bis	4	4 bis	5	5 bis
Remuneration Scheme	piece rate (PR)	Tournament (IT)	piece rate vs Tournament	**Submit** Task1 perf to piece rate vs Tournament	piece rate vs team tournament (TT)	**Submit** Task1 perf to piece rate vs team tournament	piece rate vs team tournament with a teammate of same level (TTid)	**Submit** Task1 perf to piece rate vs team tournament with a teammate of same level
Link to other Tasks			Choice Between Task1 and Task2	=Task3 Except No Performance Needed	=Task3 Except the Tournament is Team-based	= Task4 Except No Performance Needed	= Task4 + info about Teammate's Performance	= Task5 Except No Performance Needed
Controls for	Benchmark and Performance Measure	Benchmark and Performance Measure	Gender Gap in IT	Risk, Ambiguity, Feedback Aversion	Gender Gap in TT	Risk, Ambiguity, Feedback Aversion	Taste for Uncertainty on Teammate's Ability	Risk, Ambiguity, Feedback Aversion

C Instructions

The experiment is composed of 8 tasks. Before each task, you will be carefully explained what the task is about and have the opportunity to ask as many questions as you need. Please remember that you are not allowed to communicate in any way with one another. At the end of the experiment two of the eight tasks you will have completed will be randomly chosen to determine your payoffs.

Task 1. Piece Rate: In task 1, you will have 3 minutes to solve as many additions of 5 two-digits numbers as you can. You are allowed to use the scratch paper you have been given. If Task 1 is one of the two tasks randomly chosen for payment, you will receive 50 cents per addition correctly solved. At the end of Task 1, a screen will indicate you how many additions you solved correctly.

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Task 2. Individual Tournament: You will have 3 minutes to solve as many additions of 5 two-digits numbers as you can. If Task 2 is chosen for payment, you will receive 1 euro per correct answer if you solved more additions than a randomly chosen opponent present in the room, otherwise you will receive nothing. You will earn 50 cents per addition correctly solved in case of a tie. At the end of Task 2, a screen will indicate how many additions you solved correctly but you will know whether you won your tournament only at the end of the experiment.

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Task 3. Choice between Piece Rate and Individual Tournament: Before performing your 3 minutes of additions, you will have to choose whether you want to be paid according to the Piece Rate (50 cents per correct answer) or the Individual Tournament compensation scheme.
If you choose the Piece Rate, you will receive 50 cents per addition correctly solved during Task 3.
If you select the tournament, you will receive 1 euro per correct answer if your Task 3 performance exceeds the Task 2 performance of a randomly chosen opponent, otherwise you will receive nothing. You will earn 50 cents per addition correctly solved during Task 3 in case of a tie.
At the end of Task 3, a screen will indicate how many additions you solved correctly but you will know whether you won your tournament, if you choose to engage in it, only at the end of the

experiment.

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Task 3 bis. Choice between *submitting* Task 1 performance to Piece Rate or Individual Tournament: No additions to do here, the performance which will determine your payoffs is your Task 1 performance.

If you choose to submit your Task 1 performance to the Piece Rate, you will receive 50 cents times your Task 1 performance.

If you choose to submit your Task 1 performance to the individual tournament, you will receive 1 euro per addition correctly solved in Task 1 if you solved more additions in Task 1 than your randomly chosen opponent, otherwise you will receive nothing. You will earn 50 cents per addition correctly solved during Task 1 in case of a tie.

You will know whether you won your tournament, if you choose to submit your Task 1 performance to the tournament, only at the end of the experiment.

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Task 4. Choice between Piece Rate and Team Tournament: You have to choose whether they want to be paid according to the Piece Rate or the Team Tournament. The Team Tournament is a two to two competition.

If you choose the Piece Rate, you will receive 50 cents per addition correctly solved during Task 4.

If you choose the Team Tournament, two opponents will be randomly drawn among the other participants present in the room. One teammate will be randomly drawn among the participants who chose the team tournament. If the number of additions solved by your team during Task 4 exceeds the number of additions solved by the opposing team during Task 2, each teammate of your team will receive 1 euro times the average score of the team. Otherwise, you will receive nothing. You and your teammate will each earn 50 cents times the average score of the team during Task 4 in case of a tie.

At the end of Task 4, a screen will indicate how many additions you solved correctly but you will know whether you won your tournament, if you choose to engage in it, only at the end of the

experiment. You will not know either your teammate's performance until the end of the experiment.

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Task 4 bis. Choice between *submitting* Task 1 performance to Piece Rate or Team Tournament: No additions to do here, the performance which will determine your payoff is your Task 1 performance.

If you choose to submit your Task 1 performance to the Piece Rate, you will receive 50 cents times your Task 1 performance.

If you choose to submit your Task 1 performance to the Team Tournament, two opponents are randomly drawn among the other participants present in the room. One teammate is randomly drawn among the participants who chose to submit to the Team Tournament. If the number of additions solved by your team during Task 1 exceeds the number of additions solved by the opposing team during Task 1, you and your teammate will each receive 1 euro times the average score of the team. Otherwise, you will receive nothing. You and your teammate will each earn 50 cents times the average score of the team during Task 1 in case of a tie.

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Task 5. Choice between Piece Rate and Team Tournament with a teammate of the same level (TTid henceforth):

If you choose the Piece Rate, you will receive 50 cents per addition correctly solved during task 5.

If you choose the Team Tournament with a teammate of the same level, two opponents will be randomly drawn among the other participants present in the room. Your teammate will be the participant, who chose the team tournament with a teammate of the same level, whose Task 2 performance was the closest to your own Task 2 performance. If the number of additions solved by your team during Task 5 exceeds the number of additions solved by the opposing team during Task 2, you and your teammate will each receive 1 euro times the average Task 5 score of your team. Otherwise, you and your teammate will receive nothing. You and your teammate will each earn 50 cents times the average score of the team during Task 5 in case of a tie.

At the end of Task 5, a screen will indicate how many additions you solved correctly but you will know whether you won your tournament, if you choose to engage in it, only at the end of the

experiment. You will not know either your teammate's performance until the end of the experiment.

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Task 5 bis. Choice between *submitting* Task 1 performance to Piece Rate or Team Tournament with a teammate of the same level: No additions to do here, the performance which will determine your payoff is your Task 1 performance.
If you choose to submit your task 1 performance to the Piece Rate, you will receive 50 cents times your Task 1 performance.
If you choose to submit your task 1 performance to the team tournament with a teammate of the same level, two opponents will be randomly drawn from among the other participants present in the room. Your teammate will be the participant, who chose to submit to the team tournament with a teammate of the same level, whose Task 2 performance was the closest to your own Task 2 performance. If the number of additions solved by your team during Task 1 exceeds the number of additions solved by the opposing team during Task 1, you and your teammate will each receive 1 euro times the average score of their team. Otherwise, you and your teammate will receive nothing. You and your teammate will each earn 50 cents times the average score of the team during Task 1 in case of a tie.

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Belief-assessment Questions The experiment is now almost over. You just have to answer a few questions about the experiment. For each correct guess, you will earn 1 additional euro.

At Task 4, whether you chose to enter the team tournament or not, two opponents were randomly drawn among the other participants present in the room. One teammate was randomly drawn among the participants who chose the Team Tournament. Knowing that your own Task 2 performance will be recalled to you on the next screen, please guess the task 2 performances of your 2 opponents and your teammate. Also guess the Task 2 performance of the average participant present in the room.

At Task 4 bis, whether you chose to enter the team tournament or not, two opponents were randomly drawn among the other participants present in the room. One teammate was randomly drawn among the participants who chose the to submit their Task 1 performance to the Team

Tournament. Knowing that your own Task 1 performance will be recalled to you on the next screen, please guess the Task 1 performances of your 2 opponents and your teammate. Also guess the Task 1 performance of the average participant present in the room.