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## Gender differences in team work and team competition

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### ABSTRACT

We study whether the gender performance gap is affected by the gender composition of teams. A real-effort experiment is employed with wages based either on the team's performance, or on the outcome of a competition between teams. We find that, relative to a single-sex environment, gender diversity increases the gender performance gap with team pay whereas it decreases the gap with team competition. The results show that there can be a tension between the objective to maximize overall performance and to minimize gender inequality.

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## 1. Introduction

The difference in earnings between men and women is a well-known phenomenon that has been studied from many different perspectives. A number of factors have been identified as causing the earnings gap, such as differences in performance, differences in working hours and career paths, differences in pay for the same performance, and lower average earnings for professions mainly exercised by women. However, even when restricting attention to one of these factors, many new questions arise. For example, there can be various reasons for differences in performance, such as education and ability, as well as the gender composition of the workplace. The gender of one's colleagues may be one of the factors determining whether working conditions are experienced as being hostile or as encouraging, as stimulating or stifling. We focus on this potential source of performance differentials between men and women which could contribute to the gender gap in earnings.

The organization of work in teams has become widespread. As the success of a team depends crucially on the interaction among the team members, the question of how diversity of the teams affects performance has become central. In particular,

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when setting up team work in a firm, the question arises of how to group the employees into teams. Should they be of the same gender, culture, nationality, age, race or should they differ in some or all of these characteristics? Economic theory has focused on heterogeneity of team members with respect to ability, but it does not provide any clues as to the issue of how different cultural backgrounds or the gender composition of teams affects outcomes. The empirical literature on diversity in teams yields mixed evidence for the effect of diversity on performance (for an overview see Milliken & Martins, 1996). For example, Hamilton, Nickerson, and Owan (2003) show that team diversity with respect to ability has a significant positive impact on productivity. Adams and Ferreira (2009) find a negative relationship between gender diversity in the board room and firm performance. In general, the results of empirical studies on directly observable attributes like gender suggest that an increase in diversity is more likely to have a negative effect on team performance.

The experimental approach allows for a systematic analysis of the specific effects of diversity in team work and helps exploring the exact mechanisms by which diversity affects outcomes. Although there exists a large experimental literature on gender effects, almost all studies on incentive contracts consider mainly environments where subjects are paid based on their individual performance. We conducted a real-effort experiment to study the relevance of gender for performance in team work. We varied the gender composition of teams by employing two-person teams consisting either of men or of women, as well as mixed teams. Each participant in the experiment worked on a task alone, and afterwards the joint output of the team was determined. Thus, the subjects took decisions individually but their payoff depended on the performance of the whole team. The design reflects a situation where people work on their tasks separately, cannot communicate about intermediate results and cannot observe the effort level of the other team members during their work. This is the case when team members perform different tasks in which they specialize. The team members' performance in these different tasks then determines the joint output upon which individual wage payments are contingent.

Assuming rational and self-interested agents, the gender of the decision maker should not affect performance. And neither the gender of the other team members nor the gender of the competitors should matter. On the other hand, we hypothesize that in team work, the productivity of teams can be influenced by competition, peer pressure and social norms, or loyalty among group members.<sup>1</sup> So far, it has not been studied systematically how these motives interact with the gender of the decision makers.

We designed the experiment to establish how the composition of a team with respect to gender affects performance under different incentive schemes. Apart from the case when the members of the team are paid solely according to their joint output (i.e., revenue sharing), we studied competition between teams where the team with the highest performance wins a bonus. Team work and team competition have been studied in a number of experimental studies.<sup>2</sup> The general finding in this literature is that competition among groups significantly increases effort (or lowers prices) relative to the non-competitive incentive scheme. However, none of the papers on intergroup competition addresses how competition affects the gender gap in performance.

In one treatment of our experiment, we studied competition in a homogeneous environment, i.e., all-male [all-female] teams competed with all-male [all-female] teams. In a second treatment, male and female teams competed with each other, and in a third treatment, we studied competition between teams where the gender of its members was randomly drawn, henceforth called mixed teams.<sup>3</sup> In this way, we were able to evaluate whether the gender composition of an individual's own team and of the competing team matter for performance.

We sought to answer the following two questions with this experiment:

1. Does the composition of the team affect gender differences in performance (between-gender effect) for a given incentive scheme?
2. Does the composition of the team affect the performance of each gender alone (within-gender effect) for a given incentive scheme?

Our main results are as follows. With revenue sharing, we observed a significant difference in performance between men and women when men and women form mixed teams (i.e., when the gender of the other team member was uncertain). Similarly, there is a between-gender effect when the competition is in a homogenous environment (i.e., when all-male teams compete with each other and all-female teams compete with each other). Thus, the effect of gender diversity on the performance gap between men and women depends on the incentive scheme. Compared to single-sex settings, gender diversity widens the performance gap with revenue sharing. The opposite is true for team competition. Gender diversity (mixed teams or women competing against men) reduces the performance gap. We found no significant difference in the performance of each gender alone for a given incentive scheme (within-gender effect). Our results demonstrate that there can be a tension between the objective to maximize overall performance and to minimize gender inequality.

We discuss possible explanations of our results in the light of sociological and psychological theories of gender and competition. Gender stereotypes paired with salience of gender can explain the behavioral patterns in the environment with

<sup>1</sup> The role of social pressure in team work is discussed by Kandel and Lazear (1992) and Huck et al. (2004).

<sup>2</sup> Nalbantian and Schotter (1997) compare team competition to team work in an experiment where effort choice creates a monetary cost. A real-effort experiment is employed by van Dijk, Sonnemans, and van Winden (2001). Erev, Bornstein, and Galili (1993) use field experiments to compare the performance under team pay to the performance under team competition. The effect of intergroup competition has also been studied in the context of the step-level public goods game with and without communication (Bornstein, 1992), the prisoner's dilemma game (Bornstein & Ben-Yossef, 1994), the minimum-effort game (Bornstein, Gneezy, & Nagel, 2002), and price competition (Bornstein & Gneezy, 2002).

<sup>3</sup> Note that from the point of view of the participants, the gender of one's team member is uncertain in this treatment.

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