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# Does Gender Diversity Actually Matter?

Measuring the effects of gender diversity on performance is important to understand the impact of gender quotas. However, the effects of gender diversity remain understudied. We need data with a reliable assessment of team member quality to disentangle the effects of diversity from compositional effects (when higher-quality women replace mediocre men). We use the unique database of the trivia game “What? Where? When?” which has information on both the performance and gender composition of the team and allows to track each player individually. We find that the gender diversity of the team has no statistically significant effect once we control for the quality of each player. In this particular environment, with little evidence of gender discrimination, instruments like gender quotas have no merit. This result does not apply to discriminatory environments where gender quotas could bring benefits through compositional effects.



## Introduction

As gender quotas have been widely introduced in politics and in the corporate world, the effects of gender diversity have become the center of attention of many economists. Many observational studies find positive effects of gender diversity on corporate boards' performance (Desvaux, Devillard, & Sancier-Sultan, 2010). Other studies, using the introduction of gender quotas in boards as a natural experiment, find negative effects on stock valuation, which disappear in the longer run (Ahern and Dittmar, 2012; Matsa and Miller, 2013; Eckbo et al., 2019).

The effect of gender diversity on team performance may run through two different mechanisms. One mechanism is compositional effects due to discrimination: if women face a glass ceiling, only the best women get into teams/boards, and they are on average of higher quality than men. Hence, boards with female representatives perform better. The discrimination mechanism has been shown to be at work in the political setting, for example: gender quotas in parties lead to higher-quality women replacing mediocre men (Besley et al., 2017). The other mechanism is the true effect of gender diversity through complementarity between men and women: if they differ substantially in some dimensions, these differences might become the source of better team decisions, or, on the contrary, inefficiencies in decision-making.

To separate between the two mechanisms – compositional effects and diversity effects – we need data with reliable quality measurement for each team member. Controlling for team member quality would take care of the compositional effect, and the gender composition would be significant only if there is a true gender diversity effect.

We use the What? Where? When? trivia game dataset to measure the effects of gender diversity on team performance with and without control for a player's quality.

## The What? Where? When? Game

What? Where? When? (WWW) is a team-played trivia game popular in post-Soviet countries. Teams of six players are asked questions and have one minute to come up with an answer. Typically, in order to find the correct answer, a team needs to combine both logical thinking and knowledge. A tournament usually consists of 36-90 questions. The team with the most correct answers wins the first place. In 2003, a unified database of the game was created. This database contains records of more than 218,000 individuals who have played in at least one of the 6,000 recorded tournaments.

## The What? Where? When? Dataset

A unit of observation in our dataset is one game played by a team. It contains the unique ID of the team, the ID of each player, information about the number of games played by the team and by each player, the tournament date, the difficulty of the tournament and the number of teams. We identify



the gender of the players through their names and patronymic names. Overall, we use 74,475 team-game observations which were played by 2,854 teams (23,000 single players) from 2013 to 2018.

## Performance Measure

The measure of a team's performance in a tournament is the percentage of correct answers normalized by the average percentage of correct answers in this tournament. We use player's individual fixed effects as a measure of their quality in our regression analysis.

## Gender Aspects in What? Where? When?

Only 31.5% of the players in the sample are female, however, other than that, we fail to find any significant evidence indicating gender discrimination or segregation. Table 1 presents the actual shares of team-game observations by gender composition as well as the predicted shares if assignment to teams was random. The difference between the actual shares and predicted shares does not appear to be economically significant.

*Table 1: The actual distribution of women across teams is not different from random*

No. of females	Random assignment	Actual share	
0	0.103	0.098	***
1	0.285	0.284	
2	0.328	0.341	***
3	0.201	0.200	
4	0.069	0.064	***
5	0.013	0.012	*
6	0.001	0.002	***

*Source:* Authors' calculations based on the What? Where? When? dataset. Random assignment assumes that the share

of women across all teams is equal to 31.5% as in the actual data.

## Results

The basic model of our analysis, Model 1 examines the association between the performance of a team, normalized by tournament difficulty, with dummy variables for gender diversity (defined as the number of minority gender players in the team, i.e. diversity\_1 is true if there is only one woman or only one man on the team). We also include the individual fixed effects of each player in the second specification (Model 2), to control for the quality of players and rule out possible composition effects.

*Table 2. Effect of diversity on performance with and without the individual quality controls*

Dep. var.: Performance	Model 1	Model 2
<i>diversity</i> = 1	-0.044***	0.013
<i>diversity</i> = 2	-0.115***	0.033
<i>diversity</i> = 3	-0.214***	0.050
Intercept	1.583***	0.941
Individual fixed effects	-	+
R <sup>2</sup>	0.025	0.511
Num. obs.	12, 626	12, 626

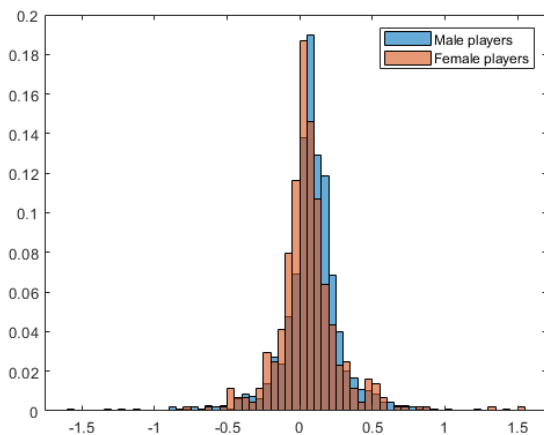
\*\*\* $p < 0.001$ , \*\* $p < 0.01$ , \* $p < 0.05$

*Source:* Authors' calculations based on What? Where? When? dataset. Individual fixed effects are included in the specification with the quality control. Only players who played at least a median number of games (62) are included.

The coefficients of Model 1 and 2 are shown in Table 2. While diversity is significant in the first specification, after accounting for the individual quality of players, we cannot reject the hypothesis of insignificance of gender diversity. These results hold under different specifications: with controls for player experience, with different player experience cutoffs, or including the neural network-generated predictions of performance.



Figure 1. The distribution of individual coefficients (proxy for player quality) for female and male players



Source: Authors' calculations based on the What? Where? When? dataset. Each individual coefficient is a proxy to the player's quality estimated in the regression from Table 2. Only players who played at least a median number of games (62) are included.

Figure 1 presents the distributions of individual coefficients of female and male players. In our sample, the female distribution centers slightly to the left of the male one. It explains the negative diversity coefficients in the specification without the individual fixed effects – in this case, the diversity dummies capture the lower average quality of female players.

## Conclusion

Our study aimed at disentangling compositional and pure effects of gender diversity by using a novel dataset of a team played trivia game. Our main finding is that after accounting for the individual quality of team members, the gender

composition of a team does not appear to be significant for a team's performance.

Although it is always dangerous to extrapolate findings obtained in specific settings, we believe that the positive gender diversity effects found in other studies are often manifestations of the change in the average quality of team/board members i.e. compositional effects rather than gender diversity effects per se. From a policy point of view, this means that while we need gender quotas in areas suffering from gender discrimination, once we reach equal opportunities such instruments may no longer have any positive effects.

## References

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