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The adverse consequences of tournaments: Evidence from a field experiment[☆]



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ABSTRACT

We ran a field experiment to investigate whether competing in rank-order tournaments with different prize spreads affects individual performance. Our experiment involved students from an Italian University who took an exam that was partly evaluated on the basis of relative performance. Students were matched in pairs on the basis of their high school grades and each pair was randomly assigned to one of three different tournaments. Random assignment neutralizes selection effects and allows us to investigate if larger prize spreads increase individual effort. We do not find any positive effect of larger prizes on performance. Furthermore, we show that the effect of prize spreads on students' performance depends on their degree of risk-aversion: competing in tournaments with large spreads negatively affects the performance of risk-averse students, while it does not produce any effect on students who are more prone to taking risks.

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1. Introduction

Tournaments – which reward agents based on their relative performance (Lazear and Rosen, 1981) – are widely used in organizations: employees often compete with one another to get promoted or to receive some kind of reward. Among the main advantages of tournaments there is the fact that they rely on easily available albeit non verifiable measures of performance: it is sufficient for the principal to rank individuals' performance rather than measuring precisely each single

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outcome. In addition, tournaments allow to filter out disturbance shocks that are common to all contestants and when these shocks tend to prevail tournaments may be more efficient than individual independent contracts (Green and Stokey, 1983).¹

The standard theory (Lazear and Rosen, 1981) suggests that in a tournament an increase in the prize spread raises the effort of competitors (typically assumed to be risk-neutral), hence their performance. However, there are also situations in which increasing the prize spread can be counterproductive. Falk et al. (2008) show that when outcomes are evaluated in relation to a reference point (Kahneman and Tversky, 1979), due to loss aversion, individuals might be less willing to work hard as the prize spread increases. High spreads can produce undesired effects also when agents are averse to risk. Larger spreads imply a raise in the variance of outcomes and this negatively affects the utility of risk averse subjects. If this is so, it could be optimal to limit the prize spread at the cost of lowering the levels of effort (Nalebuff and Stiglitz, 1983).

Empirical works testing the relationship between spread and effort have to deal with the fact that individuals characterized by higher unobservable productivity tend to sort into high stake tournaments. This implies that larger spreads are associated with the higher performance of such agents due to both an incentive effect (contestants provide more effort) and a selection effect (high ability individuals self-select in these kinds of tournaments). To disentangle these two effects researchers have relied on both laboratory and field experiments that, by using the random assignment of individuals to tournaments with different prizes, avoid sorting and allow researchers to identify the incentive effect. While the evidence from laboratory experiments tends to confirm the main predictions of tournament theory, the evidence from the field shows that effort is not always sensitive to the structure of prizes. As argued by Leuven et al. (2011), the difference between lab and field results might be due to the fact that individuals involved in laboratory experiments are engaged in short-term tasks and, having to spend a certain amount of time in the laboratory, do not have the opportunity to devote their time to alternative tasks. Instead, individuals participating in a field experiment are engaged in longer-term activities and can choose between alternative ways of spending their time.

In light of the scant and ambiguous results found in the literature, our paper aims to provide additional evidence on the incentive effects of tournaments that takes also into consideration agents' risk aversion. Despite the relevance of risk, the empirical literature investigating how the incentive effects of tournaments vary in relation to individual risk aversion is scant. The existing literature, relying both on lab and field experiments, has mainly focused on tournament participation and individual risk aversion, showing that risk averse individuals tend to avoid competitive settings. However, in many labor markets, mobility is imperfect and individuals might not be able to react to changes in the wage structure by changing their jobs. So, it is interesting to understand how risk attitudes affect individual reaction to tournaments involving higher or lower risks.

We answer this research question by running a field experiment with a sample of Italian undergraduates who undertook an intermediate test composed of two parts: one evaluated on the basis of the student's absolute performance (piece rate) and the other evaluated on the student's performance with respect to a randomly chosen colleague (tournament). Students were matched in pairs on the basis of ability and each pair was randomly assigned to one of three types of tournament with different prize structure: in the first tournament the prize spread between the winner and the loser was high, in the second tournament the spread was medium and in the third tournament the prize spread was low.

The random assignment of participants to different types of tournament allows us to disentangle a purely incentive effect of higher prize spreads. Also, since in all the three types of tournament competition is between pairs of similar ability, there is no reason for individuals assigned to different tournaments to change effort in relation to the expected ability of the pool of competitors. This implies that, in our setting, the incentive effects only derive from the prize size (and not from the fact that in high stake tournaments the expected ability of the opponent is higher). In addition, we focus on long term incentive effects in a context in which individuals can allocate their time to different activities. In fact, both the assigned treatment and the parts of the program evaluated on the basis of absolute and relative performance, respectively, have been communicated to students during the first week of classes, so that they had almost two months to make decisions about effort intensity and allocation. This is a clear advantage compared to lab experiments in which students' choice as regards the use of their time is limited. Finally, we collect information on individuals' risk preferences before they know the assigned treatment and participating in the tournament and therefore we are able to measure heterogeneity along this dimension without any reverse causation problem. While the relationship between risk aversion and prize spreads has been recently examined in a few lab experiments (Sheremeta and Wu, 2012), to the best of our knowledge, our experiment is the first in the field exploring this issue.

Results from our analysis show that students' performance does not increase when they compete in large prize tournaments if we average effects without considering individual risk-aversion. This evidence is in line with findings reported in Leuven et al. (2011) who also find no incentive effect of larger prize spreads in tournaments. However, we find that large prize spreads do effect some students' performance: competing in tournaments with high spreads negatively affects the performance of risk-averse students while it does not produce any effect on students who are more prone to take risks. Although there is a good deal of attrition in our experiment, we are confident that our results capture important attitudes of risk-averse individuals towards high-spread tournaments.

¹ However, tournaments are also affected by a number of problems: risk of sabotage of rivals' performance; inadequate incentives when agents have heterogeneous abilities; collusion among agents to exert low effort. These disadvantages are probably less relevant than the advantages since most employment relationships are characterized by employees competing for bonuses or career advancement.

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