Economics Letters 166 (2018) 31–34

Contents lists available at ScienceDirect

Economics Letters

journal homepage: www.elsevier.com/locate/ecolet

Does a short-term increase in incentives boost performance?

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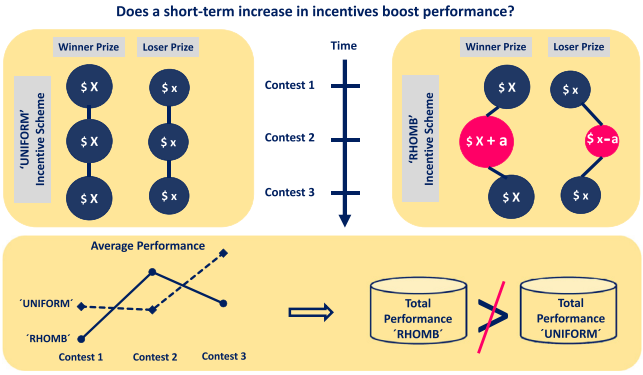
HIGHLIGHTS

- Study a dynamic competitive environment in a real-effort experiment.
- A one-time increase in incentives in a sequence of equally incentivized contests.
- Increased effort only in the contest with high incentives.
- A tendency to slack after times of high incentives.
- No boost in total performance.

GRAPHICAL ABSTRACT



ARTICLE INFO

Article history:
Received 27 December 2017
Received in revised form 2 February 2018
Accepted 2 February 2018
Available online 17 February 2018

JEL classification:
C91
D91
J22
J33
L2
M5

Keywords:
Contest
Tournament
Real-effort
Experiment
Contract theory
Forward-looking

ABSTRACT

If agents are exposed to continual competitive pressure, how does a short-term variation of the severity of the competition affect agents' performance? In a real-effort laboratory experiment, we study a one-time increase in incentives in a sequence of equally incentivized contests. Our results suggest that a short-term increase in incentives induces a behavioral response but does not boost total performance.

1. Introduction

It is generally accepted in economic theory that competitive pressure improves agents' performance (see, e.g., Jenkins Jr. et al.,

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https://doi.org/10.1016/j.econlet.2018.02.004

1998; Dechenaux et al., 2015 for empirical support).[1] Thus, one way to improve performance in a dynamic competitive environment may be to vary the severity of competition over time. For example, it is a common recommendation for sales managers to use short-term contests in order to boost performance (Roberge, 2015).

However, whether and how a short-term increase in incentives will affect total performance is not obvious due to several countervailing effects. First, performance under continual competitive pressure may cause stress and fatigue.[2] If fatigue or stress play a role, higher effort in one period increases effort cost in the next period, leading to a decline in effort after times of high incentives. Second, the change in incentives over time may influence agents' attitudes. They may perceive periods with low incentives as less valuable due to the presence of periods with higher incentives. Therefore, effort in periods with low incentives may decrease in anticipation of periods with high incentives or after experiencing high incentives. In summary, it is not clear whether total effort will be higher under variable incentives than under uniform incentives.

The literature so far does not provide an answer to this question. There are a few empirical papers that study how incentives in competitive environments affect behavior over time. However, they focus either on forward-looking behavior (e.g., Lackner et al., 2015; Raya, 2015) or on ex-post effort choice after periods of high incentives (e.g., McGee and McGee, 2013; Johnson and Salmon, 2016).

We study experimentally the effect of a short-term increase in incentives in a dynamic competitive environment, i.e., in a sequence of three two-player contests. We compare an incentive scheme where all contests feature "low" and uniform incentives over time with an incentive scheme where the pattern of uniform incentives is interrupted by a period of "high" incentives. The setting we investigate has two important features. First, the total amount of incentive pay, i.e., the sum of winner and loser prize in all contests and for all incentive schemes, is always the same. Second, in contrast to previous studies, we do not provide subjects with feedback about own earnings between contests. In this way, we focus on incentive effects only and control for feedback effects such as discouragement (see, e.g., Johnson and Salmon, 2016). Our results suggest that a one-time increase in incentives improves performance in the short run but does not lead to an increase in total performance. The latter finding is mainly driven by slacking after times of high incentives. This study adds to the growing literature on behavior in dynamic competitive environments, but also provides useful insights for practitioners who design compensation plans.

2. Experimental design

The computerized real-effort laboratory experiment was divided into two identical parts consisting of the same sequence of three contests. Subjects received instructions for part two only after part one was completed. Part one was conducted to allow subjects to get acquainted with the task and the strategic environment. We paid for all contests and all parts and used a between-subjects design.[3]

In each contest, subjects worked for eight minutes on the real effort slider task developed by Gill and Prowse (2012). Subjects were supposed to move sliders from position 0 to position 50 (the middle of 100 possible integer positions) using the computer mouse only. In each contest, a new screen with 48 sliders would appear every two minutes to ensure that running out of work was impossible, and there was a 20 seconds break between contests.[4] At the end of each contest, subjects were randomly paired. The subject with the higher number of correctly positioned sliders received the winner prize and the other subject the loser prize.[5] If tied, subjects equally shared the sum of the winner and the loser prize. An on-screen count informed subjects about their own performance (i.e., the number of correctly positioned sliders) at any time. However, they were neither informed about the performance of others, nor whether they won or lost any of the contests.

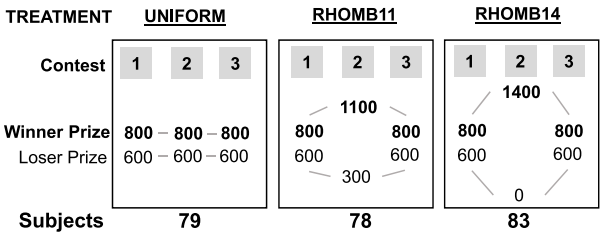

Fig. 1. Treatments and number of subjects.

Fig. 1 gives an overview of the treatments and specifies winner and loser prizes as well as the number of subjects per treatment. 'RHOMB' and 'UNIFORM' refer to the shape of the prize structure within a treatment, and the number in RHOMB to the winner prize in the second contest. In the UNIFORM treatment, the three contests were identically incentivized, i.e., the prize spreads were the same in all contests.[6] Within and between the RHOMB-treatments, we varied the winner and the loser prize across contests to get different prize spreads, and thus different incentives while the total amount of incentive pay remained constant at 1400 ECU across contests and treatments. Subjects were informed about winner and loser prizes in all three contests *before* they launched each part of the experiment.

The experiment was conducted at Technische Universität Berlin and most participants were students with a major in economics, natural sciences, or engineering. The gender composition across treatments was very similar, with a share of males between 55% and 61%. Note that, due to the absence of feedback between contests, each subject yields an independent observation.

3. Results

In our analysis, we measure performance as the number of correctly positioned sliders. For ease of comparison across treatments we also use a normalized measure of performance. The latter is the absolute difference between a subject's performance in each contest and that subject's performance in the last contest of part one.[7]

Fig. 2 plots the average normalized performance across contests and treatments. In part one, we observe a steady significant growth in performance within treatments and no significant differences in performance across treatments.[8] Subjects seem to predominantly

[1] This assumes that agents do not exit the game by shirking or choking.

[2] The potential negative (and costly) consequences can be inefficient work outcomes (due to bad judgments and inferior decisions) and even sick-leave, burnout or an early exit from the work force (Kant et al., 2003).

[3] All prizes are stated in ECU (Experimental Currency Unit) with 100 ECU = 0.5 EUR. For the instructions see the supplementary material.

[4] Real-life working conditions do not typically exhibit sufficient rest between working periods, see, e.g., Kant et al. (2003).

[5] We also paid 1 ECU (= 0.005 EUR) per correctly positioned slider.

[6] The prize spread is the difference between the winner and the loser prize.

[7] This normalization accounts for individual differences in performance in part one, e.g., due to learning dynamics.

[8] The pairwise comparisons across treatments for a given contest do not yield significant results. In contrast, the difference in performance between contest 1 (resp. 2) and 2 (resp. 3) within a treatment is significant for all treatments.