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Monetary incentives and self-chosen goals in academic performance: An experimental study[☆]

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ABSTRACT

This paper analyzes the effect of incentive-compatible self-chosen goals on academic performance by means of a randomized field experiment. We use two alternative payment mechanisms, a piece-rate and a rank-order tournament, to motivate students depending on their absolute or relative academic performance respectively. Students enrolled in Introductory Microeconomics were classified in two types depending on whether they had a failed background in this course (returning students) or they had not (new students). Controlling for potential confounding factors such as gender, degree, professor and university entrance grade, we find that both payment mechanisms are effective increasing grades of new and returning students.

1. Motivation

Many students are especially prone to focus too much on the present. Assessing the present costs of studying is much easier than evaluating (distant) potential future benefits. Policy makers might see this myopic behavior as an opportunity of improvement, and might want to try to offset present costs implementing closer benefits. One approach to address the present bias is simply requiring students to think about their academic goals and to formulate them. Another approach to correct the aforementioned bias is offering immediate incentives that trim immediate costs. Adopting both approaches, we conduct a randomized field experiment where over 170 undergraduate students are asked to report their individual goals on academic performance and monetary incentives are delivered to participants who reach their self-chosen goal.

2. Literature review

Our paper is related to two separate lines of research. The first one is the literature on goal setting. Goal setting is a cognitive theory based on the premise that the source of motivation is the desire and intention to reach a goal, i.e. the aim of a task that a person consciously desires to achieve or obtain (Locke and Latham, 2002; Locke and Latham, 2006). In achievement environments, such as higher education, task goal setting is a function of many variables, including skills and outcome expectations. Following Zimmerman (2011), outcome expectation can be defined as a belief about the success of a given task, differentiating it from the highly correlated concept of self-efficacy expectation, which is the belief about the personal capability to execute the behavior needed

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to produce the desired outcome. Both of them are key for students' motivation: if a student does not consider himself capable or has low outcome expectations, his motivation decreases and he does not make the effort needed to succeed.¹ Although Bandura (2006) developed a guide for constructing scales to measure perceived academic self-efficacy, it is not possible to get an incentive-compatible elicitation of self-efficacy scales. However, outcome expectations can be elicited using betting on outcomes as an incentive-compatible method. Specifically, when students bet on their outcome in a particular task, they take responsibility and ownership for their own goal. As Elliot and Fryer (2008) pointed out, such self-chosen goal setting is empowering and proactive, creating commitment and acceptance. In the same vein, Royer et al. (2015) and Samek (2016) concluded that giving the option to subjects to choose their own goal "acts as an internal commitment device meant to overcome problems of self-control" (Samek 2016, 2).

From the pioneering work of Latham and Locke (1979) to the present, there has been an extensive body of empirical literature testing goal-setting theory in controlled environments.^{2,3} However, when it comes to self-chosen goals, the number of empirical contributions is limited and not all of them use incentive compatibility. Without financial incentives, Falk and Knell (2004) presented a social comparison model where people choose their own reference standards in order to accomplish goals of self-enhancement and self-improvement. The model's prediction about people tending to compare themselves to similar others was confirmed through a questionnaire where students only received a small show-up fee. Using the same methodology, Sackett et al. (2014) presented a questionnaire where marathoners were either asked or not asked to provide a time goal prior to their race. They found that the mere fact of asking runners (without potential financial reward) about their goals prior to the race improved performance among experienced but not novice marathoners.

Using a large sample of college students, Clark et al. (2016) analyzed the effect of self-chosen goals based on course performance and a specific task (completing online practice exams). They found that course goals had no significant impact on the performance of college students but, in contrast, task-based goals had a large positive effect on the level of task completion. However, students' extrinsic motivation in these two field experiments could be critically undermined because students were not financially rewarded when they met their self-chosen goals. The importance of financial incentives was analyzed in Goerg and Kube (2012). By means of a natural field experiment where workers were hired to re-organize a library, these authors presented the workers with an incentives' contract that combined self-chosen goals and monetary rewards in such a way that all of them preferred to set themselves a non-trivial goal. They found that self-imposed goals could work even in the absence of corresponding monetary incentives.

Empirical evidence on self-chosen goals where subjects' performance is based on financial incentives is even scarcer. Using a field experiment in an Indian data-entry firm, Kaur et al. (2010) tested whether workers demand self-disciplining devices. They found that a fraction of workers voluntarily agreed to incur in a monetary loss when falling short of a self-chosen production goal. Moreover, Dalton et al. (2015) proposed a simple model of self-chosen goals and tested its predictions in the laboratory, finding that only men confirmed their model's predictions: they exerted greater effort under the self-chosen goal contract system than under a piece-rate contract.

More related to our experiment and involving first-year university students, van Lent and Souverijn (2016) analyzed the effect of setting a goal and increasing its ambitiousness using mentor-student meetings. They found out that treatment group students performed better as compared to students in the control group. Nevertheless, students who were challenged to set a higher goal performed significantly worse than comparable students in the goal treatment. Contrary to van Lent and Souverijn (2016), we ask students to formulate their own goal and bet on it without any external influence, rewarding them financially. Theoretically, in our experiment, students' self-chosen goals must generate more effective incentives than those given by a third party because students set their goals based on their capabilities and knowledge, creating their own individual motivation.

Second, our paper is related to the literature based on financial incentives on academic performance. Experimental economists are convinced that higher incentives will lead to more effort and higher performance. However, psychologists claim that incentives improve performance in "algorithmic" or repetitive tasks, but they are less effective, or even counterproductive, in "heuristic" tasks requiring creativity, concentration, or intuition. Because learning has generally been classified as heuristic, extrinsic grade incentives may not be effective motivators. The argument behind this claim is that the use of incentives could crowd out intrinsic motivations that are important to produce the desired behavior.⁴ Leaving aside ethical issues about the convenience of using financial incentives to improve students' grades, incentives have become object of interest of economists, policymakers, and researchers in the last years. In the literature, mixed evidence has been obtained using randomized field experiments and natural experiments (using databases from state programs) to analyze the effects of financial incentives on students' academic performance.⁵

3. Research design

All the evidence analyzed in the previous section is far from being conclusive because it has been generated in experiments or quasi-experiments with a wide array of incentive specifications, incentivized performances, target students and timing of performances and payments. The following is an elaboration of how such characteristics are related to the effectiveness of financial incentives on academic performance, comparing our study to the literature.

¹ See Pajares (2008) for a literature review on self-efficacy and regulation learning.

² These authors were the first to report evidence that goals lead to a better performance as compared to not setting goals.

³ See Dykstra (2015) for a review on empirical evidence supporting goal setting as a tool to increase individuals' performance.

⁴ Gneezy et al. (2011) state that a potential conflict arises between the extrinsic and the intrinsic effects of the incentives, especially in areas like education, contributions to public goods and forming habits, in the short run and in the long run.

⁵ See Lavecchia et al. (2014) for a survey of effectiveness of financial incentives in education.

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