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Cash versus extra-credit incentives in experimental asset markets☆

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ABSTRACT

The research community in experimental economics has been increasingly encouraged to replicate studies and increase the sample size. While these suggestions have strong advantages, they also potentially increase the financial costs associated with data collection and, as a result, hamper the growth of experimental economics and limit the questions that may be addressed using experimental methods. In this paper, we explore the effectiveness of extra credit as a reward medium as it is financially less taxing and readily available to most researchers as an alternative. We focus on experimental asset markets because data is particularly costly to collect for these experiments, e.g., a market consisting of 8–12 traders interacting over 15 trading periods is an independent observation. Our treatment variable is the reward medium, either extra credit or cash. We compare bubble measures in the two treatments and we find that bubbles observed in the extra-credit sessions are not significantly different from bubbles observed in the cash sessions. These results suggest that extra credit is an effective reward medium in experimental asset markets.

1. Introduction

Experiments in economics are run for several purposes, e.g., test a theory, guide the design of market mechanisms and institutions, and inform the implementation of economic policies.

In order to foster scientific progress or avoid misallocation of resources, it is desirable that conclusions drawn from experimental economics studies are accurate and robust. Indeed, the research community in experimental economics has been increasingly encouraged to replicate studies or collect larger samples (Butera and List, 2017; Camerer et al., 2016; List et al., 2016).

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While these suggestions have strong advantages, it is our view that they have the potential to threaten the unbiased growth of the experimental economics field. In particular, given that access to external funding is extremely competitive and that financial costs associated with significant increases in sample sizes are substantive, there is a risk of turning experimental economics into an elitarian field. The strict use of cash rewards structures in published research limits sample sizes and the questions that researchers are able to address using experimental methods, e.g., asset markets or macroeconomics experiments are very expensive as they typically utilize 8–12 people for a single independent observation. These concerns may be alleviated by the exploration of alternative incentive mechanisms that are more feasible to a wider range of researchers and whose financial costs are more reasonable. An example of such incentive mechanism is given by course extra-credit.[1]

Clearly performance-based incentives are an important cornerstone of experimental economics (e.g., Smith, 1976), and while cash is the dominant reward,[2] it is an empirical question whether other reward media work well and under what conditions.

Extra credit has been used as a reward medium in several studies (Biais et al., 2005; Isaac et al., 1994; Kormendi and Plott, 1982; Pouget, 2007; Selten et al., 1997). There are other studies that have used extra credit as a reward medium and compared their results to other experiments which used cash (e.g., Dickinson, 2009; Isaac et al., 1994; Kormendi and Plott, 1982). While these studies indicate that extra credit is a salient reward medium, with the exception of Dickinson (2009) (who compares his results to some of the results obtained by Andreoni and Miller, 2002), they are not designed to test directly the hypothesis that extra credit is as salient of a reward as cash, since the reward medium is not an explicit treatment variable and thus confounding effects may be present.

Our paper is closest to studies that have employed the reward medium (cash vs. extra credit) as a treatment variable (Grossman and Komai, 2006; Kruse and Thompson, 2001; Luccasen and Thomas, 2014). These studies focus on game theoretic settings or individual decision-making situations. In this paper we compare results from an asset-market experiment where the treatment variable is the reward medium, namely either cash or extra-credit class points. We chose to focus on asset markets since they appeal to economists as well as policy makers, and the advantages of using extra credit may be sizable for these environments since they involve the participation of a high number of subjects. Indeed, the need to study large markets or collect a high number of observations may easily drive up the cost of conducting market experiments.

We find that bubbles are not significantly different across the cash and extra-credit treatments. This result suggests that extra credit can be used to substitute or complement cash as a reward medium. In particular, extra credit may be used to contain research costs in the face of budget constraints. Our result also reinforces the idea that experiments can be effectively used for educational purposes if performance-based extra credit is used to incentivize participation.

2. Literature review

There are several studies that explore the saliency of performance-based monetary rewards or make use of extra credit as a reward medium either in isolation or in combination with cash (e.g., Biais et al., 2005; Camerer et al., 1999; Dickinson, 2009; Isaac et al., 1994; Jamal and Sunder, 1991; Kormendi and Plott, 1982; Pouget, 2007; Selten et al., 1997; Smith and Walker, 1993).

However, to the best of our knowledge, few studies provide a direct comparison by using the reward medium- cash or extra credit- as a treatment variable (Grossman and Komai, 2006; Kruse and Thompson, 2001; Luccasen and Thomas, 2014).

Our paper contributes to this literature by providing a direct comparison of cash versus extra credit as a reward medium in experimental asset markets. As described below, other studies comparing extra credit and cash as a reward medium have focused on individual decision making problems or game theoretic settings.

We start by providing a quick review of studies that have employed extra credit as a reward medium. Selten et al. (1997) study strategies in 20-period supergames of an asymmetric Cournot duopoly. In order to gain experience, subjects participate in three 20-period supergames which were one week apart. Selten et al. (1997) use class-points to incentivize subjects as they find it a more convenient reward medium, given that the same cohort of subjects was required to participate in the experiment over time. Selten et al. (1997) write "In view of the length of the experiment, it was not possible to provide an appropriate financial incentive. Presumably, money payoffs in the framework of a student seminar are not legal anyhow. The students were told that their grades would strongly depend on their success in the last tournament. It was emphasized that the absolute payoff sum rather than the rank was important in this respect. We had the impression that for almost all participants the task itself provided a high intrinsic motivation." Pouget (2007) uses class points to incentivize subjects in an experiment designed to compare the Call Market and Walrasian Tatonnement trading institutions in an environment with asymmetric information. Biais et al. (2005) also use class points in an experiment studying how overconfidence and self-monitoring affect trading performance of traders.

Other studies employ extra credit to incentivize subjects and compare the results obtained for extra credit with results obtained with cash as a reward medium. Dickinson (2009) conducts dictator games designed to elicit preferences for fairness (as in Andreoni and Miller, 2002). Dickinson (2009) uses extra-credit points as a reward medium and he compares his results

[1] While cash incentives are the dominant incentive medium in laboratory experiments, other reward media are used in field studies. Also, in experimental studies involving children, toys are used as an effective incentive mechanism.

[2] See Camerer et al. (1999) for a review of studies employing low, medium and high financial incentives.