Information Design in Contests

Extended Abstract

Alejandro Melo Ponce*

Department of Economics
Stony Brook University

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In this paper I analyze the extent to which a “contest designer” can influence players’ behavior by manipulating information in binary action contests with incomplete information about the abilities of the players. The designer is interested in inducing the players to exert the maximum amount of effort in the contest and I ask the question of how to obtain this by characterizing optimal information disclosure rules about their abilities.

In contrast with much of the literature, I don’t focus on how to design the contest, i.e. how to allocate the prize, allow for transfers between players, design compensation schedules, etc. In this paper, the contest designer is thought of as an information controller. I assume that the designer can reveal some extra information about the players abilities, i.e. an information disclosure rule. Thus, I ask the question of what is the optimal informational disclosure rule that gives informational incentives to put the maximum amount of effort from the players.

The approach followed in this paper has an universal flavor. Instead of focusing on particular classes of disclosure rules and asking what can be achieved under such rules, I instead search for the optimal rule among all possible disclosure rules.

Thus in this paper I focus on a simple moral hazard environment, a stylized contest, in which the players have private information about their own abilities but there is uncertainty about the ability of their rival. We take the specification of the contest from Dubey (2013) The players produce an economic good which the contest manager can later sell. The production of this good depends on both ability and effort. Thus, a choice for a player is to decide how much effort to put, which can be either work or shirk. After the players’ decision is made, a prize is awarded to the player who produced the most in a winner-takes-all fashion.

The focus of Dubey (2013) was to show how the average level of effort changes across a large set of parameterized games. The main result of that paper is that for large values of the prize for which the players are competing, not giving any information to them results on higher average levels of effort than disclosing

*Electronic address: alejandro.meloponce@stonybrook.edu;
to both their abilities. A previous version of the paper (Dubey, 2012) analyzed the same question under the assumption that the designer could now partially disclose whether the players were similar or different.

In this paper, we follow the recent literature on information design in order to look for the optimal information structure among all possible ones. The literature on the design of information pioneered by the seminal work of Kamenica and Gentzkow (2011) on Bayesian Persuasion for the case of a single information sender and a single receiver and by Bergemann and Morris (2016) on the comparison of information structures for multi-agent strategic games. Further contributions on the multi-agent setting are Mathevet, Perego, and Taneva (2017) and Taneva (2015) which define properly the information design problem.

The main tool that we use in this paper to obtain the optimal disclosure rule and its characterization is the concept of Bayes Correlated Equilibrium introduced by Bergemann and Morris (2016). Using the incentive constraints that define the Bayes Correlated Equilibrium of the basic game described previously, we characterize, using a revelation principle style argument, the set of equilibrium distributions that can be achieved under any possible information structure that respects the private information of the players about their respective abilities. This is the set of BCE distributions under the prior information of the players. After describing the properties of this set with respect to the parameters of the contest, we state the information design problem and look for the Bayes Correlated Equilibrium that engenders the maximum amount of effort. With this equilibrium in hand, I back out the optimal information structure that when disclosed to the players will give informational incentives for them to put the maximum amount of effort.

References


