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Competitive cheap talk

Zhuozheng Li [a], Heikki Rantakari [c,*], Huanxing Yang [b]

[a] School of International Business Administration, Shanghai University of Finance and Economics, Shanghai, 200433, China
[b] Department of Economics, Ohio State University, 410 Arps Hall, 1945 N. High St., Columbus, OH 43210, United States
[c] Simon Business School, University of Rochester, 305 Schlegel Hall, Rochester, NY 14627, United States

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ABSTRACT

We study a competitive cheap talk model with two senders. Each sender is responsible for a single project and observes its return. Exactly one project will be implemented. Both senders share some common interests with the principal, but have own-project biases. Under simultaneous communication, all equilibria are shown to be partition equilibria, but all the equilibria can no longer be ranked ex ante in terms of Pareto efficiency. The payoff of the principal depends on both the total conflict between the agents and the asymmetry in the own-project biases. In the equilibrium preferred by the principal, the agent with a smaller bias always has veto power to determine which alternative is implemented and weakly more messages. In any given equilibrium, decreasing the own-project bias of one agent improves the precision of communication by both agents. Finally, sequential communication and simple delegation are shown to be essentially outcome-equivalent to simultaneous communication.

1. Introduction

Decision makers often seek advice from multiple experts. For instance, consider an economics department trying to hire a junior faculty member. The two targeted fields are, say micro theory and macro. Due to budget constraints exactly one position will be filled. In each field a single candidate is identified. The theory group of the department observes the quality of the theory candidate but not that of the macro candidate. Similarly, the macro group observes the quality of the macro candidate but not that of the theory candidate. The department chair, say a labor economist, does not observe the quality of either candidate. The chair prefers to hire the candidate of higher quality. For each group, though they also prefer the higher quality candidate being hired, they have own-field biases: if the candidate of a group is hired that group derives an additional positive private benefit.

The above example has several distinguishing features. (i) A decision maker (DM) consults two experts regarding two alternative options (projects). (ii) The experts' interests are largely aligned with the DM's, but each expert has his own-project bias. (iii) Each expert only observes the return of his own project. (iv) The DM's action is binary (which project to adopt) and exactly one project will be adopted. The two agents are thus effectively competing with each other in having their own projects adopted. The purpose of this paper is to study information transmission in the above setting, with communication being modeled as cheap talk (Crawford and Sobel, 1982, CS hereafter). The novelty of the paper is that we introduce an aspect of competition explicitly into cheap talk models with multiple senders: each sender is an advocate for his own project.

* Corresponding author.
E-mail addresses: li.2207@osu.edu (Z. Li), heikki.rantakari@simon.rochester.edu (H. Rantakari), yang.1041@osu.edu (H. Yang).

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Real world situations of competitive cheap talk, which share the above features, abound. For instance, consider a CEO of a firm deciding on launching one of two alternative new products (projects). The CEO consults two managers, who each are responsible for one of the two products, regarding the profitability of each product. Each manager only knows the profitability of his own product and has an extra incentive to have his own product launched. Alternatively, consider the President weighing between two alternative policies to address a particular environmental issue. The President consults two experts who each are responsible for investigating the effectiveness of one policy. Each expert only observes the effectiveness of his own policy but has an extra incentive to have his own policy adopted.

Our model formalizes the features mentioned above. Specifically, there are two ex ante symmetric projects. The DM's payoff is just the return to the adopted project. Each agent's payoff has two components. The first component is the return of the adopted project. This component implies that the two experts' and the DM's interests are largely aligned: all prefer to implement a project with higher return. The second component is a private benefit: an agent receives this additional payoff if and only if his own project is adopted. We call this component the agent's own-project bias, and allow it to vary across the agents. This own-project bias creates a conflict of interests as each agent has an extra incentive to have his own project implemented. Given that exactly one project will be implemented, the own-project biases of the two agents create competition between them.

This framework differs from the standard cheap talk model of CS in two key aspects. First, instead of a continuous action by the receiver, we consider a binary choice between two alternatives. Second, each of the agents only knows the value of his own project. This uncertainty over the value of the other agent's alternative introduces uncertainty over which messages induce acceptance and leads to a rich interaction between the communication strategies of the two agents which is absent in the CS framework.[1]

We first study simultaneous communication under which the two agents send messages simultaneously to the DM. Despite the differences to the standard cheap talk framework, the equilibria in our model are qualitatively similar: all equilibria are shown to be partition equilibria in which each agent only indicates to which interval the return of his own project belongs. Intuitively, because of the own-project bias, each agent has an incentive to exaggerate the return of his own project. However, due to the common interest, there is also a cost of exaggeration: overstating by one agent reduces the probability that the other agent's project will be implemented, which might have a higher return. Moreover, overstating by the higher type involves a smaller cost because a higher type's project is more likely to be the better project among the two available projects. Therefore, a higher type will try to induce a higher posterior, which implies that all equilibria must be partitional.

As in any cheap talk model, in our model there are multiple equilibria. Further, because of the agents own project biases, some of the equilibria can no longer be Pareto-ranked. Therefore, we focus our attention on seeking the equilibrium that maximizes the DM's payoff, which we will call the payoff maximizing equilibrium. Further, within the set of equilibria, we will focus on asymmetric equilibria, where the messages of the two agents can always be strictly ranked according to the posterior induced and the DM will thus have a strict preference for one project over the other for all combinations of messages. One of the reasons for us to focus on asymmetric equilibria is that we allow the two agents have different own project biases, thus naturally two agents will "exaggerate" the returns of their own projects to different degrees. Symmetric equilibria (two agents have the same set of messages) are considered in the appendix, where it is shown when and why they may dominate the asymmetric equilibria considered in the main body.

The first main result of the paper is that the equilibrium information transmissions of the two agents' are intimately related. In particular, the posteriors induced by the equilibrium messages of the two agents must exhibit an alternating ranking structure: for any message belonging to one agent, the two messages of adjacent rankings must belong to the other agent. As a result, the number of distinct messages used by the two agents can differ at most by one. This implies that the amount of (meaningful) information transmitted by the two agents cannot be too far apart. Second, because of this interaction, if one agent's bias decreases, then both agents will transmit more information, making the two agents' information transmissions strategic complements. The underlying logic for this result is as follows. As the bias of one agent decreases, his incentives to exaggerate decrease. But this increases the cost of exaggeration for the other agent because his message risks now replacing a more attractive alternative, inducing him to exaggerate less as well.

Within the full set of messages used by the two agents, the highest message has the feature that it guarantees acceptance against all messages by the other agent. Similarly, the lowest message guarantees a rejection against all messages by the other agent. We will call these highest and lowest messages as the sure option and the give-up option, respectively. Corresponding to the allocation of these two messages among the two agents, there are four qualitatively different equilibria. We will call an equilibrium with agent i having the give-up option and agent j having the sure option an $i\mathrm{G}j\mathrm{S}$ equilibrium.

Our second set of results examines how the give-up and sure options should be allocated among the two agents in the payoff maximizing equilibrium. We begin by considering the case where the agents' private benefit consists of a multiplicative component only. In this case, the allocation of the give-up option does not matter, but the sure option should always be allocated to the less biased agent. The reason is that the less biased agent will be more conservative in exercising the

[1] In the CS setting with one agent, a binary action space of the current model would imply only two informative messages. It is the competition between the agents that generates the richer communication structure of the present framework.