

Only Valuable Experts Can Be Valued (Extended Abstract^{*})

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ABSTRACT

Suppose a principal Alice wishes to reduce her uncertainty regarding some future payoff. Consider a self-proclaimed expert Bob that may either be an informed expert knowing an exact (or approximate) distribution of a future random outcome that may affect Alice’s utility, or an uninformed expert who knows nothing more than Alice does. Alice would like to hire Bob and solicit his signal. Her goal is to incentivize an informed expert to accept the contract and reveal his knowledge while deterring an uninformed expert from accepting the contract altogether. The starting point of this work is a powerful negative result by Olszewski and Sandroni [1], which tells us that in the general case for any contract which guarantees an informed expert some positive payoff an uninformed expert (with no extra knowledge) has a strategy which guarantees him a positive payoff as well.

At the face of this negative result, we reexamine the notion of an expert and conclude that knowing some hidden variable (i.e., the description of the aforementioned distribution) does not make Bob an expert, or at least not a “valuable expert”. The premise of our paper is that if Alice only tries to incentivize experts which are valuable to her decision making then she *can* indeed screen them from uninformed experts.

On a more technical level, we consider the case where the distribution of a future event cannot be an arbitrary distribution but rather comes from some closed subset \mathcal{P} of all possible distributions. Bob gets a signal about this distribution (in this abstract we consider a perfectly accurate signal, in the paper we also discuss imperfect signals).

We first consider situations where Alice has some prior

over \mathcal{P} , and this prior is also known to Bob (even if Bob is uninformed). It turns out that the ability to screen agents crucially depends on the convexity of \mathcal{P} , or more concretely, on whether the average distribution \bar{p} is in \mathcal{P} or not. In the spirit of the result of [1] we observe that when \bar{p} is in \mathcal{P} then a contract accepted by all informed agents will also be accepted by an uninformed agent that actually reports \bar{p} , thus screening is impossible. We complement this result by showing that screening is *possible* when \mathcal{P} does not contain \bar{p} . Moreover, when \mathcal{P} *does* contain \bar{p} we show how Alice can define a contract that is rejected by uninformed experts and accepted by informed experts that are sufficiently valuable. We discuss several natural applications where $\bar{p} \notin \mathcal{P}$. One such example is when Alice wishes to discover the probability $p \in [0, 1]$ of a binary event, and Alice observes *two* independent samples from this distribution; Screening in this scenario is possible since for every non-trivial prior on the possible distributions, the average distribution of the outcome of the two samples does not correspond to any valid distribution.

We also study cases where neither an uninformed expert nor Alice knows a prior over \mathcal{P} . We present an impossibility results which is analogous to the known-prior case, saying that if \mathcal{P} is convex then some informed expert is not valuable as it would not help increase the utility of Alice, regardless of her utility function and strategy. We also show that if \mathcal{P} is non-convex (that is, missing one of its convex combination and some neighborhood around it), then there exists a contract that screens informed experts from uninformed experts.

Categories and Subject Descriptors

J.4 [Social and behavioral sciences]: Economics

General Terms

Economics, Theory

Keywords

Experts, Scoring Rules, Elicitation, Screening

1. REFERENCES

- [1] OLSZEWSKI, W., AND SANDRONI, A. Contracts and Uncertainty. *Theoretical Economics* 2, 1 (2007), 1–13.

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