On The Connection Between Persuasion And Delegation

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Summary

- Two problems, the *Monotone Persuasion* (MP) Problem and the *Constrained Delegation* (CD) Problem are equivalent.
- Both problems are equivalent to a persuasion problem with a privately informed agent, binary actions and a principal who can only use cutoff mechanisms: (restricted) KMZL problem.
- Agent's utility (principal's utility $V(\omega, y)$ or $v(\theta, \omega)$ arbitrary):
  - $\frac{\partial}{\partial y} U(\omega, y)|_{y=\omega} = 0$, $\frac{\partial^2}{\partial y^2} U(\omega, y) < 0$, $\frac{\partial^2}{\partial \omega \partial y} U(\omega, y) > 0$
  - $\frac{\partial}{\partial \theta} u(\theta, \omega) < 0$, $\frac{\partial}{\partial \omega} u(\theta, \omega) > 0$, $u(\omega, \omega) = 0$.
- The set of choice variables for the principal is the same in all three problems: $\mathcal{X}^* = \{X \subset [0,1] : X \text{ closed, and } \{0,1\} \subset X\}$.
- Equivalence: for each instance (U, V, F) of the CD problem, there is an instance $(\widetilde{U}, \widetilde{V}, \widetilde{F})$ of the MP problem leading to the same maximization problem, and vice versa.

General Comments

- Intriguing result, far from obvious.
- More motivation for the particular, “constrained” problems would be desirable, in particular for the constrained delegation model.
- Useful applications of the equivalence?

Specific Comments (I)

- Monotone experiments are defined as arbitrary non-decreasing functions $\pi : [0,1] \to \mathbb{R}$; Π^* and $\mathcal{X}^*$ are distinguished.
- Suggestion: define monotone experiments directly as elements of $\mathcal{X}^*$.
  - For each $\omega \in [0,1]$, the monotone experiment X reveals the interval $[\underline{x}_X(\omega), \overline{x}_X(\omega))$ to the agent, where

$$\underline{x}_X(\omega) = \max\{x \in X : x \leq \omega\} \text{ and } \overline{x}_X(\omega) = \min\{x \in X : \omega \leq x\}.$$

  - W.l.o.G. for the considered case of absolutely continuous F.
  - No need to define a mapping from Π^* to $\mathcal{X}^*$ (the construction in the paper only works for a subclass of monotone functions that contains $\{\underline{x}_X(\cdot) : X \in \mathcal{X}^*\}$).

Specific Comments (II)

- To ensure that both $\frac{\partial^2}{\partial y^2} U(\omega, y) < 0$ and $\frac{\partial}{\partial \theta} u(\theta, \omega) < 0$ are satisfied, one should consider certain "normalized" instances of the KMZL problem (one of the two distributions is uniform) in the equivalence proofs.
  - For instance (U, V, F) of the CD problem, the instance of the KMZL problem leading to the same maximization problem is of the form $(u, v, \mathcal{U}, F)$.
  - For instance (U, V, F) of the MP problem, the instance of the KMZL problem leading to the same maximization problem is of the form $(u, v, F, \mathcal{U})$.
- Would be good to clarify this (and potentially the invariances of each problem w.r.t. a transformation of variables).
- Give the argument of how this implies a mapping between instances (U, V, F) of the CD problem and $(\widetilde{U}, \widetilde{V}, \widetilde{F})$ of the MP problem that lead to identical maximization problems explicitly.