# Many Senders

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# BASIC CHEAP TALK: SUMMARY



- Always Babbling
- Different Preferences Implies Full Revelation Impossible
- Generally Many Equilibria
- More and “Better" Equilibria When Preferences Close

# SELECTION OF EQUILIBRIA



- “Perfection" is powerless (unlike Spence models).
- Belief-based refinements problematic.
- Evolutionary arguments sometimes work.
- New Idea . . .

# NITS



- Observation:
  In basic cheap-talk model, unique equilibrium if and only if lowest type prefers pooling action to separating.
- In Spence like models, the lowest type always does at least as well as it could by separating.

So what happens if you **require** this condition in cheap-talk models.

# NITS

An equilibrium satisfies **NITS** (no incentive to deviate) if the lowest type's equilibrium payoff is at least as great as what it would earn under complete information.

$$U^S(y^R(0), 0) \leq V^S(0)$$

Properties:

- Babbling satisfies NITS if and only if there is no other equilibrium outcome.
- If an equilibrium with $K$ actions fails NITS, then there exists an equilibrium with $K + 1$ actions.
- In quadratic case (and more generally), there is a unique equilibrium outcome that satisfies NITS. It has the most actions induced.
- NITS outcome selected in limits of perturbed models.

# WHY?



If NITS fails you can insert an extra step into the partition. (The intuition for this requires a picture.)

# HOW GENERAL IS THIS?



In general, what is the definition of the lowest type?
Roughly: No one wants to imitate it.
One can extend the definition to some natural multi-dimensional environments.

# TWO SENDERS



- Many situations in which there are multiple sources of information.
- *R* can “balance" sources to obtain better information.

# MODEL



- Maintain assumptions about preferences, biases, ...
- Add another sender, so $U_i^S(y, \theta) = -(y - b_i - \theta)^2$ for $i = 1, 2$.
- Important: Both Senders observe the state perfectly.
- Assume general domain of state ($\Theta$).

Note: If three fully informed senders, it is easy to get a fully revealing equilibrium.
Results depend on the “size" of the domain.

# GUESS WHAT HAPPENS



1. Does solution depend on location of $b_i$?
2. Is full revelation possible?

# FULL REVELATION



An equilibrium in which $R$ can infer $\theta$ from the two reports.
Without loss of generality:
If fully revealing equilibrium exists, then $S$ strategies can be taken to be honest and out of equilibrium actions degenerate.
The first part is like the revelation principle.
The second replaces non-degenerate beliefs by their expectation.

# THEOREM ON FULL REVELATION



There exists a fully revealing equilibrium if and only if:
for all $\theta$ and $\theta' \in \Theta$,

$$B(\theta' + b_1, |b_1|)) \cup B(\theta + b_2, |b_2|)$$

does not contain $\Theta$.

$B(\theta + b_2, |b_2|)$ is
the set of actions that are better for the second Sender than $\theta$.
The condition states that there must always exist a state – and therefore an action for $R$ – that is simultaneously worse than $\theta$ for both $S$.
If the condition holds, then take the mutual punishing action when reports conflict.
If condition fails, then no mutual punishing action can exist.

# ONE DIMENSIONAL VERSION



Full revelation if and only if the sum of the absolute values of the biases is less than half the length of $\Theta$.
That is, if the biases of the two sources are small enough, then full revelation is possible.

# MULTI-DIMENSIONAL INTUITIONS



Assume one Sender, first component of bias is 0.
$S$ and $R$ agree on one dimension and, assuming independence, full revelation along that dimension is possible.
In general, there is the possibility of a “dimension" of agreement.
With two senders, if the dimensions of agreement are different, full revelation is possible.