Political Economy
Theory and Experiments
Lecture 5

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Information Transmission

. Communication games are an important toolbox in political economy theory.

. We use communication games to study political debate, information aggregation, and information transmission to voters and decision makers.

. Communication models are useful in these contexts, because contracts and money transfers are ruled out, and there are no markets for information.

. Communication models serve also as a building block to study the structure of organizations.

Rules of amendment in Congress (Gilligan and Krehbiel 1987)

. Congress nominates a committee to investigate a policy and make a bill proposal.

. Congress may announce and commit to an open rule of amendment or to a closed rule.

. Under the closed rule, Congress cannot amend the proposed bill, and can only choose between the bill and a status quo policy.

. Under the open rule, Congress can choose any policy.

. Congress prefers the closed rule unless the status quo policy is in line with the committee's bias.

. Under closed rule, the status quo disciplines the committee's bill.

The model

. Congress forms a committee to investigate a policy issue.

. The committee reports and proposes a bill to Congress.

. Congress announces and commits to either an open
or a closed rule for bill amendment.

. A state x is uniformly distributed on $[0, 1]$.

. At cost k, a Parliamentary committee may observe x.

. The committee's choice to investigate x or not is observable.

. The committee reports a bill proposal $p \in \mathbb{R}$ to Congress.

. Upon consulting the committee, Congress chooses policy $y \in \mathbb{R}$.

. Under the open rule procedure, y is unconstrained.

. Under the closed rule, Congress chooses y between p and the status quo policy y_0.

. The Congress majority payoff is $u_M(y, x) = -(y - x)^2$.

. The committee's median voter's payoff is

$$u_C(y, x) = -(y - (x + b))^2.$$

Equilibrium

- Consider the open rule first.
- Suppose that the committee does not investigate.
  - Congress chooses $y = 1/2$ regardless of the bill proposal.
  - The majority ex-ante payoff is $Eu_M = -1/12$.
  - The committee's ex-ante payoff is $Eu_C = -1/12 - b^2$.
- Suppose that the committee investigates.
  - The analysis of Crawford and Sobel (1982) applies.
  - The most informative equilibrium is identified with a $N = \lfloor \frac{1}{2} + \frac{\sqrt{b+2}}{2\sqrt{b}} \rfloor$ element partition of the state space.

- The majority ex-ante payoff is $Eu_M = -\frac{1-4N^2b^2(1-N^2)}{12N^2}$.
- The committee's ex-ante payoff is $Eu_C = Eu_M - b^2 - k$.

- Hence, the committee investigates if and only if

$$k \leq \frac{\left(\left\lfloor \frac{1}{2}+\frac{\sqrt{b+2}}{2\sqrt{b}} \right\rfloor^2 - 1\right)\left(1-4\left\lfloor \frac{1}{2}+\frac{\sqrt{b+2}}{2\sqrt{b}} \right\rfloor^2 b^2\right)}{12\left\lfloor \frac{1}{2}+\frac{\sqrt{b+2}}{2\sqrt{b}} \right\rfloor^2}.$$

- Consider the closed rule.
- Suppose the committee does not investigate.
  - There is an optimal equilibrium with $y = p$ for all p on path.
  - If $y_0 \geq \frac{1}{2}$, then $y = p = \min\{\frac{1}{2} + b, y_0\}$.
  - If $y_0 < \frac{1}{2}$, then $y = p = \min\{\frac{1}{2} + b, 1 - y_0\}$.
- The majority ex-ante payoff is

$$Eu_M = \begin{cases} -\frac{1}{12} - b^2 & \text{if } b \leq |y_0 - \frac{1}{2}| \\ -(y_0^2 - y_0 + \frac{1}{3}) & \text{if } b > |y_0 - \frac{1}{2}|. \end{cases}$$

- The committee's payoff is

$$Eu_C = \begin{cases} -\frac{1}{12} & \text{if } b \leq |y_0 - \frac{1}{2}| \\ -b^2 - b(2y_0 - 1) - \left(y_0^2 - y_0 + \frac{1}{3}\right) & \text{if } b > |y_0 - \frac{1}{2}|. \end{cases}$$

- Suppose the committee investigates.
  - There is an optimal equilibrium with $y = p$ for all p on path.
  - As before, $y = p = \min\{x + b, y_0\}$ for all $x \leq y_0$, and $y = p = \min\{x + b, 1 - y_0\}$ for every $x > y_0$.
  - Wrapping this up, I obtain:

$$y = p = \begin{cases} x + b & \text{if } x \leq y_0 - b \text{ (and } y_0 < b) \\ y_0 & \text{if } \min\{0, y_0 - b\} < x \leq y_0 \\ x + b & \text{if } y_0 < x < 1 - y_0 - b \text{ (and } y_0 > \frac{1-b}{2}) \\ 1 - y_0 & \text{if } x > \max\{y_0, 1 - y_0 - b\} \end{cases}$$

- Say $b \leq 1/4$ (else, only babbling equilibrium with open rule).
- If $y_0 < b$, then $y_0 < \frac{1-b}{2}$ and ex-ante payoffs are

$$Eu_M = -\int_0^{y_0}(y_0 - x)^2 dx - \int_{y_0}^{1-y_0-b} b^2 dx - \int_{1-y_0-b}^{1}(1 - y_0 - x)^2 dx,$$

$$Eu_C = -\int_0^{y_0}(y_0 - x - b)^2 dx - \int_{1-y_0-b}^{1}(1 - y_0 - x - b)^2 dx.$$

- If $b < y_0 < \frac{1-b}{2}$, then ex-ante payoffs are

$$Eu_M = -\int_0^{y_0-b} b^2 dx - \int_{y_0-b}^{y_0}(y_0 - x)^2 dx - \int_{y_0}^{1-y_0-b} b^2 dx - \int_{1-y_0-b}^{1}(1 - y_0 - x)^2 dx,$$

$$Eu_C = -\int_{y_0-b}^{y_0}(y_0 - x - b)^2 dx - \int_{1-y_0-b}^{1}(1 - y_0 - x - b)^2 dx.$$

- If $y_0 > \frac{1-b}{2}$, then $y_0 > b$ and ex-ante payoffs are:

$$Eu_M = -\int_0^{y_0-b} b^2 dx - \int_{y_0-b}^{y_0}(y_0 - x)^2 dx - \int_{y_0}^{1}(1 - y_0 - x)^2 dx,$$

$$Eu_C = -\int_{y_0-b}^{y_0}(y_0 - x - b)^2 dx - \int_{y_0}^{1}(1 - y_0 - x - b)^2 dx.$$

. Let us consider the committee's choice to investigate or not.

. Suppose $b \leq |y_0 - \frac{1}{2}|$ so that $Eu_C = -\frac{1}{12}$ without investigation.

. The 3 possibilities above are all possible:

. When $y_0 < b$, it turns out that committee payoff (net of cost k) is larger when investigating. Value of investigation is positive.

. When $b < y_0 < \frac{1-b}{2}$, value of investigation is positive, if b is not close to the upper bound $1/4$.

. But when $y_0 > \frac{1-b}{2}$, the value of investigation is negative on a large area of the (y_0, b) parameter set.

. Suppose $b > |y_0 - \frac{1}{2}|$, so that without investigation,

$$Eu_C = -\left(b^2 - b + 2by_0\right) - \left(y_0^2 - y_0 + \frac{1}{3}\right).$$

. Then, value of investigation is positive for all y_0 and $b \leq 1/4$.

. I compare Congress majority payoff under open and closed rules.

. If $y_0 < b$, then closed rule dominates open rule for all b and y_0.

. If $b < y_0 < \frac{1-b}{2}$, then the closed rule dominates the open rule unless b is small and y_0 is large.

. If $y_0 > \frac{1-b}{2}$, then the open rule dominates unless y_0 is close to 1.

. I conclude that there is value in the commitment not to amend the committee's bill proposal, for a large parameter area.

. Epstein and O'Halloran (1994) consider intermediate rules that partially reduce the ability of Congress to amend bill proposals.

. Intermediate rules improve upon closed rules just like partial delegation improves on delegation, that may dominate communication.

Political Correctness (Morris 2001)

. This is a model of advice with reputational concerns.

. An expert may or may not be biased, and repeatedly communicates over time to a decision maker.

. With repeated communication, messages are informative about the expert's type. Hence, the expert cares about his reputation.

. Even a biased expert may be truthful not to ruin his reputation.

. But an unbiased expert may lie in the direction opposite to the biased expert's bias, to avoid being thought biased.

. Such "political correctness" is bad ex-ante for the decision maker and the unbiased expert.

The Model

. There are two periods, $t = 1, 2$.

. At each t, a state $x_t \in \{0, 1\}$ realizes with $\Pr(x_t = 1) = 1/2$.

. An expert holds a signal $s_t \in \{0, 1\}$, $\Pr(s_t = x_t | x_t) = q > 1/2$, and sends a message $m_t \in \{0, 1\}$ to a decision maker.

. The DM makes decision y_t with no other information on x_t.

. DM payoff is $u_{DM} = -a_1(y_1 - x_1)^2 - a_2(y_2 - x_2)^2$, $a_1, a_2 > 0$.

. With probability p_1, expert is unbiased, his payoff is $u_{UE} = u_{DM}$.

. With prob. $1 - p_1$, the expert is biased, and his payoff is $u_{BE} = \hat{a}_1 y_1 + \hat{a}_2 y_2$, with $\hat{a}_1, \hat{a}_2 > 0$.

. After the action y_1 is chosen, the state x_1 is publicly observed.

Equilibrium

. The game is solved backwards.

. In any equilibrium informative in period $t = 2$, the biased expert reports $m_2 = 1$, and the unbiased expert is truthful.

. If $m_2 = 0$, the DM knows that the expert is unbiased, infers that $\Pr(x_1 = 1) = 1 - q$, and chooses $y_2 = 1 - q$.

. If $m_2 = 1$, the DM believes $\Pr(x_2 = 1) = \frac{1-p_2+p_2 q}{2-p_2}$, and chooses $y_2 = \frac{1-p_2+p_2 q}{2-p_2}$.

. The action y_2 is increasing in p_2, the reputation of the expert.

. Let the time $t = 2$ equilibrium payoff for the biased and unbiased expert as a function of p_2 be:

$$v_{BE}(p_2) = \hat{a}_2 \frac{1-p_2+p_2 q}{2-p_2}.$$

$$v_{UE}(p_2) = a_2 \frac{q\left(\frac{1-p_2 q}{2-p_2}\right)^2 + (1-q)\left(\frac{1-p_2+p_2 q}{2-p_2}\right)^2 + (1-q)q^2 + q(1-q)^2}{2}$$

. Both v_{UE} and v_{BE} are strictly increasing in p_2.

. The reputation $p_2 \equiv r(p_1, m_1, x_1)$ is a function of the first period beliefs, message and state.

. The unbiased expert's payoff in period $t = 1$ is then:

$$v_{UE}(m_1, x_1) = -a_1(y_1 - x_1)^2 + v_{UE}(r(p_1, m_1, x_1))$$

. and the biased expert's payoff is:

$$v_{BE}(m_1, x_1) = \hat{a}_1 y_1 + v_{BE}(r(p_1, m_1, x_1)).$$

Proposition In every informative equilibrium, (i) unbiased experts send $m_1 = 0$ when observing $s_1 = 0$, and $m_1 = 1$ with positive probability when $s_1 = 1$; (ii) biased experts send $m_1 = 1$ at time $t = 1$ more often than unbiased experts; (iii) there is a strict reputational incentive for experts to send $m_1 = 0$ at $t = 1$, $r(p_1, 0, 1) \geq r(p_1, 0, 0) > p_1 > r(p_1, 1, 1) \geq r(p_1, 1, 0)$.

. Property ii holds because because the biased experts favors 1.

. Property ii then immediately entails property iii.

. Because of property iii, unbiased experts may want to report $m_1 = 0$, when $s_1 = 1$.

. Then, property i holds because unbiased experts have no reason to report $m_1 = 1$ when $s_1 = 0$.

There are 4 possibilities:

. unbiased experts are truthful, biased experts send $m_1 = 1$ when $s_1 = 1$, and randomize when $s_1 = 0$.

. unbiased experts send $m_1 = 0$ when $s_1 = 0$, but randomizes when $s_1 = 1$, biased experts send $m_1 = 1$ when $s_1 = 1$, and randomize when $s_1 = 0$.

. unbiased experts send $m_1 = 0$ when $s_1 = 0$, but randomize when $s_1 = 1$, biased experts send $m_1 = 1$.

. unbiased experts send $m_1 = 0$ and biased experts send $m_1 = 1$.

Proposition 2. If period $t = 2$ is sufficiently important $\left(a_2\right.$ larger enough than $\left.a_1\right)$, then no information is sent in the first period.

- The welfare analysis is based on the DM (and unbiased expert) expected payoff, and identifies three effects:
  - Sorting: message m_1 is informative about the expert's type.
  - Discipline: without reputational motives, biased experts always send $m_1 = 1$. Reputational motives make biased experts reveal $m_1 = s_1 = 0$ with positive probability.
  - Political correctness: due to reputational motives, unbiased experts may send $m_1 = 0$ even when $s_1 = 1$ to avoid being thought biased.
- The last effect is bad for the DM and the other two are good.
- When second period is sufficiently important, political correctness effect dominates and reputational motives are detrimental.

Divergent opinions as incentives (Che and Kartik 2009)

. A DM chooses one among experts whose preferences and prior beliefs about the state of the world may differ.

. The chosen expert may costly acquire a verifiable signal.

. Experts with beliefs and preferences divergent from the DM more likely withhold the signal.

. But experts with divergent beliefs have a stronger incentive to investigate, to vindicate their beliefs.

. The incentive effect dominates withholding effect unless beliefs diverge too much, and it is reinforced by preference divergence.

The model

. A state x is normally distributed with mean μ and variance σ_0^2.

. An expert believes $\mu = m > 0$, and may costly investigate on x.

. He acquires information on x at cost $c(p)$, smooth, increasing and convex in p, with $c'(0^+) = 0$ and $c'(p) = \infty$ for $p \uparrow \infty$.

. With probability p, he observes verifiable signal $s \sim \mathcal{N}(x, \sigma_1^2)$.

. If observing s, the expert may transmit s to a DM, or withhold it.

. The DM believes $\mu = 0$ and chooses $y \in \mathbb{R}$.

. The DM payoff is $u_{DM}(y, x) = -(y - x)^2$.

. The expert payoff is $u_E(y, x) = -(y - x - b)^2$.

. If $b = 0$, they have same preferences, but different prior beliefs.

Results

. DM chooses $y = E_{DM}[x|I]$ on the basis of his information I.

. If the expert could commit to transmit s, DM would update
$x|\varnothing \sim \mathcal{N}(0, \sigma_0^2)$, $\quad x|s \sim \mathcal{N}(rs, \sigma^2)$ with $r = \frac{\sigma_0^2}{\sigma_0^2+\sigma_1^2}$, $\sigma^2 = \frac{\sigma_0^2\sigma_1^2}{\sigma_0^2+\sigma_1^2}$.

. If observing s, expert would update $x|s \sim \mathcal{N}((1-r)m + rs, \sigma^2)$.

. Suppose $b = 0$. Different beliefs yield "bias" $\beta_m = (1-r)m$.

. If she could commit to transmit s, the expert's marginal benefit to investigate would be:

$$\tilde{U}_E'(p) = \sigma_0^2 - \sigma^2 + m^2 - \beta_m^2.$$

. The expert believes that signal s will vindicate his prior beliefs.

. In equilibrium, the expert withholds s if $\bar{s}_m - 2\beta_m/r < s < \bar{s}_m$.

. Because of this, $y(\varnothing) \equiv E_{DM}(x|\varnothing) < 0$.

. Expert indifference at $\bar{s}_m$ implies $\bar{s}_m = y(\varnothing)/r$.

. This gives the expert a further incentive to investigate s.

. Expert believes he will get a signal s that he won't withhold.

. The marginal benefit to investigate is at least:

$$\bar{U}'_E(p) = \sigma_0^2 - \sigma^2 + m^2 - \beta_m^2 + y^2(\varnothing) - 2y(\varnothing)m.$$

. Because $m^2 - \beta_m^2 - 2y(\varnothing)m$ increases in m, divergent opinions incentivate investigation.

. But the equilibrium threshold $\bar{s}_m$ increases in m:
Divergent opinions lead to signal withholding.

. The analysis shows that the incentive effect dominates for small $m > 0$, whereas the withholding effect dominates for large m.

. DM wants an expert with (not too) divergent opinions.

. When $m = 0$ and $b > 0$, opinions coincide but preferences differ, there is a withholding effect and no incentive effect.

. The (committed disclosure) marginal benefit to investigate is:

$$\bar{U}_E'(p) = \sigma_0^2 - \sigma^2.$$

. But when $m > 0$, preference divergence, $b > 0$, reinforces the incentive effect, because of concavity of u_E.

. The (committed disclosure) marginal benefit to investigate is:

$$\bar{U}_E'(p) = \sigma_0^2 - \sigma^2 + m^2 - \beta_m^2 + 2rbm.$$

. Delegation is dominated by communication, because it eliminates both the withholding and incentive effect.

Summary

. We have seen models of expert advice in political economy.

. Congress may benefit from committing not to amend a committee's bill proposal, and put it to vote against the status quo.

. Unless the status quo is in line with the committee's bias, it disciplines the committee's proposal. (Gilligan and Krehbiel 1987).

. If the expert's loyalty is uncertain, repeated information transmission yields reputational concerns.

. Reputational concerns may lead to more disclosure but also to "political correctness" and conformism (Morris 2001).

. When information is verifiable, beliefs divergent from the DM act as incentives for information acquisition (Che and Kartik 2009).

Next Lecture

. I will present models of information aggregation in juries.
and committees.

. Voting without deliberation leads to information aggregation distortions when the quorum is too demanding (e.g., unanimity).

. Straw polls improve information aggregation, but full aggregation is impossible with unanimity (Austen-Smith and Feddersen 2006).

. Optimal deliberation through a mediator and voting achieve constrained first best unless the quorum is unanimity.

. Optimal deliberation can be implemented without a mediator with "randomized quorum" voting rules (Gerardi and Yariv 2007).