Ignorance is bliss

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November 19, 2019

- In many principal-agent environments
  - The principal assigns one project which is promising in the principal's view to the agent to implement
  - If the agent obtains bad news during the implementation and tells the truth
  - The principal will attribute the bad news to two sources
    - Maybe, the project is indeed wrong and not promising
    - Maybe, the agent is stupid
  - The agent fears to be judged as a stupid one.

Distortion driven by judgement

- If the feedback of one project is soft
  - To avoid the principal's negative judgement, the agent may conceal bad feedback
  - Principal's judgement induces agent's strategic information disclosure
  - Distortion
    - Distorted information leads to the principal's inefficiency adjustment of the project direction.

- Example
  - In China
    - The central tries one policy
    - The local government may conceal the negative feedback in the policy experimentation
    - The wrong policy can not be adjusted efficiently

Main point

- This research tries to show
  - The principal's rational ignorance can mitigate this information distortion
    - Ignoring the informative signal about one project
    - The signal helps the principal know more about one project
    - But the principal's prior bias may lead to the agent's strategic information disclosure.
    - Ignoring the signal and trust the agent can induce agent's more informative disclosure.
  - Mao and Deng's policy experimentation
    - Mao's strong belief bias in the initial selected policy
    - Deng's belief that every policy is possible to be fine

Environment

- An organization and one leader
  - Two possible states $\theta \in \{0, 1\}$ with same likelihood in prior.
  - The leader hopes to select and implement one correct policy.
  - There is a pool with infinite agents
    - Two types of agent: competent and incometent.
    - The agent is competent with probability $p \in (\frac{1}{2}, 1)$.
    - The agent's competence: Information collection and policy implementation
    - The agent does not know his competence ex ante.

Timeline

- The game goes on as follows
  - Step 1: The leader receives a signal $\tau \in (0,1)$ where

$$P(\theta = \tau) = q \in (\frac{1}{2}, 1)$$

    and the leader can choose to **read it** or **ignore it**.
  - Step 2: The leader choose one policy and assign it to an agent from the pool to do a policy experiment.

- The game goes on as follows
  - Step 3: The agent will obtain the feedback from the policy experimentation.
    - The competent agent receives a noisy but informative signal s and

$$f(s) = \begin{cases} f_+(s) & s \in \Omega^+, \text{If the selected policy is correct} \\ f_-(s) & s \in \Omega^-, \text{If the selected policy is wrong} \end{cases}$$

      where Ω is the state space which is symmetric around 0.
    - The incompetent agent will receive signal which is pure noise s with density $g(s)$ where $s \in \Omega$
    - **Remark**: The competent agent could obtain more informative signal.

- The game goes on as follows
  - Step 4: Based on feedback signal s from experimentation
    - The agent will submit a report $r(s)$ to the leader.
  - Based on the report, the leader will decide two things:
    - Modify the initial policy or not?
    - Replace the agent or not?
  - Replacement rule
    - If the leader believes that the agent's ability is lower than the average level, the leader will replace the agent.
  - The final policy is determined in this step.

- Step 5: The policy will be implemented
  - If the agent is competent
    - The correct policy could be implemented perfectly and leads to payoff 1
    - The loss of wrong policy could be fixed partially and the loss will be $-\delta$ where $\delta \in (0, 1)$
  - If the agent is incompetent
    - The correct policy could be implemented with discount and leads to payoff $\delta \in (0, 1)$
    - The wrong policy could generate loss -1

Preference

- The leader's objective
  - Maximize final output
- The agent's objective
  - Maximize survival probability which is not replaced by other agent

    $$\max_{r(s)} \text{Prob}(\hat{p}(r(s)) \geq p)$$

    where $\hat{p}(r(s))$ is the leader's judgement about the agent's ability.

Action

- The leader
  - Prior information acquisition choice: Read it or ignore it
  - Policy adjustment decision
  - Agent's replacement decision
- The agent
  - Reporting choice $r(s)$

Example 1

- The leader read one signal $\tau = 1$ where $P(\theta = 1) = q > \frac{1}{2}$ and requires the agent to try policy 1.
- The agent's feedback structure
  - Competent agent's feedback

$$f(s) = \begin{cases} 1/2 & s \in [0,2], \text{If the selected policy is correct} \\ 1/2 & s \in [-2,0], \text{If the selected policy is wrong} \end{cases}$$

  - Incompetent agent's feedback

$$g(s) = \begin{cases} 1/2 & s \in [-1,1] \\ 0 & \text{Otherwise} \end{cases}$$

  - The agent submits a report $r(s)$

Leader's judgement

- Based on $r(s)$, the leader can infer two things
  - The policy quality

$$P(\theta = 1|r(s))$$

  - The agent's ability

$$P(\text{competent}|r(s))$$

- Full information disclosure
  - If the agent always reveal private information precisely
    - The leader's inference about the true state

$$P(\theta = 1|s) = \begin{cases} 1, & \text{if } s \in [1,2] \\ \frac{q}{pq+(1-p)}, & \text{if } s \in [0,1] \\ \frac{q(1-p)}{p(1-q)+(1-p)}, & \text{if } s \in [-1,0] \\ 0, & \text{if } s \in [-2,-1] \end{cases}$$

      and the leader will modify the policy iff $P(\theta = 1|s) < \frac{1}{2}$.
    - If $q \in (\frac{1}{2}, \frac{1}{2-p})$, the leader will modify the policy iff $s < 0$
    - If $q \in (\frac{1}{2-p}, 1)$, the leader will modify the policy iff $s < -1$

- Full information disclosure: $r(s) = s$.
  - The leader will also infer the agent's ability

$$P(H|s) = \begin{cases} 1, & \text{if } s \in [1,2] \\ \frac{pq}{pq+(1-p)}, & \text{if } s \in [0,1] \\ \frac{p(1-q)}{p(1-q)+(1-p)} & \text{if } s \in [-1,0] \\ 1, & \text{if } s \in [-2,-1] \end{cases}$$

  - The leader will replace the agent when the agent reports the feedback $s \in (-1, 0)$
  - Full information disclosure can not emerge in equilibrium
    - If agent receives $s \in (-1, 0)$, to avoid replacement, the agent will report $r(s) \notin (-1, 0)$

Equilibrium

- Babbling equilibrium always exists
- There is also an informative equilibrium
- Given the leader reads signal and choose the policy which is more likely to be correct initially
  - Agent's strategy
    - If he receives signal $s \in (\frac{1-2q}{q}, 2]$, report $r(s) =$ Good news
    - If he receives signal $s \in [-2, \frac{1-2q}{q})$, report $r(s) =$ Bad news
    - $r(s) \in \{$Good news, Bad news$\}$
  - Leader's strategy
    - Replacing if agent's ability is lower than p, No replacingif agent's ability is not less than p.
    - "Good news": The leader will stick to the initial policy
    - "Bad news": The leader modifies the initial policy

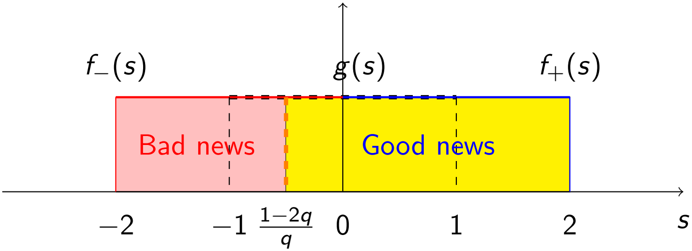

Figure: Two-signal equilibrium

Individual rationality

- Given the agent's above strategy, the leader's inference

$$P(\theta = 1|G) > \frac{1}{2}, P(\theta = 1|B) < \frac{1}{2}$$

$$P(\text{competent})G) = P(\text{competent}|B) = p$$

  so the leader's choice is rational
- Given the leader's strategy, the agent's strategy guaranttees he will never be replaced.

Distortion

- When $q \in (\frac{1}{2}, \frac{1}{2-p})$
  - It is social efficient to modify the initial policy when

$$s \in (\frac{1-2q}{q}, 0)$$

  - In above equilibrium, in this situation, the policy can not be modified.
- Trade-off
  - Benefit: Larger q can make the initial selected policy more accuracy
  - Loss: Note: $\frac{1-2q}{q}$ is decreasing in q.
    - Larger q induce larger likelihood that the wrong policy can not be modified.

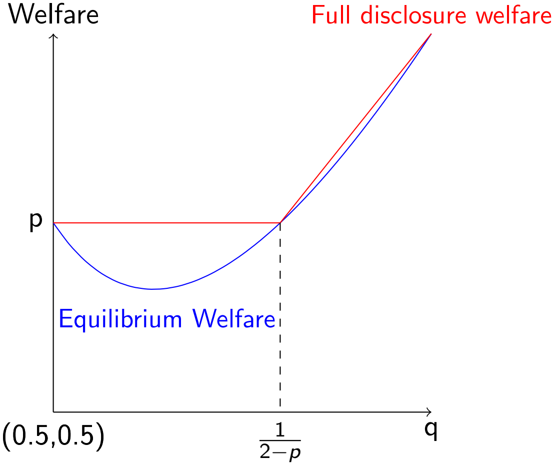

Figure: Welfare comparison in Example 1, $p = 0.75, \delta = 1$

Rational ignorance

- If q is not very large ($q < \frac{1}{2-p}$)
  - It is better that the leader ignore initial signal
- If q is large enough
  - Initial signal is very important

General case

Assumption

Assumption about the agent's signal
(1) $g(s)$ *is symmetric around 0*
(2) $g(s)/f_+(s)$ *is non-increasing in* s *and* $g(0)/f_+(0) \geq 1$
(3) $g(s)/f_-(s)$ *is non-decreasing in* s *and* $g(0)/f_-(0) \geq 1$

Main results in general case

- Given above assumption, in general
  - Full information disclosure is not an equilibrium
  - $\exists$ an informative equilibrium where
    - $s^*(q) < 0$ is the cut-off value
    - The agent reports bad news when $s \leq s^*(q)$
    - The agent reports good news when $s > s^*(q)$
    - The leader will not replace the agent in equilibrium and follow the agent's suggestion to adjust policy.
  - $ds^*(q)/dq < 0$: Less prior bias and less reporting distortion.
  - The expected social welfare $W(q)$ may be better when q is closed to $\frac{1}{2}$
- If combined with one more assumption: $F_-(s) = F_+(-s)$ holds for all $s \in \Omega^-$
  - Three-signal equilibrium may exist

Discussion

- More possible ways?
  - If the leader can verify the report and find hard information, of course, it makes everything well.
  - If the report is always some soft information, things become difficult
- Bonus based on reputation?
  - If the information is soft, the agent will always submit the report which obtains high reputation
- Multiple agents?
  - If two agents submit two reports with different direction
  - The leader can use one report to check another
  - Babbling is the safe choice for every agent
- Soft information and the agent's motivation to survive make above mechanism lead to limited and even worse result.

Conclusion

- Soft infotmation, similar to the classical cheap talk way
  - Different points
    - The agent's first concern is to survive based on certain reputation
    - The agent tries to persuade the leader to believe he is competent
  - The reputation judgement driven by leader's bias may induce agent's distorted report
  - Keep balance prior and trust agent can encourage the agent to provide more informative report.