Information and the Coase Theorem

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Introduction

- On first acquaintance, the Coase theorem seems much more robust.
- Like the welfare theorem, it says:
  - that if everything is tradeable then Pareto-efficient outcomes result.
- Unlike the welfare theorem:
  - it makes no strong assumptions about convexity, price-taking, and complete markets.
- Instead, a one-line argument says that, *absent barriers to contracting, all must be well!*

1. It does not use the assumption of PC
2. But, it assumes that no mutually beneficial agreement **is missed**
3. It demands a lot of coordination and negotiation

Introduction

- The author deals only with problems involving pairs of people-the bilateral externality problems of a pair of neighbors.
- How, then, can we evaluate the claim that in bilateral negotiations rational economic people are likely to emerge with relatively efficient outcomes?
- What are the causes of imperfections in bargaining?
- How policy affects transaction costs, and
- When these problems are severe compared with some alternative such as central direction?

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  - Roth and Murnighan (1982) report experiments confirming that when bargainers' payoffs are common knowledge, little disagreement results.
- We cannot assume that all mutually beneficial contracts are signed, unless we assume perfect information.

- **Three reasons:**

1. They are surprising.
2. Decentralization results give us a taxonomy of inefficiency. The WT lets us classify inefficiencies as due to monopoly, externalities....
3. People often use decentralization results (especially the Coase theorem) as arguments against government intervention.

- Centralization has some obvious advantages, as in problems of equity
- A common complaint about centralized decisions is that they cannot properly adjust to the special circumstances, as decentralized decisions can.
- True decentralization consists in delegating decisions to those who know more about them.
- Modern analysis of bargaining under incomplete information shows that PR and negotiation will not lead to fully efficient outcomes in that interesting case

- One must give people incentives to reveal what they know, assuming that the central authority can cope if they do so. The study of such incentives is the theory of *mechanism design*.
- People with private information may not readily reveal it, especially if they know that it will be used in a decision that affects them.
    - Unless everyone shares the same goals, people typically have incentives to lie.

- Formal framework:
  - There is a central authority, "the king".
  - He must make some decision, and
  - To make a good decision he needs some facts that other people (his "subjects") know.
  - Because the subjects care about the decision, but their goals differ from his, he must give them incentives to tell the truth.
  - To do so, the king can commit himself to an incentive scheme.
  - This scheme specifies how the decision, and perhaps some money payments, will depend on the reported information.

- Solomon had to decide which of two women was in fact the mother of a living infant boy whom they both claimed:
  - *Then the king said, "The one says, 'This is my son that is alive, and your son is dead'; and the other says, 'No; but your son is dead, and my son is the living one."' And the king said, "Bring me a sword." So a sword was brought before the king. And the king said, "Divide the living child in two, and give half to the one, and half to the other." Then the woman whose son was alive said to the king, because her heart yearned for her son, "Oh, my lord, give her the living child, and by no means slay it." But the other said, "It shall be neither mine nor yours; divide it." Then the king answered and said, "Give the living child to the first woman, and by no means slay it; she is its mother." And all Israel heard of the judgment which the king had rendered; and they stood in awe of the king, because they perceived that the wisdom of God was in him, to render justice.*

- Could Solomon rely on finding some clever scheme?
  - Mechanism design theory answers this question for us, and broadly the answer is yes.
  - Requires some side payments, which help establish people's true willingness to pay for particular outcomes, and thus show what decision would maximize net benefits.
  - By paying for the effects of your claim on others' expected welfare, you internalize the whole social problem
- *In this example, if you must pay for your neighbor's lost sleep, you will only tell Solomon you must have a party when in fact your urge is especially intense; similarly, your neighbor will only claim that he must get a good night's sleep when in fact he really needs it, since he must pay for your lost party.*

- *While Coase suggested that the efficiency of ideal bargaining means that everything can be decentralized, the mechanism-design view is that it means the opposite: centralization lets us have such a process (through an expected-externality scheme) while we know that decentralized bargaining is imperfect when there is private information.*

- For instance, suppose two people should have an indivisible object, a "seller" (who originally has it) or a "buyer."
  - *The efficient solution is that whoever in fact values it more should have it, with perhaps some payment to the other.*
  - *The king can easily achieve this outcome using an incentive-compatible scheme if participation is compulsory.*
  - *For example, he can confiscate the item from the "seller" and then auction it off, dividing the revenues equally between the two people*
  - *But this solution is not feasible with voluntary trade;*
  - *A lump sum payment to the seller could solve that problem*
  - *But then the buyer (who would have to make that payment) might prefer to withdraw*
  - *And payments to encourage participation conditional on reported " type" (value) would upset the incentive properties of the confiscation/auction scheme.*

- Central authority helps when decisions are so interdependent that they cannot well be delegated;
- and it can also help efficiency by making recalcitrant people participate in schemes that benefit society in general

- *But there are some problems!!*
  - One problem arises if people do not trust the king's commitment to an incentive scheme
  - Another problem is whether the king can handle the job of collecting and using the relevant information regardless of the incentives.

We need to recognize that centralized schemes must be relatively simple, in the sense of ignoring much relevant information.

- *Property rights and voluntary private negotiation fail to achieve "first-best" efficient outcomes when there is important private information. And such outcomes often can be achieved, despite the information problems, by a wise and benevolent king who is prepared to coerce people to participate in an incentive scheme.*

COMPARISON

- Example: *Sleepy and noisy neighbors, we want to compare the likely efficiency of their imperfect negotiation with that of a city ordinance that bans noise.*

- Suppose that a decision x must be taken,
- Two people, A and B, care about it.
- Each privately prefers some value for x: A would like $x = a$, and B would like $x = b$, where $a < b$.

COMPARISON

- Each dislikes deviations of x from his preferred value.
- Payoffs are:
  - $u(x, a) = -\alpha(x - a)^2$ (A's payoff)
  - $v(x, a) = -\beta(x - b)^2$ (B's payoff)
- A and B are risk-neutral.
- The utility functions u and v are common knowledge, as α and β, which represent the importance of the choice to A and to B $(\alpha + \beta) = 1$

COMPARISON

- Only A knows a and only B knows b.
- b is uniformly distributed on an interval $[b\_, b_+]$;
- a is (independently) uniform on $[a\_, a_+]$;
- Assume that $a_+ < b\_$.
- $E(a)$ is the expected value of a, $E(a) = [a\_ + a_+]/2$, and
- $E(b) = [b\_ + b_+]/2$.
- C is the expected degree of conflict, $E(b) - E(a)$.
- r is the variance of a, $r = [a_+ - a\_]^2/12$, and s for the variance of b, $[b_+ - b\_]^2/12$.

COMPARISON

- If a and b were public, then Pareto-efficiency *would simply* minimize $\alpha(x-a)^2+\beta(x-b)^2$
- Solving the minimization problem wrt x, $x^*=\alpha a+\beta b$
- efficiency would simply require that $x=x^*$.
- x^* depends on a and b, so that the private information **is relevant**.

COMPARISON: THEORY OF MECHANISM DESIGN

- The king ask A and B to tell him a and b, promising $x = x^*$,
- Assumption: A and B tell the truth;
- A and B would have to pay each other, sums of money that depend on their reported values of a and b
- If A reports that $a = a'$, then he has to pay the $E(b) = \beta(\alpha a' + \beta b - b)^2$,"the net effect on B's payoff of A's reporting a'"
- Similarly, B must pay the expected net effect of his report b' on A 's welfare.
- Each person internalizes the whole social payoff, and so each has incentives to report accurately: to set $a' = a$ and $b' = b$
- So Solomon gets x^*.

COMPARISON

- The bumbling bureaucrat is not up to Solomon's standard, and cannot handle such a scheme.
- He must make his decision based only on public information.
- Because u and v are quadratic, his best choice is to set x at $x^B = \alpha E(a) + \beta E(b)$.
- If a and b happen to be at $E(a)$ and $E(b)$ then it is fully optimal.
- But because the bureaucrat can use only public information, his decision cannot respond to variations in a and b around their means.
- The resulting loss in welfare is the variance in a and b that makes the bureaucrat inefficient.
- We can assess his imperfection (compared to Solomon) at $\alpha^2 r + \beta^2 s$

COMPARISON

- Evaluate the *"property rights"* system that gives one of the parties (say, A) the right to choose x,
  - but lets B offer bribes to affect A's choice of x. Assume:
  - No restrictions on the complexity of the contract,
  - and no transaction costs on the parties in negotiating it.
  - suppose (for definiteness) that B offers a "menu" of bribes in return for different possible choices of x.
- What happens?
- The welfare comparison is **ambiguous**: *depending on the parameters, the outcome of negotiation may be more or less efficient on average than the bumbling bureaucrat*

COMPARISON

- This ambiguous result should make us hesitate to use the Coase theorem to argue for laissez-faire.

- The author shows that this conclusion does not generally hold. When there is private information, voluntary private contracts are only imperfectly efficient. The comparison with a very bumbling bureaucrat can go either way.