

VII. Rational Choice and the Mutual Gains from Collective Action.

A. Ordinary economic exchange is in many respects an ideal model of interactions between individuals. Exchange only takes place when both parties expect to benefit--that is to say when each person values the thing received more than the thing given up.

- i. In a pure barter economy, exchange requires what is called a coincidence of wants.
- ii. The usual diagrammatic representation of the mutual gains from trade is the Edgeworth box.
 - a. It bears noting, that accept for agreeing that potential gains to trade exist, trading partners do not really engage in collective action.
 - b. Each "trader" simply maximizes his own utility by attempting to get the best deal possible from the other.
 - c. The decisions remain private, no "cooperative" enterprise takes place.
- iii. In the abstract models used by economists, the price system is completely sufficient to solve all the coordination problems between individuals. Prices induce sellers to bring products to the market in the pursuit of profit (Π). Prices also induce buyers to allocate their money (budget) among goods to maximize their personal gains from trade (CS).
- iv. Illustration: one can easily show CS and Profit (Π) on the same diagram, and see that social net benefits are maximized in competitive markets (ignoring externalities).

B. However, there are a wide range of situations where individuals face a genuine collective problem. In such cases, achieving a privately desired result will require coordinating several person's activities in a manner that runs counter to their immediate narrow self interests.

- i. The classic representation of a setting in which private decisions do not achieve the best outcome (in the eyes of the players themselves) is the **Prisoner's Dilemma**.
- ii. Since each person has an interest in minimizing their own time spent in jail each has an incentive to testify against the other.
 - a. (Note that regardless of what the other person does, each is privately better off testifying than not testifying.)
 - b. Testifying is said to be the **dominant strategy** of this game insofar as it maximizes a "player's" payoffs (minimizes his or her losses) no matter what the other person does.
 - c. The PD-result is said to be the **Nash equilibrium** of this game. Neither player can improve his own position by changing his strategy (from testify to not testify, in this case).
- iii. The dilemma is that **each would be better off if they had cooperated**, and neither had testified against the other!
- iv. Of course, the classic prisoner's dilemma is good for society, even though it is bad for the prisoners themselves.

- a. The greater society benefits from less expensive information about who committed a particular crime.
 - b. (This assumes that the two people caught are actually guilty--note that incentives to "confess" are not necessarily changed if both were actually innocent!)
 - c. In general, it is clear that both *participants in a PD-game would be better off if they coordinated their behavior* (agreed that neither would testify) rather than acting in their immediate self interest (and testifying against the other).
 - v. (Most of the PD-games of interest for this class **will not be Pareto optimal** for society at large.)
- C.** Of greater interest for this class are the "team production" and "free rider" problems in which an group may jointly produce some service or good more effectively than the individuals could when they are unorganized.
- i. Escape from such prisoner's dilemma games will require some method of direct coordination/contract between the parties, or an external enforcer that changes the payoffs to testifying against the other. (This tends to be true of the classic PD game as well, e. g. the "Mafia's enforcers.")

		Bob	
		Work	Free Ride (Shirk)
Al	Work	3, 3	1, 4
	Free Ride (Shirk)	4, 1	2, 2

(Payoffs are shares of the joint output, less the opportunity cost of participating in production.)

- iii. Note that each person has a dominant strategy of free riding.
- iv. The Nash equilibrium to this game is, thus, that both persons shirk, which causes the groups output to be very small, although each person has more leisure to use for other purposes.
- v. Because the enterprise is (potentially) productive, it turns out that each person would be better off if everyone worked rather than shirked $(3,3) > (2,2)$.
- vi. (That is to say there is a Pareto Superior move at the Nash equilibrium, so the "free rider outcome" is not Pareto Efficient.)

- vii. In principle the group would be willing to pay up to 2 units of output to solve the problem, because any organizational cost less than 2 would make them better off at the (work, work) outcome than at the (shirk, shirk) outcome.
- viii. That is to say $(3-T, 3-T) > (2,2)$ as long as $T < 1$.

D. *The Pareto Criteria may be defined as:*

- i. Let A and B be "states" of the world (distributions of income, production, locations etc...) A is said to be *Pareto Superior* to B if and only if at least one person prefers A to B and no one prefers B to A. A Pareto superior move makes at least one person better off and no one worse off.
- ii. State A is said to be *Pareto Optimal* (or Pareto Efficient) if and only if no Pareto Superior moves are possible. That is to say, a state of the world is Pareto efficient if there is no way to make one person better off without making someone else worse off.
- iii. Note that in the PD game, the PD solution (Nash equilibrium) is not Pareto Optimal. *The situation where neither testified (where they cooperated with each other) is Pareto Superior to the PD result.*
 - a. *Puzzles: how many Pareto efficient outcomes are there to the PD game?*
 - b. *Depict a "social opportunity set" in utility terms, and note the Pareto frontier and possibilities for Pareto Superior moves from within the frontier.*

VIII. Prisoners Dilemmas: Team Production, Externalities and Public Goods

A. There are many social dilemmas in which the result of private optimization is less than the best that can be achieved by all affected parties.

- i. DEF: An activity is said to generate an **externality** if it imposes costs on third parties not directly involved in determining the activity level in question. An externality is said to be Pareto relevant, if there are external benefits or costs at the margin (at the activity level chosen).

B. The PD-type of game matrix can be used to illustrate many of these dilemmas.

C. Examples include:

- i. The **shirking problem** associated with team production: team members may choose the "shirk" or "work."
 - a. In cases where each person's marginal product is affected by the efforts of other team members, there are often incentives for all to shirk (to work less hard than would be mutually advantageous).
- ii. The **tragedy of the commons**, in which a productive communal resource is over utilized in equilibrium.
- iii. The case of **"reciprocal" externalities**, in which several persons *both* bear external costs themselves and impose them on others.

- a. Illustrate the **reciprocal externality problem** with a PD game.
 - b. Note that the externality problem can also be illustrated with a continuous strategy set using a MB, MC, and external MB or external MC curves.
 - c. (Social surplus losses or unrealized net benefits exist at the "uncoordinated" private choice equilibrium, because external costs or benefits are ignored by the key decision makers.)
 - d. (The usual result for negative externalities is excessive usage relative to that which would have been, e.g. a greater use level than is Pareto optimal.)
- iv. DEF: A **pure public good** is a good that can be simultaneously consumed by many people. A pure public good is perfectly sharable in the sense that no one's satisfaction is reduced if another person shares the good. Examples include national defense, national parks (over some range of use), gravity, broad cast radio and TV, etc.
- v. The case of producing (unexcludable) **public goods** is similar to that of engaging in an activity that imposes a positive externality. In such cases, external benefits are conferred on other persons--that need not be accounted for by the person creating them.
- a. The result tends to be that the pure **public goods are under produced**.
 - b. *Illustrate an abstract public good problem with PD game.*
 - c. *Illustrate the discrete "free riding" problem using defense of the village, barn building, swamp draining etc. with a PD game matrix.*
 - d. *Illustrate with a continuous version of the free riding problem.*

IX. Several governmental policies can solve externality problems.

A. Indeed, one theory of the emergence of government is based on government's ability to solve such problems.

- i. The theory of the "productive state" argues that people notice that independent private decision making is not generating as good a result as they can imagine. So they band together and coordinate their activities through some method of collective decision making and enforcement.
- ii. In many cases, the required coordination can be achieved without formal penalties or other sanctions, because informal sanctions--status, honesty and self discipline--are sufficient to induce cooperative behavior .
- iii. In other cases, especially those where there are many people involved or where the costs are very great compared to individual advantage, some form of collective coercion (punishment) will be necessary to achieve the desired result.

B. The **social contract theory** of collective action argues that individuals may agree to be coerced (taxed, or otherwise penalized for free riding) as a necessary part of overcoming free riding problems in the team production and in the production of public goods. (See, for example, Hobbes 1651, Locke 1689, or Rawls 1970.)

- i. Here a productive joint enterprise is formed by a voluntary agreement of all affected parties.
- ii. Illustrate the "Den of Thieves dilemma" to show why enforceable property rights might be accepted by all parties (even among thieves!).
- iii. (Show that theft takes time away from productive activities reducing income for all.)

X. Some Quotes on the Emergence of Organization out of Individualistic Anarchy: the Productive State and the Social Contract:

A. On the nature of anarchy: from Thomas Hobbes, *Leviathan* (1651)

- i. "Whatsoever therefore is consequent to time of Warre, where every man is Enemy to every man; the same is consequent to the time wherein men live without other security than what their own strength, and invention shall furnish them withal. In such condition .. the live of man [will be] solitary, poor, nasty, brutish and short.

B. From James Buchanan, *Limits to Liberty*, 1975.

- i. "The state serves a double role, that of enforcing constitutional order and that of providing "public goods." This duality generates its own confusions and misunderstandings. "Law," in itself, is a "public good," with all the familiar problems in securing voluntary compliance. Enforcement is essential, but the unwillingness of those who abide by law to punish those who violate it, and to do so effectively, must portend erosion and ultimate destruction of the order that we observe. These problems emerge in modern society even when government is ideally responsive to the demands of citizens. When government takes on an independent live of its own, when Leviathan lives and breathes, a whole set of additional control issues cone into being. "Ordered anarchy" remains the objective, but ordered by whom? Neither the state nor the savage is noble, and this reality must be squarely faced.

C. From Mancur Olson, "Anarchy, Autocracy and Democracy" (1991)

- i. "The conqueror of a well defined territory has an encompassing interest in that domain given by the share of any increase in the territorial income that he collects in taxes. This encompassing interest gives him an incentive to maintain law and order and to encourage creativity and production in his domain. Much of the economic progress since the discovery of settled agriculture is explained by this "incentive."

XI. The Productive State

A. The above model of public goods and collective action provide the basis for a theory of the productive state.

- i. Individuals voluntarily agree to create an organization with the power to coerce certain forms of behavior to solve various "PD" like problems of collective action and perhaps also coordinatrion problems.
 - a. Collective enforcement of property rights can mitigate "the den of theives" dilemma.
 - b. Taxation can provide the resources necessary to finance the production of desired public goods are produced (national defense, law enforcement, transport system right a ways, etc).
 - c. Regulations backed by sanctions can reduce externality and commons problems (pollution, high way speeds, and so forth).

B. *Any form of collective action requires a method for making collective decisions.*

C. Obviously, if a group undertakes to form a state, they must also make some decisions about how collective choices will be made.

- i. Even if there is unanimous agreement to provide a particular service, or enforce some property right or rule, there may not be unanimous agreement about the level of service or enforcment that is appropriate, or best.
- ii. Appointing one person--a "leader," king, or dictator--to make decisions in a particular area is one such collective decision procedure.
 - a. However, the person appointed "leader" still has to be chosen.
 - b. And, some method for replacing him or her would, in most cases, be another collective concern.
- iii. Majority rule is another possible rule for making such choices.
- iv. We will analyze implications of that rule beginning next lecture.

XII. A Digression: Olson's Alternative Theory of the State as a Stationary Bandit

A. Before moving on, it is worth considering another theory of the emergence of the state and state services.

B. Mancur Olson notes that a good deal of what we have historically observed as governments have been significantly different than the voluntary model noted above.

C. He proposes an alternative model, based on the different incentives of what he calls "roving" and "stationary" bandits. The argument is based as follows:

- i. Suppose that initially, there are a several roving bandits, each with sufficient power to sweep through a farm, village, or town, and steal what ever they want to.
 - a. This may be thought of as a pleasant life for the travelling bandit: of considerable riches travel and comradery.

- b. Although their lifestyles might be pleasant or not, the existence of multiple groups of roving bandits creates a number of problems for the bandit groups, themselves, and also for their victims.
 - ii. The victims might organize for their own defense.
 - a. That is to say, potential victims may form a productive state, to erect high walls, and guard the gates, to keep the bandits out.
 - iii. If potential victims do not succeed in protecting themselves (or fail to organize) from roving bandits, **incentives for investment and saving are limited.**
 - a. Why save if you know that whatever you put aside for the future will be taken by a roving bandit before you get to use it?
 - b. Thus, farmers, merchants, and other productive people, would produce and save less than they would have in the absence of some form of protection from the roving bandits.
 - c. (Show this with an expected benefit expected cost diagram.)
 - d. Life for both bandits and their victims would be poor!
 - iv. Another possible escape from the roving bandit dilemma is suggested by Mancur Olson.
 - a. If no productive state or defense organization can be put together by the victims, it is possible that a very clever Bandit might realize that if he were to take over an area and exclude other groups of roving bandits from that area he or shee would be wealthier.
 - b. Rather than ten bandits "sharing" the "take" from a village in say different months of the year, a stationary victim can take it all.
 - c. This reduction in the number of other bandits is the direct advantage of being a stationary bandit.
 - d. **There are also indirect advantages associated with being a stationary bandit.**
 - e. Note that roving bandits have incentives to take all the wealth that they can lay their hands on. (There is a PD game involving roving banditry.). Anything left behind simply goes to the next bandit that comes through the village.
 - v. A stationary bandit profits by taking less than "all that can be carried away," because because he or she can always return another day and collect it at a later time. Taking less than "all that can be carried away" has a very important incentive affect.
 - a. Letting potential "victims" keep part of their harvest, livestock, gold, and so forth, of course has an effect on their incentives to accumulate such capital. Instead of expecting to lose all of their wealth to roving bandits, they now expect to be able to keep *and enjoy* at least part of it (at least for a longer time period than before).
 - b. This encourages potential victims to be more productive, to make more long term investments, to work harder, etc. etc. which increases the "tax revenue" that the stationary bandit can obtain.
- D.** Indeed, a clever stationary bandit will realize that he or she **should encourage economic growth** in "his or her" village as a means of increasing the tax base and his or her personal wealth.
- i. He or she may invest in a legal system, in roads, and even in education as a method of making his village wealthier and thus a better source of tax revenues.
 - ii. That is to say, the stationary bandit becomes richer because his potential victims become richer.
 - a. (Show figure of a Laffer curve, linking tax/take rates with work and output level.)
 - b. (The incentive to provide public services can be characterized in a *diagram* that shows the "tax revenue" maximizing service level.)
 - c. (Note that the optimal service level varies with the tax rate.)
 - d. (The greater the tax rate at the margin, the greater is the "encompassing interest" of the dictator in the wealth of his domain.)
- E.** A stationary bandit, has what Mancur Olson calls an **encompassing interest** in the welfare (at least wealth) of his potential victims because he can profit by making them wealthier.
- i. Mancur Olson, "Anarchy, Autocracy and Democracy" (1991) argues that:
 - ii. "The conqueror of a well defined territory has an encompassing interest in that domain given by the share of any increase in the territorial income that he collects in taxes. This encompassing interest gives him an incentive to maintain law and order and to encourage creativity and production in his domain. Much of the economic progress since the discovery of settled agriculture is explained by this "incentive."
- F.** (One **major problem** with the Olsonian model of dictatorship is that it ignores the security problems that dictators face. Sometimes there is a trade off between increasing the wealth and welfare of "his or her" citizenry, and the risk that "he or she" will be over thrown.)
- G.** The idea of an encompassing interest is very important in other applications as well. Clearly, a person whose own direct interest is advanced whenever "your" welfare improves will be a better representative/zar/agent than one whose interest runs at cross purposes.
- i. The elected leader of a democracy may be said to have an encompassing interest in his country if his or her prospects for reelection increase as the nation prospers.
 - ii. A Mafia Don may have an interest in "law and order" within his domain. (Protection fees can be higher when the value of commercial activity increases.)
- H.** Although the smaller one's share in the fruit of a collective enterprise, the smaller is one's encompassing interest, it may also be applied to understand some behavior by individual members of a family, clan, club, interest group, or society.
- i. Encompassing interest explains, for example, why some forms of employee stock options and other forms of ownership as in a cooperatives may work. (Again the encompassing interest would generally not be complete, so other incentive problems would remain.)

- ii. Politically, it may partially explain why citizens often care about such abstract ideas as GNP or average income, insofar as their own income is correlated with those macro-economic variables.
- iii. It may also explain, or at least help explain, some forms of publically oriented behavior by individuals in many walks of life whose interest is somehow tied to the interest of a larger organization.
- iv. To some extent, voting in a democracy may also be tied to individual perceptions that the welfare of their country is enhanced by their vote, which in turn makes them better off.